Generating Video Narratives to Support Learning

Abrar Mohammed

Submitted in accordance with the requirements for the degree of Doctorate of Philosophy

School of Computing

University of Leeds

2024

Publications

Some of the work in this thesis has been presented prior to thesis submission:

The semantic tagging algorithm designed as part of characterising videos segments to support learning which is part of the VISC-L framework presented in **Chapter 4** and **Chapter 6** is discussed in :

Mohammed, A. and Dimitrova, V., 2020. Characterising video segments to support learning. In Proceedings of the 28th International Conference on Computers in Education.

The implementation of VISC-L framework in the Giving Pitch Presentations domain that has been presented in **Chapter 4** and **Chapter 6** is discussed in:

Mohammed, A. and Dimitrova, V., 2022, September. Video Segmentation and Characterisation to Support Learning. In European Conference on Technology Enhanced Learning (pp. 229-242). Cham: Springer International Publishing.

An overview of the approach has been discussed in :

Mohammed, A., 2022, July. Generating Narratives of Video Segments to Support Learning. In International Conference on Artificial Intelligence in Education (pp. 22-28). Cham: Springer International Publishing.

To my Parents

Acknowledgements

With the grace and will of Allah, I managed to accomplish my PhD research and present this work which I wish to be beneficial and inspire anyone who reads it or uses it.

Throughout my PhD journey, I thought I was setting goals for me to achieve but, in reality, the goals have been set for me by Allah! These goals were represented by how to accept fate (the loss of the meaning of my life- my parents), and deal with hard feelings and translate these feelings to success. I am thankful and grateful for having my Mum and Dad, who I express as angels sent to me from heaven, for bringing me up, teaching me and showing me how to live in the right way. Now, I am proud to say, yes Mum and Dad, I have finished my PhD and it is the beginning of more success to come- this is my promise. Thank you for being so compassionate, patient, supportive and for filling my life with happiness. One day we will meet, in the other life, and I will tell you everything since you left me and we will celebrate this success together as we wished to do in this life. You are in my heart to the last beat and after.

Sincere thanks and gratitude goes to my supervisor, Vania Dimitrova, who believed in me, encouraged and guided me. Your support throughout all the difficulties I have passed and all the challenges I have faced, your words and support were just what I needed. I am lucky to have an amazing and successful person like you in my life. You deserve all the best!

A huge thanks go to my second supervisor David Hogg for his support, feedback and encouragement.

Thank you very much to Professor Tanja Mitrovic, Lydia Lau, the PhD researchers in the University of Leeds, the PhD researchers in the University of Canterbury and to the researchers in the InAdvance project for their support throughout my research. I wish you all the success!

To Karam and Ahmed (my children), I am gifted to have you in my life. Many times you have made me feel so enthusiastic, and my eyes would go full of tears from pride to see you grow up, be so intellectual, successful, and compliant. No words can express my love to you, all my gratitude sent to Allah for his grace to me. Love you!

I believe that real siblings who will stand side by side with you do not only share feelings with you, but also make you feel that you are altogether one soul living in different bodies. For me those are: Mohammed, Maan, Rathwan and Wiqar- my brothers and sister. Thank you very much for being real siblings and may Allah protect you!

I kept my half to the end as we together share this message. To my husband, Khalid, your support, love, interest and encouragement is what I live with. I am glad that you are my half and I do not mind if you take my heart as well- you deserve it.

Abstract

Videos have become popular learning resources which are available through various online platforms, e.g. YouTube, Khan Academy and MOOCS. However, using videos for learning can be challenging, especially when learners are new to the domain. Learners may not know what key points to notice, can lose concentration, and become frustrated. Some of the effective ways to address these challenges are to provide video annotations, summarise the main points, and link different video segments. Existing approaches for annotation and summarisation are either manual and do not scale, or automatic but do not explicitly relate to main domain concepts. There are no approaches which provide automated ways to segment and characterise videos by relating to domain concepts and linking segments from different videos to support learning key domain areas.

The thesis embarks on the challenge of addressing this shortcoming by proposing an automated way to generate video narratives that group segments from different videos to support learning key domain concepts. Our approach is knowledge driven and presumes the domain is computationally represented via a taxonomy. Our first contribution is by developing the Video Segmentation and Characterisation for Learning (VISC-L) framework which uses video transcripts and a domain taxonomy to characterise video segments. Characterising video segments with a domain related topic(s) and concept(s) generated by combining both the Semantic Tagging and Topic Classifier characterisation is found to be an interesting way of linking video content to its domain as recognised by the Technology Enhance Learning community. Our second contribution

is the designing of the Videos Narratives for Learning (VIN-L) framework which links different video segments from different videos following a pedagogical theory called 'Subsumption Theory for meaningful learning.' Four types of video narratives, as defined in the Subsumption Theory, are generated–Combinational, Correlative, Derivative, and Super-Ordinate. These narrative types represent how the information is linked in the learner's cognitive structure, for full details about the narrative types, see Section 3.3.3. VIN-L is a novel and generic framework which contributes to the area of using Artificial Intelligence in Education by linking domain related parts from different videos using a pedagogical theory and this framework is new and the idea of this type of narrative has not been done before. Both VISC-L and VIN-L are implemented in two domains for learning soft skills: Giving Pitch Presentations and Health Related Quality of Life Awareness. Soft skill domains, (See Section 3.7), are an important domain but are not well structured and the main learning resources are available as online videos like: tutorials, interviews, stories, etc. The learners of these domains need to find the learning materials among the huge amount of available online videos. Additionally, learners need to be able to identify and remember different domain areas in these videos which could cause learning barriers if the learners are new to the domain and may not able to learn these domains systematically by themselves.

The resultant video narratives are evaluated with domain experts (11 experts for the first domain and 6 experts for the second domain) and advanced learners (in the presentation skills domain)–we could not evaluate VIN-L with learners in the second domain because of the time and budget constraints which are out of the scope of this thesis and will be considered as future work (see Section 7.3). With the first domain (Giving Pitch Presentations), we have evaluated VIN-L with advanced learners because we used workers from Amazon Mechanical Turk to participate in the evaluation study. The number of workers was 217 and they had different knowledge of the domain

(80% had domain related experience) and this is why we refer to them as advanced learners. The Quality and the Perceived Usefulness of the video narratives was assessed. The evaluation outcomes from the evaluation studies are presented as average values in (Sections 5.4 and 5.5–the experts and learners outcomes in the first domain respectively, Section 6.6–the experts outcome in the second domain). For the actual numbers used in these studies, see (Appendices L for the first domain and O for the second domain). All the evaluation studies conducted in this thesis are saved in our GitHub account [1]. The findings of the responses of all video narrative types show that the overall Quality of the narratives is good, as well as indicate some areas for improving the supporting text that clarifies the domain connections. All video narrative types have been proved to have potential to be useful if used to support learning, considering Perceived Usefulness, Learning Effect and Cognitive Work Load evaluation results.

[1] https://github.com/Generating-Video-Narratives/Generating-Video-Narratives.git[Accessed: June 2023]

Abbreviations

VISC-L	Video Segmentation and Characterisation for Learning
VIN-L	Video Narratives for Learning
CO	Combinational Narratives
CR	Correlative Narratives
D	Derivative Narratives
S	Super Ordinate Narratives

Contents

List of Figures

Chapter 1

Introduction

Videos for learning have showed their effect to support teachers when embedded in lessons. In recent years, they have been seen as the main method for learning for both teachers and learners. Videos have been widely used in various learning settings to facilitate independent learning and are becoming a key platform for digital learning (Hsin & Cigas, 2013; June *et al.*, 2014). They provide learners with audio and visual learning channels that can meet vast learning needs (Haridakis & Hanson, 2009; Khan, 2017). Teachers, when using videos for learning, have a responsibility to select the most suitable videos (Lange & Costley, 2020; Yacobson & Alexandron, 2023), provide suitable feedback (Cohen & Cohen, 2023; Majumdar *et al.*, 2023; Villagrán *et al.*, 2022) and supply the learning platform with digital tools to help learners meet their learning objectives. Learners, who are familiar with Video Based Learning (VBL), are able to develop self-regulated skills, learn at their own pace, set goals and plan their learning independently (Tammets *et al.*, 2022).

However, there are major challenges that affect user engagement with videos. Learners prefer watching short videos as their concentration span is reduced over time (Meseguer-Martinez *et al.*, 2017; Risko *et al.*, 2012). Video content complexity could affect a user's engagement with the video and hence cause confusion or boredom (Mongkhonvanit *et al.*, 2019). Consequently, learners may have to watch videos many times and may not be able to identify the most relevant key points. Furthermore, there are learners who are either new to the domain or have a lack of prior knowledge. In such cases, they do not know the key points to look out for in the videos which causes frustration and reduces engagement. As a result, they will not be able to meet their learning goal(s). This calls for finding new ways to identify the main points in a video and to direct learners to the corresponding parts in the video that elaborate on specific key points. Consequently, a teacher's support is required by providing a suitable technique(s) (Esterl *et al.*, 2022; Richtberg & Girwidz, 2019; Rohloff & Meinel, 2018); feedback, quizzes, setting goals, annotation tools, summarisation, and providing a forum for group discussions.

This research proposes a novel automatic approach that supports video annotation and summarisation. Summarising videos for learning attracts different researchers to enhance the use of videos for learning. This includes segmenting and characterising videos to help in identifying key domain areas to direct a student's focus. Teachers can manually identify relevant areas in the videos where the domain key points are elaborated and highlight these areas with key words (Castro & Tumibay, 2021; Tseng, 2021). Meanwhile, learners can segment and characterise the videos via note-taking (Mirriahi *et al.*, 2021). However, the aforementioned challenges are experienced at a large scale with the increase of both the amount of video footage available and the number of learners who use videos for learning. Therefore, manual solutions would not scale up: using experts to analyse the video segments and identify how they will be used by potential learners can be costly and ineffective. Hence, there is a need for computational means to automate the characterisation of video segments in order to identify what concepts are covered and whether learners will grasp these concepts or not.

Automatic approaches have tried to address the aforementioned challenges and scale up by utilising different AI tools and the support of knowledge models (e.g, DPBedia, knowledge graphs, etc.). This included: using the learners' interaction with the videos to highlight high attention areas (Bywater *et al.*, 2021; Mitrovic *et al.*, 2016), using visual and textual video content to characterise video segments (Liu & Lauw, 2022; Schlotterbeck *et al.*, 2021), segmenting the videos based on the change in the topic recognised in the video's textual data with the aid of Wikipedia pages (Das & Das, 2019; Sikos, 2017). Other researchers attempted to enrich VBL through a storytelling style (Bianchi & Ragonese, 2023) to arrange learning resources and support for learners (Aqqal *et al.*, 2007; Lee *et al.*, 2021;

McQuiggan *et al.*, 2008). Likewise, other researchers found that concept maps help in presenting videos and learning resources as narratives (Hao *et al.*, 2021; Pinandito *et al.*, 2021; Tang *et al.*, 2021).

Most of the existing approaches have notable limitations; they rely on visual content when segmenting and characterising videos (Liu & Lauw, 2022; Schlotterbeck *et al.*, 2021), they use general knowledge models when characterising the videos (Das & Das, 2019; Sikos, 2017) where domain specific concepts within the main topics are missed, they link the whole videos together but without specifying or locating the key domain areas within the videos, and they do not link different video segments to other related segments from other videos (Hao *et al.*, 2021; Pinandito *et al.*, 2021; Tang *et al.*, 2021).
The aim of this thesis is to support video based learning by designing, implementing and evaluating the generic and novel frameworks we designed for Video Segmentation and Characterisation for Learning (**VISC-L**), and Video Narratives for Learning (**VIN-L**). VISC-L helps in segmenting and characterising videos by identifying the domain related knowledge presented in the video transcript. The **segmentation** of a video transcript is to divide it into smaller segments. This aims to reduce watching time and enhance concentration as cognitive load and attention span play a significant role in learning. The **characterisation** (summarisation) using the video transcript is applied in this thesis by combining the Semantic Tagging and Topic Classifier characterisations. The Topic Classifier helps in generating the contextual characterisation of the video segments' transcript and the Semantic Tagging characterisation identifies the domain-terms' full path to their main domain topics using the taxonomy hierarchy as explained in detail in (Section 3.5). Using the video segment characterisation with the domain taxonomy helps in implementing VIN-L to generate **video narratives** by linking different segments from different videos which have the same Focus Topic and Concept under the guidance of the Subsumption Theory. VIN-L aims to provide learners with a cohesive learning experience. The Subsumption Theory helps in identifying the type of learning while trying different linking types, e.g, the learning type from a generic domain concept to a specific domain concept can be followed by implementing the Derivative linking from the Subsumption Theory. The generic and the specific

concepts are identified by the characterisation and the relationship between them is presented in the hierarchy of the domain taxonomy, (see Section 3.6). Generating video narratives by linking video segments helps to minimise watching time, keep learners engaged and helps them remember important parts and retain the critical information from videos.

We have two main assumptions in our work. The first assumption is that the domains tackled should be represented by videos which are associated with their transcript. This is crucial for the domains we are tackling- soft-skills domains- where people share their experiences using videos or podcasts. Although the visual content can give useful visual cues (demonstrations, hints, etc), it does not necessarily represent the domain and will narrow our approach to specific types of videos (e.g, lecture videos with slides). Hence, the video transcript contains the useful domain related information for learners to use and improve their self-regulated skills. Most of the videos freely available online are designed and associated with a transcript, e.g, the videos available on YouTube. Using video transcripts enables us to handle a wide range of video types. The second assumption is that the concepts of the domain are represented via a taxonomy or ontology. To generate video narratives from video segments, we have adopted the Ausubel Subsumption Theory of Meaningful Learning (Ausubel *et al.*, 1968) where four types of subsumption links were identified to link learning materials. We implemented these links using the characterisation of the video segments and the domain taxonomy to generate four types of video narratives which have been presented to learners as learning materials (see Chapters 5 and 6).

Our hypothesis is as follows: using video narratives designed based on a pedagogical theory utilising video segment characterisation and domain taxonomy will help in providing useful learning materials. Learners, who will use these learning materials, will be able to focus on key domain areas, recall and recognise the link between them. For that purpose, segmenting and characterising videos is needed to identify key domain parts and should be evaluated by users to assess their benefit to help learners in identifying such parts. Then, domain related key parts (characterised video segments) from different videos should be linked to generate the video narratives. These narratives should be evaluated by experts and learners to assess their benefits of guiding learning while watching videos and help in focusing on key domain areas.

Following this hypothesis, we address the following research questions where the quality of the generated video segment characterisation (RQ1 and RQ2) is crucial to help in generating good quality video narratives to support domain learning (RQ3 and RQ4):

- **RQ1:** How to automatically generate good quality characterisations of video segments that can be used for learning?
- **RQ2:** Does the characterisation of video segments help in identifying and focusing on the key domain concepts?
- **RQ3:** How to generate good quality narratives that can be used to support perceiving domain learning?
- **RQ4:** Are the generated narratives useful to support perceiving domain learning?

We present two novel domain taxonomy-underpinned frameworks, VISC-L and VIN-L, to address our research questions.

To address **RQ1**, the first framework, Video Segmentation and Characterisation for Learning (VISC-L) uses a domain taxonomy and video transcripts to segment, characterise and link videos to the domain knowledge covered in the segments. This framework is presented and described in (Chapter 3) and is implemented in (Chapters 4 and 6) in two different domains.

To address **RQ2**, our work has a key difference from previous approaches. While none of them assesses the effect on learning, we provide an evaluation study with learners to examine the Quality, Perceived Usefulness and Cognitive Work Load of the segmentation and characterisation in a learning context (Chapter 4). We also compare the VISC-L characterisation with a state-of-the-art video segmentation and characterisation interface that is available for YouTube videos which is Offered by Google and produced by Google Video AI [1].

To address **RQ3**, we designed a second framework, Video Narratives for Learning (VIN-L), which represents the main contribution of this thesis. VIN-L generates video narratives using different characterised video segments that have a domain topic(s) and concept(s) in common, and link them following the Ausubel Subsumption Theory. We generated four types of video narratives that are used to learn a domain from different perspectives based on each narrative's definition. The video narratives we have generated are augmented with text representing the segment characterisation and the type of linking used. The Quality of the generated video narratives has been assessed via an evaluation study with domain experts whose domain experience varies based on the domain, e.g. teaching, delivering (as presented in Section 5.3), practicing, or researching (as presented in Section 6.6).

To address **RQ4**, VIN-L has been implemented in two different domains and the generated narratives have been evaluated with domain experts (Chapter 5 and Chapter 6). The generated video narratives of the first domain (Giving Pitch Presentations) have also been evaluated with advanced learners from Amazon Mechanical Turk in which it is proven that the video narratives have potential to support domain learning (presented in Section 5.5).

This thesis contributes to the following areas: (a) segmenting and characterising videos for learning, (b) using narratives for learning and (c) video based learning environments. A number of original contributions have been made to the following research communities:

- *Video segmentation and characterisation*–this thesis presents automatic methods by designing algorithms to: (a) segment video transcripts based on the Text Tiling approach, and (b) characterise video segments using a semantic tagging algorithm and the BERT model. Then, adjacent segments

[1] https://cloud.google.com/video-intelligence/docs/analyze-labels[Accessed:June 2022]

are aggregated based on the Thematic Progression Theory as described in (Chapter 4 and 6). In-case the domain taxonomy is not available, we can create this taxonomy either manually, which makes our method semi-automatic (Chapter 6), or we create the taxonomy automatically to have a fully automatic way of characterising video segments. The automatic method for taxonomy creation is considered as a limitation in this thesis (see Section 7.3).

- *Video narratives for learning*– generated by developing a novel and generic framework to link different segments from different videos following the Ausubel Subsumption Theory of meaningful learning. We have designed four algorithms for this purpose as described in (Chapter 5 and 6).

- *Video based learning environments*–where: (a) we have presented a semi-automatic way to search and collect domain related videos from online video platforms (e.g, YouTube) as described in (Section 3.5.1 and implemented in Sections 4.3 and 6.3.1). This includes designing a search schema that is based on a domain taxonomy and implementing it using Python libraries (the full code is available on our GitHub account), (b) we have validated the frameworks (VISC-L and VIN-L) in two different domains with experts and validated the pedagogical value of the frameworks within one domain (Giving Pitch Presentations). The average value of the responses from the expert and learner studies showed that the Quality and the Usefulness of the generated narratives is good and the video narratives have a potential to support learning when used by domain learners. However, a future study is needed to assess the usefulness of using the video narratives with beginner learners as described in (Sections 5.6.5 and 7.4.2).

Thesis structure. The thesis is structured into seven chapters. In this chapter we have introduced the context of this thesis, the research questions and the thesis' contribution.

Chapter 2 provides related work and background research where the context of this thesis is defined and the key issues the research aims to address are highlighted .

Chapter 3 describes and discusses the overall research methodology to address the research questions detailed in Chapter 1. The algorithms and the theories used to design them are described and the domains where these algorithms have been implemented are also identified.

Chapter 4 describes the implementation of the first framework, VISC-L, in our first domain (Giving Pitch Presentations). The evaluation with domain experts to assess the Quality and Usefulness of the VISC-L results compared to the video characterised segments generated by Google is also presented in this chapter.

Chapter 5 describes the implementation of VIN-L in our first domain (Giving Pitch Presentation). The evaluation of the generated video narratives with experts and advanced domain learners is presented.

Chapter 6 describes the implementation of VISC-L and VIN-L in the second domain (Health related Quality of Life Awareness). The evaluation of the frameworks has been conducted exclusively by domain experts.

Finally, Chapter 7 summarises the main aspects of our research, discusses the main contributions, and highlights the future directions of this research.

Our full work in this thesis including code, taxonomies and experimental data can be accessed using the link to our GitHub account [1].

[1] https://github.com/Generating-Video-Narratives/Generating-Video-Narratives.git[Accessed: April 2023]

Chapter 2

Related Work

2.1 Introduction

Video Based Learning (VBL) has become widely spread in education as it is used to enrich the learning experience, promote engagement, and empower both learners and educators. However, there are still challenges associated with using VBL which are represented by: selecting suitable videos from the vast amount of available online learning platforms (Haridakis & Hanson, 2009; Khan, 2017), locating the key points in these videos and remembering them (Bywater *et al.*, 2021; Schlotterbeck *et al.*, 2021), and not all of the learners know the key domain points to identify in the videos. These challenges cause frustration and introduce a lack of interactivity with the videos among learners. As a result, educators need to tackle these issues which is a costly process as it requires time and effort.

This motivates studies to use manual and automatic approaches (Dodson *et al.*, 2019; Dutta & Zisserman, 2019) to identify key parts in the videos by segmenting and characterising them. The manual approaches did not scale, and were time consuming and subjective (Chiu *et al.*, 2018; Colasante & Douglas, 2016). The automatic approaches succeed to scale and be objective by relying on the visual content for segmenting and characterising the videos (Bywater *et al.*, 2021; Liu & Lauw, 2022). Additionally, these approaches try to enrich the characterisation of the video segments using general knowledge models (Das & Das, 2019; Sikos, 2017). However, this limits the use of these automatic approaches to tutorial videos, which are designed using slides, and will not be applicable to other type of videos, e.g, interviews, podcasts, patient stories, etc. Moreover, the use of general knowledge models will not capture domain specific topics and concepts.

On the other hand, many researchers advocate using Artificial Intelligence (AI) tools to enhance video based learning by: helping to set goals (McQuiggan *et al.*, 2008), linking to additional resources (Recke & Perna, 2021), including quizzes, and improving the interaction by generating nudges utilising learner comments or by adding a tutor agent by asking knowledge-building questions (Serrano-Iglesias *et al.*, 2021).

Along this line is the research on facilitating video based learning by supporting the linking of learning materials by exploring the use of concept maps (Pinandito *et al.*, 2021; Shao *et al.*, 2020; Spicer *et al.*, 2020; Tang *et al.*, 2021). However, these approaches are computationally expensive and are usually domain-dependent. Crucially, while the visual representation of complex knowledge structures can be helpful for navigating through videos, it may be overwhelming for learners not familiar with the domain.

The aim of the work in this thesis is to help learners interact with the videos by developing an automatic way to link different video segments from different videos together following a pedagogical theory. Using this kind of linkage between video segments will enable learners to identify key areas in the domain and the relationship between them.

In this chapter, we position our work in the relevant literature which allows us to contextualise our research, identify the key challenges and show the difference of our research in comparison to other researchers as presented in (Section 2.2). In (Section 2.3), we review the approaches that focus on segmenting and characterising videos to support learning as they help in understanding the main videos' content which is related to the first part of our approach–video segmentation and characterisation. Additionally, we describe how our segmentation and characterisation is different from the aforementioned approaches in (Section 2.3.3). To be able to pedagogically link the key domain areas presented in different domain related videos to generate video narratives, in (Section 2.4), we show some of the approaches used by other researchers to adopt the idea of narratives in learning and highlight how our approach is different. In (Section 2.5), we summarise the researches we reviewed, the identified gaps and identify our own way to tackle these gaps.

2.2 Background: Video Based Learning (VBL)

In this section, we review the importance of video based learning and highlight the challenges that teachers and learners face while using this learning method.

2.2.1 Importance of VBL

The use of video based learning has increased rapidly. It offers the flexibility of having visual and auditory channels that make it easier for learners to gather information and to support their learning (Haridakis & Hanson, 2009; Khan, 2017). This is noticed when instructional videos have been used successfully in flipped learning by enhancing the learning achievement of students and helping in supporting self-regulated learning (Kim *et al.*, 2023; van Alten *et al.*, 2020). Additionally, students highly ranked e-lectures in terms of their technology acceptance (Sprenger & Schwaninger, 2021) as they allow them to learn at their own pace and revise for their tests accordingly. Furthermore, videos can be used before lessons for preparation (Förster *et al.*, 2022) to help them strengthen their knowledge retention and recognise any knowledge gaps. The design and content of the videos affects their impact on learning as students engage more when watching short animated videos as opposed to using videos with slides (Köhler *et al.*, 2023). Consequently, video based learning is not free of challenges for both teachers and students which, in turn, will affect the learning process if not resolved.

2.2.2 Challenges faced by teachers and learners

There are some challenges faced by teachers when adopting videos in their teaching which require support. An example of these challenges is that some teachers (Mhamdi, 2017) are affected with the profession's workload and struggle to find time to search for appropriate videos and define suitable video parts to be used by their students, and thus, struggle to find suitable videos for learning. Some teachers rely on using specific criteria while searching for educational videos: a curriculum, learning objectives, the reliability of the resources which is decided by recommendations from peers, or the credentials of the content designer (Yacobson & Alexandron, 2023). Hence, it is beneficial for teachers to know: video designers, downloaders and the associated video comments. Finding the videos is not the only challenge faced by teachers; providing suitable usage-support techniques to the videos to help their learners is another. Some of these techniques are: reducing watching time, enhancing video quality and intelligibility (Lange & Costley, 2020). To help learners while watching videos, teachers provide them with tools to segment the videos into short clips and to decide how many segments to watch (too many segments may slow down the understanding of the information). Video quality can be improved when the media diversity is used properly, e.g, when the visual content complements the audio content. Meanwhile, video intelligibility can be improved by adding media controls for learners e.g, volume and brightness controls.

Nevertheless, these solutions are not applicable for many teachers as some teachers have a lack of professional training in digital technology; consequently, training workshops are required to equip the teachers with the necessary digital knowledge (Michel & Pierrot, 2022).

The aforementioned challenges faced by teachers also affect learners who face other challenges while using VBL; watching videos takes up time and, for many learners with a lack of domain knowledge, it can be hard to identify key points in the videos and link these points to the study domain (Bywater *et al.*, 2021; Schlotterbeck *et al.*, 2021). Consequently, support is needed to help learners interact with VBL to improve their performance. The aim of this thesis is to support learners while using VBL, and accordingly, we review the possible approaches to help them.

2.2.3 Possible approaches to help learners

Learners' self regulation skills and engagement within VBL can be enhanced via: responding to the teacher's support provided to them and by following suitable learning strategies.

Teacher support to learners while using VBL is varied and can be classified as providing: (a) feedback and (b) educational resources which can be used to serve the learning objectives.

(a) Using feedback can take different forms, e.g, Villagrán *et al.* (2022) used multimodel feedback which is based on pedagogical goals and not criticism to help learners improve their work. The type of feedback should match the types of interaction tools and resources available to learners. For instance, the learners in Villalobos *et al.* (2022) interact differently with a learning system that includes: topics addressed to be learnt every week, quizzes and assignments, practical exercises, reading materials, practical and theoretical solutions, watching videos, and system visualisation. Accordingly, teachers can personalise their feedback to learners based on the difficulty level of the task (Cohen & Cohen, 2023; Majumdar *et al.*, 2023). Verbal feedback, using dialogic interactions with learners is found to be beneficial especially for learners with limited domain knowledge or learners with special needs (Mirzababaei *et al.*, 2023). Automatic feedback can be used to improve the learners' performance and help them correct their mistakes quickly (Gabbay & Cohen, 2022). The generation of automatic feedback can be varied, e.g, Abu-Rasheed *et al.* (2023) includes a chat-bot within an educational web application where teachers design exercises for their learners following a pedagogical informed template. The learners who use this application and interact with the exercises will be provided with a chat-bot that provides predefined teacher feedback. Varying feedback based on each learner's performance is more beneficial than using the same feedback for all learners (no one type fits all). Enhancing online teaching with pedagogical strategies is essential for successful online learning as stated by Archambault *et al.* (2022) who identified the five pedagogical pillars for this purpose *"the ability to: Build Relationships and Community, Incorporate Active Learning, Leverage Learner Agency, Embrace Mastery Learning, and Personalize the Learning Process."* This idea has been adopted by Dever *et al.* (2022), where a pedagogical agent has been used with ITS tutoring systems through dialogue and feedback to learners which helped them be more self-regulated. Similarly, in Ausin *et al.* (2021) the ITS has been supported with a neural network model to help in predicting the type of feedback to be presented to the learners which is either a problem to be solved or an expert step-by-step solution to a problem. Experts' feedback, designed following a pedagogical policy, shows a positive impact on the learners' performance.

In addition to feedback, learners use other supporting tools differently, e.g, learners who have been classified as high attention learners were found to use play/pause buttons often while watching videos (Rabin *et al.*, 2019). This indicates that their focus is on knowledge acquisition. Differently, learners with a low attention classification, tried quizzes and final exams more than watching educational videos which affected their knowledge gain. Hence, personalised feedback and learning strategies are required to direct learners to their best learning behaviour. Teachers also use different types of quizzes which are found to not only familiarise learners with the technology, but also to engage them more with the learning materials (Tammets *et al.*, 2022).

(b) Educational resources can be added to learning environments to help learners. For example, Esterl *et al.* (2022) shows that using websites with hyper text, playful programming platforms, and forum discussions helped online learners during the pandemic. Similarly, multimodel learning systems use different data about learners (Lee *et al.* (2023) uses visual and audio data, physical movement, and Lee *et al.* (2023) uses taste and smell sensors) to assess the learners' interactivity and guide the designing of customised feedback. Learners' engagement can be detected using computer vision techniques where their facial expressions are recognised and mapped to a lecture video timeline (Linson *et al.*, 2022). This helps teachers identify the times in the lecture where learners need support. Furthermore, the learners' noise, silence and speech times can be detected using speech recognition via supervised machine learning models (Barzola *et al.*, 2022). Based on these signals, automatic feedback can be provided to learners within a virtual learning environment. Although speech analysis can lead to more accurate results, it can raise data privacy concerns.

Learners follow learning strategies. Adding to the teacher support within VBL, learners, from their perspective, can use different learning strategies. For example, learners who use MOOC learning platforms are able to improve their self-regulated skills via some strategies, e.g, goal setting, learning planning, self-learning evaluation, and summarisation (Richtberg & Girwidz, 2019; Rohloff & Meinel, 2018). Additionally, when the learner's behaviour while watching videos has been analysed, it was found that active learners engage more through: social interaction (discussion forums and messenger apps), information seeking (annotation tools), and environmental configuration (buttons, progress bars, pausing, moving forwards and backwards) (Yoon *et al.*, 2021). An interaction with VBL can be more informative if learning pathways and progress were combined together to guide teachers in giving support (Bourguet, 2022). Another learning strategy used by learners is manual video annotation which was found to be easy to use and helped learners boost their knowledge (Seo *et al.*, 2021). Learning via video annotation was found to be more appealing than learning via annotating textual learning resources (Lee & List, 2019). However, this type of annotation is subjective and prone to errors. For that reason, teachers annotate their videos by highlighting main points and adding different types of questions to enhance their students' engagement and information retention (Tseng, 2021) .

A learner's interactivity with the learning materials can produce different visual or textual data which can be used to train a classifier to help in predicting their knowledge gain successfully (Otto *et al.*, 2021).

The problem is that not all learners who use VBL are equipped with suitable learning strategies and teacher-support techniques to aid in using VBL. Consequently, many learners will be overwhelmed when searching and selecting videos from the massive amount of freely available online videos. Adding to that, selecting the most suitable videos for learning will take up a significant amount of their time. Furthermore, and more crucially, is the challenge of identifying key points in different videos and linking these points to the study domain (Bywater *et al.*, 2021; Schlotterbeck *et al.*, 2021). Accordingly, VBL needs to be enriched with interactive techniques that aid learners and help them engage more while using learning resources. Various interaction types can be provided to learners that have been identified by Palaigeorgiou *et al.* (2019); video annotation–annotating fixed positions within a video (video segment characterisation), adding side content, questions, reflective pauses, video summaries (to help information recall), formative and summative assessments, giving feedback, structuring the video content, encouraging replays and tracking interactions.

Hence, relying on a video's visual content will limit the education to using only tutorial videos where the visual and textual video content is related to the learning domain. However, if we want to use videos with examples of activities (e.g, interviews, presentations and negotiations) related to our main domain (soft skills), the visual content (e.g, nodding, smiling) may not be directly related to the domain. Accordingly, our approach focuses predominantly on textual video data (video transcripts) to automatically detect the key domain areas and segment the videos correspondingly. We aim to link different domain related video parts together to generate video narratives–our ultimate goal. For that purpose, within the next two sections, we review the literature that tackled video segmentation and characterisation, and the generation of video narratives to help in motivating our research questions.

2.3 Video Segmentation and Characterisation

Segmenting and characterising videos helps in identifying the different key parts in them and can be done using their visual or textual content. Video segmentation involves dividing a video transcript into individual segments and, in this thesis, we segment the video transcript using a text-window following the Text Tiling approach, as described in (Section 3.5.2) and implemented in (Sections 4.4.2 and 6.4.2). Video segment characterisation aims to understand and describe the content of the segment to facilitate learning. In our work, characterising video segments involves identifying the focus topics and concepts using: a Deep learning model (BERT) to contextually characterise a video segment by identifying its focus topic, and using Semantic Tagging to identify the focus concept(s) and its full path to the focus topic(s) using a taxonomy hierarchy. The characterisation process is defined in (Section 3.5.3) and implemented in (Sections 4.4.3 and 6.4.3) Generally, video segmentation and characterisation can be done for different purposes, not only for learning. In this section, we review the application of video segmentation and characterisation in non-learning and in learning contexts.

2.3.1 Non-learning Contexts

Video segmentation and characterisation can be approached differently for different purposes, for example: the characterisation of archival sport videos (Xue *et al.*, 2017) is based on the collected metadata about these videos using an assembly of computer vision techniques (shoot boundary detection, a tensor based compact representation, player detection and tracking, and optical character recognition). A video characterisation (Fajtl *et al.*, 2019; Rochan & Wang, 2019) can be created using the visual content (key frames) of the videos. The key frames, which are similar in their visual features, will be grouped and the point where the scene is changed will be detected using Kernel Temporal Segmentation. The key shots (each one is a group of similar key frames) represent the video characterisation which can be used to identify key areas in the video. Similarly, characterising a video can be done using the video summarisation Cycle-SUM model (Yuan *et al.*, 2019) which takes, as an input, a sequence of video frames and produces an importance score frame-wise as an output. The frames with the highest scores will be selected as a key area in the videos.

According to our approach where we focus on video transcripts, here we are reviewing the literature that focuses on characterising other types of text, e.g, app reviews and product information. These types of text are unstructured and this is similar to the nature of a video transcript. For example, Tushev *et al.* (2022) used an automatic unsupervised approach (KeyATM) for extracting cohesive domain related topics from user reviews on mobile apps which can be considered to look at by the users of the app. Similarly, Khatter *et al.* (2022) showed that product information available on e-commerce websites works as a summary of the product which can be collected via a website designed for this purpose that utilises the web scraping methodology. Based on the collected data, the user will have an overview about a product.

Adding to that, Google has started annotating YouTube videos [1] [2] to engage users and communicate with them while watching the actual video footage. For

[1] https://www.youtube.com/watch?v=wf_77z1H-vQ[Accessed: September 2021]

[2] https://cloud.google.com/video-intelligence/docs/reference/rest/v1/videos/annotate[Accessed: September 2021]

that purpose, Google developers began by using the Freebase knowledge graph [1] where nodes correspond to real world things and have their own unique ID. Google uses three types of data sources to be able to annotate a video (text metadata, audio/visual features and video context). The text metadata is the description of the video that is provided by the up-loader which, in many cases, has many-to-many associations that cause text ambiguity. For that reason, text metadata should be consistent to allow it to be correlated with other sources of data. Google developers first extract main entities from the text and assign scores to them based on their connection with other entities in the text. First, the relationship between these entities will be extracted from the open internet. A score will be assigned to all entities for being mentioned in the text and another score will be added if they appear in the title as well. Additional scores are given for any link that the entity has with other entities. It is essential now to know the central entity to be included in the annotation. This will be processed by applying a specific threshold, e.g, keeping the entities with scores $\geq \theta$. However, in-case the text metadata is of poor quality or not available, the video's audio and visual features will be used. For that purpose, a classifier can be used but an issue of types of nuances in the features will affect its accuracy. Consequently, the context of the video (user comments, web pages linked to it, and the overall user engagement) can be used to detect what is notable about the video. Aggregating these data sources could boost the annotation quality. Video annotation should be central which means it should be: complete (completely describe the video), specific (no more specific words can replace them), and compact (cannot be removed). To support the video annotation, developers can use the structured data on Freebase to get more information about the video entities.

The aforementioned segmentation and characterisation approaches showed the benefits of summarising videos or textual resources using visual or textual cues to aid the process of sorting or recalling these resources. However, these segmentation approaches have not been tested across multiple domains.

According to the context of our work, we review in more depth the approaches for video segmentation and characterisation in a learning context.

[1] Freebase knowledge graph has now been replaced by Google with Firebase-Google's App Development Platform

2.3.2 Learning-related Contexts

In a learning context, there are a number of approaches to support video segmentation and characterisation: (a) manual, (b) automatic, (c) textual and (d) ontological approaches.

(a) Manual Approaches. A widely used approach for video segmentation and characterisation is manual annotation (note-taking) which helps in identifying references of the main points mentioned within a video (Dodson *et al.*, 2019; Dutta & Zisserman, 2019). Video characterisation can be done by students, teachers or by both. In Castro & Tumibay (2021), teachers segmented videos by providing sections within the videos related to specific courses. Additionally, teachers in Tseng (2021) highlighted video content with a phrase or keyword or by adding questions in order to improve learner engagement and to help the digestion of the learning material. Teachers in Tseng (2021) characterised videos by highlighting the contents with a phrase or a keyword or by adding questions.

Characterising videos can also be done by learners. For instance, teachers have asked learners to annotate videos and test their effect on their learning (Mirriahi *et al.*, 2021). Though learner annotation can improve engagement with videos, it is dependent on the learner's engagement (e.g, high self-efficacy learners engage better) and their prior knowledge (e.g, learners may not be able to notice key points). Co-working can be done by teachers and learners (Chiu *et al.*, 2018; Colasante & Douglas, 2016) to characterise and highlight video content for learning to help find such content quickly. To speed up the video characterisation process, Benkada & Moccozet (2017) used a constrained tracker to choose which video frame a user should characterise, and also allow collaborative characterisation by a group of people. These approaches characterise the whole video considering different purposes, including learning.

While such characterisation is closely linked to the learning goals set by the teachers, it is subjective, laborious and does not scale across different educational domains. Hence, automatic characterisation approaches will be considered to improve video characterisation in terms of the speed and the applicability in different educational domains with characterisation-quality preservation.

(b) Automatic Approaches. Recent works have developed approaches for automating the process of video segmentation and characterisation for learning. This includes using different types of data. For example, a learner's interaction while watching videos is represented by their comments (Mitrovic *et al.*, 2016); these are aggregated to identify "high attention intervals" which refer to key points noted by learners. These intervals are used to facilitate interactions with videos by offering an interactive visualisation interface. These interactions can indicate points of interest or confusion. However, this type of segmentation depends on the learner's engagement and learners may not appropriately capture the key points in the videos.

Alternative approaches focusing on the video content are proposed. Videos' different associated data can be used (Schlotterbeck *et al.*, 2021) to detect teaching practices (presenting, guiding, administration) in recorded lessons of trainee teachers. For that purpose, a multi-learning model is designed where the acoustic features are extracted from the audio using the Random Forest model to classify the three aforementioned teaching practice categories. The textual features were extracted from the transcripts of the recorded videos using the Google Speech API while a Spanish BERT Model was used to add contextual information to the data.

Enriching tutorial videos containing slides is done by matching a slide to a video snippet (Liu & Lauw, 2022) via a deck of slides (containing several slides) and its related videos. First, for each slide, (Liu & Lauw, 2022) start with a window size and accordingly, a number of slides will be combined with the first slide and a number of video snippets that match the window size. Dynamic Time Wrapping (DTW) is where the similarity between the time series of the slides and the video snippets within a window is measured. This process is repeated for different window sizes to identify probable irrelevant slides to exclude them. Within this process, several calculations have been done; the best match between the video snippets and the slides, the total distance between the video snippets and the slides, and the cosine distance between each slide and the video snippets they are matched to. (Liu & Lauw, 2022) use all of these calculations to decide a threshold to keep relevant slides and exclude any irrelevant ones.

Recent video segmentation approaches based on video content utilise state-of-the-art tools in natural language processing and tap into the availability of knowledge models. For example, MOOC video lectures were automatically segmented in Das & Das (2019) using a neural network over adjacent sentences; the neural network was trained on Wikipedia pages. The transcript of the lecture videos was then segmented into sentences and each sentence associated with its universal encoding using the Stanford Natural Language Inference. Then, the sentence, together with its preceding sentence and its following sentence, were fed to a Long Short Term Model (LSTM) classifier to decide a topic boundary among the sentences and identify which sentence represents the segment boundary. To annotate each segment, the text on the slides of the lecture video is first detected using Stroke Width Transform where the slide text will be bounded with a box. Accordingly, the top third slide –text within a box would be extracted as an image and passed to an OCR engine to recognise the text. Main terms (words) would be extracted from the text lines and would be compared to the list of topics extracted from the course syllabus. The similarities between the terms and the list of topics were measured using Word Mover's Distance to assign the selected topic for segment characterisation.

Learners' action while using open ended educational environment (CAD) (Bywater *et al.*, 2021), are collected and segmented into different groups based on the difference in the actions. These segments can be used later to identify a student's engagement and the type of personalised feedback to help them further improve their performance. The learner's sequence of actions is collected where each sequence will be segmented using an algorithm designed for this purpose. Each segment will consist of actions which are different from the actions in the neighbouring segments. As the design behaviour among the students might be similar, a clustering step is conducted to group the similar designs and the proportion of actions within each cluster. The clustering step is done using K-means clustering and the distance measure between the proportion of actions within each segments is calculated using Euclidean distance. K-means is repeated 100 times and every time the K-means is repeated, a silhouette width average value is calculated to measure the quality of the cluster. The clusters with the highest silhouette average value will be selected as segments of similar actions. Accordingly, personalised feedback for each segment (cluster) can be generated to help learners.

From the aforementioned approaches, we can conclude that the video transcript allows us to understand the domain. For example, when listening to patient stories, it is the video transcript that explains the patient conditions but not the visual contents. This is also noticed when listening to people talk about job interviews or their experiences with health systems. Analysing the visual contents gives us some gestures, whereas the transcript gives us the richness of the domain related information. Using video transcripts allows us to manipulate both tutorial and example videos where people share their experiences. Accordingly, we investigate the characterisation approaches that tackle educational text as well, e.g, intelligent textbooks.

(c) Intelligent Textbooks. Different AI technology generations have been utilised to improve the use of digital textbooks, some are: Semantic Web and NLP and Machine Learning. A comparison between textbooks and intelligent textbooks using AI has been conducted in Koć-Januchta *et al.* (2020) where it has been found that AI textbooks, if used for longer, will have a noticeable effect on learning. This is because AI textbooks offer linking between content sections. The value that AI added to the textbooks can surpass the content of an individual textbook. For instance, in Sosnovsky (2022), they enrich the textbooks with domain related external smart activities by using the index terms of textbooks to extract domain knowledge models. As a result, each index has its reference pages and the corresponding domain concepts presented in these pages, linked to sections in the knowledge model. To enrich the textbook with related external resources, the concepts from textbooks will used by a parser application to extract concepts from the smart learning resources (which includes domain related examples and problems). To decide to which extent the extracted resources are linked to the concepts in the textbooks, an expert is invited to manually annotate the smart learning activities previously annotated by the parser application to filter out the concepts that the learners should focus on.

Inspired by the importance of extracting the domain knowledge presented in the text (video transcripts, in our work), we review the literature about enriching video characterisation using domain ontologies. This guides us on how to extract the domain's hierarchical knowledge presented in the video transcript which, in turn, help in linking different video segments together.

(d) Using Domain Knowledge. Using domain related ontologies adds semantic meaning when characterising videos which will facilitate their usage for learning. A recent review of semantic video characterisation (Sikos, 2017) points to key challenges, including: the wide variety of video codecs, the lack of standardised vocabularies, the vast number of video resources, the inherent ambiguity of audio-visual content and the unstructured nature of user generated content. As a way to address these limitations, Sikos (2017) recommends semiautomatic or automatic video annotation using ontologies and Linked Data combined with semantic tagging tools. Semantic video characterisation adds meaning by linking objects from the videos to a specific domain, and has been proposed in several works.

Labelling videos with textual data (Kithmi *et al.*, 2016) can be done using shot boundaries, extracting features, and conducting automatic text annotation. These features have been used to conduct semantic matching (via an ontology) between them and the user's query to select the most related videos to answer the query. For this purpose, the work began by analysing a video using a hash algorithm to identify shots where each shot has been given a fingerprint string based on the image details. A single unique frame from each shot has been sent to a deep learning model for object classification. This model has been trained on image data sets categorised with 1000 classes to generate textual annotation. The labelled shots have been used to annotate their video and the latter has been stored in the MySQL database. The stored videos are retrieved based on a comparison between the user query and domain ontology terms, if a match is found, the related stored videos are retrieved and displayed to the user.

Different video textual modalities (Cagliero *et al.*, 2019), e.g, transcripts, slide text and hand written text on whiteboards, can be used to segment and characterise videos. A lecture video is segmented in a semi-automatic way based on detecting slide transitions. The text in each segment is represented by the associated transcript, slide text and the notes written on the whiteboard by the teacher. The text is pre-processed and analysed using a supervised approach (Named Entity Recognition and Disambiguation), and for disambiguation, they used the decision tree classification model. Then, the tokens from the text are mapped to Wiki-data and DPBedia terms. The annotation of the segments is associated with the video where the user can browse to select a segment to start with.

Some video characterisation approaches utilise video transcripts only. For example, Schulten *et al.* (2020) used video transcripts to extract keywords using DBPedia Spotlight and ranked them using tf-idf to measure their suitability to annotate the transcript. The keywords are presented to learners as learning resources in their learning environment. Accordingly, these keywords can be used via Google Custom Search API to collect domain related resources. Additionally, the associated DBpedia URLs related to each key word can be presented to learners as learning resources to enhance their engagement.

Instead of using generic knowledge models (DBPedia), domain related knowledge graphs (Das & Das, 2020), with the aid of the BERT model, can be used for topical segmentation of lecture videos. At the beginning, the semantic similarity between the concepts mentioned in the video segments is computed. The segments with the same focus concepts are grouped together. Then, the slides of the lecture videos are analysed using inception-V3 to classify slide frames and apply frame difference techniques to extract unique slides. Each slide has a starting and ending time within the lecture and their associated transcript is extracted. They use the FLAIR-api [1] to calculate the average score of the similarity between the mentioned concepts and assign the value as an edge weight in the domain knowledge graph. For each slide, a graphlet, where the concepts mentioned in the transcript are connected, and the edge weight are assigned from the knowledge graph. The frequency of the concepts is used to measure the similarity between consecutive slides which indicates that the instructor is carrying on in explaining a specific concept. Otherwise, a topic boundary will be

[1] FLAIR Api

detected between these consecutive slides. The final output is a lecture video where the topics taught are highlighted.

Likewise, domain knowledge graphs (prerequisite relations) (Torre *et al.*, 2022) can be built using the video transcript. It presents an unsupervised method for prerequisite identification and graph building. The video transcript has been used to identify the intervals where a concept is intensely mentioned and to track it within the video. To identify concept intervals, a Hidden Markov Model is used, which is a statistical model that aims to describe the probabilistic relationship between sequences of observations and a sequence of hidden states. Video analysis tools are used to improve the identification of concept intervals and these tools are: video segmentation using segment similarity, using the XGBoost decision tree machine learning library (used for, e.g, classification and ranking) for lecture type identification, and Tesseract-OCR to detect concepts and definitions from slide text. To extract the prerequisite relations, Allen's algebra (Allen, 1983) is applied on the extracted concept intervals to decide if: one concept precedes the other, the two concepts meet each other, or one concept includes the other concept. Based on that, the prerequisite relations have been determined and used to build the prerequisite graph using RDF data.

2.3.3 Video Segmentation and Characterisation in this Thesis

Our main focus is to help learners to notice different perspectives of key domain concepts in video transcripts and the complementary between them. The existing approaches tried to achieve this goal using manual or automatic video segmentation and characterisation. The manual approaches helps in identifying domain related parts but they are:time consuming, prone to errors, subjective and do not scale (Dodson *et al.*, 2019; Dutta & Zisserman, 2019). The automatic approaches can scale and capture video content objectively but they: depends on the learner's engagement (Mitrovic *et al.*, 2016) and learners may not appropriately capture the key points in the videos, depends on the acoustic features which extracted from the audio recording (Schlotterbeck *et al.*, 2021) where these features are prone to noise and not focusing on the main points, rely on the videos' visual contents, e.g.

video slides (Das & Das, 2019; Liu & Lauw, 2022) where not all of videos used for learning contain slides (especially the video for soft skills learning which is the main domains in this thesis) and this counts as a limitation to using videos for learning, and use general knowledge representation, e.g. DBPedia or Wikipedia to annotate videos semantically where domain specific topics and concepts could be missed in these general models Sikos (2017).

Our main contribution in the video segmentation and characterisation area is the design, implementation and evaluation of the Video Segmentation and Characterisation for learning Framework (VISC-L). VISC-L is different from the aforementioned methodologies as it relies only on video-transcript to understand the main video contents. This is based on the fact that not all videos (e.g. videos used to learn soft skills, interviews, podcast, patient stories, etc.) are designed by including informative visual contents, e.g.slides. To segment the video-transcript, VISC-L use the TextTiling approach, which is well known for segmenting documents into coherent multi paragraphs units (see Section 3.3.1) to generate initial segments from the video transcript. To create coherent segments, we need first to understand the content of the video segments: VISC-L uses a Deep learning model to identify the context of the video segments and use semantic tagging to link the video segment-content to the domain topics and concepts. The novelty of VISC-L is represented by combining between the characterisation generated by the semantic tagging and the Deep learning model to identify the domain focus topic and concept in the video segment utilising the hierarchy of the domain taxonomy. To complete the segmentation work of VISC-L which is to generate coherent segments, VISC-L aggregates adjacent video segments that focus on the same topic and concept. Given that the aim of VISC-L is to support learning using video segments, and that the video transcripts represent the way that the speaker constructs their message, we underpin the aggregation process of video segments with Thematic Progression Theory (see Section 3.3.2). This theory is based on the link between the main starting point in the speakers message (Theme–we use domain topics to refer to the Theme of a video segment) and the added information (Rheme–we use domain concepts to refer to the Rheme of a video segment). Accordingly, to complete the segmenting work, we aggregate the initial segments using the Aggregation with interpolation algorithm (see

Section 3.5) to generate coherent segments as they focus on the same domain topic and concept. VISC-L is implemented and evaluated with users in our prime domain 'Giving Pitch Presentation' with a comparison with Google Segmentation and Characterisation methodology (see Chapter 4). Additionally, we prove that VISC-L is generic by applying it in our second domain 'Health Related Quality of Life Awareness' as presented in (Chapter 6) where different challenges related to the implementation process has been discussed.

The semantic characterisation of the video segments allows us to link related segments together following the ontology hierarchy. This enables us to generate video narratives from these characterised video segments to be used for focus-learning. For this purpose, in the next section, we review the use of narratives in learning as another useful interaction technique.

2.4 Video narratives for learning

A narrative, in education, is defined as a sequence of ideas or actions that belong to or are done by humans or machines which relate to a specific event (Greenhalgh & Hurwitz, 1999). The intersection of technology and storytelling has led to fascinating developments in linking domain related areas together by focusing on: Storytelling Design, Hypermedia, and Concept Maps.

2.4.1 Narratives using Storytelling Design

A well known type of narratives in learning is storytelling. The vast production of personal videos, web pages (used for conversation blogs), and games (that use dialogues in their design) have affected the symbolic communication used during storytelling (Bianchi & Ragonese, 2023). Narrative based learning environments (McQuiggan *et al.*, 2008) have been used to teach different subjects where the domain context is delivered using storytelling following pedagogical strategies, ensuring effective and engaging learning. The idea of linking educational content in a Web Based Training (WBT) product has been supported (Aqqal *et al.*, 2007) by providing teachers with a "macro design" methodology. Hence, the teachers identified the concepts to learn and their relationship with the previous concepts that the student knows. Then, the teachers followed the Rhetorical Structure theory (Mann & Thompson, 1987) to justify their design of the WBT by stating the reason for the WBT, the knowledge to be produced within it and the form it is used in to produce this knowledge.

To help learners access the most related video parts from lecture videos to help them revise quickly, a digital library has been designed (Lee *et al.*, 2021) that includes managing educational videos. Students, through using a web browser where this library is deployed, can access and play the short videos which are part of lecture videos. These short video parts have been detected using the logs of other students who visited and spent more time on them in comparison to the other parts of the video. The students are presented with a video usage graph to show high attention sections of the videos to help them select their revision materials. Differently, Pina *et al.* (2022) designed a set of instructions based on the narrative idea for learners who are attending face to face classes or are learning remotely to study principles in engineering design.

To help students set their ultimate goals and design their learning plans, a *narrative experience design canvas* has been designed in Recke & Perna (2021) for that purpose. Many researches, as reviewed by Naul & Liu (2020), focus on using narratives in video games designed for learning purposes which showed enhancements in the students' engagement, motivation and performance. For example, Colaço *et al.* (2022) designed an interactive narrative game that aims to raise awareness of gender equality in STEM for a group of teenagers.

To automate the generation of the narratives, their computational definition is followed (Oghaz *et al.*, 2020) which includes the following: "topic mining, text summarisation, machine translation, graph visualisation". First, to generate a summary-based narrative of short text, it requires defining the main topics in the domain of the text. The topic is selected using an unsupervised model. Secondly, selecting the sentences that summarise their focus topic –the sentences that better represent the topic are selected based on word co-occurrence and temporal information. The discovered probabilities of the topics are applied over the whole document to extract the sentences that belong to the same topic. The higher the number of topic-words in a sentence, the higher this sentence is ranked. The sentences with the highest ranking are presented as summary-based narratives for that topic starting from earliest to latest in their time stamp (e.g, a summary of tweets).

It is noticeable that narratives in education became a focus of many researchers and are implemented via different tools. Researchers have tried to use different tools in conjunction to watching educational videos to enhance learning, e.g, using hypermedia tools and concept maps.

2.4.2 Narratives using Hypermedia

Hypermedia takes different shapes like graphics, audio, video, plain text and hypertext to be used in online learning. Hypertext can be used to implement the idea of narratives to learn foreign languages (Bourina & Dunaeva, 2019) by linking contextual visual and textual learning modalities following a pedagogical theory. Educational videos, which are a type of hypermedia, have been used widely in online learning, e.g, YouTube educational videos, and have been ranked highly by learners for their suitability and usefulness to learn different domains (Maziriri *et al.*, 2020). Learning based videos are one of the instructors' main instruments to help in delivering topics (Guo *et al.*, 2022) or track the students' progress in conversational videos (Dey-Plissonneau *et al.*, 2021). Other hypermedia types have been applied differently, e.g, in Serrano-Iglesias *et al.* (2021), a smart learning environment has been designed where YouTube videos, web pages and quizzes are utilised by the instructors to set goals and provide their learners with personalised resources.

Similarly, the web application designed by Fessl *et al.* (2021) has been found to be useful as mentioned in a study with instructors and learners. It could facilitate communication between instructors and students, allowing instructors to set goals and design lectures while enabling students to direct their learning and to develop self-regulation skills.

Using Hypermedia in VBL helps in varying the learning resources which serve different students' needs. However, to help students identify the key domain learning points in these resources, we require other tools. Next, we review the idea of using concept maps which, in their structure, resemble the idea of video narratives –the main contribution of our work.

2.4.3 Narratives with Concept Maps

Domain key points can be either defined clearly by storytelling, or be extracted from the learning materials. Based on that, the idea of creating concept maps is developed to enhance engagement and improve student performance. The idea of concept maps is first developed by Novak (1964), and established on the subsumption theory of meaningful learning by Ausubel (Ausubel, 1963). It should be for a specific domain or theme and have a structure (nodes and links). A node represents a topic in the domain while the link represents the relationship between these topics. The use of concept maps as an annotation tool helps in grasping the key domain areas and develop a student's critical thinking (Machado & Carvalho, 2020). These concepts maps can be created using (a) **semi automatic approaches** or (b) be generated **automatically**.

(a) Semi automatic approaches. Students (Spicer *et al.*, 2020) created their own concept maps using a tool designed for them which also includes prompts as recommended concepts. The students can use these prompts or create their own concepts to build a concept map. Manually created concept maps help students improve their critical thinking and domain concept comprehension. Semi-automatic concept map creation is also attempted in Pinandito *et al.* (2021) by providing learners with a system that has concept labels extracted from lecture videos to help them build a concept map for these videos. However, students might have a learning barrier towards the new technology of using concept maps which can be expressed as: creating concept maps is time consuming, and the students' limited domain knowledge prevents them from identifying the relationship between domain topics. Nevertheless, with the development of machine learning and the intensive work in NLP field, an automatic approach has been developed for aiding the automatic creation of concept maps.

(b) Automatic approaches. The automatic creation of concept maps has been developed in Tang *et al.* (2021) by designing ConceptGuide based on the idea of concept maps. The designing of ConceptGuide includes extracting the topics of YouTube videos (via the transcript and metadata), using Wikipedia glossaries and using NLP techniques to identify the possible semantic similarities between the topics. ConceptGuide helps students by identifying the topics of the videos to be used for learning. Likewise, in Shao *et al.* (2020) concept maps generation has been automated by extracting the domain concepts and identifying the relationships between them using textual data. This has been done by extracting the concepts from text questions and student answers and using these questions and answers to link the main concepts together. Then, implementing "Association Rules Mining between Concepts" for the concept map generation. However, they assume that each question considers one concept–they did not consider multiple concepts recognition per test. Hence, if the number of concepts increased, the generated concept map will be different from the ground truth concept map generated manually by an expert using the same dataset. Differently, Hao *et al.* (2021) links online resources as narratives and represents them via a knowledge-graph to help in filtering the relevant resources and avoiding the irrelevant ones during the search process.

2.4.4 Video narratives in this thesis

Along the segmentation and characterisation line, is the research on facilitating video-based learning by supporting the linking of learning materials (Bianchi & Ragonese, 2023; Liu & Lauw, 2022; Pina *et al.*, 2022). Building on this idea, some studies have explored the use of concept maps. Semi-automatic concept maps (Lecuyer *et al.*, 2020) rely on the learners' abilities to identify key points, and may not be effective when the learners are not familiar with the domain. Automatic concept maps provide visual representation of video content which can support learning (Tang *et al.*, 2021). However, these approaches are computationally expensive and are usually domain-dependent (Shao *et al.*, 2020). Crucially, while the visual representation of complex knowledge structures can be helpful for navigating through videos, it may be overwhelming for learners not familiar with the domain. The current automated approaches for linking videos do not explicitly utilise pedagogical models for linking knowledge structures to support learning, while adopting pedagogical theories to link videos is seen as key by teachers (Archambault *et al.*, 2022).

This thesis contributes to the stream of automating the linking between video parts by developing a novel and generic framework for generating video narratives which utilises Ausubel's subsumption theory of meaningful learning(Ausubel *et al.*, 1968) (see Section 3.3.3 which introduces the theory and Section 3.6 which presents how the theory is utilised in our work). The theory focuses on how the learning materials are linked in the learners' cognitive structure. The cognitive structure is a hierarchical organisation of general (high inclusive) concepts from which there is a link to specific (less inclusive) sub concepts. Ausubel argued that new material would be learned by relating to relevant concepts in the existing cognitive structures. Accordingly, Ausubel defined four subsumption links to learn new concepts (Ausubel, 2012): **(a) Derivative:** when the new learning material is an example of an idea that exists in the cognitive structure, **(b) Super-ordinate:** when the new learning material is related to a generic idea in the cognitive structure, **(d) Correlative:** when the the new learning material is linked to a similar previously learned idea, and **(c) Combinational:** when the new learning material is not (super-ordinate or sub-ordinate) with any existing ideas in the cognitive structure but rather can be learnt in combination with other, more generic, less relevant ideas. These narratives aim to support learners by providing them with short learning resources (video segments) that have been connected to provide meaningful learning.

To be able to implement these subsumption links to generate the video narratives, we have designed the Video Narratives for Learning (VIN-L) framework which requires, as an input, the characterised video segments (with domain topics or concepts) and a domain taxonomy representing the key concepts and their hierarchy in the domain. VIN-L has been applied and evaluated with experts and potential learners in the prime domain 'Giving Pitch Presentation' (see Chapter 5) and implemented and evaluated with domain experts in the second domain 'Health Related Quality of Life Awareness' (see Chapter 6).

2.5 Summary

In our work, we have been motivated by the vital role that VBL plays in promoting and facilitating learning among students online. Accordingly, we have reviewed the literature that focuses on: using VBL, the challenges associated with using VBL and the possible approaches to address these challenges (video segmentation and characterisation, and generating video narratives).

Using videos available online (e.g, YouTube videos) helps teachers embed technology into their lessons to help students meet the learning objectives. Nevertheless, there are many challenges associated with using VBL for both teachers and learners. They are varied; from teacher perspectives, these challenges include: selecting the best videos for learning, identifying the related parts in the videos to learn from, engaging and supporting students while using VBL. From the learners' perspectives, these challenges include: identifying the key domain points and finding ways to recall them, watching videos without getting overwhelmed by the vast amount of available videos, and getting support while watching the videos to clarify any misconceptions.

The aim of our research is to address the above challenges by developing a methodology that can be applicable to different soft skills learning domains and scale for a vast number of videos related to these domains. The main steps included in our methodology are : semi-automating the collection of domain related videos, automating the identification of the key domain points in the videos via segmentation and characterisation approaches using domain taxonomy, and automating the linking of related parts from different videos (to generate video narratives) based on the Ausubel Subsumption Theory to support domain learning. Our methodology has been motivated in this chapter, clarified and justified in Chapter 3, and implemented and evaluated in two different domains in Chapters 4, 5, and 6.

Chapter 3

Research Methodology

3.1 Introduction

The main aim of this research is to support learning by providing video narratives that are automatically collected, segmented, characterised and linked following a learning theory. For this purpose, we designed two generic frameworks, one of which is for Video Segmentation and Characterisation to Support Learning (VISC-L). The second framework is to link these characterised segments based on a learning theory to generate Video Narratives to Support Learning (VIN-L). To ensure that these frameworks are applicable in soft skills learning domain, we have underpinned their design with theories. For video segmentation, we based our work on the Text Tiling approach (Hearst, 1993), and for video segments' aggregation we adopted the Thematic Progression theory (Danes, 1974). Finally, we adopted Ausubel's Subsumption Theory for meaningful learning (Ausubel *et al.*, 1968) to guide the linking of the characterised video segments to generate the video narratives.

The following sections will provide details about: the research methodology (Section 3.2), underpinning theories (Section 3.3), the research preliminaries (Section 3.4), the Video Segmentation and Characterisation framework (VISC-L) (Section 3.5), and the framework of video narratives for learning (VIN-L) (Section 3.6). The domain of soft skills we will use to implement and validate the frameworks will also be illustrated (Section 3.7).

3.2 Overview of the Research Methodology

In our work, we have adopted a knowledge driven approach that consists of two main frameworks: Video Segmentation and Characterisation for Learning (VISC-L) and Video Narratives for Learning (VIN-L).

In **VISC-L**, we first collect domain related videos by utilising the domain taxonomy to implement the search schema we designed for this purpose–the limitation of this step is described in (Section 3.5.1). The collected videos are filtered based on duration, transcript availability and via manual inspection to check their domain relevancy. These videos are segmented following the Text Tiling approach (described in Section 3.3.1). Then, the segments are characterised using two algorithms (Semantic Tagging and contextual characterisation using a Topic Classifier). The characterisation results from both algorithms are combined and the characterised segments are aggregated following Thematic Progression Theory to improve their quality. Thematic Progression Theory has been selected to underpin the aggregation process. This is due to the nature of the video transcript that holds the main presenter message. The video transcript is subdivided into segments which are aggregated coherently based on the common focus topic and concept between them. To prove the applicability of VISC-L, we implement its algorithms described in (Section 3.5) in the prime domain–Giving Pitch Presentations. The full implementation details is described in (Chapter 4) where the output of VISC-L is evaluated with users by assessing the Quality, Perceived Usefulness, Cognitive Work Load and the Learning effect in comparison with Google segmentation and characterisation methodology. To prove the generality of VISC-L, we apply and evaluate it in a second domain–Health Related Quality of Life Awareness, see (Section 6.4). In the second domain, the domain taxonomy was not available and we have created it manually which causes the VISC-L implementation to be semi-automatic–this limitation is described in (Section 3.5.1).

In **VIN-L** to be able to link video segments together in a way close to the domain structure which is represented by a taxonomy, Ausubel Subsumption Theory is used. Subsumption Theory focus on how the learning materials are

linked together in the learner's cognitive structure. Accordingly, VIN-L takes, as an input, the characterised video segments (VISC-L output) and utilises the domain taxonomy to implement Subsumption Theory. This theory is fully described in the next section. Four types of video linking are generated based on the definition of Subsumption Theory (Derivative, Super-Ordinate, Correlative and Combinational). The video narratives are as web pages to facilitate its usage by learners. VIN-L is applied and evaluated in the first domain–Giving Pitch Presentations. To prove the generality of VIN-L, we apply and evaluate it in the second domain–Health Related Quality of Life Awareness.
The overall research methodology is presented in Figure 3.1.

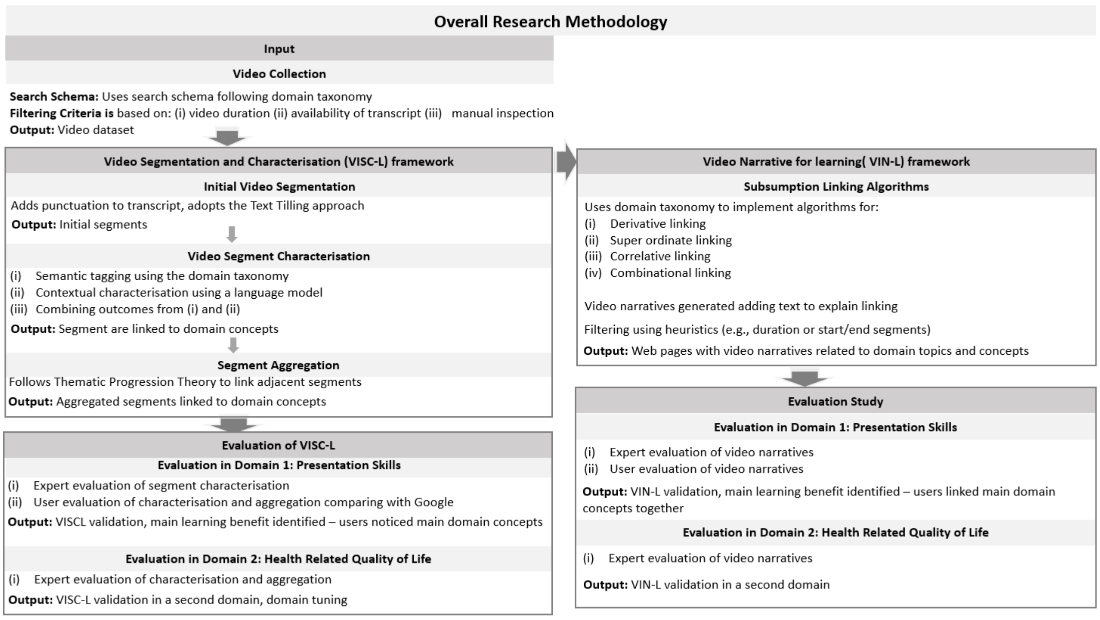


Figure 3.1: Overall Research Methodology.

The two main practical stages in our methodology are: Video segmentation and Characterisation for Learning (VISC-L) and Video Narratives for Learning (VIN-L).

3.3 Theoretical underpinning

In this section we will review the main approach and theories adopted in this research.

3.3.1 Text Tiling (Hearst, 1993)

To be able to achieve our goal of generating video narratives to support learning, our work is concerned with the segmentation of videos to identify the key domain concepts. In order to carry out video segmentation, we adopt a text segmentation approach by focusing on the video transcript–Text Tiling which is one of the most elegant and commonly applied approaches for text segmentation. Although this approach is old but it is still adopted successfully by researchers to help in identifying key areas in a document. Below we explain the Text Tiling approach and review the way it is adopted in different work. Then, we described how we adopt this approach to help us in implementing our methodology described in the previous section. Additionally, we describe our work similarity and difference from the other work that adopt this approach.

Text Tiling is designed by Hearst (1993, 1997a) and is based on an assumption that a discourse is mostly consisting of paragraphs which are well structured with opening sentences introducing the main topic and ending sentences that summarise the paragraph. Consequently, sub-dividing this text into subtopics (multi-paragraph units) makes it coherent. The shift between the subtopics within a discourse is based on *patterns of lexical co-occurrence and distribution*. In her work, Hearst implemented Text Tiling in two applications: Hypertext and Information Retrieval. Hearst imposes the use of Text Tiling in hypertext on the hypothesis that it is better to segment long online documents when presenting them to users to help them recall useful information. These segments, which are passages, need to be meaningful units.

The main steps included in the Text Tiling algorithm (Hearst, 1997a) are: Tokenisation, Lexical Score Determination and Boundary Identification, Smoothing the Plot and Determining the Number of Boundaries. In the Tokenisation step, the text is split into tokens which will be grouped into blocks of size K (3 to 5 sentences long)-the value of K is based on the average paragraph length within the actual text. Then, the similarity among the token-sequence between two adjacent blocks is calculated and the gap token-sequence is also calculated to detect the boundaries to decide the segmentation of text into subtopics. Following this, she uses the initial segments of several sentences in the video transcript, and then applies segment aggregation to detect segment boundaries.

Counting the frequency of words between the blocks is not enough to decide the similarity between these blocks. Consequently, Hearst (1993) decided to use *Yarowsky's statistical lexical disambiguation algorithm* (Yarowsky, 1992) which helps in calculating the word sense. These values are also used when calculating the similarity of the words among adjacent blocks. Although Yarowsky's algorithm does not need training data, it requires a thesaurus. As a result, WordNet-an openly available hand-built lexical thesaurus-has been used. To better identify the boundaries between blocks (paragraphs), the depth score is calculated and plotted to present the valleys and peaks. The depth score presents the depth of the valley which is a token-sequence gap. The plotted values can be smoothed to remove small gaps by using average smoothing. The scores used in the averaging formula are the depth scores of the blocks to the left and to the right of the token-sequence gap and the score of the token sequence gap. The blocks' boundaries will be adjusted to the nearest block break. For the evaluation, the results of the Text Tiling algorithm against human judgment of segmentation were compared and showed acceptable performance but there is still room for improvement. One of the suggested improvements is to decide the boundaries based on the subtopics hierarchy. Another suggestion is to improve the word sense calculation to better decide the similarity of words among adjacent blocks. In the same vein, we use similarity between segments to define segment boundaries. However, we apply a more elaborate characterisation approach which allows us to identify the stretch of a topic, called Thematic Progression Theory.

The Text Tiling approach has been utilised by He *et al.* (2020) where the similarity values between blocks have been plotted. The resulting curve is smoothed by using a sliding window over the interval points. The average similarity values within each window are calculated and placed in the middle of the windows.

Having done so, the local variations in the curve are terminated and highlighted to show large similarity variations.

Text Tiling techniques have been adopted by other researchers, e.g. in Ghinassi (2021) the approach was used for linear text segmentation. To calculate the similarity between adjacent blocks in the text, the two techniques Text Tiling and deep sentence encoding have been used. This includes extracting sentences from a document, using the sentence encoder to calculate sentence embeddings, selecting a window size to have blocks of sentences, computing the score of each sentence in a block using cosine similarities with the embedding- the average of the sentences in the adjacent blocks- then, calculating the depth scores for each position (sentence) in the window. The number of boundaries in the document is decided by the number of the highest depth scores; otherwise, the number of boundaries is the depth scores that fall above a predefined threshold. The evaluation with other methods revealed that this methodology produced better results when compared with unsupervised methods also based on Text Tiling. Meanwhile, this methodology did not compete well with supervised approaches when enough training data was available. This proved that using deep sentence encoders helps in improving the text segmentation and annotation which showed a potential to successfully apply it on different broadcasting media types. In comparison, our work does not rely on the similarities between sentence embeddings but on the similarities in topics in the adjacent segments. To identify the focus topic in the segments, we presume that the tackled domain should be presented with a domain taxonomy. Correspondingly, we have utilised transformer-encoders as a topic classifier to identify the focus topics in the segments. Accordingly, adjacent segments with the same focus topic will be aggregated to facilitate learning key areas in the domain.

Moreover, Miculicich & Han (2023) hypothesised that accurate text segmentation leads to a better summarisation prediction by the model. Accordingly, two methods have been used. One method is unsupervised where the improved Text Tiling model is used to calculate the similarity score between adjacent blocks of tokens with the aid of BERT embeddings. The other method is the supervised model that compares adjacent sentences to detect the beginning of a new section. The combined results from the two methods have been used to improve the accuracy of an extractive summarisation model.

To summarise, Text Tiling starts with segmenting text (initial segments) based on sentences from documents then deciding the boundaries by combining segments together. To do so, the similarities between the text in adjacent segments are calculated between the words in the text (Hearst, 1993, 1997a) or via using machine learning models (Ghinassi, 2021; Miculicich & Han, 2023).

In our work, we are using a video transcript as a source of domain related information. To be able to understand which domain areas presented in the video transcript, we decided to segment the video transcript into coherent parts–which is the same goal of Text Tiling approach. Accordingly, this approach is adopted in our work to help in generating initial segments but instead of segmenting based on paragraphs or sentences, we segmented the transcript into a window of 6 text lines segments which resembles the size of a paragraph. We have been inspired by the aforementioned work that adopts Text Tiling and uses contextual characterisation to recognise segments' contents and based on that aggregate adjacent segments. In our work, to better understand segments' content, we combine contextual characterisation and semantic tagging to identify domain key areas. Instead of deciding the segment boundary by calculating the patterns of co-occurrence of words in different segments and aggregate them as in Text Tiling, we characterise the video segments with domain topics and concepts. These topics and concepts are defined by domain taxonomy and use the taxonomy hierarchy to link related segments together to generate video narratives–our ultimate goal in this thesis. The second step of Text Tiling which is to aggregate adjacent segments that has the pattern of words co-occurrence, has been adopted but in a different way. To ensure that the aggregation of the segments is implemented coherently which serves our goal to support learning while watching video segments, we underpin the aggregation process with Thematic Progression Theory (see Section 3.3.2). This theory is used to teach coherent writing where the aggregation is based on the Theme and Rheme of adjacent paragraphs (video segments in our work). We use the focus topic as the Theme and the focus concept as the Rheme of a video segment. The use of the Text Tiling theory in generating video initial segments is described in (Section 3.5.2) and its implementation in the prime domain 'Giving

Pitch Presentations' is described in (Section 4.4.2) and its implementation in the second domain is described in (Section 6.4.2).

3.3.2 Thematic Progression (TP) Theory (Danes, 1974)

Text Tiling allows us to propagate the initial segments which shows a shift in the concepts based on the similarity between adjacent segments' text. Hence, we will use it as the basis to identify adjacent segments in the video that can be aggregated and the gap segments that can be interpolated. Since in our work we are using the video transcript only and to ensure that our aggregation mechanism is generic, we need a theory or an approach to guide us on how to aggregate small segments into larger segments. For that purpose, we will follow TP theory which is often used for analysing a student's writing coherence. TP is designed by Danes (1974) that is based on the systematic functional grammar theory which shows how to write in a cohesive manner. This means how to arrange the main components of a sentence (clauses) cohesively. Clauses are considered similar if they begin with the same elements. These elements are called Theme and the remaining elements of the clause are called Rheme.

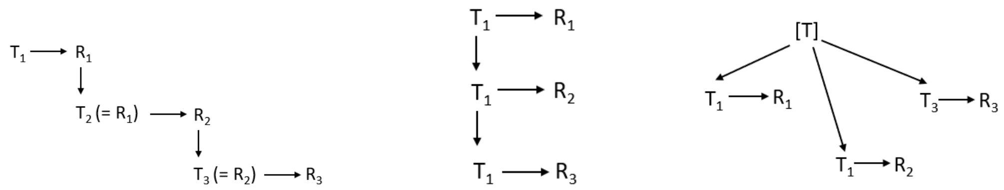
The basic terms used by this theory are 'Theme' and 'Rheme' which were defined by Halliday & Matthiessen (2014). He defines the term Theme as *the element that serves as the point of departure of the message* while the term Rheme is defined as *the part in which the Theme is developed* (Halliday & Matthiessen, 2014, pg.89). Accordingly, any sentence begins with a Theme and is supported by/ ends with a Rheme.

Based on these terms (Theme and Rheme), (Danes, 1974, pg.114) defines the TP theory as the *skeleton of the plot*. TP has been used by Danes (1974) to analyse scientific and professional text. Accordingly, three types of Thematic Progressions have been identified, see Figure 3.2:

(a) Simple Linear TP: the Rheme of one utterance (statement) becomes the Theme of the next utterance.

(b) TP with a Constant Theme: the Theme of one utterance becomes the same Theme of the next utterance.

(c) TP with Derived Themes: the utterance has multiple Themes.



(a) (b) (c)

Figure 3.2: (a) Simple Linear (b) Constant Theme (c) Derived Themes (Danes, 1974).

The Thematic Progression theory has been applied in many learning contexts. To help English non-native learners better understand the lectures and the learning materials that are delivered or written in the English language, both Theme and Thematic Progression Theory have been applied. Jing (2015) tried to help learners with being able to write cohesively by presenting them with an instructional package. This package is based on the Thematic Progression theory for Chinese students to improve their English writing. In Kuswoyo *et al.* (2020), to help Indonesian learners understand the Engineering lectures delivered in English, they examined the use of the Theme and Thematic progression theory. Their findings proved that if TP is followed by lecturers or writers, the learning materials will direct learners to the key point in the discourse. In the domain they tackled which is English Engineering lectures, both Constant and Derived TP were applied.

In this thesis we use TP theory when developing the aggregation mechanism to inform how to link the small segments. Considering the characterisation nature of the video segments that is identified in (Section 3.4) which consists of a set of focus topic(s) and focus concept(s). We can refer to the focus topic as Theme and the focus concept as Rheme. As the focus topic and its focus concept can be extended among adjacent segments in a video, we found the most suitable TP type for our work is Simple Linear as the focus concept (Rheme) is extended to be the focus in the adjacent segment(s). The description of how this theory is used to design VISC-L framework is in (Section3.5) and the implementation of this theory, as part of VISC-L, in the prime domain 'Giving Pitch Presentation' is described in (Section 4.4) and in the second domain 'Health Related Quality of

Life Awareness' is described in (Section 6.4).

3.3.3 Subsumption Theory For Meaningful Learning (Ausubel *et al.*, 1968)

The ultimate goal of our computational approach is to automatically generate video narratives to support learning. A video narrative is an account of domain topic(s) and concept(s) elucidated via video segments that are arranged following a specific structure. To be able to arrange the video segments, the hierarchy of their focus topic(s) and concept(s) should be identified. Accordingly, our knowledge driven approach presumed that the domain we tackle should be presented via a taxonomy that specified the hierarchy of the domain topic(s) and their concept(s). Additionally, we need to follow a systematic learning theory to guide the linking of the video segments that can be implemented by utilising the domain taxonomy. Correspondingly, Subsumption Theory (Ausubel *et al.*, 1968) seemed to be the most appropriate theory to adopt in this work as it has been applied to underpin learning using a taxonomical model.

A primary process in learning has been defined in Ausubel *et al.* (1968) as a subsumption in which new material related to relevant ideas in the existing cognitive structures is derived from learning experiences. A learners' cognitive structure is a hierarchical organisation of general (high inclusive) concepts from which there will be a link to specific (less inclusive) sub concepts. Ausubel argued that new material should be integrated with previously presented information through comparisons and crossreferencing of new and familiar concepts. Hence, during the learning process the new learning material interacts with the learners' cognitive structure and will be linked to the more inclusive concepts in it. However, if the learning material cannot be subsumed (linked) to an existing concept in the cognitive structure, then it will be classified as a high inclusive concept with no further subsumed concepts yet.

Four subsumption linking types, that link learning material to each other, have been identified by Ausubel Ausubel (2012):

(a) Combinational: when the new learning material is not super ordinate or sub ordinate with any existing ideas in the cognitive structure but rather can be learnt in combination with other, more generic, less relevant ideas.

(b) Correlative: when the the new learning material is an elaboration of a previously learned idea.

(c) Derivative: when the new learning material is an example of an idea that exists in the cognitive structure.

(d) Super-ordinate: when the new learning material is related to a generic idea in the cognitive structure.

Successful adoption of Subsumption theory for meaningful learning includes using concept maps (Katagall *et al.*, 2015; Liu *et al.*, 2018) that allow learners to group information in related modules, making the connections between modules more apparent. While concept maps provide domain structure, they do not allow reasoning and automation. Similarly to concept maps, taxonomies can define the main concepts and relationships in a domain. In addition, using taxonomies (or more generic ontologies) allow reasoning to automate the generation of instruction paths through the domain. Therefore, instead of concept maps, we use a taxonomy to represent the domain.

Similarly to Al-Tawil *et al.* (2020), who operationalises Subsumption Theory to generate information exploration paths through a large knowledge graph, we explore the hierarchical relationships between domain taxonomy concepts to identify how to link content. In this thesis, the **fundamental difference** is that we first need to characterise video segments by mapping them to a taxonomy which allows the subsumption processes proposed by Ausubel. To do that, we firstly identify focus topics and concepts of video segments using reasoning over the hierarchical links in the taxonomy. This enables subsumption links (Derivative, Correlative, Super-Ordinate, and Combinational subsumption) to combine video segments for meaningful learning, as described in (Section 3.6). The implementation of Ausubel Subsumption Theory in the prime domain 'Giving Pitch Presentations' is described in (Chapter 5) where the output is evaluated by domain experts and advanced learners using Amazon Mechanical Turk. Additionally, the theory is implemented in the second domain 'Health Related Quality of Life' is described in (Section 6.5) and the output is evaluated with domain experts as described in (Section 6.6).

3.4 Preliminaries

This section includes the main definitions used in the formal description of the domain context, frameworks and the algorithms throughout this thesis.

Definition 1: Video segment. A video segment VS is a video interval that has: an id which is a YouTube video ID with a number relating to its position in the video as a video can include several segments, a start time VS_{s} (with respect to the start of the full video from which this segment comes) and an end time VS_{e}. We assume that each video has a transcript (text) VS_{t}. Consequently, each video segment is associated with an id, start time, end time and a transcript representing the presenter utterance in the segments, $VS = \langle\ VS_{\text{Id}}, VS_{\text{s}}, VS_{\text{e}}, VS_{\text{t}}\ \rangle$.

Definition 2: Domain taxonomy. We assume that the domain is defined with a taxonomy $\Omega = \{C, H\}$ which consists of classes and individuals (that belong to these classes). C is a non empty set of relevant domain classes and individuals which are linked via a hierarchy H. We use $c_i \in C_j$ to denote that c_i is an individual of a class C_j meaning that c_i is directly beneath C_j in the taxonomy hierarchy. We refer to the immediate classes of the root of the hierarchy as domain topics T_i, where each T_i is a set of classes and each class is a set of its individuals, $T_i = \{C_1, ..., C_m\}$, m > 0, i.e. $C_i \in T$. Throughout this thesis, any class C_i at the very top level in the taxonomy hierarchy will be referred as T_i, see Figure 3.3. Hereafter, we are going to call any domain entity (class C_j or individual c_i) mentioned in the video transcript as a concept. This is also because in learning (which is the focus of our work), teachers refer to the domain as concepts not classes or individuals.

Using semantic tagging, we can link a video transcript to concepts (classes or individuals) in the taxonomy. The mentions of a concept c_i in a video segment transcript VS_{t} accumulate all the explicit mentions of c_i, i.e. the function $f(c_i, VS_{\text{t}}) > 0$, indicates the number of times that the concept c_i has been mentioned explicitly in the video segment transcript VS_{t}. For each video segment VS we identify the domain concepts mentioned at least once in the transcript VS_{t} as $f(C_j, VS_{\text{t}}) > 0$ which indicates the number of times that the concepts C_j

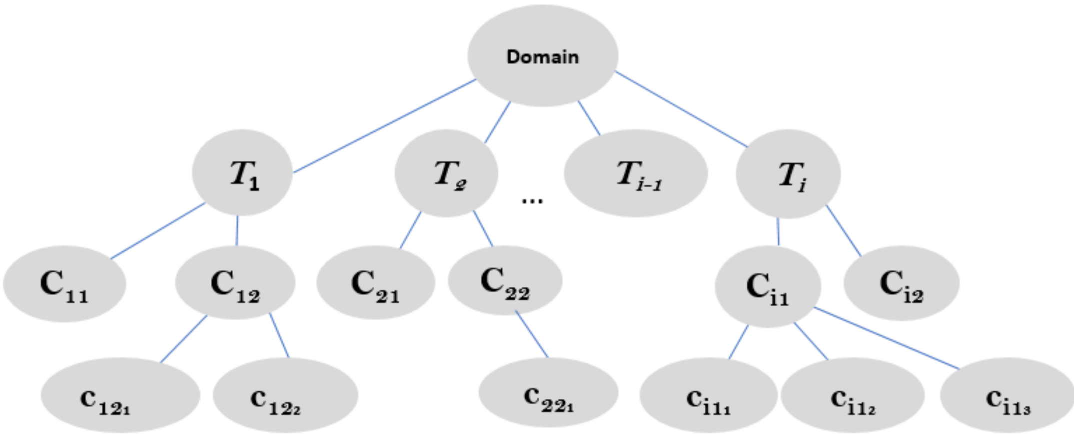


Figure 3.3: Domain taxonomy. The top classes T represent the main domain topics. The hierarchy of a concept (class or individual) represent its path to the main topic, e.g. $c_{i1_1} \in C_{i1}$ and the latter is $\subseteq$ of the topic T_i (which is one of the top classes in the taxonomy). Hence, the path of the concept c_{i1_1} is: $c_{i1_1} \rightarrow C_{i1}$ $\rightarrow T_i$.

have been mentioned in the text VS_{t} explicitly or implicitly–if at least one of its concepts (individuals) c_i has been mentioned explicitly. This is because these concepts C could be classes or individuals. Using the taxonomy hierarchy, we can implicitly identify the topic T of the mentioned concepts by referring them to their topic.

Definition 3: Concept Path. It represents the hierarchy of the concept (class or individual) in the domain taxonomy to reach its topic. For example, the path PC of a concept c_i (which is an individual in this example) will be: $PC(c_i)$ $= \langle c_i, C_j, T_i \rangle$, this indicates that the concept $c_i \in$ (class) C_j and $C_j \subseteq$ (of top class in the taxonomy hierarchy) T.
Based on the above definitions, we can define the Focus Topic and Focus Concepts presented in the video segment transcript.

Definition 4: Focus Topics. A focus topic FT in the transcript of a video segment is one of the top classes in the taxonomy hierarchy which is mentioned explicitly or implicitly if at least one of its concepts (classes or individuals) has a notable number of mentions in the video segment transcript VS_{t} which we indicate with a parameter θ. The function f is to calculate the frequency that FT_{i} is mentioned in the video segment transcript $f(FT_i, VS_{\mathrm{t}})$ where $f(FT_i, VS_{\mathrm{t}}) \geq \theta$. Depending on θ, a video segment can have several focus topics (for example, in the application presented in the (Section 3.5.3), we used $\theta \geq 1/3$ (third) of all concepts or topics mentions number). However, in case all the mentioned concepts in the video segments belong to a single domain topic then we use Ft to denote that it is a single focus topic not a set of focus topics FT.

Definition 5: Focus Concepts. Within a focus topic, we can identify corresponding focus concepts (classes or individuals). A set of Focus concepts FC within the focus topic FT as expressed in the transcript of a video segment VS_{t} is defined as the mentions frequency of focus concepts in the video transcript. The function f is to calculate the frequency that a FC_{i} is mentioned in the video segment transcript $f(FC_i, VS_{\mathrm{t}})$ where $f(FC_i, VS_{\mathrm{t}}) \geq \theta$. Depending on θ, a video segment can have several focus concepts within the same focus topic. However, if none of the mentioned concepts in the segment transcript passed the condition $f(FC_i, VS_{\mathrm{t}}) \geq \theta$, then these concepts will be considered as mentioned but not as a focus in the video segment. In case there is only one concept that is mentioned in the video segment and its mentions $\geq \theta$ then we use Fc to denote a single focus concept.

Definition 6: Characterised Video Segment. Any video segment VS that has assigned focus topics FT and focus concepts FC, after implementing the characterisation algorithms, is called a characterised video segment Ch. Correspondingly, a characterised video segment will have its: id, start time, end time, transcript (text) and the focus topic(s) and a focus concept assigned to it: $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC \rangle$. In case a video segment has only one focus topic where only one of its concepts is a focus then the definition will be: $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, Ft, Fc \rangle$

Definition 7: Video Narrative (VN) is a sequence of characterised video segments which are linked based on a specific domain linking type.

VN is based on two components, the $(FT$ or $FC)$ to be learned and a sequence of video segments containing this $(FT$ or $FC)$ in their characterisation and these segments are linked following domain linking. Notice that the focus topic can be a set of focus topics FT or a single focus topic Ft which is based on the type of the domain linking followed to generate the video narrative. Similarly, focus concepts can be a set of focus concepts FC or a single focus concept Fc.

Following Ausubel's Subsumption Theory, we define four types of narratives that are based on the main subsumption links and utilise the domain taxonomy. In our work, each video narrative has a duration of ≥ 3 minutes and ≤ 6 minutes and this is based on the recommendation in (Brame, 2016) where the duration of educational videos should not exceed 6 minutes.

Definition 8: Derivative Video Narrative (D) is a type of video narratives that defines the learning to have the generic concept in the cognitive structure first before introducing one of its specific concepts to bind with it. Hence, to learn the specific concept c_i, the learning should start from the generic C_j, where $c_i \in C_j$. Consequently, the structure of the Derivative narrative will start with a group of video segments from the set of input segments which focus on the generic concept. Each video segment in this group has this definition: $Ch = \langle VS_{\text{Id}}, VS_{\text{s}}, VS_{\text{e}}, VS_{\text{t}}, Ft, FC_j \rangle$. Then, the Derivative narrative ends with a group of video segments that focus on the specific concept c_i and have this characterisation: $Ch = \langle VS_{\text{Id}}, VS_{\text{s}}, VS_{\text{e}}, VS_{\text{t}}, Ft, Fc_i \rangle$. Notice that both concepts c_i and C_j belong to one topic Ft.

Definition 9: Super-Ordinate Video Narrative (S) is a type of video narratives that defines the learning to have the specific concept in the cognitive structure first before introducing its generic concept to bind with it. Hence, to learn a generic concept C_j, the learning starts from one or more of its specific concept(s) c_i, where $c_i \in C_j$. The structure of the Super-Ordinate narrative will start with a group of video segments from the set of input segments with the following characterisation $Ch = \langle VS_{\text{Id}}, VS_{\text{s}}, VS_{\text{e}}, VS_{\text{t}}, Ft, Fc_i \rangle$. Accordingly, the specific concept c_i is in the cognitive structure now and ready to bind to its generic concept C_j. Therefore the last group of video segments in the

Super-Ordinate narrative structure will have the following characterisation $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, Ft, FC_j \rangle$ where both the generic concept C_j and the specific concept c_i belong to the same topic Ft.

Definition 10: Correlative Video Narrative (CR) states that to learn a target concept c_i, the learning starts from one or more of its similar concepts (same level in the taxonomy hierarchy). Hence, to learn a target concept c_i, the structure of the Correlative narratives starts with video segments that focus on similar concepts to it c_{i-1} and c_{i+1}. Hence the video segments have the following characterisation: $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, Ft, Fc_{i-1} \rangle$ and $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, Ft, Fc_{i+1} \rangle$ respectively. The last group of the video segments will focus on the target concept c_i, $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, Ft, Fc_i \rangle$ where c_{i-1}, c_i, $c_{i+1} \in C_j$ and $C_j \subset T_i$.

Notice that all the concepts (class C_j and individuals c_{i-1}, c_i, and c_{i+1}) belong to one topic Ft.

Definition 11: Combinational Video Narrative (CO) means learning two topics together by exploring how some of their concepts are related to each other as they are mentioned in the same video segment. Hence, to learn the topics T_i and T_j, the Combinational narrative will list a group of video segments from the input set of segments that have the focus concepts c_i and c_j from the topics T_i and T_j respectively. Each selected segment to be in the Combinational narrative will have the following characterisation: $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC \rangle$. Hence, FT refer to the two topics to be learnt and FC refers to the set of focus concepts (classes or individuals belong to the focus topics and mentioned together in the same video segment).

Definition 12: Augmented Video Narrative is when we augment the Video Narrative with text to make it suitable for learning as the sequence of video segments alone is not sufficient for learning.

These definitions will be used when presenting the frameworks VISC-L and VIN-L in (Section 3.5 and 3.6).

3.5 Video Segmentation and Characterisation for Learning (VISC-L) Framework

The first step of our computational approach is to define ways of segmenting and characterising videos. In order to make it generic to ensure it is applicable in different domains, contexts and independent on the area of learning, we define a framework for video segmentation and characterisation which we call VISC-L.

These algorithms are not novel but they are part of the novel framework (VISC-L) which is presented in Figure 3.4. It includes three main steps which is implemented in their order as presented in Figure 3.4 where the output of one algorithm is the input of the following algorithm. These algorithms, according to their order, are: Input, Initial Segments (Algorithm 1) where the initial segments are generated, Segment Characterisation (Algorithm 2) where the initial segments will be characterised, and Aggregation (Algorithm 3) where the characterised adjacent video segments is aggregated based on the common domain topic(s) and concept(s).

The novelty of VISC-L is represented by the combining of the Semantic Tagging characterisation and Topic Classifier characterisation which is different from other methodologies as described in (Section 2.3.3). Hence, the final video segment characterisation is represented by the: segment Id, segment start time, segment end time, segment transcript, the focus topic and the focus concept. The application of these algorithms in the selected domains is described in (Chapter 4 and 6). This kind of characterisation is essential to link different video segments from different videos as described in (Chapter 5 and 6).

3.5.1 Input

VISC-L is based on two assumptions. Firstly, it is assumed that the *video transcript* relates to the domain which will be learned. Hence, the text in the video transcript is taken as an input. The second assumption is that there is a *domain taxonomy*, refer to Definition 2. The taxonomy of the available ontologies, the Linked Open

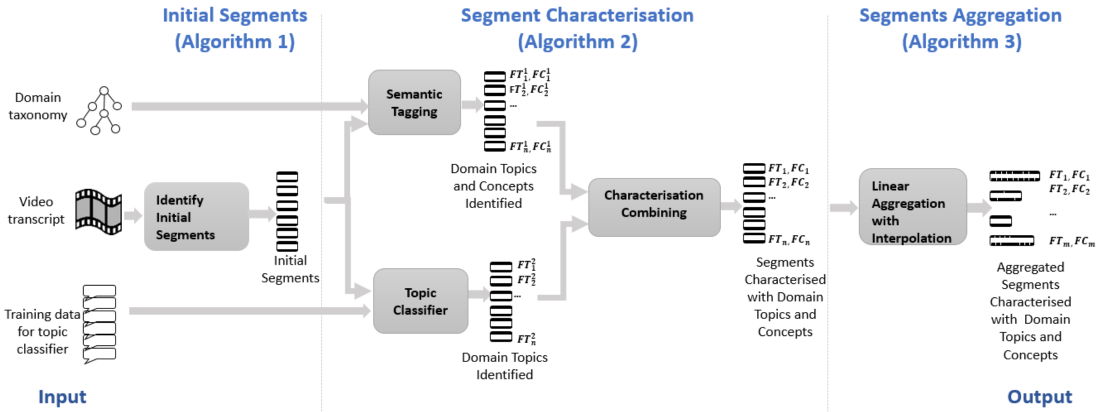


Figure 3.4: Video segmentation and characterisation framework. Notice that FT means a set of focus topics and FC means a set of focus concepts within the focus topics, e.g. T_1C_1 means there is a set of focus concepts FC_1 in the focus topic FT_1.

Data Cloud [1] can be used or the domain taxonomy can be developed with domain experts. The latter is used in this work. With the first domain, we used the available domain ontology (Chapter 4), while with the second domain we built the domain taxonomy manually as described in (Section 6.2). The implementation of the VISC-L framework requires a domain taxonomy. If a domain taxonomy is not available, it can be generated either manually or automatically (Avron *et al.*, 2022; Liu *et al.*, 2012; Robin *et al.*, 2017). The need for a domain taxonomy is further discussed in the limitations, see Section 7.3).

If there is no pre-selected set of videos related to the domain, the domain taxonomy can be used to automatically collect videos from available social platforms (like YouTube). Following the concept hierarchy, a search schema can be developed, similarly to Pritoni *et al.* (2021). For example, using a combination of $< Domain, t_i, c_i,$"tutorial"$>$ as search terms, videos with tutorials related to the concept c_i (class or individual) from topic t_i in the domain can be collected. The word "tutorial" can be replaced with other words [lectures/tutorials/conversations, patient stories, etc.] based on the required videos that relate to the domain to be learned. Although the collection of the videos from YouTube has been done

[1] https://lod-cloud.net/[Accessed: March 2021]

automatically, the checking of the videos, to select domain related videos only, has been done manually. Hence, the method of video collection is semi-automatic.

In order to identify the main topics in the video transcripts, as part of the characterisation step, *training data* with domain topics as labels is needed. This can either be created with expert annotators, collected from past user interactions or automatically created (the latter two options are followed in the application of VISC-L in the prime and second domain, respectively). The collected video transcripts are passed as an input to the VISC-L framework.

3.5.2 Initial Segments

Following the Text Tiling approach we start with initial segments. Then, these segments are aggregated following TP theory to get larger coherent units (e.g. paragraphs). Hence, we include an initial segmentation step where the video transcripts are cut into small segments and are aggregated based on their characterisation. The size of the video segment can be decided using a window of text lines that has a specific size. For example, in Hearst (1997a), as described in Section 3.3.1, the tokens within a text are grouped into blocks of size K(3 to 5 sentences long) each and K represent the average paragraph length within the actual text. Video transcript doesn't consist of paragraphs but text lines, that represent the utterance, where most of the text lines are shorter than a normal sentence in a document. For that reason, in our work, the size of the video segments is determined by two conditions: it should include at least 6 text lines from the utterance, and the last text line should include one of the end of sentence punctuation symbols, $[., ?, !]$. This punctuation determines a segment boundary. Adding to that, these are initial segments, where the final segment is an aggregation of the adjacent segments that has the same focus topic and concept where the size of the aggregated segments can be increase. Hence, our segmentation Algorithm 1, presented next, describes the initial segmentation step of VISC-L where it divides video transcript text lines into segment. The tracing of this algorithm is in (Appendix A). The output of this algorithm is used as an input to the next step of VISC-L. This algorithm is not new or original but it is part of the original framework VISC-L and we run it on each video we have in our input data.

Algorithm 1: VISC-L–Initial segments

Data: V_{id}, V_t and V_s /∗ *V_{id} is a YouTube video id. V_t is a list of video transcript's text lines where each text line is a list of characters. V_s is a list of the start time of each text line in the video. Both V_t and V_s have the same length*∗/

Result: List of video segments L /∗ *List of lists where each list includes: segment Id, start time, end time, transcript of video segment*∗/

punctuationList = ["." , "?", "!"] /∗ *Used to smoothen the segment boundary* ∗/

textCounter = 0 /∗ *Used to go through V_t* ∗/

segmentStartTime=0; *segmentEndTime*=0; *n*=0 /∗ *used to number the segments* ∗/ ; *segmentId*=' ' /∗ *It is a string which is a combination of V_{id} and n* ∗/; *textLines* = []; *L*=[]; $\theta = 6$ /∗ *Starting with 6 text lines* ∗/

while *textCounter* $+\theta <$ *length(V_t)* and *textCounter* $<$ *length(V_t)* **do**

    /∗ *length (V_t): returns the number of text lines in the video transcript. The loop should stop if the number of the remaining text lines in the transcript $+\theta \geq$ length(V_t). The loop also should stop if there are no remaining lines where textCounter $\geq$ length (V_t)*∗/

    if *textLines =[]* **then**

        segmentStartTime=V_s [*textCounter*];

        $n = n + 1$; *segmentId*=string(V_{id} +*n*);

        for $i = 0$ *to* θ **do**

            textLines.append(V_t[*textCounter*]);

            textCounter = *textCounter*+1

    /∗ *Check the segment boundary* ∗/

    if *intersection(punctuationList, V_t [textCounter-1])* $\neq \phi$ **then**

        segmentEndTime=V_e [*textCounter*-1]; *L*.append([*segmentId*, *segmentStartTime*, *segmentEndTime*, *textLines*]);

        textLines = [] /∗ *To start new video segment* ∗/

    else

        textLine.append(V_t[*textCounter*]);

        textCounter = *textCounter*+1 /∗ *Keep adding more text line to find any of the punctuationList* ∗/

if *textCounter* $+\theta \geq$ *length*(V_t) **then**
    /* *Either create a new segment to include the remaining text lines or add the remaining text lines to the current segment* */
    if *textLines* =[] **then**
        segmentStartTime=V_s [*textCounter*];
        $n = n + 1$;
        segmentId=string(V_{id} +n);
    for i = *textCounter* $- 1$ *to length* (V_t) **do**
        textLines.append($V_t[i]$);
        textCounter = *textCounter*+1;
segmentEndTime=V_e [*textCounter*-1];
L.append([*segmentId*, *segmentStartTime*, *segmentEndTime*, *textLines*]);
Return L

3.5.3 Segment Characterisation

In order to aggregate the initial segments, we need to identify what domain content is presented in each segment. This is done during the segment characterisation step which links each video segment VS with a set of domain focus topics FT and a set of domain focus concepts FC (classes or individuals) that are presented in the transcript of the segment. The outcome is the characterised segment (see Definition 6) which includes information about: the video Id, beginning and end of a segment referring to its position in the video footage, segment's transcript, domain FT and FC. The segment characterisation enables linking related domain areas from different videos following the domain taxonomy.

To produce segment characterisation, we propose to combine two algorithms: Semantic Tagging (using the domain taxonomy) and Topic Classifier (using a language model). Then, the outcomes from both algorithms are combined to obtain the segment characterisation.

Semantic Tagging. This is the first characterisation step where we apply the semantic tagging algorithm which we developed in our work Mohammed &

Dimitrova (2020), see Figure 3.5. This semantic algorithm links each video segment to its focus topics and focus concepts by mapping the terms from the domain taxonomy to the text in the video transcript. It first pre-processes the transcript[1] : tokenising the transcript, cleaning it from stop words and punctuation, and selecting nouns and noun phrases to match them with the taxonomy terms. If there is a match, the taxonomy concept c_i is identified (tagged to the text), noting also the path to reach a top level concept (i.e. linking to a focus topic T, $c_i \in T$). Based on Definition 4 and 5 from (Section 3.4), each segment VS_i is linked to a set of focus topics FT^1 and their corresponding focus concepts FC^1; where ^{1} indicates that this is an output from the first segment characterisation algorithm).

A key challenge for this algorithm is word sense ambiguity. This is not that prominent with carefully selected videos. However, if the videos are selected automatically from open social spaces, there will be a need of word sense disambiguation. To do this, we disambiguate the focus topics based on context, which is done with the second step of segment characterisation which is Topic Classifier.

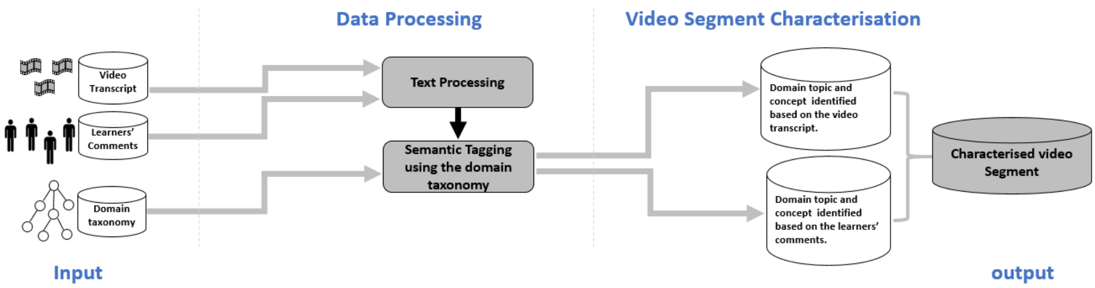


Figure 3.5: Video Segment Characterisation Pipeline

Topic Classifier. This is the second algorithm which identifies a domain topic based on the context of that topic to overcome the issue of word sense ambiguity. This issue happens when same word has different meaning when used in different domains, e.g. the word bank has two different meanings: either river bank or a financial institution. Following the latest development in

[1]We have used the Natural Language Tool Kit (NLTK) `https://www.nltk.org/`[Accessed: May 2021]

natural language processing, we use Bidirectional Encoder Representations from Transformers (BERT) (Devlin *et al.*, 2018) as a topic classifier. BERT embeds pre-trained deep bidirectional representations from unlabelled text by jointly conditioning on both left and right context in all layers. Accordingly, it can be fine-tuned with just one additional output layer to create state-of-the-art models for different language tasks, topic classification in this case. First, the BERT model is fine-tuned using training data with domain topic labels (which is part of the input for VISC-L). Then, the fine-tuned model is used as a classifier to link each segment VS_{i} to its domain topics FT_i^2 (where ^{2} indicates that this is an output from the second segment characterisation algorithm).

Characterisation Combining. This is the last step in the segment characterisation phase where the output from each algorithm (Semantic tagging and Contextual Classification) is combined. For each segment Ch_{i}, the outcomes from the two algorithms $Ch_{\mathrm{i}}=\langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT^1, FC^1\rangle$ and

$Ch_{\mathrm{i}}=\langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT^2\rangle$ are combined by intersecting the focus topics $FT_i^1 \cap FT_i^2$ to find the common focus topic FT_i and selecting the focus concepts FC_i from FC_i^1 that belong to FT_i. Hence, the final characterisation outcome is that each segment is characterised by $Ch_{\mathrm{i}}=\langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC\rangle_{\mathrm{i}}$ (a set of focus topics FT_i and their concepts FC_i).

Algorithm 2 includes the steps we run to do the segment characterisation step of VISC-L and its tracing is in (Appendix B).

Algorithm 2: VISC-L- Algorithm (Segment Characterisation)

Data: List of video segments L which is the output of Algorithm 1 and domain taxonomy topics = $\{T_1, ..., T_n\}$ where each T_i is a set of concepts (classes or individuals).

Result: List of Characterised Video segments LCh.

/∗ *LCh is a list of lists where each list includes: a segment information [segmentId, start time, end time, transcript], a list of Focus Topics FT and a list of Focus Concepts FC* ∗/

$i = 0$; FT= []; LCh=[]; $SemanticTaggingOutput$=[]; $TopicClassifierOutput$=[];

  /∗ *Loop through all video segments. Each segment will have two characterisations, one from the Semantic Tagging and the other one from the Topic Classifier characterisation which are parts of the the Segment Characterisation steps of VISC-L* ∗/

while $i <$ *length(L)* **do**

  $SemanticTaggingOutput$=[L[i], $FT^1[i], FC^1[i]$] /∗ *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics (FT^1) and Focus Concepts (FC^1)* ∗/

  $TopicClassifierOutput$=[L[i], $FT^2[i]$] /∗ *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics (FT^2)* ∗/

  FT[i] = intersection($FT^1[i]$, $FT^2[i]$) /∗*FT is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* ∗/

  if $FT[i] \neq []$ **then**

    LCh.append([L[i], $FT[i], FC$[i]]) /∗ *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic FT[i]* ∗/

  else

    LCh.append([L[i], [], []]) /∗ *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* ∗/

  $i = i + 1$;

Return LCh

3.5.4 Segment Aggregation

After characterising the video segments and to decide how to aggregate these segments to complete the segmentation work, we have examined the result. We have noticed that most of the adjacent segments within a video have similar focus topic and concept. Accordingly, the next step in VISC-L, after segment characterisation, is to aggregate the adjacent segments based on the similarity in their focus topic and concept which corresponds to boundary finding (as described by Text Tiling). For that purpose, we have developed an aggregation algorithm based on Thematic Progression (TP) theory (Danes, 1974), see (Section 3.3.2).

Relating to video segments and their characterisation, we associate the focus topic with the segment's Theme (i.e. the main clause) and the focus concepts with the segment's Rheme (the part of the sentence where the Theme is developed). The Simple linear Theme pattern was selected as the most appropriate (as described in Section 3.3.2), as it allows for keeping a continuous focus topic and focus concept along the aggregated segments. Some segments can be without characterisation which can be because the speaker is silent or is digressing from the domain. If we look strictly for adjacent segments, these gap segments which break the topic flow will lead to starting a new aggregate. Following (Hearst, 1993), as described in Section 3.3.1, we smoothen the boundaries between adjacent blocks by removing small gaps using interpolation. If the segments before and after a gap segment have common focus concepts, it is assumed that the common concepts are spread across the three segments. Hence, the gap segment is interpolated in the aggregated segment. Examples of Linear Aggregation with Interpolation are presented in both Section 4.4.4 and Section 6.4.4.

Below we propose a linear aggregation with an interpolation algorithm (see Algorithm 3) where the tracing of this algorithm is in (Appendix C).

Algorithm 3: VISC-L–Linear Aggregation with Interpolation

Data: List of characterised video segments *LCh* which is the output of Algorithm 2. Each characterised segment LCh_i has the following elements: at position 0 is the list of [segmentId, start time, end time, transcript], at positions 1 and 2 are the lists of the Focus Topics (FT) and the Focus Concepts (FC), respectively.

Result: List of aggregated video segments (*LAgg*).

1 $i = 0$; *gap*= []; *newSeg*= [] /* *Temporary holder of the aggregates* */ *LAgg*=[]; $\theta = 30$ /* *Setting to 30 seconds duration* */

2 *AggFT*=[] ; *AggFC*=[]; /* *AggFT and AggFC are the Focus Topic and Focus Concept of the aggregates, respectively* */

3 **while** $i + 1 <$ *length(LCh)* **do**

4     $s_1 =$ *LCh*[i] /* *Check the first segment s_1 has a FC* */

5   **if** s_1*[2]* = [] **then**

6   /* *No Focus Concepts (FC), save s_1 as a single segment* */

7   *LAgg*.append(s_1); $i = i + 1$; go to step 3;

8   **if** *i+1 < length(LCh)* **then**

9         $i = i + 1$; s_2 =*LCh*[i] /* *Take the adjacent segment* */

10   **else**

11   go to step 44 /* *If it is the end of the list, do the required saving* */

12   **if** *intersection(s_1[2], s_2[2])* $\neq$ *[]* **then**

13   /* *Aggregate the adjacent segment and save the FC to AggFC and FT to AggFT* */

14   *AggFC*=intersection(s_1[2], s_2[2]); *AggFT*=intersection(s_1[1], s_2[1]);

15   *newSeg*.append(s_1); *newSeg*.append(s_2); s_1 =[]; s_2 =[]; got to 23 /* *Exit this loop and start to read one segment at a time and compare its FC with the AggFC* */

16   **else**

17   /* *Either save s_2 as a gap segment or save s_1 as a single segment and make $s_1 = s_2$. In both cases read a new s_2* */

18   **if** *(s_2[0][2]- s_2[0][1])* $\leq \theta$ **then**

19   *gap*.append(s_2); s_2 =[]; go to step 8;

20   **else**

21   *LAgg*.append(s1); $s_1 = s_2$; $i = i + 1$; go to step 8;

/* *This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment* */

while *i+1 < length(LCh)* **do**

  $i = i + 1$; s_2=LCh[i];

  if *intersection(AggFC,* s_2[2]*)* $\neq$ *[]* **then**

    if *gap* $\neq$ *[]* **then**

      newSeg.append(gap); *newSeg*.append(s_2); s_2 =[];*gap* =[];

    else

      newSeg.append(s_2);s_2 =[];

  else

    if *duration(*s_2*)* $\leq \theta$ **then**

      gap.append(s_2); s_2 =[];

    else

      /* *Before starting a new aggregate, call Function Saving 1* */

      Call Function Saving 1; $s_1 = s_2$;s_2 =[]; Go to step 5; /* *Start a new aggregate* */

Function `Saving 1()`:

  if *gap* $\neq$ *[]* **then**

    newSeg.append(*gap*); *gap* =[];

  if *newSeg* $\neq$ *[]* **then**

    LAgg.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]], AggFT, AggFC]) /* *Save the id, start time of the first segment and the end time of the last segment in the aggregates list with the AggFT and AggFC* */

  if s_1 $\neq$ *[] and* s_1 *not in newSeg and* s_1 *not in LAgg* **then**

    LAgg.append(s_1); s_1 =[];

  return $gap, newSeg, s_1, LAgg$;

Call Function Saving 1;

if s_2 $\neq$ *[] and* s_2 *not in newSeg and* s_2 *not in LAgg* **then**

  LAgg.append(s_2);

Return *LAgg*

3.5.5 Output

The output of VISC-L is a set of characterised video segments with: id, a start time, end time in the corresponding video and transcript. Each characterised video segment Ch_{i} has a set of domain focus topics FT_i (top classes in the taxonomy) and a set of concepts FC_i (classes or individuals) from the focus topics which are mentioned in the transcript of the video segment. These characterised video segments represent the input to the VIN-L framework which is used to generate domain related video narratives.

3.6 Video Narratives for Learning (VIN-L) Framework

Similarly to the VISC-L framework which is generic and can be applicable in different learning domains and contexts, we propose a generic framework for generating video narratives to support learning (VIN-L). The overall architecture of VIN-L framework is presented in Figure 3.6.

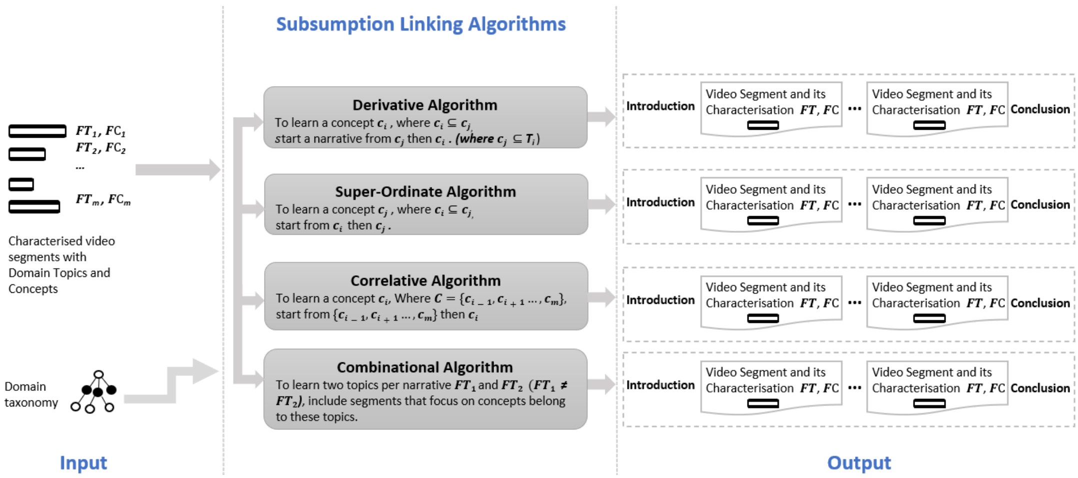


Figure 3.6: VIN-L Framework. The taxonomy is a list of topics which are top level in the taxonomy structure (black nodes), and a list of concepts (classes or individuals) C (white nodes).

Although Ausubel theory has been adopted by different researches as described in (Section 3.3.3), the novelty of the video narratives is represented by the VIN-L framework that includes four algorithms each designed following Ausubel subsumption theory to generate four types of video narratives. These narratives, that link video segments from different videos, have been evaluated in two different domains in terms of their quality, perceived usefulness to support learning (see Chapter 5 and Section 6.5). VIN-L includes three main phases: Input, Subsumption Linking Algorithms and Output. The input is the aggregated video segments and the domain taxonomy. The Subsumption Linking Algorithms are designed based on Ausubel's subsumption Theory that defined in (Section 3.4), Definitions 7, 8, 9, 10 and 11. The output includes the four types of video narratives generated from the four types of Subsumption Linking Algorithms. The duration of the generated video narrative should be ≥ 3 minutes and ≤ 6 minutes as described in (Section 3.4), Definition 7.

3.6.1 Input

To be able to implement VIN-L, we first assume the availability of the domain related video segments characterised based on the domain taxonomy which, in our work, is the output of the VISC-L framework. Secondly, we assume the availability of the domain taxonomy that is utilised to implement the Subsumption Linking Algorithms.

Domain taxonomy. We are using the domain taxonomy defined in (Section 3.4), Definition 2. The Linked Open Data Cloud, as discussed in (Section 3.5.1), can be used or the taxonomy can be developed with experts (the latter is used in this work).

The Characterised Video Segments. The output of the VISC-L framework is video segments that have been characterised with domain FT and FC as defined in (Section 3.4), Definition 6. The segment characterisation is used to implement the four Subsumption Linking Algorithms.

3.6.2 Subsumption Linking Algorithms

Here we are explaining the implementation of Ausubel's Subsumption Theory Ausubel *et al.* (1968) which defined four types of linking (Derivative, Super-ordinate, Correlative and Combinational). The subsumption link definitions revolve on human cognitive structure that help in binding prior and new knowledge. Based on their definitions in (Section 3.4) we have designed four Subsumption Linking Algorithms (Derivative, Super-ordinate, Correlative and Combinational). Ausubel theory as a cognitive theory that is described in (Section 3.3.3) is different from learning style where the latter can be defined by, e.g. an interview with learners and can be assessed by using e.g. questionnaires, after using the learning materials. In this thesis, we are focusing on linking the video segments by generating video narratives based on how the information reside in the cognitive structure. Then, we evaluated the video narratives in terms of their quality, perceived usefulness and cognitive work load. From the evaluation studies we have obtained the information about the average number of experts and learners preferring one type of narratives over the other type due to their cognitive preferences. In future work, another type of analysis between video narratives, which is similar to comparing learning styles, can be conducted by embedding these video narratives in a learning platform.[1]

Derivative Linking. It helps to learn a specific concept by exploring its generic concept first to be able to link them together. The design of the Derivative algorithm is based on its definition in (Section 3.4), Definition 8. Hence, referring to the taxonomy structure presented in (Figure 3.7), to learn the specific concept c_{22_1}, the Derivative algorithm first introduces the generic concept C_{22} via a group of video segments that focus on it and places these segments at the beginning of the narrative. Then, the Derivative algorithm select the video segments that

[1]For example, in Zapalska & Dabb (2002) four types of learning styles have been mentioned: concrete (where learners use a concrete object to learn in a real way), abstract (learners pay attention to details), sequential (learners are organised and tend to follow instructions), and random (learners are not sequential but holistic). As a future work (Section 7.4.2), the narratives can be embedded in a learning platform to make an analogy between the Derivative linking and random learning style and between the Super Ordinate linking and the sequential learning style.

focus on the specific concept c_{22_1} and add these segments to the narrative. The algorithm below shows the steps we followed to implement Derivative subsumption linking to generate the Derivative narratives.

The input to the algorithm is the list of the characterised video segments and a list of the taxonomy concepts' paths. A path of a concept c_i, as defined in (Section 3.4), Definition 3, is: $PC(c_i)= \langle c_\mathrm{i}, C_\mathrm{j}, T_\mathrm{i} \rangle$. To learn a specific concept c_i, the algorithm first iterate through the list of the characterised video segments and match their focus concepts with the concepts c_i from the concept path. Hence, if the FC of a segment includes C_j (the immediate parent concept of c_i) then this segment is selected for the first group in the Derivative Video Narrative (D). Whilst, if the FC of the segment includes the concept c_i (the concept to be learnt) then this segment is selected for the second group of the segments in the D. The duration of the selected segments for the D does not exceed six minutes (as described in Section 3.4), Definition 7. If the duration is <= 6 minutes then include all the collected segments in D; otherwise, we select some of the collected segments from both groups to prevent exceeding the 6 minutes duration of the D. Examples of the generated Derivative narratives in both domains are described in (Chapter 5 and 6). Algorithm 4 includes the steps we followed to generate the Derivative narratives and the tracing of this algorithm is in (Appendix D).

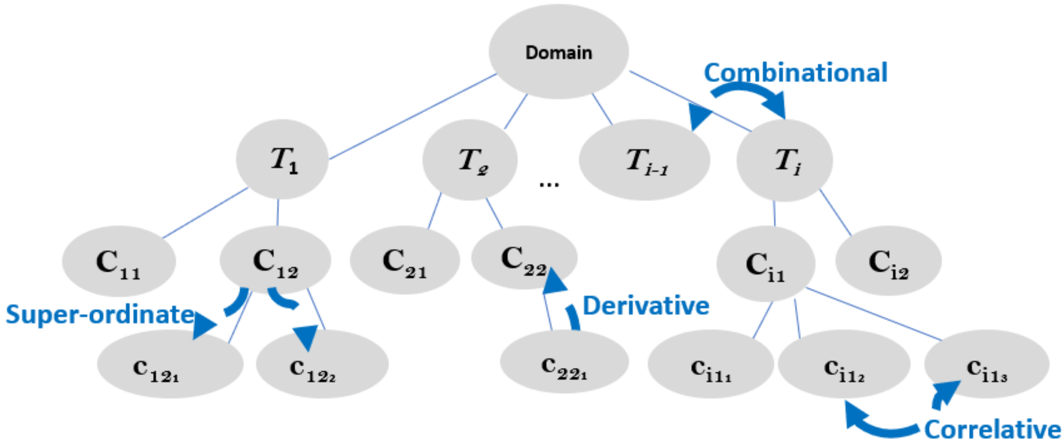


Figure 3.7: The domain taxonomy consists of: top concepts T that represent the main domain topics. The hierarchy of a concept (class or an individuals) represent its path to the main topic, e.g. the concept $c_{i1_1} \in C_{i1}$ and the latter is $\subseteq$ of the topic T_i. Hence, the path of the concept c_{i1_1} is: $c_{i1_1} \to C_{i1} \to T_i$. The Subsumption links are illustrated using the domain taxonomy hierarchy. The Combinational linking used to learn concepts related to different topics (T_{i-1}, T_i). The Correlative linking used to learn concepts related to the same topic (e.g c_{i1_1} and c_{i1_2}). The Derivative linking used to learn the specific concept c_{22_1} by first learning its generic concept C_{22}. The Super-Ordinate linking is used to learn the generic concept C_{12} by start learning its specific concept c_{12_1} or/and c_{12_2}.

Algorithm 4: VIN-L–Algorithm (Derivative Linking–D)

Data: List of the aggregated video segments *LAgg*, which is the output of Algorithm 3 where each segment has: its information at position 0, the list of the Focus Topics at position 1, the the list of the Focus Concepts at position 2. List of taxonomy concepts' paths *PC* /* *Each concept c from the taxonomy is represented with a list of concepts where c is the first concept and the remaining concepts are its parents* */. The specific concept to be learnt *c*.

Result: D: List of video segments to learn the specific concept *c* by introducing first video segment focusing on its parent concept *p*.

$D = []$; $i = 0$; $j = 0$; $p = ``$ /* *Variable to get the name of the parent of the concept c* */
$\theta = 6$ /* *Set 6 minutes as a max segment duration* */
$Lp = []$ /* *List of the segments that have the parent concept p of a concept c as the focus concept in their characterisation* */
$Lc = []$ /* *List of the segments that have the specific concept c as the focus concept in their characterisation* */
while $j <$ *length(PC)* **do**
    /* *Finding the path in PC for the concept c* */
    if *PC[j][0]* $= c$ **then**
        $p = PC$[j][1] /* *Find the immediate parent concept p which is at position 1 in the path of the concept c* */
    $j = j + 1$;
while $i <$ *length(LAgg)* **do**
    /* *Find the characterised video segment where its second element includes p; otherwise check if the second element includes c* */
    if $p \in$ *LAgg[i][2]* **then**
        Lp.append(*LAgg*[i]);
    else if $c \in$ *LAgg[i][2]* **then**
        Lc.append(*LAgg*[i])
    $i = i + 1$;

/* *Ensure the duration of the collected segments does not exceed* θ */

$i = 0$; *durationp* $= 0$ /* *Save the duration of the segments that have P in their Focus Concept FC* */

while $i <$ *length(Lp)* **do**

  durationp $=$ *durationp* $+ (Lp[i][0][2] - Lp[i][0][1])$; $i = i + 1$;

$i = 0$; *durationc* $= 0$ /* *Save the duration of the segments that have c in their Focus Concept FC* */

while $i <$ *length(Lc)* **do**

  durationc $=$ *durationc* $+ (Lc[i][0][2] - Lc[i][0][1])$; $i = i + 1$;

if *durationp* $+$ *durationc* $<= \theta$ **then**

  /* *If the duration of the collected segments is* $\leq \theta$, *save these segments in the list of the video segments for the Derivative narrative D* */

  D.append(Lp); D.append(Lc);

else

  /* *If the duration of the selected segments is* $> \theta$, *split the time* ($\theta = \theta/2$) *between the two groups of the collected segments, Lp and Lc* */

  $\theta = \theta/2$; $i = 0$; *duration* $= 0$; *someLc*=[]; *someLp*=[] /* *The lists someLp and someLc include some of the segments from the Lp and Lc lists, respectively* */

  while $i <$ *length(Lp)* **do**

    if *duration* $\leq \theta$ **then**

      someLp.append(Lp[i]);

      duration $=$ *duration* $+ (Lp[i][0][2] - Lp[i][0][1]))$;

    $i = i + 1$;

  $i = 0$; *duration* $= 0$;

  while $i <$ *length(Lc)* **do**

    if *duration* $\leq \theta$ **then**

      someLc.append(Lc[i]);

      duration $=$ *duration* $+ (Lc[i][0][2] - Lc[i][0][1])$;

    $i = i + 1$;

  D.append(*someLp*); D.append(*someLc*);

Return D

The output from the algorithm is the video narratives which include a sequence of video segments ordered based on the definition of the D. These videos narratives with the segments only are not sufficient for learning. For this purpose, we augment them with text following the template in Figure 3.8 to be suitable for learning.

Text purpose	Description
1. Narrative Introduction	[Domain name] This is a collection of video segments from YouTube videos with [video type: tutorial/ patient stories, etc.]. They have been automatically segmented, characterised and linked to domain concepts. The videos in this page have been linked via [linking type] which means: To become aware of a specific concept from a topic, you will explore videos about its parent concept which is more generic. Become aware of the concept [specific concept name] by exploring its parent concept [generic concept name] from the topic [topic name]
2. Segments Introduction	Each segment will start from a time point in the video and will stop when the corresponding concepts are covered. You can re-watch the segment or watch other parts of the video, if you wish so.
3. Segment Characterisation	The next video segment mentions [generic concept name] (related to [topic name]). The segment is taken from a YouTube video with ID= [video Id] and starts at [segment's start time in the video] with duration of [the difference between segment's start time and end time].
4. Video Segment footage	[A video segment that will start from its starting time and stop at the end of its duration as decided by the characterisation algorithms. There are controls to: maximise segment's size, volume up and down, and skip forward and backword to watch any part of the video if needed.]
Parts 3 and 4 are repeated for group 2 of segments that introduces the specific concept	
5. Conclusion	You watched video segments about [generic concept name] which is a generic concept that includes [specific concept name]. These concepts are related to [topic name]. The segments were automatically extracted from popular YouTube videos related to the [domain name], using algorithms for segmentation, characterisation and linking based on a theory for concept learning. We hope you found the collection of video segments helpful.

Figure 3.8: The template used for generating the augmented Derivative Video Narrative.

Super-Ordinate Linking. It helps to learn a generic concept by exploring its specific concept(s) first to be able to link them together. The design of the Super-Ordinate algorithm is based on its definition in (Section 3.4–Definition 9). Hence, referring to the taxonomy structure presented in Fig. 3.7, to learn the generic concept C_{12}, the Super-Ordinate Linking algorithm first introduces the specific concept(s) c_{12_1} and/or c_{12_2} via a group of video segments that has it/them as a focus and places these segments at the beginning of the Super-Ordinate video Narrative (S). By doing this, these concepts are in the cognitive structure and ready to bind to its/their generic concept C_{12}. Hence, the Super-Ordinate algorithm select the video segments that focus on the generic concept C_{12} and add these segments to the S.

The input to the algorithm is the list of the characterised video segments and a list of the taxonomy concepts' paths. A path of a concept c_i, as defined in (Section 3.4–Definition 3), is: $PC(c_i) = \langle c_\mathrm{i}, C_\mathrm{j}, T_\mathrm{i} \rangle$. To learn a generic concept C_j, the algorithm first iterate through the list of the characterised video segments and match their focus concept(s) with the concepts which are belong to the C_j. Hence, if the FC of a segment includes the c_i (the specific concept of C_j) then this segment is selected for the first group in the S. Whilst, if the FC of the segment includes the concept C_j (the generic concept to be learnt) then this segment is selected for the second group of the segments in the S. The duration of the selected segments for the S does not exceed six minutes. If the duration is <= 6 minutes then we include all the collected segments in S; otherwise, we select some of the collected segments from both groups to prevent exceeding the 6 minutes duration of the S. Algorithm 5 includes the steps we followed to generate the Super-Ordinate narratives and the tracing of this algorithm is in (Appendix E).

Algorithm 5: VIN-L–Algorithm (Super-Ordinate Linking–S)

Data: List of the aggregated video segments *LAgg*, which is the output of Algorithm 3 where each segment has: its information at position 0, the list of the Focus Topics at position 1, the the list of the Focus Concepts at position. List of taxonomy concepts' paths *PC* /* *Each concept c from the taxonomy is represented with a list of concepts where c is the first concept and the remaining concepts are its parents* */. The generic concept to be learnt g.

Result: S: List of video segments to learn the generic concept g by introducing first video segments focusing on its specific concepts.

```
S=[]; i = 0; j = 0; sc = [] /* List to save the concepts that belong to the generic concept g */
θ = 6 /* Set 6 minutes as a max segment duration */
Lg =[] /* List of the segments that have the generic concept g as the focus concept in their characterisation */
Lc =[] /* List of the segments that have the concepts sc of the generic concept g as the focus concepts in their characterisation */
while j < length(PC) do
    /* Finding the path in PC where the generic concept g is the parent of other concepts */
    if PC[j][1] = g then
        if PC[j][0] not in sc then
            sc.append(PC[j][0]) /* Add the concepts to sc which are at position 0 where g is their immediate parent at position 1 */
    j = j + 1;
while i < length(LAgg) do
    /* Find the characterised video segment where its second element include any of sc; otherwise check if the second element includes g */
    for concept in sc do
        if concept ∈ LAgg[i][2] then
            Lc.append(LAgg[i])
    if (g ∈ LAgg[i][2]) and (LAgg[i] not in Lc) then
        Lg.append(LAgg[i])
    i = i + 1;
```

```
/* Ensure the duration of the collected segments does not exceed θ */
i = 0; durationc = 0 /* Save the duration of the segments that have c in
  its Focus concept FC */
while i < length(Lc) do
    durationc = durationc + (Lc[i][0][2] − Lc[i][0][1]); i = i + 1;
i = 0; durationg = 0 /* Save the duration of the segments that have g in
  its Focus concept FC */
while i < length(Lg) do
    durationg = durationg + (Lg[i][0][2] − Lg[i][0][1]); i = i + 1;
if durationc + durationg <= θ then
    /* If the duration of the collected segments is ≤ θ, save these segments
      in the list of the video segments for the Super Ordinate narrative S */
    S.append(Lc); S.append(Lg);
else
    /* If the duration of the selected segments is > θ, split the time
      (θ = θ/2) between Lg and Lc */
    i = 0; duration = 0; θ = θ/2; someLc=[]; someLg=[] /* The lists
      someLc and someLg include some of the segments from the Lc and Lg
      lists, respectively */
    while i < length(Lc) do
        if duration ≤ θ then
            someLc.append(Lc[i]);
              duration = duration + (Lc[i][0][2] − Lc[i][0][1]));
        i = i + 1;
    i = 0; duration = 0;
    while i < length(Lg) do
        if duration ≤ θ then
            someLg.append(Lg[i]);
              duration = duration + (Lg[i][0][2] − Lg[i][0][1]);
        i = i + 1;
    S.append(someLc); S.append(someLg);
Return S
```

The output from the algorithm is the video narratives which includes a sequence of video segments ordered based on the definition of the S. These videos narratives with the segments only are not sufficient for learning. For this purpose, we augment them with text following the template in Figure 3.9 to be suitable for learning.

Text purpose	Description
1. Narrative Introduction	[Domain name] This is a collection of video segments from YouTube videos with [video type: tutorial/ patient stories, etc.]. They have been automatically segmented, characterised and linked to domain concepts. The videos in this page have been linked via [linking type] which means: To become aware of a generic concept from a topic, you will explore videos about its children concept which is more specific. Become aware of the concept [generic concept name] from [topic name] by exploring more specific concepts [specific concept(s) name(s)].
2. Segments Introduction	Each segment will start from a time point in the video and will stop when the corresponding concepts are covered. You can re-watch the segment or watch other parts of the video, if you wish so.
3. Segment Characterisation	The next video segment mentions [specific concept name] (related to [topic name]). The segment has been taken from a YouTube video with ID= [video Id] and starts at [segment's start time in the video] with duration of [the difference between segment's start time and end time].
4. Video Segment footage	[A video segment that will start from its starting time and stop at the end of its duration as decided by the characterisation algorithms. There are controls to: maximise segment's size, volume up and down, and skip forward and backword to watch any part of the video if needed.]
Parts 3 and 4 are repeated for group 2 of segments that introduces the generic concept	
5. Conclusion	You watched video segments about [specific concept name] which is part of [generic concept name]. These concepts are related to [topic name]. The segments were automatically extracted from popular YouTube videos related to the [domain name], using algorithms for segmentation, characterisation and linking based on a theory for concept learning. We hope you found the collection of video segments helpful.

Figure 3.9: The template used for generating the augmented Super-Ordinate Video Narrative.

Correlative Linking. It helps to learn a specific concept by exploring its similar concept(s) first to be able to link them together. The design of the Correlative algorithm is based on its definition in (Section 3.4), Definition 10. Hence, referring to the taxonomy structure presented in Figure 3.7, to learn the specific concept c_{i1_2}, the Correlative algorithm select the video segments that focus on the concepts c_{i1_3} and c_{i1_1}, respectively, and place them in the Correlative Video Narrative (CR). Notice that these concepts (c_{i1_3}, c_{i1_1}) are similar to the specific concept c_{i1_2} and all of these concepts $\in C_{i1}$. By doing this, (c_{i1_3}, c_{i1_1}) are in the cognitive structure and ready to be linked to their similar specific concept c_{i1_2}. Then, the Correlative algorithm select another group of video segments that focus on the specific c_{i1_2} and add these segments to the CR.

The input to the algorithm is the list of the characterised video segments and a list of the taxonomy concepts' paths. A path of a concept c_i, as defined in (Section 3.4), Definition 3 is: $PC(c_i) = \langle c_\mathrm{i}, C_\mathrm{j}, T_\mathrm{i} \rangle$. To learn a specific concept c_i that has a generic concept C_j, the algorithm first iterate through the list of the concepts paths $PC(C)$ to identify all the specific concepts that have C_j as their generic concept, e.g. c_{i-1} and c_{i+1}. Then, the algorithm iterate through all the characterised video segments to select the segments that have the specific concepts c_{i-1} and c_{i+1} as a focus. These segments are selected as first group of segments in the CR. The same process is followed to select the characterised video segments that have the specific concept c_i as a focus and place them as the second group of segments in CR. The duration of the selected segments for the CR does not exceed six minutes. If the duration is <= 6 minutes then we include all the collected segments in CR; otherwise, we select some of the collected segments from both groups to prevent exceeding the 6 minutes duration of the CR. Algorithm 6 includes the steps we followed to generate the Correlative narratives and the tracing of this algorithm is in (Appendix F).

Algorithm 6: VIN-L–Algorithm (Correlative Linking–CR)

Data: List of the aggregated video segments *LAgg*, which is the output of Algorithm 3 where each segment has: its information at position 0, the list of the Focus Topics at position 1, the the list of the Focus Concepts at position 2. List of taxonomy-concepts' paths *PC* /* *Each concept c from the taxonomy is represented with a list of concepts where c is the first concept and the remaining concepts are its parents* */. The name of the concept to be learnt c and its parent concept name p.

Result: CR: List of video segment to learn the specific concept c by introducing video segments that focus on similar concepts to c where c and its similar concepts have the same parent concept p.

CR=[]; $i = 0$; $j = 0$; $\theta = 6$ /* *Set 6 minutes as a max segment duration* */
s=[] /* *List of the names of the similar concepts to c* */
Ls=[] /* *List of the segments that have any of concepts in the list s as the focus concept in their characterisation* */
Lc=[] /* *List of the segments that have c as the focus concept in their characterisation* */
while $j <$ *length(PC)* **do**
  /* *Finding the path in PC for the parent concept p* */
  if *PC[j][1]* $= p$ **then**
    if *PC[j][0]* $\neq c$ **then**
      /* *Do not collect the concept c as similar to itself* */
      s.append(PC[j][0]) /* *Finding the specific concepts which are similar to c as p is their immediate parent* */
  $j = j + 1$;
while $i <$ *length(LAgg)* **do**
  /* *Find the characterised video segment where its second element includes s; otherwise check if the second element includes c* */
  $k = 0$ /* *Variable used to loop through the s list* /*
  while $k <$ *length(s)* **do**
    if *(s[k]* $\in$ *LAgg[i][2]) and (LAgg[i] not in Ls)* **then**
      Ls.append(*LAgg*[i]);
    $k = k + 1$;
  if $c \in$ *LAgg[i][2] and LAgg[i] not in Ls* **then**
    Lc.append(*LAgg*[i]);

```
/* Ensure the duration of the collected segments does not exceed θ */
   i = 0; durations = 0 /* Save the duration of the segments that have s in
   their Focus concept FC */
while i < length(Ls) do
    durations = durations + (Ls[i][0][2] − Ls[i][0][1]); i = i + 1;
i = 0; durationc = 0 /* Save the duration of the segments that have c in
   their Focus concept FC */
while i < length(Lc) do
    durationc = durationc + (Lc[i][0][2] − Lc[i][0][1]); i = i + 1;
if durations + durationc <= θ then
    /* If the duration of the collected segments is ≤ θ, save these segments
       in the list of the video segments for the Correlative narrative CR */
    CR.append(Ls); CR.append(Lc);
else
    /* If the duration of the selected segments is > θ, split the time
       (θ = θ/2) between Ls and Lc */
    i = 0; duration = 0; θ = θ/2; someLs=[]; someLc=[] /* The lists
       someLs and someLc include some of the segments from the Ls and Lc
       lists, respectively */
    while i < length(Ls) do
        if duration ≤ θ then
            someLs.append(Ls[i]);
             duration = duration + (Ls[i][0][2] − Ls[i][0][1]));
        i = i + 1;
    i = 0; duration = 0;
    while i < length(Lc) do
        if duration ≤ θ then
            someLc.append(Lc[i]);
             duration = duration + (Lc[i][0][2] − Lc[i][0][1]);
        i = i + 1;
    CR.append(someLs); CR.append(someLc);
Return CR
```

The output from the algorithm is the video narratives which includes a sequence of video segments ordered based on the definition of the CR. These videos narratives that include the segments only are not sufficient for learning. For this purpose, we augment them with text following the template in Figure 3.10 to be suitable for learning.

Text purpose	Description
1. Narrative Introduction	[Domain name] This is a collection of video segments from YouTube videos with [video type: tutorial/ patient stories, etc.]. They have been automatically segmented, characterised and linked to domain concepts. The videos in this page have been linked via [linking type] which means: To become aware of a specific concept from a topic, you will explore videos about a similar concepts. Become aware of the concepts similar to [specific concept name] from topic [topic name].
2. Segments Introduction	Each segment will start from a time point in the video and will stop when the corresponding concepts are covered. You can re-watch the segment or watch other parts of the video, if you wish so.
3. Segment Characterisation	The next video segment mentions [similar concept names] (related to [topic name]). The segment has been taken from a YouTube video with ID= [video Id] and starts at [segment's start time in the video] with a duration of [the difference between segment's start time and end time].
4. Video Segment footage	[A video segment that will start from its starting time and stop at the end of its duration as decided by the characterisation algorithms. There are controls to: maximise segment's size, volume up and down, and skip forward and backword to watch any part of the video if needed.]
Parts 3 and 4 are repeated for group 2 of segments that introduces the specific concept	
5. Conclusion	You watched video segments about [similar concepts names] which are similar to [specific concept name] related to [topic name]. The segments were automatically extracted from popular YouTube videos related to the [domain name], using algorithms for segmentation, characterisation and linking based on a theory for concept learning. We hope you found the collection of video segments helpful.

Figure 3.10: The template used for generating the augmented Correlative Video Narrative.

Combinational Linking. It helps to learn two topics together by exploring the relationship between some of their concepts as they are mentioned together in the same video segment. The design of the Combinational Algorithm is based on its definition in (Section 3.4), Definition 11. Hence, to learn the topics FT_i and FT_j, the Combinational algorithm select a group of characterised video segments, from the input set of segments, that have the focus concepts Fc_i and Fc_j where $Fc_i \in FT_i$ and $Fc_j \in FT_j$.

For example, referring to the taxonomy structure presented in Figure 3.7, to learn the relationship between two topics T_1 and T_2, the Combinational algorithm include video segments that focus on the concepts, e.g. C_{12} and C_{22} mentioned together in the same video segment and they belong to the topics T_1 and T_2, respectively. The full details of the Combinational algorithm are presented below and the tracing of this algorithm is in (Appendix G).

Algorithm 7: VIN-L–Algorithm (Combinational Linking–CO)

Data: List of the aggregated video segments *LAgg*, which is the output of Algorithm 3 where each segment has: its information at position 0, the list of the Focus Topics at position 1, the the list of the Focus Concepts at position 2. The name of the topics to be learnt t_1 and t_2.

Result: CO: List of video segments to learn the topics t_1 and t_2 by introducing video segments focusing on these topics.

CO=[]; $i = 0$;
$j = 0$;
$\theta = 6$ /∗ *Set 6 minutes as a max segment duration* ∗/
Lt= [] /∗ *List of the segments that have the topics t_1 and t_2 as the focus topics in their characterisation* ∗/
while $i <$ *length(LAgg)* **do**
    /∗ *Find the characterised video segments where its first element includes both t_1 and t_2* ∗/
    if $t_1 \in$ *LAgg[i][1]* and $t_2 \in$ *LAgg[i][1]* **then**
        Lt.append(*LAgg*[i]) /∗ *Each collected segment has, in its second element, focus concepts that belong to t_1 and t_2* ∗/
    $i = i + 1$;
/∗*Ensure the duration of the collected segments does not exceed θ* ∗/
$i = 0$; $durationt = 0$ /∗ *Save the duration of the collected segments that have t_1 and t_2 in their Focus Topics FT* ∗/
while $i <$ *length(Lt)* **do**
    $durationt = durationt + (Lt[i][0][2] - Lt[i][0][1])$;
    $i = i + 1$;
if $durationt \leq \theta$ **then**
    $CO = Lt$;
else
    /∗ *If the duration of the collected segments is $> \theta$, select some of the collected segment where their duration do not exceed θ* ∗/
    $j = 0$;
    $duration = 0$;
    while $j <$ *length(Lt)* and $duration \leq \theta$ **do**
        CO.append(*Lt*[j]) ;
        $duration = duration + (Lt[j][0][2] - Lt[j][0][1])$;
        $j = j + 1$;
Return *CO*

The output from the algorithm is the video narratives which includes a sequence of video segments ordered based on the definition of the CO. These videos narratives with the segments only are not sufficient for learning. For this purpose, we augment them with text following the template in Figure 3.11 to be suitable for learning.

Text purpose	Description
1. Narrative Introduction	[Domain name] This is a collection of video segments from YouTube videos with [video type: tutorial/ patient stories, etc.]. They have been automatically segmented, characterised and linked to domain concepts. The videos in this page have been linked via [linking type] which means: You will explore videos which link concepts from two topics. Link the topics [topic 1 name] and [topic 2 name].
2. Segments Introduction	Each segment will start from a time point in the video and will stop when the corresponding concepts are covered. You can re-watch the segment or watch other parts of the video, if you wish so.
3. Segment Characterisation	You will watch video segment mentions [specific concept(s) name(s)] (related to [topic 1 name]) and [specific concept(s) name(s)] related to [topic 2 name]. The segment has been taken from a YouTube video with ID= [video Id] and starts at [segment's start time in the video] with a duration of [the difference between segment's start time and end time] seconds.
4. Video Segment footage	[A video segment that will start from its starting time and stop at the end of its duration as decided by the characterisation algorithms. There are controls to: maximise segment's size, volume up and down, and skip forward and backword to watch any part of the video if needed.]
Parts 3 and 4 are repeated for all the video segments included in the CO	
5. Conclusion	You watched video segments that link [topic 1 name] and [topic 2 name]. The segments were automatically extracted from popular YouTube videos using algorithms for segmentation, characterisation and linking based on a theory for concept learning. We hope you found the collection of video segments helpful.

Figure 3.11: The template used for generating the augmented Combinational Video Narrative.

3.6.3 Output

These algorithms are implemented all at the same time. The output from each subsumption linking algorithm is a set of video narratives and each narrative is a set of video segments that have been linked together following Ausubel's Subsumption Theory. The generated narratives need to be augmented with text to make them more sufficient for learning. Hence, generated video narratives are augmented with text as presented in the text templates in Figures 3.8, 3.9, 3.10 and 3.11. Accordingly, each video narrative begins with an introduction identifying the domain, focus topic, the type of linking and the focus concept. Then, it presents the video segments where each segment is preceded by its characterisation. The characterisation of each segment is the focus topic and concept, segmentId, the start time within the video and the segment duration in seconds. At the end of each narrative, there is a conclusion statement reminding the users of the focus topic and concepts illustrated in the video segments they have watched. Each video narrative has a duration that <= 6 minutes based on the recommendation in (Brame, 2016). The augmented narratives have been embedded in four groups of web pages generated automatically, each group correspond to the linking type used to generate them.

Examples of video narratives are presented in the evaluation studies (see Chapter 5 and Chapter 6). The quality and the perceived usefulness of these narratives has been evaluated when used to support domain learning.

3.7 Domains Used in this Thesis

In order to assess the applicability and to validate the frameworks, we need to apply them in practical domains. In this thesis, we have chosen two representative domains which are both in the area of soft skill learning. Soft skill learning is the main area to apply our work where videos are used for informal soft skill learning. Soft skills refers to a collection of inter personal skills and personal attributes (Dixon *et al.*, 2010). Interpersonal skills represents the ability to communicate with others and being able to present and convey the ideas clearly. This will enhance the personal attributes and enhancing the self esteem to grab an opportunity and start actions (Vasanthakumari, 2019). Learning soft skills for students to prepare them for professional environments (Mainga *et al.*, 2022) and to help them sustaining long term employability which requires more than a formal training. It requires informal support, self-study and self analysis which happens outside the professional environment (Crosbie, 2005; Tseng *et al.*, 2019). To aid the informal support to learn soft skills, online learning and using videos for learning plays a key role in that (Cinque, 2017). Videos for learning help users to pay attention to soft skills details and the relation ship between them to enhance their self regulation and motivation (Conkey *et al.*, 2013). Learning such skills requires time and resources management to ensure good quality of learning materials (Crosbie, 2005). On the other hand, teaching soft skills requires wide knowledge of pedagogical knowledge to decide the best teaching and a knowledge in the latest ICT resources to select the best methods (Caeiro-Rodríguez *et al.*, 2021). In our work we focus on two domains. One domain is typically used in academic context, e.g. within a software engineering course, and the other domain is informal learning in every day living context, e.g. a health domain. In both domains we have tapped into international collaboration. Within the first domain, which is Giving Pitch Presentations, we are part of the AVW project which involves an international collaboration with the University of Canterbury. Within the second domain which is Health Related Quality of Life Awareness (HRQLA), our work is linked to the European project (InAdvance) which is focusing on palliative care support. In this section, we present an overview of the two domains which are further applied in Chapters 4 and 5 (Giving Pitch Presentations) and in chapter 6 (HRQLA).

3.7.1 Giving Pitch Presentations

Giving Pitch Presentations represents a key transferable skill that students should have for their academic or career purposes (Van Emden & Becker, 2017). They will be able to present and explain their work to large audiences, share their ideas, and be prepared for interviews and professional meetings. There are different collaboration applications like (Google Drive, Mendeley, Office 365, Dropbox, text apps as Whats App, Snapchat, etc.) to learn presentation skills. Adding to that, using social networks and messaging apps becomes a popular tools for sharing information and learning resources (Maican *et al.*, 2021). This resulted in having more self-efficacy learners who engage in online and collaborative learning (Alshare & Hindi, 2004) to boost up their presentation skills like: presenter engaged audience, hand gestures, eye gestures, verbal communication, voice, eye contact and presenter presence (Di Gangi *et al.*, 2017).

In this research, we have decided to aid students in learning how to pitch their presentation using videos by implementing our frameworks (VISC-L and

VIN-L) in this domain. This decision has also been based on the successful design and usage of the video based learning platform AVW (Active Video Watching) (Lau *et al.*, 2016; Mitrovic *et al.*, 2016). AVW is a platform that allows people to watch videos and annotate them interactively. It can be set up using different domains, e.g. doctor training, introduction to university, empathy training and presentation skills. AVW has been designed by the research team in the University of Leeds, University of Canterbury and University of Adelaide focusing on helping students build up skills on delivering pitch presentations to a wide spectrum of audiences (Lau *et al.*, 2016; Mitrovic *et al.*, 2016). AVW is used by both teachers and learners. Teachers select a set of videos and define aspects to draw a learner's attention to, targeting presentation skills. For Giving Pitch Presentations, the AVW instantiation includes 4 YouTube tutorial videos on giving presentations. The aspects defined by teachers for these videos to help students be reflective are: "I am rather good at this", "I did/saw this in the past", "I didn't realise I wasn't doing it" and "I like this point". While the aspects defined by teachers to drag the students' attention to main concepts in the tutorials are: "Delivery", "Speech", "Structure" and "Visual aids". Students can be active with AVW while watching videos by commenting individually in the Personal Space using the aspects defined by the teacher, see Figure 3.12. Students' comments are recorded by the system and once they are approved by the teachers, they can be shared and browsed in the Social Space and can be rated by other students, see Figure 3.13. Two evaluation studies (Mitrovic *et al.*, 2016, 2017) have been conducted to test the impact of using AVW spaces (Personal and Social) on students' learning. The results revealed that using the AVW spaces improved students' engagement in constructive learning. Inspired by this result and to further support learning presentation skills while watching videos, Dimitrova *et al.* (2017) showed that adding nudges is an opportunity for intervention to enhance engagement while watching videos. In Mohammadhassan *et al.* (2022) high quality comments written by students have been added as quality nudges to encourage students to write better comments to enhance their engagement while watching videos.

However, within the presentation skills domain, AVW studies have used four tutorials and four example videos. It is not sufficient for learning as we can not explore the domain deeply. In reality, learners can access much broader

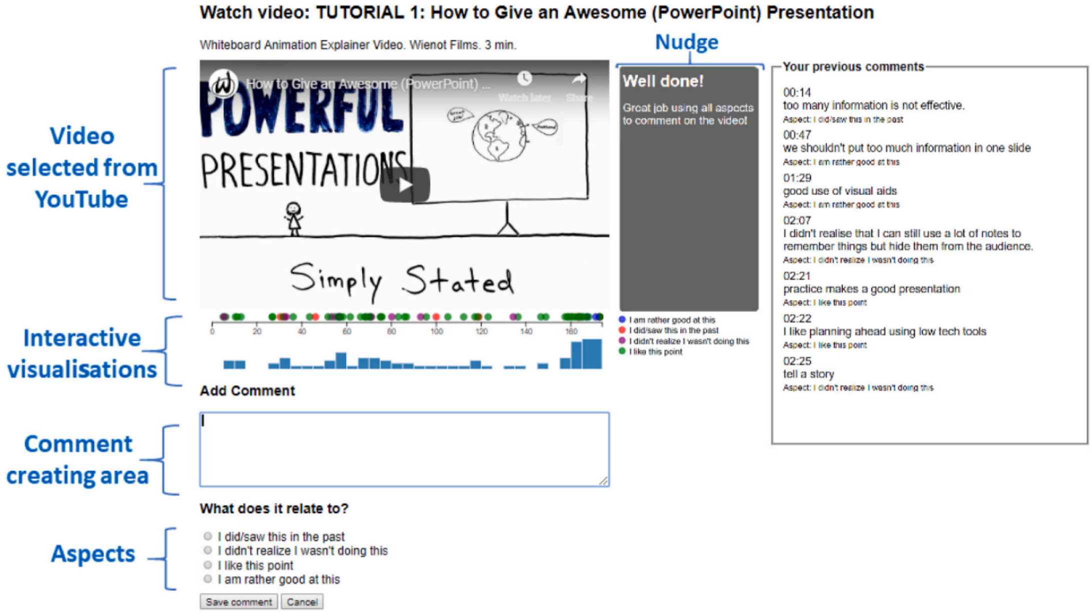


Figure 3.12: AVW-Personal Space (Mohammadhassan *et al.*, 2022).

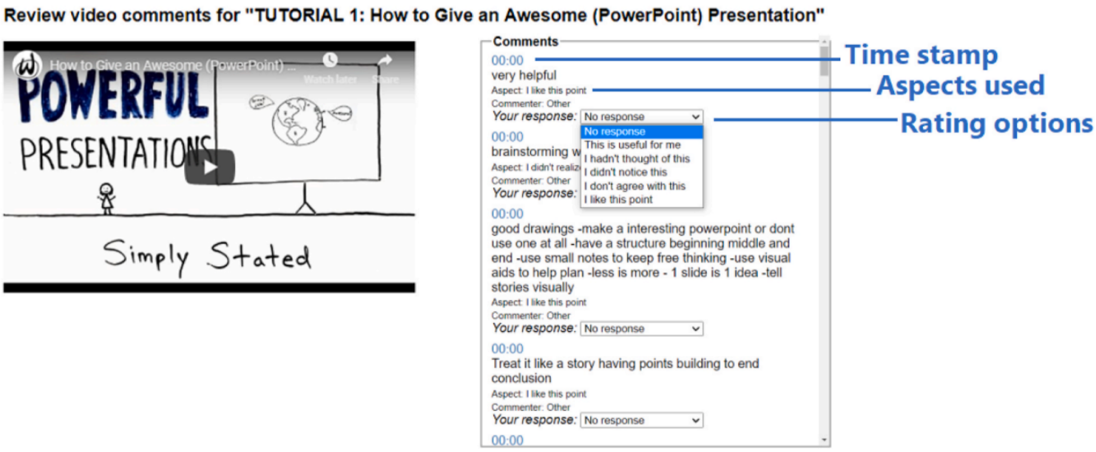


Figure 3.13: AVW- Social Space (Mohammadhassan *et al.*, 2022).

space of videos (using e.g. YouTube) which cause some challenges. For example, the amount of time needed to watch the videos to decide the most relevant ones, and the inabilities to recognise the key domain points regarding the lack of experience or domain knowledge. For that purpose, we have developed our frameworks to be able to work automatically with more videos that are broader and can cover more domain aspects. Our work includes automating the process of:

collecting domain related videos from social learning platforms (e.g. YouTube), segmenting, characterising and linking the videos to aid learning. Accordingly, we first collect videos related to giving pitch presentations using the taxonomy of this domain to design a search schema. Secondly, we segment the collected videos and characterise their transcript using the domain taxonomy by implementing the VISC-L framework described in (Section 3.5). Finally, we use both the characterised segments (VISC-L output) and the domain taxonomy to link the related segments following a pedagogical theory by implementing the VIN-L framework described in (Section 3.6). This way, learners will be able to focus and learn specific related key points extracted and linked from different videos without needing to watch full videos.
The use of this domain in our work will be fully described in detail in Chapters 4 and 5.

3.7.2 Health Related Quality of Life Awareness (HRQLA)

To show the broad application of our approach and to validate the generality of VISC-L and VIN-L, we will consider a second domain for soft skills learning. For this purpose, we have chosen the HRQLA. Health related quality of life as mentioned by [1] is the "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." This domain shows the link between the physical, psychological and social health needs used to guide specialists and health agencies to meet them if they are reported by patients, carers or specialists. The aspects of the health related quality of life domain have been proven to have a direct impact on patients with different needs. For example, patients with cancer who have left the hospital (Sitlinger & Zafar, 2018) need regular checks to maintain their health stability. In addition, elderly people need support from health authorities to maintain health circumstances and environments (Marques *et al.*, 2019). On the other hand, being aware of health related quality of life can help in preventing the spread of pandemics and epidemic diseases. For

[1] https://iris.who.int/bitstream/handle/10665/77932/WHO_HIS_HSI_Rev.2012.03_eng.pdf?sequence=1[Accessed: August 2022]

example, when patients diagnosed with COVID 19 leave hospitals, they need to be aware of the possible weakness symptoms that might affect them (Talman *et al.*, 2021); especially with elderly people. This is to prevent any impairments in their functionality (Walle-Hansen *et al.*, 2021).

Providing health related services and educating patients, carers, relatives and friends are essential in maintaining a positive health related quality of life. For example, providing educational components (Koekenbier *et al.*, 2016), exercise sessions and nurse interventions, called 'non-pharmacological interventions' showed a positive impact on a patients' health with different diseases, e.g. breast-cancer (Oei *et al.*, 2021).

Notwithstanding, the concepts of the health related quality of life should be clearly identified and differentiated from general quality of life. This is because general quality of life is a broad concept while health related quality of life focuses primarily on peoples' health and all the factors that are associated with it. Only 6% of researchers distinguish between the two domains (Haraldstad *et al.*, 2019). The identification of these concepts will make them easy to be observed and implemented by experts (Post, 2014).

Identifying health related quality of life concepts will support educating people about them. The recommendations from most researchers in the health sector state that educating patients (Ciasullo *et al.*, 2022) to be aware of their health needs will have a positive impact on their different requirements. For example: being aware of the key elements behind COPD exacerbation to avoid them (Hurst *et al.*, 2020), stopping the risk of menopausal syndrome on menopausal women by providing them with Multidisciplinary Health Education based on Lifestyle Medicine (MHELM) Li *et al.* (2023), and to prevent the risk of developing lower back pain in certain populations with special socio-demographic and levels of education parameters (Járomi *et al.*, 2021).

Motivated by the findings from the aforementioned research, our work aims to raise awareness of health related quality of life of patients with respiratory illness. There are different learners (users) in this domain. First, patients, carers, relatives, friends will use this domain to learn the main aspects of health which are: PHYSICAL HEALTH, PSYCHOLOGICAL HEALTH, SOCIAL RELATION SHIP, PERSONAL VALUES AND BELIEFS, ENVIRONMENT and LEVEL

OF INDEPENDENCE. This will help them to measure the factors related to their health and enables them to communicate with professionals to maintain better health outcomes. From a professional's side, knowing these patients' health related quality of life aspects will aid them in making clinical decisions and to guide their researches.

Accordingly, we have firstly unified the main health related quality of life concepts identified by different researches by designing the domain taxonomy (the full design process is in Section 6.2). Secondly, we used this taxonomy to implement the search schema we defined in (Section 3.5) to collect domain related videos from YouTube. Thirdly, the transcript of the collected videos has been segmented, characterised and linked to generate video narratives as illustrated in (Sections 3.5 and 3.6). The generated narratives are presented to users as web pages that include video segment URLs to focus on the key domain concepts and to raise awareness of health related quality of life aspects.

3.8 Summary

In this chapter, we have introduced our research methodology, which allow us to address the main research question 'How to generate good quality narratives that can be used to support perceiving domain learning?'. These narratives aim to help learners focus on key domain concepts and understand the link between them. Our research is outlined in (Section 3.2) where we illustrated the main generic frameworks we designed to achieve our goal. The design of the frameworks has been underpinned by several theoretical models introduced in (Section 3.3); including the Text Tiling approach (used to guide segmenting and aggregating of videos), the Thematic Progression (used to guide the aggregating of video segments for learning), and Subsumption linking Theory (to guide the generating of video narratives).

The main definitions of the terms used throughout this thesis and explanations of the main frameworks are presented in (Section 3.4 Preliminaries).

To produce a generic work, we have designed two frameworks for video collecting, segmenting, characterising and linking. These frameworks with their associated algorithms have been illustrated in detail in (Sections 3.5 and 3.6).

Finally, to prove the generality of our methodology, we have selected two domains to implement the designed frameworks with their algorithms. These domains focus on soft skills (Giving Pitch Presentations and Health Related Quality of Life Awareness). These domains' full descriptions have been presented in (Section 3.7).

In the following chapters we present the implementation of VISC-L and VIN-L in the two chosen domains, and evaluate the validity of our approach with experts from the two domains and with advanced learners with the first domain.

Chapter 4

Implementation and Validation of VISC-L in the Presentation Skills Domain

4.1 Introduction

This chapter describes how the VISC-L framework, which is presented in Section 3.5, is implemented in our prime domain 'Giving Pitch Presentations' in order to validate VISC-L and assess its applicability in a practical context. The VISC-L implementation includes collecting, segmenting and characterising domain related videos to identify the key domain concepts presented in the videos. Having done so, we are be able to generate the video narratives from these video segments (our ultimate research goal) as described in (Chapter 5).

By implementing and evaluating VISC-L, this chapter will answer RQ1 and RQ2 (see Chapter 1).:

RQ1: How to automatically generate good quality characterisations of video segments that can be used for learning?

RQ2: Does the characterisation of video segments help in identifying and focusing on the key domain concepts?

In order to answer these research questions, we implement VISC-L in the prime domain (Section 4.4) and evaluate with experts (Section 4.5). Since our approach is knowledge driven, the implementation of VISC-L requires a domain taxonomy which is used to collect domain related videos (as described in Section 3.5.1) and to implement the VISC-L framework (as defined in Section 3.5). For the domain "Giving Pitch Presentations", we utilise the ontology designed by Abolkasim (2019), which is described in Section 4.2, and use it to collect domain related videos (described in Section 4.3) and to implement VISC-L (described in Section 4.4). To evaluate the video segment characterisation output of VISC-L we compare it with the Google video segment characterisation output (described in Section 2.3.1). The Google video segment characterisation has been selected because it was launched during this research and represented the state-of-the-art in video characterisation at the time the evaluation was conducted. The evaluation study (presented in Section 4.5) was done with domain experts, including people with experience in giving presentations. This allows validation of the characterisation and its potential to support learning.

4.2 Presentation skills ontology

'Giving Pitch Presentations' is the prime domain we adopted in this thesis to generate the video narratives. It represents a transferable skill that can assist learners in transmitting their message or to convince others of their ideas (Di Gangi *et al.*, 2017; Maican *et al.*, 2021). The computational representation of this domain is presented via an ontology designed by Abolkasim (2019) where the domain terms are extracted from the studies conducted in Abolkasim (2019) to extend the already built Body Language ontology terms. To convert the domain terms into an ontology, the semi-automatic ontology engineering approach had been utilised and the resulting ontology is called Presentation Skills Ontology (PreSOn) [1]. To ensure the validity of this ontology, (Abolkasim, 2019) invited three experts from the institutional study skills training team at the University of Leeds. They have been asked to either agree or disagree with the selected concept, or suggest

[1] https://archive.researchdata.leeds.ac.uk/982/[Accessed: June 2022]

new concepts. According to their feedback, the ontology has been improved and the final number of concepts has been agreed. The main Topics T of PreSOn (which are the top classes in the ontology) and the number of concepts (classes and individuals) per topic (each topic has several concepts linked to it, see Figure 3.3) is as follows: DELIVERY- 99, STRUCTURE- 67, VISUAL AID- 93 and PRESENTATION ATTRIBUTE- 27.

The taxonomy of PreSOn has been used successfully to measure the diversity profiling in a social cloud using the meta data of online objects and the user profiles who used these objects and wrote associated comments. According to the successful implementation of this ontology, we have decided to use it in our work and improve it by increasing the number of concepts to be 398 concepts to be used to implement VISC-L and VIN-L, as we illustrate in this chapter. Figure 4.1 shows an example of the the ontology main topics and Figure 4.2 shows the structure of the topic DELIVERY and its main concepts. The improved version of the PreSOn ontology, after implementing VISC-L framework, can be accessed using our GitHub account [1].

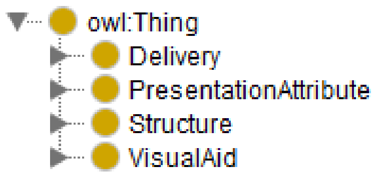


Figure 4.1: Giving Pitch Presentations main topics based on the PreSOn ontology.

4.3 Data Collection

The main input data required to implement the VISC-L framework is the domain related videos. Any pre-selected domain related videos can be used (Mohammed & Dimitrova, 2020) or they can be collected automatically from available social platforms (like YouTube). In this section, we semi-automatically collect the

[1] Presentation Skills Domain /Domain Ontology

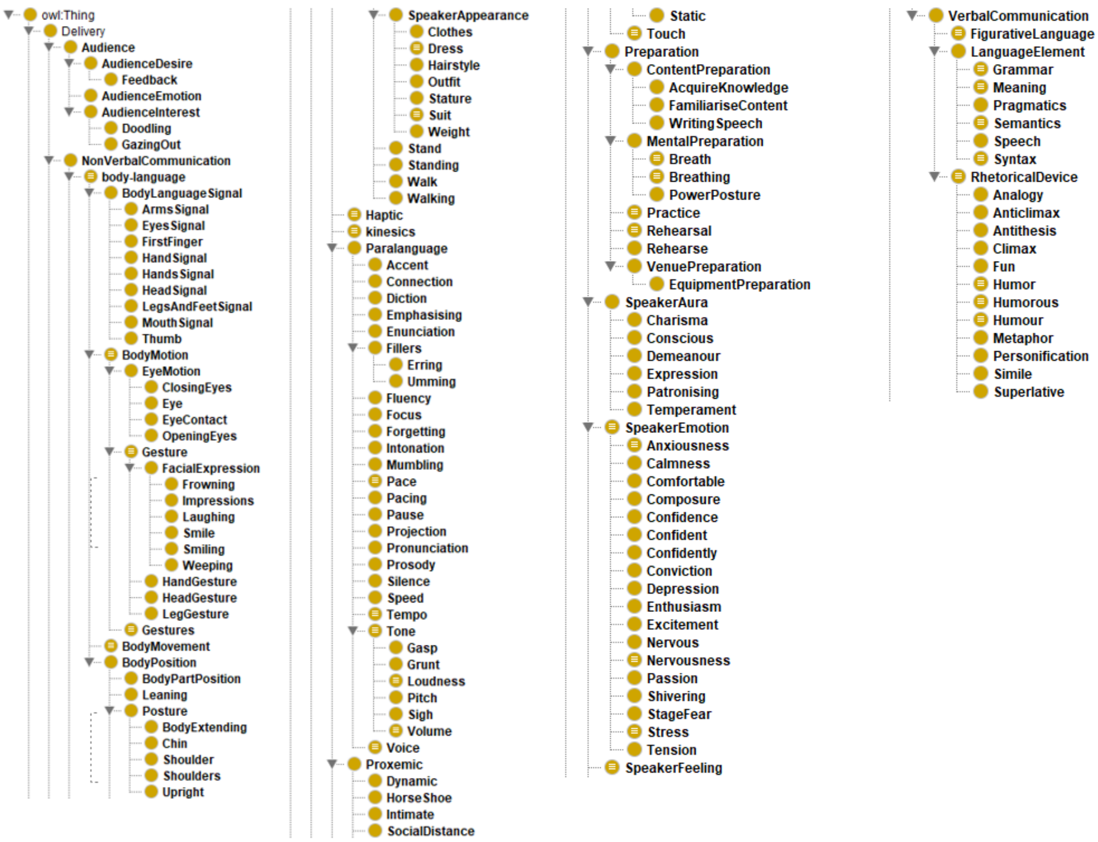


Figure 4.2: Part of the PreSOn ontology representing the hierarchy of the topic DELIVERY and its concepts.

domain related videos by implementing the search schema described in (Section 3.5.1) by following the concept hierarchy in the domain ontology (PreSOn). For example, using a combination of $<$Domain, T_i, c_i,"tutorial"$>$ as search terms, videos with tutorials related to the concept c_i from the topic T_i in the domain are collected. We have implemented this search schema using the library youtube-search-python [1]. To filter out the collected videos, we have manually followed the scoping review approach (Arksey & O'Malley, 2005) that is designed to review the literature (Oravec *et al.*, 2022; Prahladh & van Wyk, 2020).

Videos retrieved. We have implemented the search schema with a time condition so that each video duration should be $>=$ 3 minutes and $<$ 60

[1] https://pypi.org/project/youtube-search-python/[Accessed:June2022]

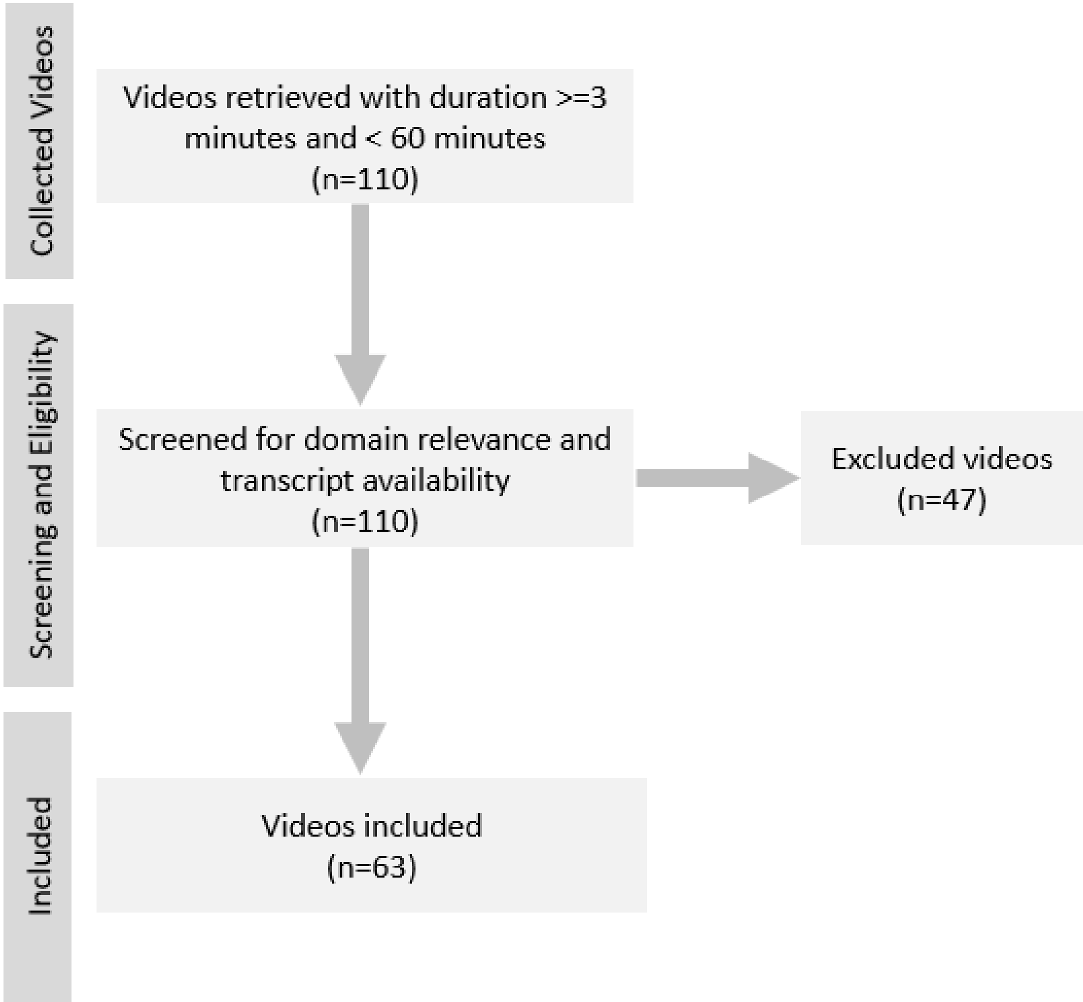


Figure 4.3: The collected domain related videos have been filtered using the scoping review approach.

minutes–as learner's concentration span is reduced over time (Meseguer-Martinez *et al.*, 2017; Risko *et al.*, 2012). Consequently, 110 videos have been collected which we passed to the next stage of the scoping review.

Screened for domain relevance and transcript availability. Some of the collected videos have domain related words in their title but they are domain-irrelevant. Example of domain-irrelevant videos are, the videos: *'Architecture Presentation Tips — 4 FUNDAMENTAL Principles'* which is about how to draw an architecture project using PowerPoint, and *'Schooled by Kids: Presentation Skills, Part 1'* which is a one minute video for primary school students practicing their presentations. Additionally, since we process the video transcripts only, we only include the videos that have their transcript automatically generated by YouTube. Based on these two conditions, we have excluded 47 videos. This part requires manual screening to ensure that the collected videos are relevant–this step is not automatic and it is part of the limitation is added to (Section 7.3).

Videos included. After applying all the filters (excluding irrelevant videos and checking for the transcript availability), the final outcome was 63 videos. These videos are with a corpus of 110594 tokens and an average duration of 660 (STDV=780) seconds, see Figure 4.3.

The taxonomy with the collected videos are passed as inputs to implement the VISC-L framework.

4.4 Implementation of VISC-L

In this section, we start implementing the framework for Video Segmentation and Characterisation for learning (VISC-L) proposed in (Section 3.5) in the prime domain 'Giving Pitch Presentations'. The Inputs are the collected domain related videos and the domain taxonomy. In the Initial Segments step, the videos are segmented by implementing the Text Tiling approach as proposed in (Section 3.5.2). In the Segment Characterisation step, the initial video segments are characterised by implementing the Semantic Tagging and Topic Classifier steps, as proposed in (Section 3.5.3). The characterised video segments are aggregated by implementing the Thematic Progression Theory as proposed in (Section 3.5.4). The final output is evaluated with experts by comparing the VISC-L output with Google's characterisation of the video segments as described in (Section 4.1).

4.4.1 Input

The VISC-L framework presented in (Section 3.5), requires three inputs. The first one is the **domain taxonomy**, $\Omega = \{C, H\}$ which includes the relevant domain concepts $C \neq \phi$ linked in a concept hierarchy H as proposed in (Section 4.2). We use $c_i \subset C_j$ to denote that c_i is a subclass of C_j. The top level concepts in the concept hierarchy define the main domain topics $\{T_1, ..., T_m\}$. Available ontologies - The Linked Open Data Cloud:[1] can be used if such domain taxonomy is not available.

The second input is the 63 videos collected as described in (Section 4.3) where their **video transcript** relates to the domain to be learnt. Each text line in any video transcript is associated with a timestamp that represents its start within the video. Before we commence the Initial Segmentation algorithm, we pre-process the video transcripts by restoring their punctuation. This is because we are aiming to use the end of sentence punctuation, $[., ?, !]$, as one of the segment boundary determiners as we describe in the next section. For this purpose, we have used the *restore punctuation tool* [2] that has been designed by (Tilk & Alumäe, 2016) which is a 'bidirectional recurrent neural network model with an attention mechanism for restoring missing inter-word punctuation in unsegmented text'–Note that this tool can be deactivated by the designer at any time. The third input is domain related **training data** labelled with the domain topics. It is required in order to fine-tune the model used as a topic classifier to be able to identify the main topics in the video transcripts as part of the characterisation step. We obtained our training data from the six studies (Mitrovic *et al.*, 2016, 2017) conducted when AVW Space was used as a learning platform by users, as described in (Section 3.7.1). The students, who used AVW Space as a learning platform to learn presentation skills, were able to write comments or rate other students' comments. The total number of participants who watched the videos was 38 and they wrote 2038 comments. These comments had been labelled by other students with the domain topics: DELIVERY, STRUCTURE and VISUAL AIDS. Note that the topic PRESENTATION ATTRIBUTE is missed from the labels–we have

[1] https://lod-cloud.net/[Accessed: March 2021]
[2] http://bark.phon.ioc.ee/punctuator[Accessed: May 2021]

solved this issue in the semantic tagging step which we described later in this chapter. The total number of the comments labelled with the topics DELIVERY, STRUCTURE and VISUAL AIDS is 1134, 422 and 482 respectively. Although the data is unbalanced among the topics which is a limitation in this work, it enables us to fine-tune the topic classifier model.
For the Initial Segment step in VISC-L, we passed the 63 collected videos.

4.4.2 Initial Segmentation

Our initial video segmentation algorithm defined in (Section 3.5.2) implements the Text Tiling approach (Hearst, 1997b) starting with smaller units (6 text line sentences) and aggregating them to get larger coherent units (paragraphs). Hence, the algorithm starts by cutting the video transcripts into small segments that are used as a starting point for aggregation. Initial segmentation can be done by using a certain number of text lines (e.g. 6 utterance text lines which is the approach followed in this section) or by using pre-defined segments (e.g. high attention intervals from past interactions (Mohammed & Dimitrova, 2020)). Each transcript line has a corresponding time in the video footage which is used to decide the segment duration. Accordingly, each video segment have three types of data: the transcript (= 6 text lines), the starting time (the timestamp of the first text line in the video) and end time (the timestamp of the last text line in the video). We have implemented this algorithm on the 63 collected videos of the prime domain and generated 2382 segments. These segments have an average duration of 14 (STDV=6) seconds and an average number of 38 (STDV=49) segments per video. The generated segments are passed to the next phase of the the VISC-L framework which is the Segment Characterisation.

4.4.3 Segment Characterisation

In order to aggregate the initial segments, we need to identify what domain content is present in each segment. This is done during the segment characterisation step where we propose using two algorithms (Semantic Tagging and Topic Classifier) to link each video segment VS_i with a set of focus topics FT_i and a set of concepts

FC_i. The final characterisation of the video segments will be as proposed in (Section 3.4–Definition 6), $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC \rangle$

Semantic Tagging. To apply the Semantic Tagging algorithm, as demonstrated in (Section 3.5.3), two inputs are needed; the transcript of the 2382 segments generated from the Initial segmentation step in VISC-L, and the taxonomy (Abolkasim, 2019) of the prime domain. This algorithm first pre-processes the transcript [1] by: (a) tokenisation; (b) cleaning from stop words and punctuation; (c) PoStagging ('Part-of-Speech tagged') to get the resulting nouns and noun phrases. The resulting nouns and noun phrases are to be semantically tagged to the taxonomy terms to decide the focus concept FC. Noting also the concept path to reach a top level concept (i.e. linking to a focus topic FT; $FC \subset FT_i$). As a result, each characterised video segment Ch_{i} is linked to a set of focus topics and their corresponding concepts; we denote this as $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT^1, FC^1 \rangle$ where ^{1} indicates that this is an output from the first segment characterisation algorithm. This algorithm also succeeds in noticing the topic, PRESENTATION ATTRIBUTE, and collecting its concept.

Characterisation Evaluation. In order to evaluate the characterisation of the single segments, we have asked an external expert to assess the accuracy of the characterisation of 137 random selected segments taken from the 2382 segments that we have characterised from all the videos, (see Appendix H). The expert was a researcher working on the same domain used in this work 'Giving Pitch Presentations'. We provided the expert with a sheet that includes the selected segments with their characterisation, and the topics and concepts in the domain taxonomy with their hierarchy to be familiar with the nature of the video segments' characterisation. The expert was asked to do the following: add new topics or concepts if it is thought to be missed from the characterisation, mark the assigned topic or concept to segment as wrong if she thought it was irrelevant or leave the characterisation if it was correct. The overall number of topics/concepts she assessed were 345. The expert accessed all the taxonomy structure and were

[1]We have used the Natural Language Tool Kit (NLTK) https://www.nltk.org/[Accessed: May 2021]

able to see all the concepts and their super concepts. In her evaluation, the expert did not suggest to change the structure of the taxonomy but she either recommend adding new concepts, disagree or agree with the assigned concepts by the algorithm. After receiving the evaluation **result**, we have designed three types of responses; 'To Fix the Domain taxonomy', 'To fix the Semantic Tagging Algorithm', 'Ignore–the concept was picked for the segment' and 'Ignore–suggested new concept is irrelevant'.

'To Fix the Domain taxonomy' means we have added the the new suggested concepts by the expert which we found were missed from the domain taxonomy. There were 34 new suggested concepts added to the taxonomy. We have improved the **PreSOn taxonomy** in response to the expert evaluation and through our observation of the video transcript and the Semantic Tagging result.

'To fix the Semantic Tagging Algorithm' response happens with the two concepts, 'VIDEO' and 'SUIT', which were selected by the algorithm and disagreed by the expert. They have been selected because their video transcripts are domain related but the presenter used the concept 'VIDEO' to mention the video they are presenting but not how to use videos during presentation design. Additionally, they use the concept 'SUIT' with the meaning 'convenient' while in the domain it relates to the presenter's outfit. This issue we are aiming to avoid by enhancing the characterisation of the video segments with the aid of the Topic Classifier.

Furthermore, the 'Ignore–the concept was picked for the segment' response is to ignore the expert's disagreement with the assigned concepts. This is because the concepts assigned to the segments, by the algorithm, are included in the taxonomy and are presented in the segment's transcript. Furthermore, the experts were given the initial segments that characterised only by the Semantic Tagging algorithm not the final segments characterisation. The final characterisation is the combining of the Semantic Tagging and Topic classifier–that contextually characterise the video segments. The adjacent segments in a video with the same focus topics and concepts are aggregated and these aggregated segments with their common focus topics and concepts represent the final segments to be used to generate the narratives. Accordingly, these concepts should be kept for the segments' characterisation at this step. Hence, we have ignored 21 suggestions from the experts. The 'Ignore–suggested new concept is irrelevant' is when the expert suggested a new concept which is not presented in the transcript but the expert found that it relevant from the context of the segment. Accordingly, we decided to ignore 40 suggested concepts as it is impossible to assign them to the video segments characterisation because they have not been mentioned explicitly in the transcript.

Finally, to calculate the agreement between the expert responses and our responses, we ran Cohen's Kappa Coefficient (Cohen, 1960). We are using Python where we use a library[1] to calculate Cohen Kappa Coefficient. We have passed two lists to the code showing the agreement and disagreement between the expert evaluation and our responses. To create these lists and inspired by the Confusion Matrix (Luque *et al.*, 2019), we have designed a combination of the two responses and include them into brackets where the first element in the bracket is our response to the expert evaluation and the second element is the expert evaluation. Each segment in the evaluation data has been assigned one of these brackets. The values within these brackets are as follows: (1,1) means that the expert agree with the Semantic Tagging characterisation, (1,0) means we ignore the expert's disagreement on the Semantic Tagging characterisation of a segment, (0,1) means we ignore the new suggested concept by the expert as they are irrelevant because they did not appear in the video transcript. We have saved the first element of each bracket in a list that represent our responses and save the second element of each bracket in another list representing the evaluator responses. These two lists have been passed to the Python code we designed to calculate the Cohen Kappa Coefficient where the inner agreement result was very high (90%).

On the other hand, after we run the Semantic Tagging algorithm, we found that some concepts within the ontology are not domain specific concepts. This caused an issue with the characterisation results as these concepts mentioned in the videos are in different contexts. For example, the concept 'Speaker' in the topic 'Visual Aid' is referring to a speaker as a device in the ontology while in the video transcript it refers to the presenter of the slides. Also, the concept 'Table' is used in the domain ontology for organising data while in the video transcript it has been mentioned many times for a piece of furniture. Consequently, we have deleted 8 concepts, 1

[1] https://scikit-learn.org/stable/modules/generated/sklearn.metrics.cohen_kappa_score.html[Accessed: May 2021]

from the Topic DELIVERY and 7 from the topic VISUAL AIDS. Additionally, we have used the transcripts of the collected videos to extend the PreSOn ontology which resulted in adding new concepts. Examples of the concepts added per topics are: DELIVERY (within the concept 'BODY POSITION' we have added 'STANDING', 'WALKING', 'LEANING'), STRUCTURE (within the concept 'STRUCTURE APPROACH' we have added 'TACTIC', 'STORY TELLING'), PRESENTATION ATTRIBUTE (within the concept 'IMPACT' we have added the concepts 'PERSUASIVE', 'REMOEMORABLE', 'MOTIVATIONAL'), and VISUAL AIDS (within the concept 'VISUAL AIDS DEVICE' we have added the concept 'VIRTUAL REALITY (VR)'). The final number of the concepts is as mentioned in (Section 4.2) is 398.

After we made the required amendments to the domain ontology, we re-implemented the Semantic Tagging algorithm.

A key challenge for this algorithm is word sense disambiguation. This is not that prominent with carefully selected videos (Mohammed & Dimitrova, 2020), however, if the videos are selected automatically from open social spaces, there will be a high risk of word sense ambiguity (words in transcripts are used in different contexts to the domain). For example, the word 'BODY COMPONENT' can have two different meanings if used in two different contexts, e.g. in *BIOLOGY* or in *PRESENTATION'S STRUCTURE*. Hence, we need to disambiguate the topics based on the context, which is done with the second algorithm which is the Topic Classifier.

Topic Classifier. To overcome the aforementioned word sense ambiguity issue, we need a topic classifier which identifies a domain topic based on its context. Following the latest development in natural language processing, we use Bidirectional Encoder Representations from Transformers (BERT) (Devlin *et al.*, 2018) as a topic classifier.

(a) Brief description of BERT. It is a powerful natural language processing (NLP) model developed by Google (Devlin *et al.*, 2018). We will use pre trained BERT models which will be fine tuned. BERT is a deep neural network model that is based on transformers in its architecture. A transformer has two main components (Encoder and Decoder) and can process a large amount of data in parallel and BERT is based on the Encoder part only. Each encoder (Vaswani *et al.*, 2017) consists of two main components a self-attention layer and feed forward layer, where the output from the self-attention layer is the input of the feed forward layer.

The self-attention layer in BERT structure helps in recognising the context of the input. First, it passes the input sentence to an embedding layer where each word in the input will be converted to a vector using, e.g. word-to-vec. These vectors will be used to form a matrix (A) where each value is the dot product of two specific vectors. Then, another matrix (X) is formed using the word vectors generated from the embedding layer and a dot product between the two matrix (A*X) will performed to produce an output matrix (Y) which is a context aware matrix as each word knows its neighbours. This output layer (Y) will be passed to feed forward network where it is further processed to give it a richer representation. The encoders can be stacked N times to further encode the information where each layer will be able to learn different attention representations. Hence, by pre-training BERT on a large corpus of text data, it can develop a deep understanding of the structure and meaning of the language, which produces a highly effective tool for different NLP tasks. This will allow BERT to be fine-tuned with just one additional output layer to create models for different language tasks, topic classification in this research.

Within the Segment Characterisation phase of VISC-L, the BERT model is fine-tuned using training data with domain topic labels (which is part of the input for VISC-L). Then, the fine-tuned model is used as a classifier to link each segment VS_i to its domain focus topics FT_i^2 (where ^{2} indicates that this is an output from the second segment characterisation algorithm). For that purpose, we need first to select a BERT model to be the topic classifier.

(b) Use of BERT as Topic Classifier. To select the best BERT model as a topic classifier for our work, we are going to run three experiments to select one from the three models: Roberta Base, Distill Bert and BERT-BASE-Uncased. These models are widely used for topic modelling and semantic analysis tasks. We fine-tune these models with the training data. Each BERT model type has the following architecture: number of **Parameters** which are the learnable variables available for the model, **Transformer Layers** which are used to transform a sequence of word representations to a sequence of contextualised words, **Hidden Size** which is a middle layer between the input and output layers used to assign weights to words to produce a desirable outcome, and **Attention Head** represents the size of a transformer block. The architecture of the selected BERT models is presented in the Table 4.1.

Table 4.1: Selected BERT models for topic classification. The information has been taken from (Adoma *et al.*, 2020).

Model Type	Transformer Layers	Hidden Layers	Attention Heads	Parameters
BERT-base-uncased	12	768	12	110 M
RoBERTa-base	12	768	12	125 M
DistilBERT-uncased	6	768	12	66 M

The models will be fine-tuned using the domain related training data described in (Section 4.4.1). The model that shows the best results on the metrics (Precision, Recall, and F1 score) will be selected as the VISC-L topic classifier. Within the experiments, we will assess the performance of the models by selecting different values of hyper parameters (Maximum length, Batch size, Learning rate and Epoch). The group of hyper parameters where all the models showed improvement in the evaluation metrics will be selected and the model that gives higher values of these metrics will be selected as the VISC-L topic classifier. Before we commence the experiments, we will define the hyper parameters used. **Maximum length** e.g, 512 is the maximum number of tokens of the input. Accordingly, the input will be either truncated if it is above the maximum length or padded if it is below the maximum length. According to the small size of the labeled data we have, we used BERT BASE-Uncased-small model as one of the selected model to compare with instead of BERT-BASE-Uncased-large model. **Batch size** is the number of samples processed before the model is updated and is always set in powers of two. **Learning rate** is used to regulate the weights of the model concerning the loss gradient. **An epoch** is one cycle through the full training data (Devarakonda *et al.*, 2017). Inspired by (Adoma *et al.*, 2020), we have designed three experiments where we used three groups of hyper parameters with different values: Group 1 (maximum length=500, batch-size=6, learning-rate=5_e-5, epochs=1), Group 2 (maximum length=500, batch-size=16, learning-rate=5_e-5, epochs=5), and Group 3 (maximum length=500, batch-size=16, learning-rate=5_e-5, epochs=6).

To run the experiments, we first downloaded the Python libraries required for this purpose which are: **tensorflow**, created by Google as a library in Python that can be used to create deep learning models by using a wrapper library. We have used **Ktrain** as the wrapper library. The training data has been pre-processed using the libraries from the **Ktrain** model in Python to divide them into training and validation sets. Within these experiments we have used the models as multiple classifiers. Within each model, the training data is split into both training and test data in a ratio of 9:1 respectively. This ratio is decided because we have a limited training dataset. The main idea of splitting the dataset into a validation set is to prevent our model from over-fitting. Random-state=42 is used to enable reproducible results and allows us to get the same training and test sets across different executions. In this way, the training data will be constant for every run. The model is fine-tuned on the training set and, simultaneously, the model evaluation is performed on the validation set after every epoch. To implement the evaluation of the models, we have used the Ktrain library in Python [1].

Within the first and second experiments, we have selected the hyper parameters Group 1 (maximum length=500, batch-size=6, learning-rate=5_e-5, epochs=1) and Group 2 (maximum length=500, batch-size=16, learning-rate=5_e-5, epochs=5) respectively to fine-tune the aforementioned BERT models. The results are presented in the Tables 4.2, 4.3, and 4.4

We can notice that the BERT models give better results in regard to the metrics (Precision, Recall, and F1 score) after applying the second group of the hyper parameters. The Roberta Base model showed improvement in the metrics results using the Group 2 hyper parameters except for the topic STRUCTURE where it did not improve the Recall metric. Whilst the Distill BERT model did not improve any of the metrics with the topic STRUCTURE, it did improve them with the other topics using Group 2 of the hyper parameters. This can be referred

[1] https://pypi.org/project/ktrain/0.1.6/[Accessed:May2021]

Table 4.2: Roberta-BASE model as multiple classifiers after applying the hyper parameters Group 1 and Group 2.

Topic	Hyper parameters- Group 1			Hyper parameters- Group 2		
	Precision	Recall	F1-score	Precision	Recall	F1-score
Delivery	**0.88**	0.79	0.83	**0.88**	**0.93**	**0.91**
Structure	0.53	**0.71**	0.61	**0.69**	0.63	**0.66**
Visual Aids	0.81	0.78	0.79	**0.95**	**0.85**	**0.90**

Table 4.3: Distill BERT-BASE-Uncased model as multiple classifiers after applying the hyper parameters Group 1 and Group 2.

Topic	Hyper parameters- Group 1			Hyper parameters- Group 2		
	Precision	Recall	F1-score	Precision	Recall	F1-score
Delivery	0.83	0.90	0.86	**0.85**	**0.91**	**0.88**
Structure	**0.64**	**0.60**	**0.62**	0.61	0.57	0.59
Visual Aids	0.97	0.78	0.87	**1.00**	**0.85**	**0.92**

Table 4.4: BERT-BASE-Uncased model as multiple classifiers after applying the hyper parameters Group 1 and Group 2.

Topic	Hyper parameters- Group 1			Hyper parameters- Group 2		
	Precision	Recall	F1-score	Precision	Recall	F1-score
Delivery	0.83	0.90	0.86	**0.89**	**0.94**	**0.92**
Structure	0.64	0.60	0.62	**0.76**	**0.74**	**0.75**
Visual Aids	**0.97**	0.78	0.87	**0.97**	**0.85**	**0.91**

to the lower presentation of the topic STRUCTURE in the training data with 422 labels compared to the other topics, DELIVERY- 1134 and VISUAL AIDS- 482. On the other hand, BERT-BASE-Uncased gave the highest results in regards to the metrics with all of the topics using Group 2 hyper parameters.

To further explore the performance of the BERT models, we have fine-tuned them using the Group 3 hyper parameters which differ from Group 2 in which the number of epochs is to be 6 instead of 5: (maximum length=500, batch-size=16, learning-rate=5_e-5, epochs=6). The result is presented in the Table 4.5

Table 4.5: Applying Group 3 hyper parameters to fine-tune the BERT models: Roberta Base (R), Distill BERT (D), and BERT-BASE-Uncased (B).

Topic	Precision			Recall			F1-score		
	R	D	B	R	D	B	R	D	B
Delivery	0.88	**0.90**	0.87	0.92	0.93	**0.94**	0.90	0.91	0.91
Structure	0.66	**0.75**	0.74	0.66	**0.69**	0.66	0.66	**0.72**	0.70
Visual Aids	0.98	0.91	**1.00**	0.87	**0.89**	0.87	0.92	0.90	**0.93**

We found that Distill BERT has out-performed the Roberta Base and BERT-BASE-Uncased in regard to the Precision, Recall and F1-score metrics. Compared to the result of fine-tuning the BERT-BASE-Uncased with Group 2 hyper parameters, we found that BERT-BASE-Uncased out-performed Distill BERT in all the metrics except for the Precision metric of the topic DELIVERY and the Recall metric of the topic VISUAL AIDS. For that purpose, and for better performing results and execution time, we decided to select the BERT-BASE-Uncased model using the Group 2 of hyper parameters as our topic classifier. Inspired by the success of using BERT as a binary classifier (Paraschiv & Cercel, 2019) used in German tweets classification, we have decided to run a fourth experiment to compare between BERT-BASE-Uncased model as multi and binary classifiers. Accordingly, we ran BERT-BASE-Uncased as a binary classifier for each topic. Accordingly, we have three copies of the training data, a copy for each topic (DELIVERY, STRUCTURE, VISUAL AIDS) where the labels are either the topic name or 'No'. The results after using the BERT-BASE-Uncased model as a multi and binary classifier are presented in Table 4.6.

The results showed that the model as a binary classifier improved the Precision metric for the topics DELIVERY and all the metrics for the topic VISUAL AIDS. However, the model did not improve any of the metrics for the topic STRUCTURE and this can be referred to the imbalance in the labels of the topics in the training

Table 4.6: BERT-BASE-Uncased model as multi and binary classifier results.

Topic	Multiple Classifier			Binary Classifier		
	Precision	Recall	F1-score	Precision	Recall	F1-score
Delivery	0.89	**0.94**	**0.92**	**0.91**	0.93	**0.92**
Structure	**0.76**	**0.74**	**0.75**	0.69	0.71	0.70
Visual Aids	0.97	0.85	0.91	**1.00**	**0.87**	**0.93**

data. Based on these results, we have decided to use BERT-BASE-Uncased as a binary topic classifier.

To characterise the video segments using the selected topic classifier, we have passed on to it the 2382 video segments generated from the initial segmentation step. This process has been repeated three times, one for each topic. After that, we concatenated the characterisation results from the three runs. Having done so, each segment is now characterised with a set of focus topics FT^2 where ^{2} means this is the characterisation using the topic classifier.

To get the final characterisation of each video segment, we have combined the Semantic Tagging and the topic classifier characterisations as described in the next section.

Characterisation Combining. To get the final segment characterisation, we ran the step of **Combining the characterisation results** identified from the semantic tagging and the topic classifier as explained in (Section 3.5.3). For instance, a segment VS_{i} has two characterisations, one from the semantic tagging algorithm $\langle FT_i^1, FC_i^1\rangle$ and one from the topic classifier model FT_i^2. The final characterisation of the segment VS_{i} is the result of combining the two segment's characterisations: $\langle FT\rangle = \langle FT_i^1 \cap FT_i^2\rangle$ which is the common Focus Topic(s) assigned to the segments after running the the Semantic Tagging algorithm and the Topic Classifier model. This means, the focus topic is the one identified in both characterisations and the focus concepts belong to the agreed focus topic which can be extracted from the Semantic Tagging characterisation output. Hence the final characterisation of video segments is $Ch = \langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC\rangle$.

Notice that the topic *PRESENTATION ATTRIBUTE* can only be recognised by the semantic tagging algorithm as mentioned in (Section 4.4.3–Semantic Tagging).

Characterisation Outcome. The final characterisation result revealed that 1848 segments have been characterised with a focus topic(s) and concept(s). However, there are 534 segments with no characterisation which happens when the presenter is silent or digresses from the domain. The characterisation results are presented in Table 4.7. According to the characterisation results, 32% of all characterised segments focus on only one topic which could help in learning the effect of the focus topic on the design of presentations. Whereas, 68% of the characterised video segments focus on multiple topics which could help in exploring the relationship between different topics and the effect of using them on the design of presentations. These segments can be aggregated together to get longer segments with the same focus topic and concept. By aggregating the video segments guided by the Thematic Progression theory, we will finish implementing the Text Tiling approach and the VISC-L framework.

Table 4.7: Video Segment Characterisation output.

Focus Topic	Number of Segments	Segment Duration in sec.			
		Avg.	STDV	Min	Max
Delivery	243	13	3	7	25
PresentationAttribute	53	14	4	8	32
Structure	167	13	4	7	35
Visual Aids	114	14	5	8	41
Multi Focus Topics	1271	15	6	6	68

4.4.4 Segment Aggregation

Following the Text-Tiling approach (Hearst, 1997b), small segments are aggregated into larger segments. To maintain the flow of information within adjacent segments, we apply the aggregation algorithm based on the Thematic Progression (TP) Theory (Bloor & Bloor, 2013) described in (Section 3.2.2). Accordingly, we ran the third step of VISC-L on the characterised segments by implementing the

Linear Aggregation With Interpolation algorithm based on the focus topic and concept, see (Section 3.5). The input to the aggregation (Algorithm 3) is the video segments with their final characterisation. The algorithm compares the adjacent segments Ch_{i}, $Ch_{\mathrm{i+1}}$ within a video and checks their focus concepts $\langle FC_i \rangle$, $\langle FC_{\mathrm{i+1}} \rangle$. It checks whether they intersect with each other and have common concept(s) $\langle FC \rangle = \langle FC_i \cap FC_{\mathrm{i+1}} \rangle$. If $\langle FC \rangle \neq \phi$ then these segments are aggregated and their focus concepts are $\langle FC \rangle$ and their focus topics are extracted from the segments characterisation which are related to the $\langle FC \rangle$. The duration of the aggregates starts from the beginning of the first segment and finishes at the end of the last segment. If $\langle FC \rangle = \phi$, then the second segment $Ch_{\mathrm{i+1}}$ is a gap segment as long as its duration is $\leq \theta$–The value of θ represents the segment duration threshold and in this thesis we have selected θ to be 30 seconds which is the average duration of a video segment. The algorithm checks the intersection between the first and third segment $\langle FC \rangle = \langle FC_i \cap FC_{\mathrm{i+2}} \rangle$. If $\{FC\} \neq \phi$ then the segment Ch_{i}, $Ch_{\mathrm{i+1}}$, $Ch_{\mathrm{i+2}}$ are aggregated–this is the reason we call it aggregation with interpolation. Otherwise, if $\langle FC \rangle = \phi$, the first segment Ch_{i} is saved as a single segment and a new aggregation starts from the segment $Ch_{\mathrm{i+1}}$ which is considered the first segment, see Figure 4.4.

4.4.5 Output

The output of VISC-L is a set of aggregated video segments with a start and end time in the corresponding video. Each aggregated video segment Ch_{i} is characterised with a set of domain focus topics FT_i (top classes in the taxonomy) and a set of focus concepts FC_i from the focus topics which are mentioned in the transcript of the video segment (for every $FC_i \subset FT_i$ and FC is a set of classes or individuals). The aggregation result revealed that the number of segments decreases to 969 (where the original number was 2382), see Figure 4.5. This showed that many adjacent segments have the same focus topic and concept. This is proved with the increase in the percentage of segments (73%) that focus on one topic. In line with the aggregation, the size of the new aggregates has been increased with an average duration of 36 (STDV=35) seconds. Furthermore, the predominant topics, after aggregating the segments, are Delivery (29.1%

Start Time	End Time	Video segment transcript	Focus concept	Focus Topic
2:45	3:00	So what I 'm going to do is first of all go through some basic about **power point** and then we 're going to think about how you structure a talk in order to lead a member of the audience through the data in a way that they will understand each piece that you 're presenting and be able to really understand what the take **message** is . First of all, what **font** should you use ?	PowerPoint Message Font	Visual aids Structure Visual Aids
3.00	3.06	It turn out that some of the default font in **power point** and keynote are exactly wrong . The font you should use is a Sans Serif **font** .	PowerPoint Font	Visual aids Visual aids
3.06	3.13	nan		
3.14	3.20	What is a Sans Serif **font** ? San Serif **font** are **font** without little doober line and stuff at the bottom of letter . And that 's to be contrasted with Serif **font** which have all the little doober at the bottom of each letter .	Font	Visual Aids
3.20	3.27	nan		
3.28	3.39	So why do you use one and not the other ? Well visual psychophysicist have discovered that using a Sans Serif **font** when you 're projecting **text** onto a screen like this make it easier for the audience to read the **text** quickly . These **font** down here the Serif **font** this is the **font** if you have novel you were going to read it in bed	Font Text	Visual aids Visual aids
3.39	3.50	it 's very easy to read . And that 's why book are printed with Serif **font** but you should choose and there are a range of choice that you can make	Font	Visual aids
3.50	3.59	one of the Sans Serif **font** for your scientific presentation . How big should your **font** be ?	Font	Visual aids
3.59	4.04	Again be careful of some of the default **font** size . One of the default in **Power Point** is astronomically huge	Font PowerPoint	Visual aids Visual aids
4.04	4.11	bigger than this one right here it 's like 42 . It 's way too big ! You do n't need that . So the range of **font** size that you should use are shown here .	Font	Visual aids
4.19	4.28	Anywhere from 18 down to 36 with one exception . We often in our scientific presentation will want to insert a reference to a published paper which is n't really the focus of the **slide** but we want to have it up there for scientific accuracy .	Slide	Visual aids
4.34	4.41	So under those circumstance you might use a 14 point **font** to put your reference at the bottom of the **slide** .	Font Slide	Visual aids Visual aids
4.42	4.48	Other than that just work in this range and you 'll be good . Avoid using capital letter . This make it clear why. It 's actually really hard to read all capitol . And secondly in this age of email I think we all know that capitalizing everything		
4.49	4.57	is the visual equivalent of shouting at someone . So it 's just not polite . In addition when you 're thinking about title		
4.57	5.04	or how you would actually capitalize word use a sentence **format** . In other word do n't capitalize every word	Format	Presentation Attribute

Gap segment with no focus topic and no focus concept and its duration is ≤ 30 seconds.

Figure 4.4: Example of aggregating adjacent segments by interpolating the gap segments. For example, we have aggregated some of the segments in one of the collected videos which has the YouTube video ID= Hp7Id3Yb9XQ–this is taken from the segment characterisation which saved the segment Id that is created using the video Id as described in Algorithm 1. The aggregation process is as follows: the segment with duration [3.06-3.13] is with duration < 30 seconds so it is aggregated with the previous segments. The same process is followed to aggregate the segments with duration [3.20-3.27], [4.19-4.28], [4.42-4.48] and [4.49-4.57] with the previous segments.

of the segments) and the topic Structure (20.6% of the segments). There is a noticeable decrease in the number of segments that focus on multiple topics (27.03%). Nevertheless, the topics Delivery and Structure stand out as the more correlated topics among other topics which highlighted that they are necessary to understand each other. On the other hand, the topic Presentation Attribute appears alongside other topics in the aggregates more than it being a single focus topic. This indicates that this topic is better to be demonstrated by presenting its relationship with other topics, see Table 4.8.

To evaluate the Quality, Perceived Usefulness, Learning effect and the Cognitive

Video Collection using YouTube

Search Schema
< Domain name, Topic, Concept>

Filtering Criteria
Duration >= 3 minutes
Video has transcript

Output

#Videos	AVG Duration	STDV
63	660s	780

Video Segmentation and Characterisation VISC-L framework

Initial Segments

#Segments	AVG Duration	STDV
2382	14s	6

Segment Aggregation

#Segments	AVG Duration	STDV
969	36s	35

Filtering Criteria
Video views >=100K and delete the first and last segments as they do not include domain related information

Output
247 segments coming from 33 videos

Topic	#Segments	AVG Duration	STDV
Delivery	86	62s	48
Presentation Attribute	12	63s	63
Structure	54	45s	29
Visual Aid	43	88s	87
Multi	52	45s	24

Figure 4.5: VISC-L output using the videos with views $\geq 100K$ after restoring the punctuation of their transcript

.

Work Load of the video segments' characterisation to support learning, we have conducted our user study in which we compared VISC-L video segment characterisation with Google's video characterisation, see (Section 4.1).

4.5 User Evaluation

The evaluation study is an initial exploratory study which aims to assess the Quality, Perceived Usefulness, Learning Effect and Cognitive Work Load of the characterised video segments when used for learning. These types of assessment have been used in other work to assess the effect of new learning strategy on users. First we assessed the Quality of the characterised video segments inspired by Kriksciuniene *et al.* (2019) by asking the participants whether the provided

Table 4.8: Video Segment Aggregation Data.

Focus Topic	Number of Segments	Segment Duration in sec.			
		Avg.	STDV	Min	Max
Delivery	282	42	47	6	390
PresentationAttribute	48	29	20	8	93
Structure	200	32	24	7	127
Visual Aids	177	42	32	7	199
Multi Focus Topics	262	30	30	6	321

segments are useful to learn from and the characterisation of the video segments helped them to recognise and focus on domain key areas. For that purpose we have used the LIKERT scales (Taherdoost, 2019). Inspired by (Dimitrova & Mitrovic, 2022), where they assess the acceptance of the new technology in learning, we use TAM questionnaire (Davis, 1989) to assess the participants' Perceived Usefulness of learning while watching the characterised video segments, and use NASA-TLX instrument (Hart, 2006) to check the participants' perception of Cognitive Work Load while using the characterised video segments for learning. The Learning Effect of the characterised video segments on participants' domain comprehension have been assessed using the pre and post tests. For this reason, users have been invited to participate in this evaluation study where the evaluation process includes comparing the video segment characterisation generated by VISC-L with the Google's characterisation (See Section 2.3.1).

4.5.1 Study Setup

To commence this evaluation study, we invited 18 potential users to assess the characterisation of a selective number of videos following the evaluation procedure. All the details are described below.

Participants. According to the domain of this thesis which is for learning, we decided to invite learners or educators to participate in the study. This decision is based on the results of the evaluation studies (Mitrovic *et al.*, 2016, 2017) conducted on AVW within the presentation skills domain where it is found that postgraduate participants provided better responses. Consequently, we decided to invite postgraduate researchers from the University of Leeds or PhD holders from industry. Only 18 participants responded (10 male, 7 female and 1 other); 16 PhD students from the University of Leeds and 2 from Industry. 12 participants were 24-29 years old, 1 participant was 18-23 years old and 5 participants were above 30 years. The training level is varied: 13 have some training on giving presentations, the rest either have a lot of training or have received no training before. Their presentation experience is varied: 10 have a medium level, 5 have either an experienced level or little experience. 12 participants are native English speakers. 10 participants watch YouTube videos every week for learning and every day for other purposes, whereas the rest watch YouTube occasionally.

The selection of the participants is done using a convenience sampling which is a non-probability sampling method which is some of the limitations of this study (Section 7.3). The participants were researchers and lecturers who were available at the time of the study and showed willingness to participate in the study as not of all the invited participants responded to the invitation.

The study was approved by the ethics committee of the Faculty of Engineering and Physical Sciences, University of Leeds. We asked the participants to leave their emails so their time will be compensated by £50 each[1] (as token of appreciation) and the emails were deleted afterwards. This decision is inspired by (Largent & Lynch, 2017) where they defined the payment to the evaluators participated in a study by:"Payment may also be offered to compensate research participants for the fair value of their time, their willingness to accept research-related burdens, and their contributions to research". The amount of payment depends on the time and the number of questions that participants need to answer. In this study the payment was £50 each while in the study conducted in (Section 6.6) the participants were paid £30 as they did not do the pre and post tests.

[1]The amount of £50 that each participant received as a voucher was decided to ensure a fair reward considering both the duration of the study (around 3 hours) and the budget limitation for this PhD research.

Materials. To be able to conduct the surveys, we have selected 8 videos from the data set. The selection of these videos is based on the following filtering criteria: their popularity (where we divided the number of the video's views by the days since its creation to the date of the data collection), and the video's duration which be between > 4 and <6 minutes so the study will not last for more than one hour. The surveys have been designed using Google Forms to assess the segment's characterisation in regard to its: Quality, Learning Effect, Perceived Usefulness and Cognitive Work Load. To do so, we have compared the characterisation of the same video segments using VISC-L and Google characterisation. We have designed 2 Google forms (see Appendix I), Form 1 and Form 2, where the order of the videos in both forms is the same. However, in Form 1, the first 4 videos have been characterised by Google while in Form 2 these videos have been characterised by VISC-L. The second 4 videos in Form 1 have been characterised by VISC-L while in Form 2 they have been characterised by Google. We sent these forms separately to 20 different participants however not all of them responded. Accordingly, Form 1 was completed by 8 participants while Form 2 was completed by 10 participants. The surveys are fully compliant with the General Data Protection Regulation (GDPR) and have been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences, University of Leeds, UK. The structure of the forms is the same and as follows: a consent form, a section to collect user profiles, a pre-test section where the participants list all the terms they know about the domain topics, and the last **two parts**. **Part 1** (whether it is Form 1 or 2), has three sections. Section 1 includes the footage of 4 videos where each video is followed by the characterisation of the recognised segments by one of the algorithms, followed by the quality questions designed using the LIKERT response labels (Taherdoost, 2019) and post-test where they will list the domain related terms they recognised while watching the videos. Section 2 is the Perceived Usefulness questions to assess the characterised video segments and their positives and negatives and in Section 3, the Cognitive Work Load scales. The structure of **Part 2** of the survey is the same as **Part 1**, but the characterisation of the videos will be done by using the other algorithm. The Perceived Usefulness of the characterised video segments is designed following the TAM questionnaire

(Davis, 1989) while the Cognitive Work Load scales have been designed using a combination of NASA-TLX scales (Hart, 2006).

Procedure. To commence the evaluation study, we sent the evaluation form link to the participants. Each participant should go through the following steps in the evaluation form: (1.) Read and accept the consent form, (2.) Complete a short pre-study section to collect their profiles, (3.) Watch several suggested video segments with a characterisation generated using one of the algorithms (VISC-L or Google), (4.) Give feedback on the video segments and provided characterisations, (5.) Provide a short video summary, (6.) Give feedback on the usability and usefulness of the recommended video segments for learning about giving presentations, (7.) Repeat [3-6] with segments generated by the other algorithm (Google or VISC-L).

In the following section, we analyse the outcome from the evaluation studies where we aggregate the outcomes of the two surveys. We report and analyse the results of the Quality, Learning effect, Perceived Usefulness, Cognitive Work Load and the positives and negatives of the video segments' characterisation generated by VISC-L in comparison with Google's characterisation.

4.5.2 Results: Quality of the Segment Characterisations

We analysed the Quality of the characterisation of the video segments based on the aggregated experts' responses to be able to answer RQ1.

RQ1: How to automatically generate good quality characterisations of video segments that can be used for learning?

To assess **Quality**, we asked the participants to rank whether the segments were useful and the characterisation was helpful for learning about presentation skills. Referring to the Table 4.9, more than half of the participants agreed that the video segment were useful with a slight difference between Google and VISC-L characterisation. Google segments found to be more useful than VISC-L with an AVG difference of 0.08. Similarly, nearly half of the participant agreed that the characterisation of the video segments is helpful where Google was higher than VISC-L characterisation with an AVG difference of 0.19. Additionally, around quarter of the participants found that video segments were not useful and VISC-L characterisation found to be less helpful than Google with an AVG difference of 0.16. These results indicate that more than half of the participants agreed that the positives (usefulness and the help of the video segment characterisation) is more than its negatives with both VISC-L and Google characterisation.

Table 4.9: Quality of the characterisation of video segments' characterisation using VISC-L and Google. Hence, the values of each quality category (Useful, Not useful, Helpful, Unhelpful) of each video characterised by VISC-L is aggregated from both surveys and the final result is presented in the table as an average (STDV). The same steps were followed for the videos characterised by Google in both surveys. Notice that there is 1 segment characterised by VISC-L but had not been watched by one of the experts and 11 segments characterised by Google that had not been watched by an expert.

Method	Useful	Not useful	Helpful	Unhelpful
VISC-L	0.51 (0.50)	0.29 (0.45)	0.48 (0.50)	0.43 (0.49)
Google	0.59 (0.49)	0.23 (0.42)	0.67 (0.47)	0.27 (0.45)

To assess the **Learning effect** of watching the video segments, we compared the participants' domain terms mentioned in the pre-test with the new domain terms mentioned after watching the video segments generated by either VISC-L or the Google algorithms. During the pre-test, an average of 6.78 terms (STDV=5.67) were mentioned by the participants. After watching the VISC-L segments, the participants named an average of 9.89 (STDV=8.48) new terms, while after watching the Google segments, the participants named an average of 8.72 (STDV=8.36) new terms. There is no significant difference between the segments with a characterisation that led to identifying new domain terms.

4.5.3 Results: Usefulness of the Segment Characterisations

In this part we analyse and compare between the Perceived Usefulness results of the characterised video segments using VISC-L and Google based on the aggregated experts' responses to be able to answer:

RQ2: Does the characterisation of video segments help in identifying and focusing on the key domain concepts?

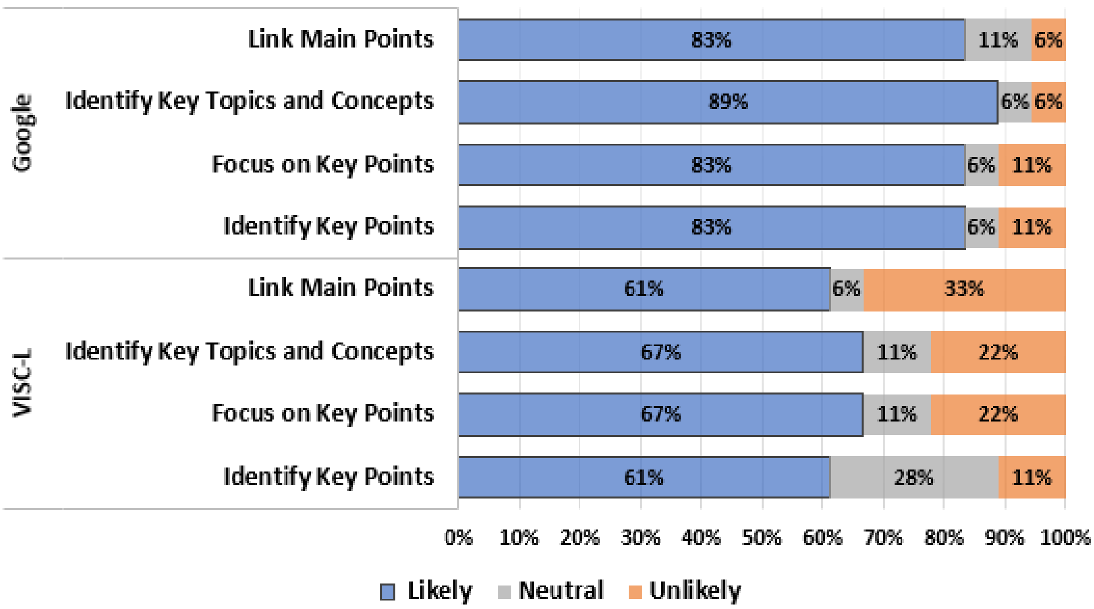


Figure 4.6: Evaluation results of the Perceived Usefulness of the segment characterisation using the VISC-L and Google characterisations.

Perceived Usefulness. The comparison considered whether participants managed to identify and link main points in the videos to the topics in the domain and to identify key points and focus on them. The results presented in Figure 4.6 showed that in general, the characterised segments were LIKELY to meet their goals. The participants preferred the characterisation generated by Google more because the language used was extracted directly from the transcript and was easy to recognise in the video, while in VISC-L the characterisation was referring to key domain topics form the domain ontology that related to the key concepts mentioned in the transcript. Figures 4.7, 4.8 and 4.9 show the difference in the video segment characterisations generated by VISC-L and Google.

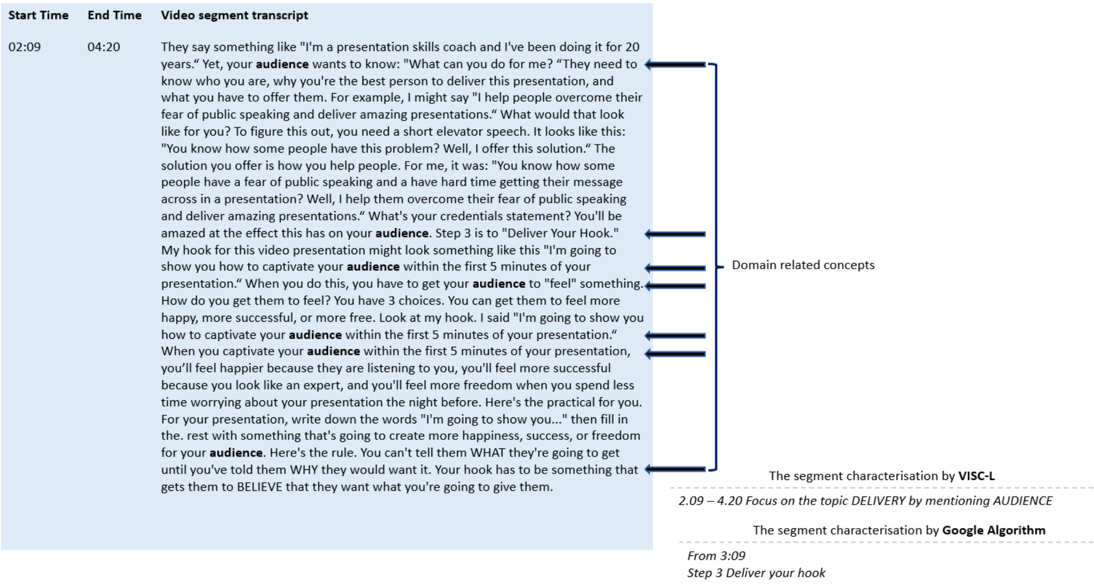


Figure 4.7: Example 1 of characterising a video segment using VISC-L and Google. The segment has been taken from one of the collected domain related videos with ID= dEDcc0aCjaA, and starts at minute 2.09 and ends at minute 4.20 from the video footage.

Cognitive Work Load. In this part, we assess the Cognitive Work Load expected while watching the characterised video segments using VISC-L and Google. For this purpose, we have analysed the experts' responses on the NASA-TLX sub-scale items after watching the characterised video segments. We have assessed the Mental Load, Effort, Frustration, and Performance sub-scales and the results are presented in Figure 4.10 as an average using the range of scores starting from 1 (the lowest) to 20 (the highest). The participants were asked to provide comments to justify their scores. They reported that the characterised video segments generated with both VISC-L and Google had **low** Mental Load and required **low** Effort with average scores < 10. This is because the segments were short, easy to watch and the characterisation helped the participants to focus on a single topic. Meanwhile, **high** Mental Load and Effort was reported because

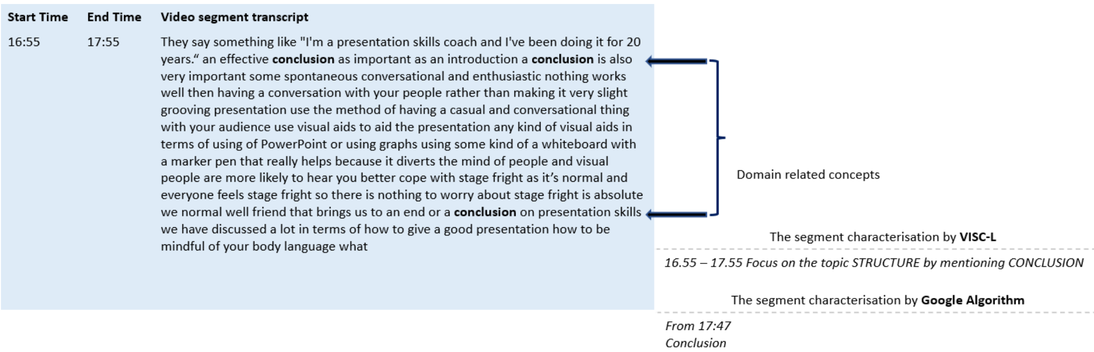


Figure 4.8: Example 2 of characterising a video segment using VISC-L and Google. The segment has been taken from one of the collected domain related videos with ID= ADJAcyTq1us, and starts at minute 16.55 and ends at minute 17.55 from the video footage.

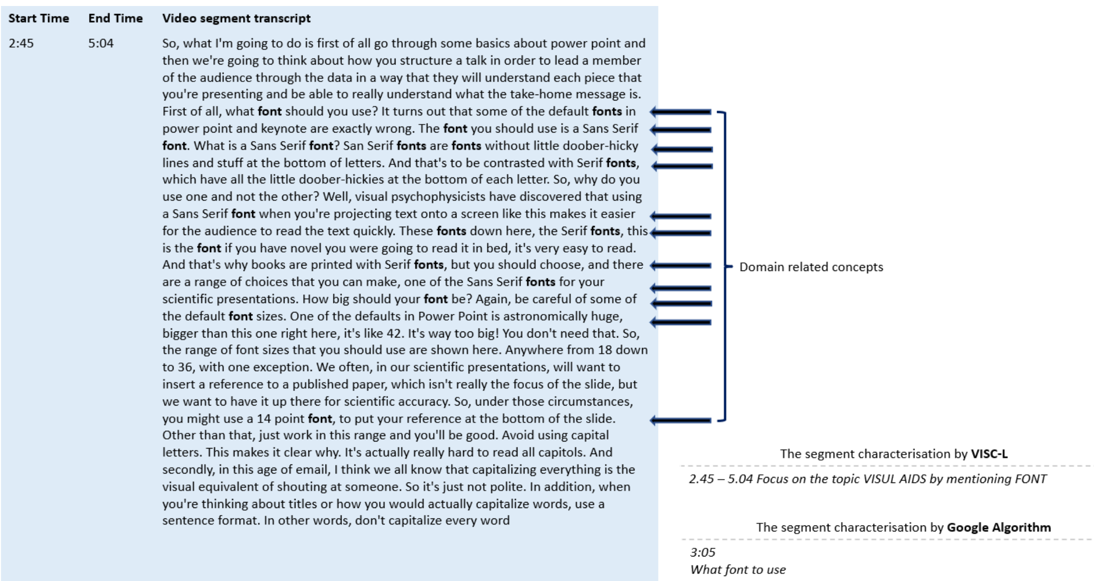


Figure 4.9: Example 3 of characterising a video segment using VISC-L and Google. The segment has been taken from one of the collected domain related videos with ID= Hp7Id3Yb9XQ, and starts at minute 2.45 and ends at minute 5.04 from the video footage.

some of the video content added little or no new knowledge, or the description was not in-line with the video or did not specify the focus topics. For that reason, 12 participants scored ≥ 10 for Mental Load and 7 scored ≥ 10 for Effort while watching the segments characterised by VISC-L. On the other hand, there are 8 and 9 participants who scored ≥ 10 for Mental Load and Effort respectively while watching the segments characterised by Google.

Some examples of the participants' positive and negatives feedback regarding the Mental Load and Effort while watching the characterised video segments by VISC-L are: for Mental Load **positives**, "The descriptions helped to signpost what was being taught in a section", and for Mental Load **negatives**, "the short description limits my experience of watching the videos". For Effort **positives**, "Easy, very simple and passive videos often with widely known knowledge and little new information", and for Effort **negatives**, "There were a number of points to remember and the short descriptions were not specific for many of the segments."

Whereas, some participants' positive and negative feedback regarding the Mental Load and Effort while watching Google's characterised video segments is: for Mental Load **positives**, "It was very easy to watch and read the suggested segments", and for Mental Load **negatives**, "The videos were easy to listen to and understand what they were presenting, but segmenting made it slightly more to think about". For Effort **positives**,"It was easy to click the videos and begin and focus on the segments", and for Effort **negatives**, "however, there was also a small amount of physical demand required for stopping and starting the videos to remember things and take notes".

With regard to Frustration, for VISC-L, 6 participants reported **high** Frustration $\geq$ 15 because they found some of the segments' characterisation did not align with the actual content. While with Google, 4 participants gave **high** Frustration $\geq$ 15 because they found some segments' start time was inaccurate or the characterisation was incomplete. Examples of participants' feedback regarding the Frustration while watching characterised video segment by VISC-L are: **positives**, "It is good to watch the videos if the person have time", **negatives**, "Some segments were not relevant or incorrectly labelled, which was frustrating as it meant putting in more thought to decide what the point of the talk was". Whereas, participant feedback regarding the Frustration while watching characterised video segment by Google is: **positives**, "The videos where very good and useful to me", and **negatives**, "It was frustrating when the segments started in the middle of a sentence, as the description was not enough to work out what was going on".

Regarding Performance, there was similar feedback for both segments generated with VISC-L and Google. Participants gave **high** Performance, 9 scores were ≥ 15 for VISC-L and 6 scores were ≥ 15 for Google, as they found the segments were very good at explaining the key terms and helped them to think of the domain topics. Whereas, 9 scores were < 15 for VISC-L and 12 scores were < 15 for Google as participants did not enjoy some of the video content and did not feel they learned new things. Examples of participant feedback regarding the Performance while watching the characterised video segments by VISC-L are: **positives** "I learnt aspects of giving presentations especially on Delivery and Visual Aids", **negatives** "The segment description included the terms but was often wrong about the content within the segments". Whereas, participant feedback regarding the Performance while watching characterised video segment by Google is: **positives**, "I learned quite a lot from the videos", and **negatives**, "I think I remember many points but it was hard to think which were related to structure, delivery etc".

The results presented above showed that the participants preferred the Google characterisation which was found to be more user friendly and clear as it is taken directly from the video transcript. Notwithstanding, the conceptual characterisation of VISC-L is also noticed positively by users and this characterisation represents the key to generate the narratives (as described in Sections 5.2 and 6.5). These results are not statistically significant at $p < 0.05$ after running Mann Whitney U Test with regard to the Quality, Learning effect, Perceived Usefulness and Cognitive Work Load of the video segment characterisation. This is due to the limited number of participants in the evaluation study. The number of the participants could not be increased in this study according to the scope of this PhD research which is considered to be one of the limitations in this thesis. Nevertheless, the number of the participants could be increased in future study, see (Section 7.3).

Qualitative Feedback from Experts. The participants were asked what they found positive or negative when watching the characterised video segments

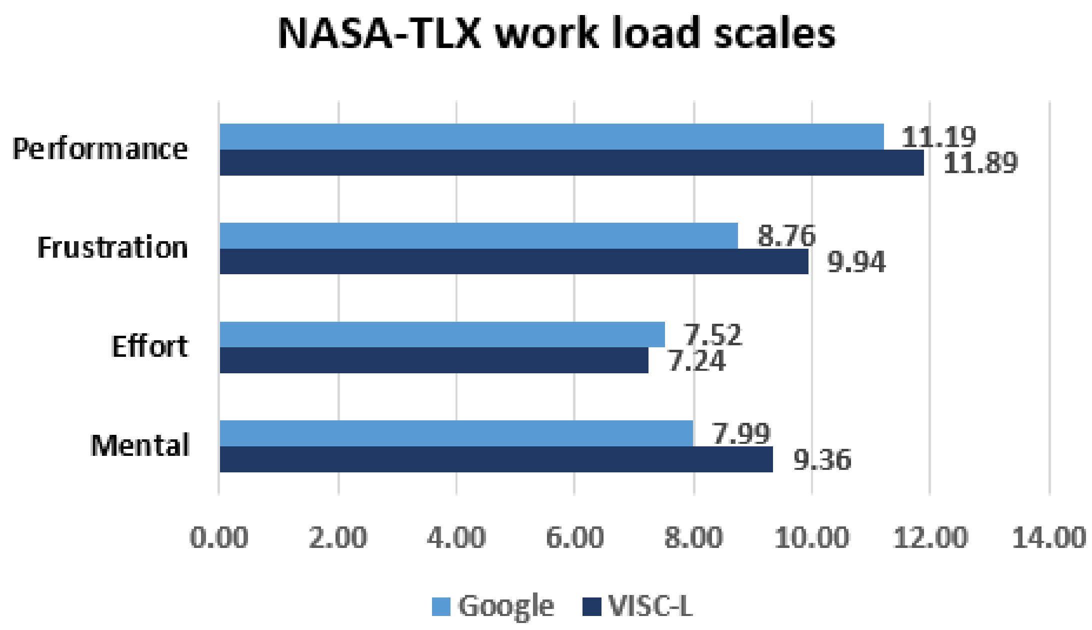


Figure 4.10: Mental Load estimation of the segment characterisation using VISC-L and Google. The score range is 1-Low to 20-High.

generated by VISC-L or Google. For **both VISC-L and Google Positives** the participants found that the segments offered them a strategy for learning and were good to help them focus as these segments are short and with description. For **VISC-L Negatives** the participants noticed that the characterisation was scripted and not in a natural way while for **Google Negatives** they found that some descriptions did not match with the video content, and commented that there were too many segments within some videos, and pointed at inaccurate starting times. Examples of the positive and negative feedback regarding the Quality of the characterised video segments using VISC-L: positives, “focused on specific areas rather than too much information”, “It was helpful to target certain aspects of the video relating to areas I lack experience in”, and the negatives, “some were irrelevant and not useful. The descriptions were very inaccurate”, “They were very brief and sometimes unclear what they related to specifically”. Whereas, examples of the positive and negative feedback regarding the Perceived Usefulness of the characterised video segments using Google: positives, “it helped to identify the main points and what the video was going to cover”, “The description felt natural and tailored for each video and the description shows the main points for the video", and the negatives, "Some phrases were not depicting the actual learning point", "Some of the descriptions seemed unfinished so it was difficult to work out what they meant".

4.5.4 Discussion

We have implemented our generic video segmentation and characterisation framework VISC-L to support learning as presented in (Section 3.5). It was applied in a presentation skills domain to answer research questions RQ1 and RQ2 identified in this thesis (see Chapter 1).

An evaluation study examined the Quality, Perceived Usefulness, Learning effect and the Cognitive work Load of video segmentation and characterisation by comparing VISC-L and Google. The results from the study give two indications. Firstly, they indicate that using characterised video segments could improve a learners' domain knowledge, as the learners were able to identify new domain terms. Secondly, the results showed that there is no statistically significant difference between VISC-L and Google video segmentation and characterisation. With regards to the learning effect, for both VISC-L and Google there was improvement in learning because there were new unique terms mentioned in the summaries after watching the videos. Hence, the study provides support for using segmentation with characterisation to support learning. The Quality with both VISC-L and Google shows that their generated characterised segments were helpful. The Perceived Usefulness of segmentation and characterisation with Google was slightly better than VISC-L. Participants' feedback indicated that the format used to present the characterisation has influenced the usefulness- the natural language descriptions offered by Google were easier to follow than the list of concepts offered in the VISC-L interface.

In response to the feedback from the experts, after evaluating the aggregated characterised video segments, we have improved the initial segmentation algorithm. We have decided the segment boundary to be the end of sentence punctuation $[., ?, !]$. We have also selected the videos with views $\geq 100K$ to ensure that the content of the videos is more engaging. This is in response to some of the participant's feedback where they did not like the video content, e.g. "some of them were really outdated and boring", "some of the videos were not engaging as (they) presented a different style of presenting to how I would do it". Accordingly, 33 videos match the number of views filtering criteria and for them we re-ran the initial segmentation algorithm with the new condition (using the aforementioned punctuation to decide the segment boundary) and the result was 2788 segments with a duration in seconds of AVG=5 (STDV=6) with an average number of segments of 86 (STDV=66) per video. After we re-ran the Aggregation algorithm on these segments, the result was 247 segments as presented in the Figure 4.5. These new segments are used as an input for VIN-L as described in (Section 5.2) and the segments and the narratives quality and usefulness for learning is assessed in (Section 5.3) by experts and workers from Amazon Mechanical Turk.

In Chapter 6, we combine VISC-L with the Google approach: VISC-L to extract the concepts and Google to formulate titles when we apply VISC-L in the healthcare- focusing on patient quality of life awareness . Now having characterisations in the forms of terms linked to a domain ontology, in the next chapter we implement the VIN-L framework presented in (Section 3.6) for connecting video segments to create video narratives (combining several segments) to focus on specific domain concepts .

4.6 Summary

In this chapter we have presented the implementation of the VISC-L framework on the prime domain, 'Giving Pitch Presentations'. The aim is to prove the applicability of the VISC-L framework. We have automatically collected, segmented and characterised videos related to Presentation Skills. The characterisation of the video segments have been evaluated in comparison with Google's characterisation. For that purpose, we have invited 18 PhD participants from the University of Leeds and Industry to participate in this study. The aim of this evaluation study is to be able to answer the following research questions:

How to automatically generate good quality characterisations of video segments that can be used for learning?

Does the characterisation of video segments help in identifying and focusing on the key domain concepts?

The initial results are promising which point towards potentially answering these research questions. The users after watching the characterised video segments using VISC-L found them have a potential to help them: identify domain key terms, focusing on these terms, and improving their domain learning be recalling new domain terms different from the domain terms they knew before watching these segments.

Chapter 5

Implementation and Validation of VIN-L in the Presentation Skills Domain

5.1 Introduction

The aim of this chapter is to prove the applicability of the VIN-L framework, designed in (Section 3.6), that is underpinned by Ausubel's Subsumption Theory to generate video narratives to support learning presentation skills. Generating video narratives represents our main goal in this thesis; consequently, the work in this chapter aims to answer the following research questions from this thesis (chapter 1):

RQ3: How to generate good quality narratives that can be used to support perceiving domain learning?

RQ4: Are the generated narratives useful to support perceiving domain learning?

To be able to answer these questions, we generate the domain related video narratives and evaluate them with experts, who have experience with giving presentations and teaching others how to give presentations, and with advanced learners. The expert evaluators are domain experts from the University of Leeds and the University of Canterbury in New Zealand and their responses are analysed to answer RQ3. In addition, we use Amazon Mechanical Turk as a crowd source to evaluate the video narratives with users and analyse their responses. Thus, we can compare between the expert and learners answers of RQ3, and use the learners' responses to answer RQ4. Consequently, we implement the subsumption linking algorithms from the VIN-L framework that take, as an input, the characterised video segments (VISC-L outputs from Chapter 4) and link them to generate the narratives. According to the approach of this research which is a knowledge approach, the design of the VIN-L framework presumes that the domain taxonomy is available. We use the taxonomy to implement the subsumption linking algorithm part of VIN-L which is presented in (Section 3.6).

The structure of this chapter is as follows: the implementation of VIN-L to generate video narratives is presented in (Section 5.2), the generated video narratives are evaluated with experts in (Section 5.3) to answer RQ3, in (Section 5.4) the generated video narratives are evaluated with learners using Amazon Mechanical Turk to answer RQ4, and the summary of the chapter is presented in (Section 5.5).

5.2 Implementation of VIN-L

Generating video narratives is the aim of this research for which we designed the VIN-L framework, as shown in (Section 3.6), and in this chapter we prove its applicability by applying it to the presentation skills domain. This is to help learners identify and link together the domain's key points presented in the generated video narratives. The full implementation of VIN-L is presented next.

Input. To apply VIN-L in the presentation skills domain, the following inputs are required: the domain taxonomy which we presented in (Section 4.2) and the 247 characterised video segments which were the output of VISC-L as presented in (Chapter 4). These segments are linked together to generate the narratives by implementing the subsumption linking algorithms as is shown next.

Subsumption Linking Algorithms. We use the subsumption linking algorithms designed in (Section 3.2.3) (Algorithms 4, 5, 6, 7) to implement the linking types defined by Ausubel's subsumption theory; Derivative, Super Ordinate, Correlative and Combinational. Referring to Figure 3.6 column 2, we demonstrate the implementation of the linking algorithms.

Filtering Criteria To ensure that the generated video narratives fulfill their target of helping learners identify the key domain points and link them, we have applied a duration filtering criteria on them. This filtering criteria imposes that the video narrative duration is ≥ 3 minutes and ≤ 6 minutes, see (Section 3.4–Definition 7). Additionally, we generated narratives where the number of video segments included in them is ≥ 2 and ≤ 6 to ensure that learners are not watching too few or many segments per narrative.

Output. After applying the conditions to control the generating of the video segments, we generated 85 video narratives with a minimum average duration of 199 (STDV=86) seconds and a maximum average duration of 290 (STDV=11) seconds. They are distributed among the four narrative types as follows: 15 Derivative narratives, 13 Super Ordinate narratives, 51 Correlative narratives and 6 Combinational narratives, this is presented in Figure 5.1. The number of Correlative video narratives is higher than the video narratives generated for other types of narratives because of the repetition issue. This means the same video narrative is generated for all the sibling concepts within a parent concept. On the other hand, a few Combinational narratives have been generated because we only have 4 topics and we generate one narrative per pair of topics. Hence, no different narratives focus on the same pair of topics.

These generated video narratives are a sequence of video segments that are ordered based on their linking type. However, these generated narratives include only the video segments and are not sufficient for learning. Accordingly, we augment them with text following the templates identified for each narrative type as presented in (Section 3.6). We illustrate the output with several examples.

Subsumption Linking Algorithms

Video Narrative generation
VIN-L framework

Four Algorithms

Narrative Type	#Narratives	AVG Duration	STDV
Derivative	22	199s	86
Super Ordinate	14	224s	57
Correlative	80	202s	59
Combinational	6	198s	106

Filtering Criteria:
2<=Number of segments per narrative **<=6**
180 s<=Duration of narrative **<=300 s**

Output

Narrative Type	#Narratives	AVG Duration	STDV
Derivative	15	199s	86
Super Ordinate	13	237s	31
Correlative	51	239s	35
Combinational	6	290s	11

Figure 5.1: The output after applying the four Subsumption Linking Algorithms. Four types of video narratives have been generated: Combinational, Correlative, Derivative, Super Ordinate. The number of narratives per type with their duration Average and Standard Deviation (STDV) is reported.

An example of one of the augmented video narratives is presented in Figure 5.2.

The full list of the narratives is available in our research GitHub link [1].

An example of the Derivative narrative is shown in Figure 5.3 and aims to support learning the concept 'GRAPH'. It first introduces the parent concept 'FIGURE' to the cognitive structure by providing a segment focusing on it. Then,

[1] https://github.com/Generating-Video-Narratives/Generating-Video-Narratives.git

Learning about Presentation Skills:

Link DELIVERY and VISUALAID.

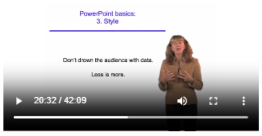
You are given a collection of video segments about DELIVERY and VISUALAID.

These video segments have been extracted automatically from popular YouTube videos related to presentation skills.

Each segment will start from a time point in the video and will stop when the corresponding concepts are covered.

You can re-watch the segment or watch other parts of the video, if you wish so.

You will now watch a video segment that mentions FEEDBACK (related to DELIVERY) and SLIDE (related to VISUALAID). The segment is taken from a YouTube video with ID= Hp7Id3Yb9XQ , and starts at 20.32 with duration of 40 seconds.



You will now watch a video segment that mentions SMILE , AUDIENCE (related to DELIVERY) and PICTURE , SLIDE (related to VISUALAID). The segment is taken from a YouTube video with ID= h6sm47j-Am4 , and starts at 4.16 with duration of 33 seconds.

You watched several video segments that link DELIVERY and VISUALAID relevant to Presentation Skills.

The video segments were automatically extracted from popular YouTube videos on presentation skills, using algorithms for segmentation, characterisation and linking based on a theory for concept learning.

We hope you found the collection of video segments helpful.

Figure 5.2: Example of a video narrative augmented (Section 3.4–Definition 12) using the template we designed in (Section 3.6.2).

the narrative provides a video segment that focuses on the specific concept 'GRAPH' to help in linking both concepts together.

An example of the Super Ordinate narrative is shown in Figure 5.4 that aims to support learning the concept 'POSTURE'. It first introduces the specific concept 'SHOULDER' to the cognitive structure by providing a segment focusing on it. Then, the narrative provides a video segment that focuses on the generic concept 'POSTURE' to help in linking both concepts together.

An example of the Correlative narrative is shown in Figure 5.5 and aims to support learning the concept 'CONNECTION' by introducing its similar concept(s). The narrative first introduces the similar concepts 'PAUSE' and 'FOCUS' to the cognitive structure by providing segments focusing on them. Then, the narrative provides a video segment that focuses on the specific concept

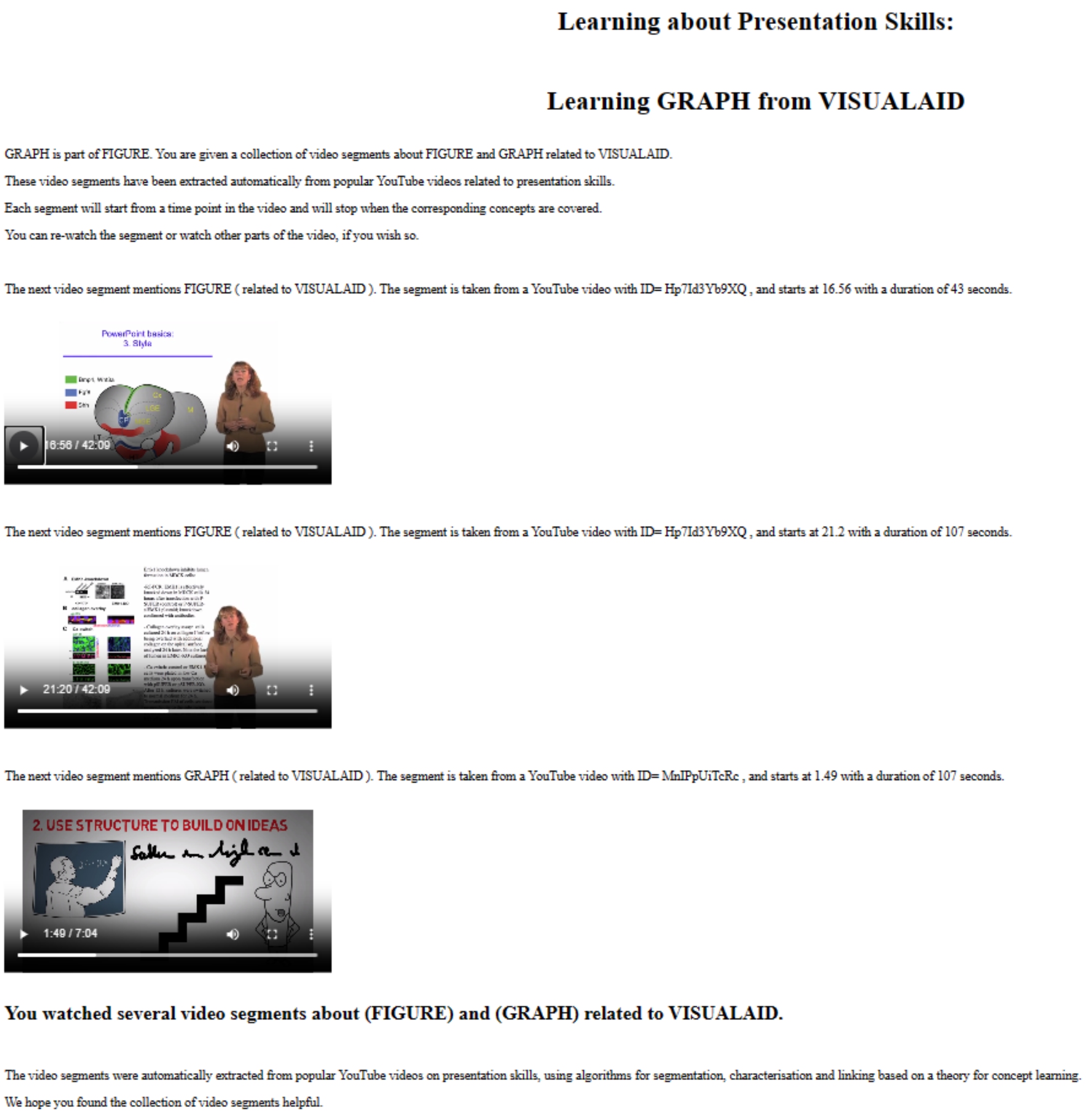


Figure 5.3: Example of the Derivative Narrative to support learning showing that to learn the specific concept 'GRAPH', its generic (parent) concept 'FIGURE' must be introduced first before introducing the specific concept. Both concepts belong to the topic 'VISUAL AIDS'.

'CONNECTION' to help in linking all the concepts together.

An example of the Combinational narrative is shown in Figure 5.6 and shows the relationship between the topics 'STRUCTURE' and 'PRESENTATION

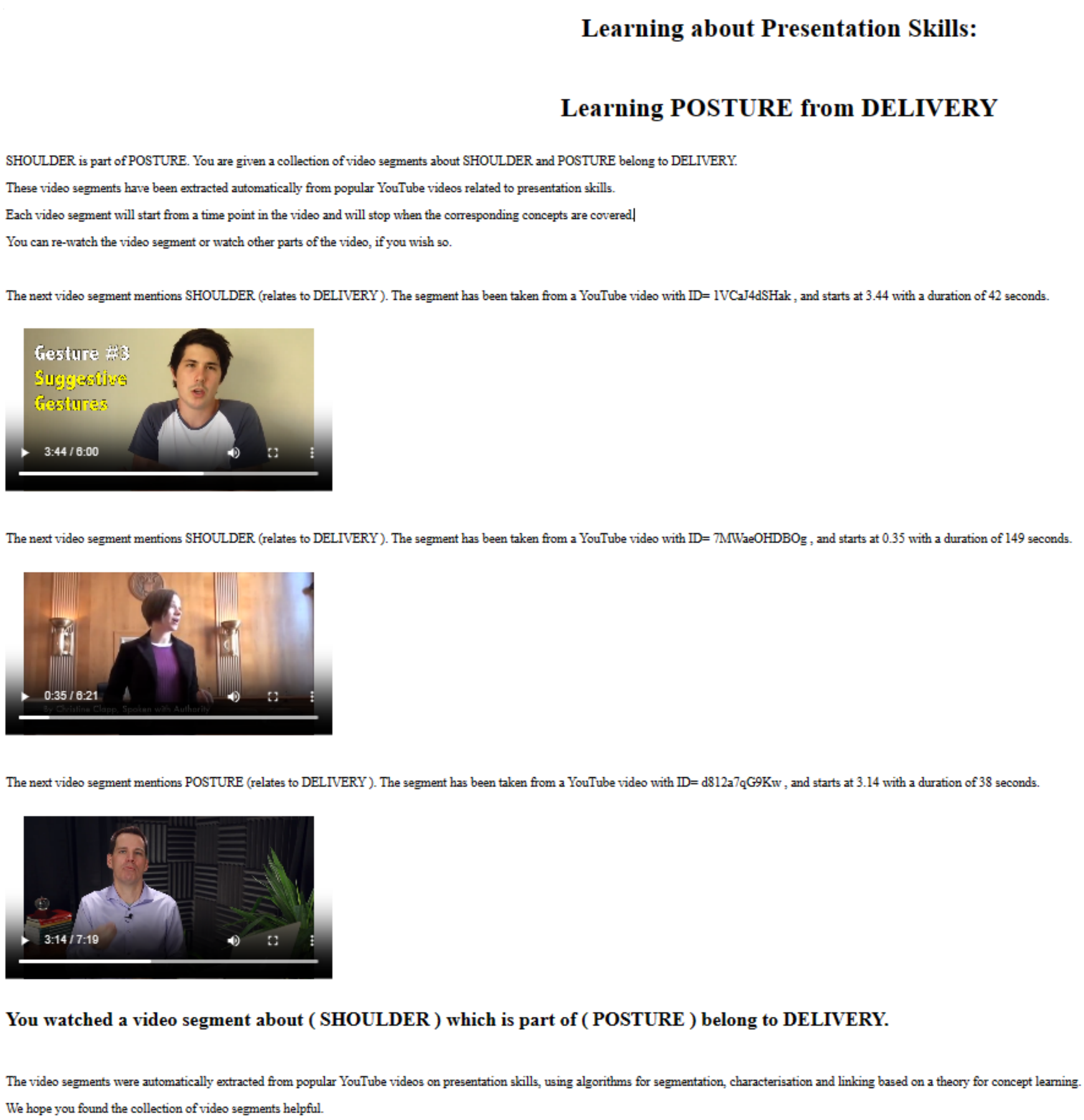


Figure 5.4: Example of the Super Ordinate Narrative to support learning showing that to learn the generic concept 'POSTURE', its specific concept 'SHOULDER' must be introduced first before introducing the generic concept. Both concepts belong to the topic 'DELIVERY'.

ATTRIBUTE' by identifying the relationship between their concepts mentioned in the same segment.

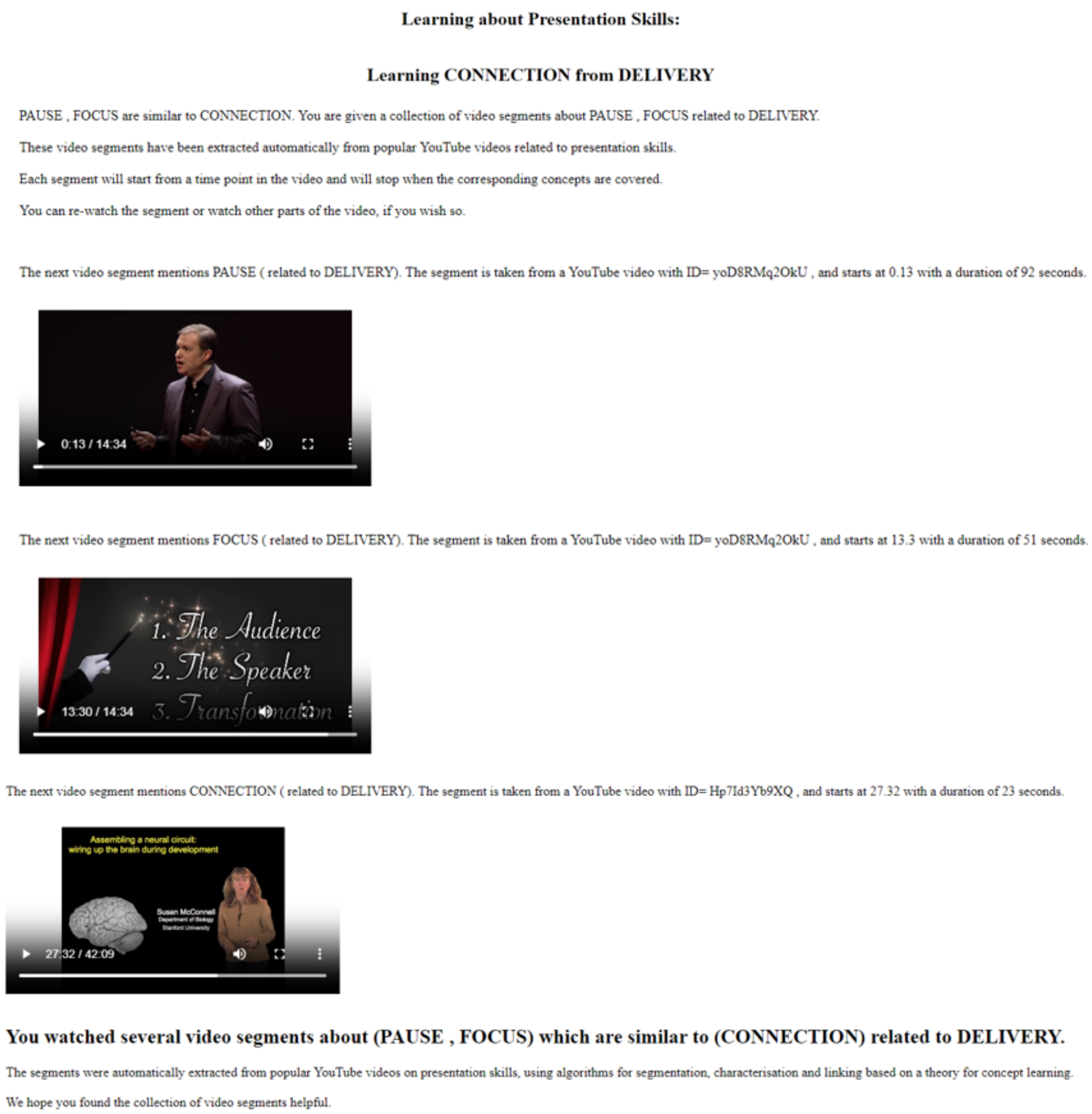


Figure 5.5: Example of the Correlative Narrative to support learning showing that to learn the specific concept 'CONNECTION', its similar concepts 'PAUSE' and 'FOCUS' must be introduced first before introducing the specific concept. All concepts belong to the topic 'DELIVERY'.

Learning about Presentation Skills:

Link STRUCTURE and PRESENTATION ATTRIBUTE.

You are given a collection of video segments about STRUCTURE and PRESENTATION ATTRIBUTE.

These video segments have been extracted automatically from popular YouTube videos related to presentation skills.

Each segment will start from a time point in the video and will stop when the corresponding concepts are covered.

You can re-watch the segment or watch other parts of the video, if you wish so.

You will now watch a video segment that mentions STORY (related to STRUCTURE) and MEMORABLE (related to PRESENTATION ATTRIBUTE). The segment is taken from a YouTube video with ID= yoD8RMq2OkU , and starts at 3.05 with duration of 41 seconds.

You will now watch a video segment that mentions START , BEGINNING (related to STRUCTURE) and ATTENTION (related to PRESENTATION ATTRIBUTE). The segment is taken from a YouTube video with ID= fzIxD1jXn44 , and starts at 4.41 with duration of 42 seconds.

You watched several video segments that link STRUCTURE and PRESENTATION ATTRIBUTE relevant to Presentation Skills.

The video segments were automatically extracted from popular YouTube videos on presentation skills, using algorithms for segmentation, characterisation and linking based on a theory for concept learning.

We hope you found the collection of video segments helpful.

Figure 5.6: Example of the Combinational Narrative to support learning the topics 'STRUCTURE' and 'PRESENTATION ATTRIBUTE' by introducing video segments that focus on different concepts belong to these topics.

5.3 Experimental Setup

We conducted two studies, Study-1 with experts and Study-2 with learners, to be able to answer RQ3 and RQ4. In both studies, the participants assessed the Quality and the Perceived Usefulness of a number of selected video narratives. Additionally, in Study-2, the participants also assessed the Cognitive Work Load and the possible Learning Effect of the generated video narratives. An overview of the materials used in this study and the evaluation result are presented in Figure 5.7.

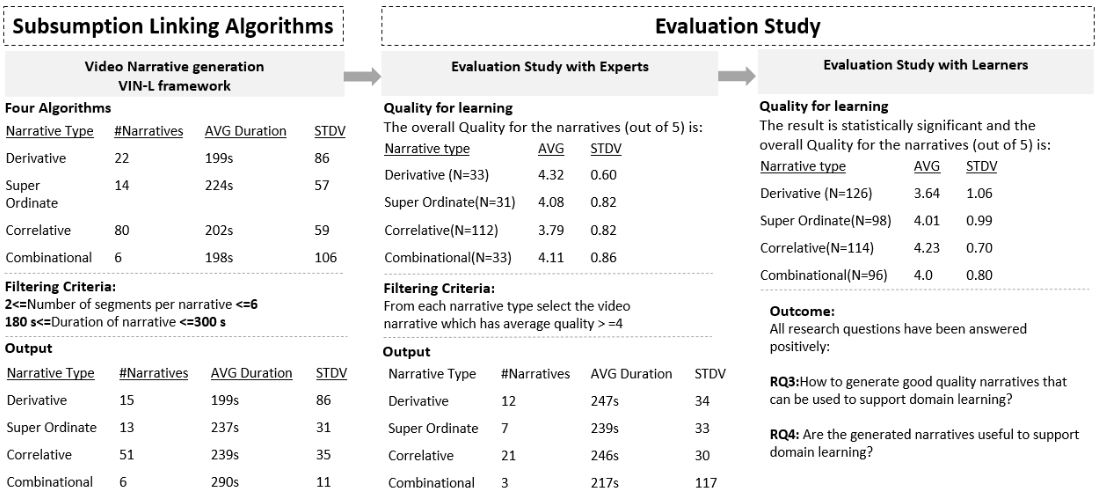


Figure 5.7: Implementation of VIN-L in the Giving Pitch Presentations domain.

The study was approved by the ethics committee of the Faculty of Engineering and Physical Sciences, University of Leeds.

Participants. For Study-1, we invited 11 domain experts who had substantial experience in giving presentations or had taught/assessed presentation skills. The participants included: 9 PhD researchers (7 from the University of Leeds, UK and 2 from the University of Canterbury, New Zealand) who were experienced with giving presentations- they all had given numerous presentations for conferences and had been involved in teaching; 2 academics (1 retired associated professor from the University of Leeds, and 1 professor from the University of Canterbury, New Zealand) who had over 30 years of experience in teaching, presenting to a broad audience, and advising others on presentation skills, see Figure 5.8 for a summary of the domain expertise spread.

Convenience sampling was used for selecting participants. Following the ethics approval from the University of Leeds, each participant was given a £50 Amazon voucher as gratitude for their participation, as described in (Section 4.5.1).

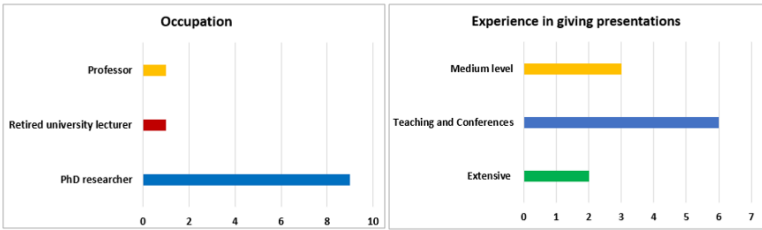


Figure 5.8: Experts' profiles.

For Study-2, we used the Amazon Mechanical Turk marketplace [1] to invite workers to participate in the evaluation study to help in evaluating the generated video narratives. Accordingly, we have created an account and assigned as a 'requester' with Amazon Mechanical Turk marketplace which allowed us to create a project in which we designed 4 batches. A batch, as presented in (Appendix K), is where the Amazon workers (hereafter known as advanced learners) around the world can access the study link and participate in it. We have used some conditions to decide the workers who can participate in our study. First, they can speak English and more than 100 participants are English native speakers. Second, they are Master workers where 95% of their hits is approved in the surveys they participated in. Referring to Figure 5.10, those participants are advanced learners not actual learners as they have ample presentation skills knowledge (80%) which enables them to give useful feedback to the questions asked about learning this skill. However, their domain expertise might seen as a limitation because their domain knowledge might affect the pre-test result where they are able to notice the domain aspects clearly, as described in (Section 5.5). Their hits (answers) are saved in the batch answers which can be downloaded as an Excel sheet for analysis after the completion of the study. The number of

[1] https://www.mturk.com/[Accessed:January 2023]

advanced learners who participated in the study was 237. This number is 61.5% of the usually required number 385 [1]. We could not ask for the 385 number of participants from the beginning because of the budget constraints of this PhD research. This number has been filtered out by excluding the duplicated answers and the responses where learners did not answer the pre-test or post-test as this affects the analysis of the video narrative's learning effect. The number of learners, after applying the filters, was 217. Further discussion about the limitation of using this number of participants is discussed in (Section 5.6.5). We collected the learners' profiles, see Figures 5.9 and 5.10, showing that more than half of the learners were males from the age group ≥ 30 years, are employed and can speak English fluently. Additionally, more than half of the participants watch YouTube videos for learning and for other purposes. More than a third of the participants have a lot of training on presentation skills through training in the universities to pitch project presentations. Accordingly, they are classified as medium-to-advanced learners and their experience in presentation skills means they are able to give useful feedback to the questions asked about learning this skills.

[1] https://www.calculator.net/sample-size-calculator.html?type=1&cl=95&ci=5&pp=50&ps=1000000&x=Calculate[Accessed: March 2024]

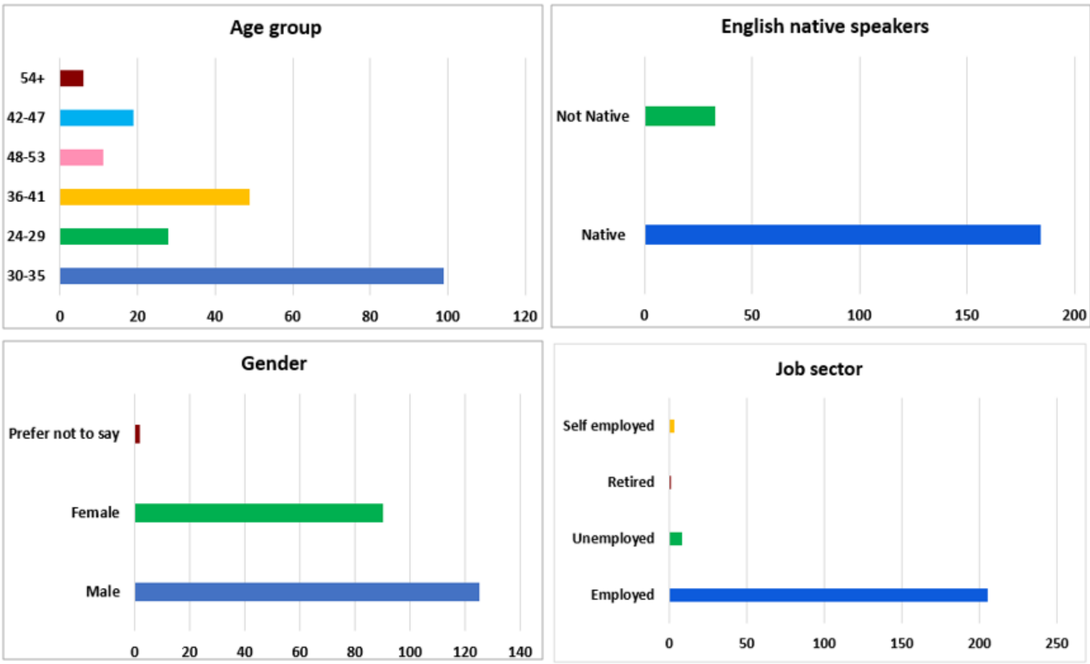


Figure 5.9: Learners' profiles which include: Age group, Gender, English native speakers and Job sector.

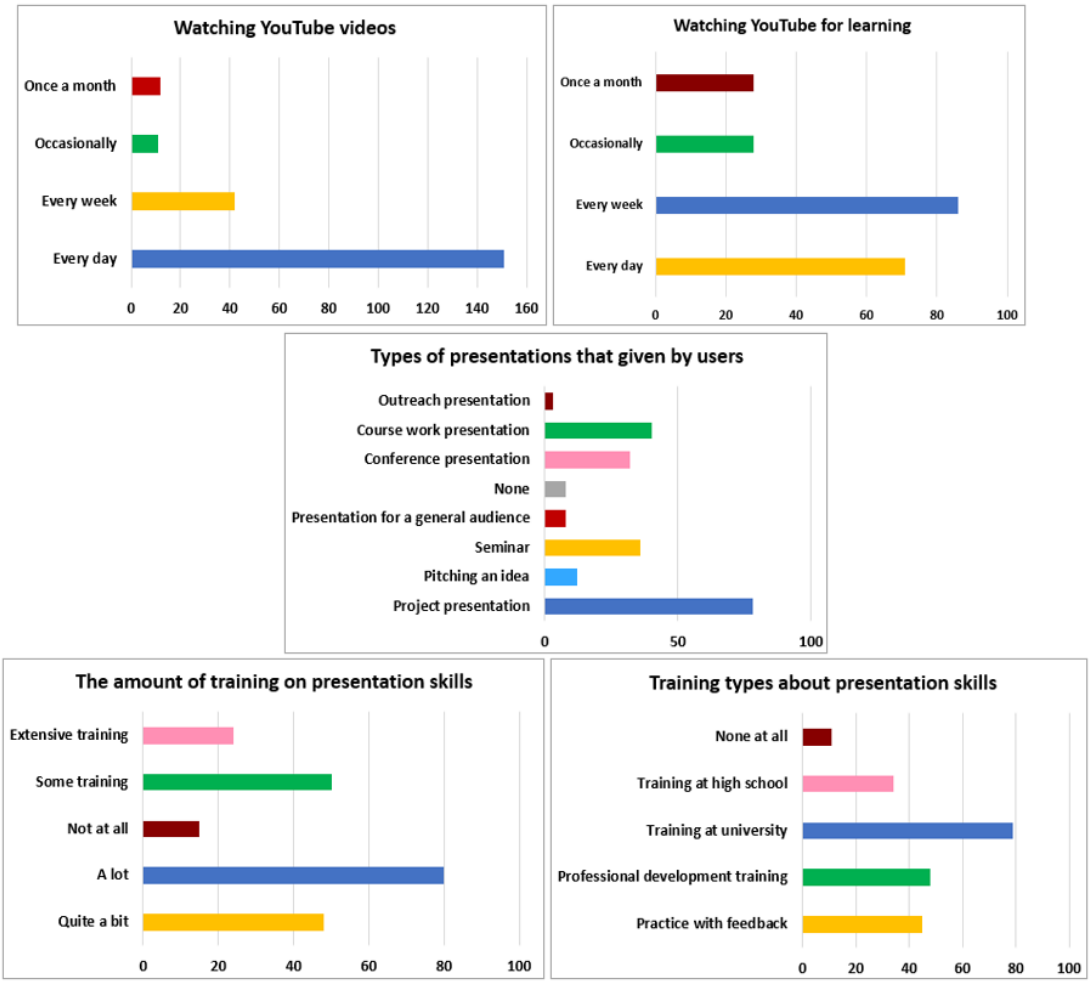


Figure 5.10: Learners' profile including data about: how often they watch YouTube videos, how often they watch YouTube for learning, the type of presentations they have given, the amount and type of training they had about presentation skills.

Materials. To provide public access for the video narratives, we converted the video narratives into web pages which we included in Google forms to be shared with the evaluators. The Google forms we designed have the same structure in both studies with a slight difference which is described below.

For Study-1, we designed five Google forms as evaluation surveys (survey-1, survey-2, survey-3, survey-4 and survey-5) and we distributed the 85 generated video narratives among them. We sent the survey links to 20 participants in a ratio of 4:1 to ensure that each video narrative is evaluated by 4 experts. However, only 11 have responded and for that reason the number of participants per survey is varied: 1 expert was assigned to survey-1, 4 experts were assigned to survey-2 and 3 experts have been assigned for each of the surveys 3, 4 and 5. Each video narrative has been evaluated by at least 2 experts except for the 19 narratives included in survey-1 which have been evaluated by 1 expert. The URLs of these narratives can be found in our GitHub account [1]. The surveys are fully compliant with the General Data Protection Regulation (GDPR).

The structure of the surveys is as follows: a consent form, a section to collect user profiles and then the narrative section which is divided into four groups where each group represents a narrative type (see Appendix J). In each narrative group there are two parts; the Quality categories after each video narrative link, and the Perceived Usefulness scale items at the end. The Quality categories aim to assess the quality of each video narrative and are designed using the LIKERT response labels (Taherdoost, 2019). The Perceived Usefulness of the generated narratives is assessed using a TAM questionnaire (Davis, 1989). At the end of each survey, we have asked the experts to type feedback to identify the possible positives and negatives of the video narratives they have watched. These two parts (the Quality categories and the Perceived Usefulness scale items) have been repeated for each narrative type.

For Study-2, we filtered out the video narratives based on the expert evaluation by selecting the video narratives that have a quality rank ≥ 4, meaning it is a good quality narrative. This filtering of the video narratives might be seen as

[1] https://github.com/Generating-Video-Narratives/Generating-Video-Narratives.git

biased and thus a further limitation of this study, see (Section 5.6.5). However, this filtering process is required to exclude the lower quality video narratives and reduces the number of video narratives to be evaluated with learners. This helps us using the resources of our study (number of participants and budget) efficiently. We have only selected 8 videos (2 videos from each narrative type) from the filtered video narratives, see Figure 5.11. We also considered selecting a variety of topics and concepts to avoid redundancy of the information presented to the users. The selected video narratives for the study, as presented in the Table 5.1, are included in 4 surveys, one for each video narrative type (Derivative, Super Ordinate, Correlative and Combinational). These surveys are designed using Google Forms with a structure similar to the expert surveys (see Appendix J). The difference from the expert surveys is that we included pre-test questions to collect the domain terms that learners know prior to watching each video narrative. Additionally, we have included a post-test to collect new domain terms that the learners recognised after watching the video narratives. Furthermore, to determine the learner acceptance of the generated video narratives as learning materials, we have included an extra part in the evaluation study to estimate the Cognitive Work Load resulting from using video narratives to support learning.

Table 5.1: The selected video narratives based on experts' evaluation study where the overall Quality ranking of a video narrative was ≥ 4 which is $\simeq$ Agree. The narrative types are: (Combinational, Correlative, Derivative, Super Ordinate) and their duration, in seconds, is presented in the table as an average and standard deviation.

Narrative Type	No.Narratives	AVG Duration	STDV
Combinational	2	180.5	138
Correlative	2	244.5	11
Derivative	2	241	23
Super Ordinate	2	243.5	76

Evaluation Study with Experts

Quality for learning

The overall Quality for the narratives (out of 5) is:

Narrative type	AVG	STDV
Derivative (N=33)	4.32	0.60
Super Ordinate(N=31)	4.08	0.82
Correlative(N=112)	3.79	0.82
Combinational(N=33)	4.11	0.86

Filtering Criteria:

From each narrative type select the video narrative which has average quality > =4

Output

Narrative Type	#Narratives	AVG Duration	STDV
Derivative	12	247s	34
Super Ordinate	7	239s	33
Correlative	21	246s	30
Combinational	3	217s	117

Figure 5.11: Quality of the generated narratives of the Giving Pitch Presentations Domain as evaluated by experts. We have used the quality average value of ≥ 4 as filtering criteria to select from the video narratives which their quality match this criteria to be used for the evaluation study with learners.

Procedure. The evaluators in both studies (who participated via different Google forms links) followed the same procedure which is: (1.) Complete a short pre-study section to collect their profiles; (2.) Click on the video narrative link which will open in a new tab. They can also copy the link and open it in a browser themselves; (3.) Go through the video narrative page by following the descriptions and watch the suggested video segments which have a duration of 3 to 5 minutes; (4.) Go back to the screen with the survey and complete the scoring form for each video narrative and give suggestions, if applicable, for improving the narrative; (5.) Repeat steps 2-4 for each each video narrative link included in the survey. After each narrative type (D, S, CR and CO), complete the: (6.) Perceived Usefulness section; (7.) Further Feedback section. The difference in Study-2 is that we have a pre-test section which is part of the learner profile step, and a post-test to be completed after watching the video narratives. Additionally, in Study-2, there is a section for Cognitive Work Load. Example of the Google form used for the evaluation study is in (Appendix J).

5.4 Findings from Study-1: Experts

We analysed the outcome from the evaluation studies where we aggregated the outcomes of the 5 surveys. We reported and analysed the results of the Quality and Perceived Usefulness, and presented a qualitative analysis of the positive and negative feedback written by the experts after watching the generated video narratives.

5.4.1 Quality of the Video Narratives

We have aggregated the responses from 11 experts per video narratives who participated in 5 studies (different experts participate in different studies where they evaluated different number of video narratives from different types), see Table 5.2 and Figure 5.12. The aggregated responses are used to analyse the quality of the generated video narratives in order to answer RQ3.

Table 5.2: Expert Evaluation Results of the Quality of the video narratives. Each narrative type (CO, CR, D, S) has a number of assessments (N) and the Median, AVG and STDV scores of each Quality question based on the responses from the experts (1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree). The difference between the narrative types is based on the Quality category and has been calculated using the Kruskal-Wallis test. The * indicates when $p<0.05$, the difference between the video narratives is statistically significant.

Video Narrative Quality Categories	CO N=33	CR N=112	D N=33	S N=31	All N=209
Q1–The introduction text in the video narrative gives a clear idea of the aim of the narrative.	5.0 4.39.0 (0.79)	4.0 3.88 (1.07)	4.0 4.12 (0.82)	4.0 3.94 (1.03)	4.0 4.0 (1.0)
***Q2**–All video segments are clearly linked to the presentation skills areas mentioned in the introduction.	4.0 3.64 (1.14)	3.0 3.36 (1.11)	4.0 4.21 (0.70)	4.0 3.58 (1.26)	4.0 3.75 (1.12)
Q3–The descriptions which introduce each video segment provide a useful summary.	4.0 3.97 (1.02)	3.0 3.42 (1.08)	4.0 3.64 (1.03)	4.0 3.74 (1.12)	4.0 3.59 (1.08)
***Q4**–All video segments provide relevant content for presentation skills learning.	4.0 4.0 (1.12)	4.0 3.85 (1.16)	5.0 4.48 (0.83)	5.0 4.10 (1.19)	4.0 4.01 (1.13)
Q5–The concluding text at the end of the video narrative provides an appropriate summary.	4.0 3.91 (1.13)	4.0 3.66 (1.11)	5.0 4.21 (1.05)	4.0 3.90 (1.25)	4.0 3.82 (1.14)
OVERALL Quality–AVG score for all Quality questions per narrative type.	4.15 4.01 (0.59)	3.70 3.63 (0.64)	4.27 4.13 (0.66)	3.84 3.85 (0.57)	4.00 3.80 (1.09)
***USEFULNESS**–This video narrative is useful for learning presentation skills.	5.0 4.30 (0.95)	4.0 4.10 (1.01)	5.0 4.67 (0.69)	5.0 4.35 (1.02)	5.0 4.26 (0.98)

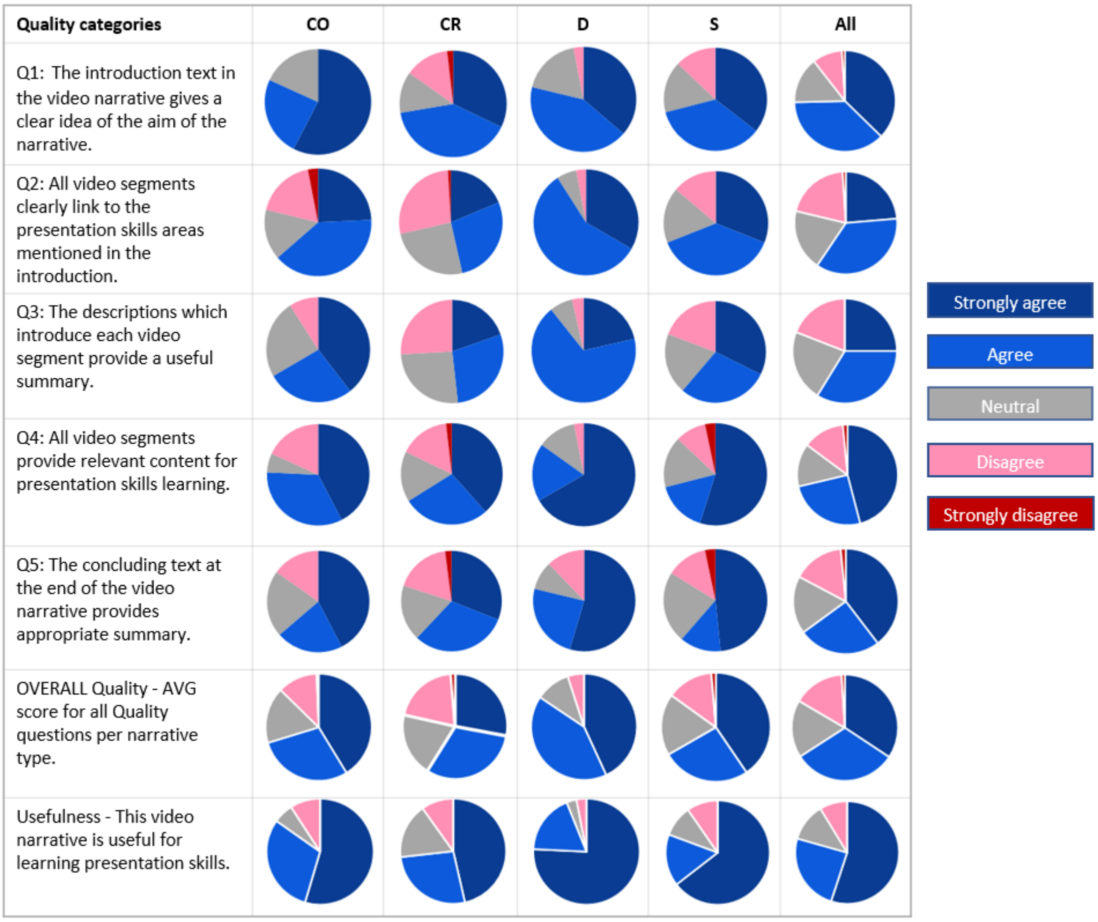


Figure 5.12: Quality of the generated narratives of the Giving Pitch Presentation Domain as evaluated by the experts.

Quality categories of the video narratives. In our analysis of the quality categories of the video narratives, we first refer to the column 'All' in Table 5.2 which shows an overview of the quality of each category based on the experts' responses. The experts found that the majority of the video segments have good quality with a median of 4.0 and an average of 3.80 (Agree). They also agreed that the video narratives provide content related to the domain (Q4) with a median of 4.0 and an average score of 4.01 out of 5. Furthermore, they agreed that the domain's key areas are clearly mentioned in the introduction (Q1, with a median and average of 4.0) which helps the experts notice them in the content. As a result, the conclusion statement (Q5) was also found to clearly summarise the key domain areas which are presented in the introduction and noticed in the segments (with a median of 4.0 and an average score of 3.82). Additionally, the experts found that the segments are linked clearly to the domain (Q2 with a median of 4.0 and an average of 3.75) and the description clearly describes the segment's content (Q3 with a median of 4.0 and an average score of 3.59). To assess whether these values are statistically significant, we ran the Kruskal-Wallis test. We found that there is a statistically significant difference in categories Q4 and Q2 among the narrative types with ($p<.05$). To identify which narrative type(s) caused this difference, we ran the Mann Whitney U Test to run a pair-wise comparison, as presented next.

Comparison between the narrative types. To analyse the difference in the quality of the narratives, we ran the Mann Whitney U test for a pair-wise comparison. The result was statistically significant with $p<0.05$ between the narrative types D and CR. This indicates a statistically significant agreement among the experts that the Derivative narratives are better than the Correlative narratives in providing conceptual learning. Hence, Derivative type of linking (from generic to specific) seems to be more appealing than Correlative linking (learning similar sibling concepts). Experts' comments about the two narratives types CR and D, indicate that it is easier to notice the generic and specific concepts in the video segments in the D narratives, e.g.: " so clearly the segments are semantically very related to the topic."; and further clarification is needed in the CR narratives, e.g.: "I do understand why you use the word 'similar' in the context of the ontological hierarchy, but you need to think about does it make sense to the learner... may need some rephrasing.". There were no statistically significant results among the other pairs of video narratives. It should be noted that when comparing video narratives, we did not consider participants' learning styles or cognitive preferences, this is further discussed in Section 7.4.2.

5.4.2 Perceived Usefulness of the generated Video Narratives

In this part, we analyse the Perceived Usefulness results of the generated video narratives based on the aggregated experts' responses to be able to answer RQ4.

We aggregated the expert responses from all surveys on the Perceived Usefulness of the generated video narratives and they are reported in Table 5.3 and presented in Figure 5.13. We ran the Kruskal Wallis, Mann Whitney and Spearman's RHO tests but the results showed that there is no statistically significant difference among the narrative types in regard to the Perceived Usefulness scales. Consequently, we analyse the experts' responses presented in Table 5.3.

By referring to column 'All' in Table 5.3, we can conclude that the experts found the video narratives 'Quite Likely' to be useful when used to learn presentation skills. According to the scores of the individual narrative types, the D narratives scored the highest as they enabled the experts to identify key domain areas (PU1); be able to focus on them (PU2), identify the name of the focus topic and concept mentioned in the video narrative (PU3) and link the focus concepts together (PU4). However, the CR narratives scored slightly below the other narrative types where the experts found that linking concepts in breadth (sibling concepts) might misdirect a learner's attention as the type of linking is not clear. Similarly, the link between different concepts from different topics mentioned in the same video segments (CO narratives) causes confusion. According to the overall results of the Perceived Usefulness scores among the narrative types (median 6.06 and average 5.85 (STDV=0.86) out of 7), we can infer that the video narratives are 'Quite Likely' to be useful when used to learn presentation skills. Based on size of the study and the participant's expertise, we can deduce that the video narratives have a potential to answer RQ4.

5.4.3 Qualitative feedback from experts

In this part we summarise the experts' written feedback where they expressed what they found positive and negative about the video narratives.

Positives. These positives are classified into two groups; (a) Support focusing on specific domain concept(s) and (b) Support linking between domain concept(s).

(a) Support focusing on specific domain concept(s). The experts found that the CO narratives provide an overview of the concepts from different topics

Table 5.3: Evaluation Results of the Perceived Usefulness of the narratives. Each narrative type (CO=Combinational, CR=Correlative, D=Derivative, S=Super Ordinate) has 11 expert assessments and a Median, AVG and STDV score of their assessments as per the Perceived Usefulness category (1= Extremely Unlikely, 2= Quite Unlikely, 3= Slightly Unlikely, 4= Neutral, 5= Slightly Likely, 6= Quite Likely and 7= Extremely Likely).

Perceived Usefulness scale items	CO	CR	D	S	All
PU1–Identify key points related to giving presentations.	6.0 6.09 (0.83)	6.0 6.09 (0.94)	6.0 6.09 (1.04)	6.0 5.82 (1.25)	6.0 6.02 (1.02)
PU2–Focus on a certain key point(s) at a time.	6.0 5.73 (1.10)	6.0 5.73 (1.10)	6.0 6.09 (1.04)	6.0 5.64 (1.29)	6.0 5.80 (1.10)
PU3–Identify key topics/concepts to learn.	6.0 5.82 (1.17)	5.0 5.64 (1.03)	7.0 6.36 (0.81)	6.0 5.82 (1.08)	6.0 5.91 (1.02)
PU4–Link main points mentioned in the video.	6.0 5.45 (1.57)	6.0 5.45 (0.93)	6.0 6.0 (1.0)	7.0 5.73 (1.62)	6.25 5.66 (1.28)
Overall Perceived Usefulness (AVG score for all Perceived Usefulness scales per narrative type.)	5.77 5.77 (0.40)	5.86 5.73 (0.59)	6.18 6.14 (0.44)	5.82 5.75 (0.60)	6.06 5.85 (0.86)

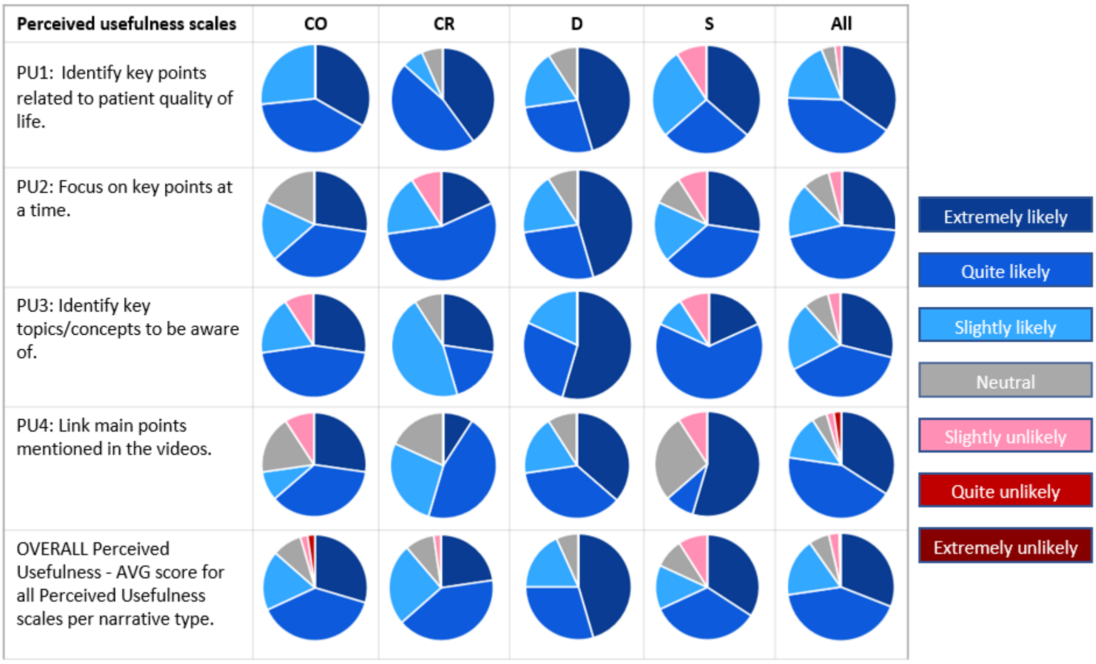


Figure 5.13: Perceived Usefulness of the generated narratives of the Giving Pitch Presentations domain evaluated by experts.

and the relationship between them; “serves as an anchor to build on or start from if one topic is new”, “connecting two concepts from different presentation skills areas helps one understand the idea in more breadth.”

The CR narratives were found to aid focusing on relevant key domain areas by showing examples; “situates the concept within related concepts and areas”, ”they provide examples.”

The D narratives were found to facilitate conceptual learning; “short, focused, saves time, and provides the context (the whole video) if we wish to go in more depth”, “I think this generation process is very useful in enhancing derivative concept learning. So, it could make the teaching process and understanding of new concepts easier by providing such a way.”

The S narratives were found to be helpful in providing in-depth learning; “they go deeply into more specific related topics”, “some give actual key points that support the relevant skills.”

(b) Support linking between domain concept(s). The **CO** narratives support in-breadth learning by linking different concepts from different topics together: "connecting two concepts from different presentation skills areas helps one understand the idea in more breadth", "they link up pretty well."

The **CR** narratives provide examples which clarify the link between the target concept and its siblings, "I understand the concept more when it is linked to similar concepts from the same class. It is also felt that the videos are much more related and cohesive as compared to the earlier videos", "relevant videos are easy to understand and emphasize the most important point."

The **D** narratives were found to provide in-depth learning starting from the generic to specific concepts using short segments linked in one narrative: "knowing that a specific concept is part of a more generic concept. When watching the video covering the generic concept, a deeper learning may be triggered in the learner as he/she might try to work out the relevance of the selected segment", "it is more tangible".

The **S** narratives were found to support learning a generic concept by providing in-depth learning about it (its specific concepts): "defining the relationships between concepts, and somehow simplifying the concept by starting to explain parts of the whole idea", "they go deeply into more specific related topics".

Negatives. There are some issues associated with using video narratives for learning as specified by the experts which we have separated into two groups: "Confusion and distraction" and "Lack of elaboration".

(a) Confusion and distraction. In the **CO** narratives, sometimes the link between the concepts might not be obvious which causes attention-distraction: "real links might not be there", "it is possible though since there are multiple concepts being discussed that the learner might be confused (about) or might not be able to focus on the main point or topic."

With the **CR** narratives, focusing on more concepts within a narrative, even when they are similar, might cause distraction as the link between them might be vague: "might distract or confuse if concepts are on same level but not very similar", "it is sometimes confusing."

With the **D** narratives, the linking of concepts from generic to specific might limit learning by not showing other related concepts: “a rather limited viewpoint is presented by just linking a specific concept to a generic concept. May be more useful to optionally reveal the other siblings under that same generic concept so that the learner understands the size of the learning space.” Furthermore, the experts found that some segments start by carrying on what was previously mentioned in the video footage before starting to illustrate the main focus concept which caused confusion: “sometimes start of the video contains previous points’ statement which could be confusing.”

With the **S** narratives, a learning issue became apparent when the linking between the specific and generic concept was not clear enough which also caused confusion. This happened when the segments were short and did not elaborate enough on the focus concepts: “the sole use of linear style of linkage only reveals a fraction of the knowledge tree. There are usually other sibling concepts covered in the chosen segments and might confuse a beginner learner”, “there is a need to explain or describe properly how specific concepts are linked to the main concept being learned.”

(b) Lack of elaboration. With the **CO** narratives, it is found that the duration of the segments which focus on multiple concepts might not offer enough elaboration on these concepts: “it is possible though since there are multiple concepts being discussed that the learner might be confused or might not be able to focus on the main point or topic”, “occasionally contains videos with less explanations.” A similar issue appears with the **CR** narratives as the experts found that: “some segments were not stand-alone in explaining a concept well... can see that it was picked purely because the word was mentioned”

With the **D** narratives, learning only one specific concept from a generic concept might cause confusion by not mentioning the other specific concepts within the same generic concept: “a rather limited viewpoint is presented by just linking a specific concept to a generic concept. May be more useful to optionally reveal the other siblings under that same generic concept so that the learner understands the size of the learning space”, “all specific features might not be covered.” A similar issue was also noticed with the **S** narratives: “the sole use of linear style of linkage only reveals a fraction of the knowledge tree. There are usually other sibling concepts covered in the chosen segments and might confuse a beginner learner", "I was quite confused as to what the specific concepts were in the 2nd and 3rd set of videos. It seems that for super-ordinate narratives, there is a need to explain or describe properly how specific concepts are linked to the main concept being learned"

According to the experts' evaluation results and considering their feedback, we decided to filter out the generated video narratives before evaluating them with learners. We have selected the video narratives based on their Quality result which should be ≥ 4, meaning there is an agreement among the experts that these narratives have the potential to support domain learning, see Figure 5.11.

5.5 Findings from Study-2: Potential learners

We analysed the quality of the generated video narratives based on the aggregated learners' responses to be able to answer RQ3 and RQ4 based on the learners' point of view. This includes assessing the video narratives considering their: Quality, Perceived Usefulness, Learning effect, Cognitive Work Load and qualitative feedback.

5.5.1 Quality of the Video Narratives

The number of participants from the four surveys was 217 (CO-48, CR-57, D-63 and S-49) and each participant provided two responses as he/she watched two video narratives per survey. Accordingly, the number of the aggregated responses was 434 and they are reported in Table 5.4 and presented in Figure 5.14. The aggregated learners' responses of each narrative type per quality category are reported as the Median, Average (AVG) and Standard Deviation (STDV) scores, and the N value indicates the number of learner responses per narrative type. In our analysation of the learners' responses, we present two comparisons. One comparison is between the quality categories and the other comparison is between the video narrative types.

Table 5.4: Evaluation Results of the quality of the narratives. Each narrative type (CO=Combinational, CR=Correlative, D=Derivative, S=Super Ordinate) has a number of assessments (N) and the Median, AVG and STDV score of each Quality question based on the responses from the learners (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree). The difference between the narrative types is based on the Quality category and has been calculated using the Kruskal-Wallis test. The * indicates when $p<0.05$, the difference between video narratives is statistically significant.

Video Narrative Quality Categories	CO N=96	CR N=114	D N=126	S N=98	All N=434
***Q1**–The introduction text in the video narrative gives a clear idea of the aim of the narrative.	4.0 3.98 (0.62)	4.0 4.20 (0.65)	4.0 3.72 (0.89)	4.0 3.89 (0.96)	4.0 3.94 (0.81)
***Q2**–All video segments are clearly linked to the presentation skills areas mentioned in the introduction.	4.0 4.07 (0.80)	4.0 4.32 (0.66)	4.0 3.67 (1.09)	4.0 4.18 (0.93)	4.0 4.05 (0.93)
***Q3**–The descriptions which introduce each video segment provide a useful summary.	4.0 3.94 (0.88)	4.0 4.15 (0.69)	4.0 3.65 (1.09)	4.0 3.94 (1.07)	4.0 3.91 (0.97)
***Q4**–All video segments provide relevant content for presentation skills learning.	4.0 4.08 (0.78)	4.0 4.36 (0.67)	4.0 3.50 (1.17)	4.0 4.23 (0.92)	4.0 4.02 (0.98)
***Q5**–The concluding text at the end of the video narrative provides an appropriate summary.	4.0 3.93 (0.95)	4.0 4.13 (0.84)	4.0 3.67 (1.04)	4.0 3.83 (1.07)	4.0 3.88 (0.99)
OVERALL Quality–AVG score for all Quality questions per narrative type.	4.0 4.0 (0.80)	4.0 4.23 (0.70)	4.0 3.64 (1.06)	4.0 4.01 (0.99)	4.0 3.96 (0.93)
***USEFULNESS**–This video narrative is useful for learning presentation skills.	4.0 4.19 (0.79)	4.0 4.31 (0.63)	4.0 3.60 (1.13)	4.0 4.16 (1.05)	4.0 4.0 (1.01)

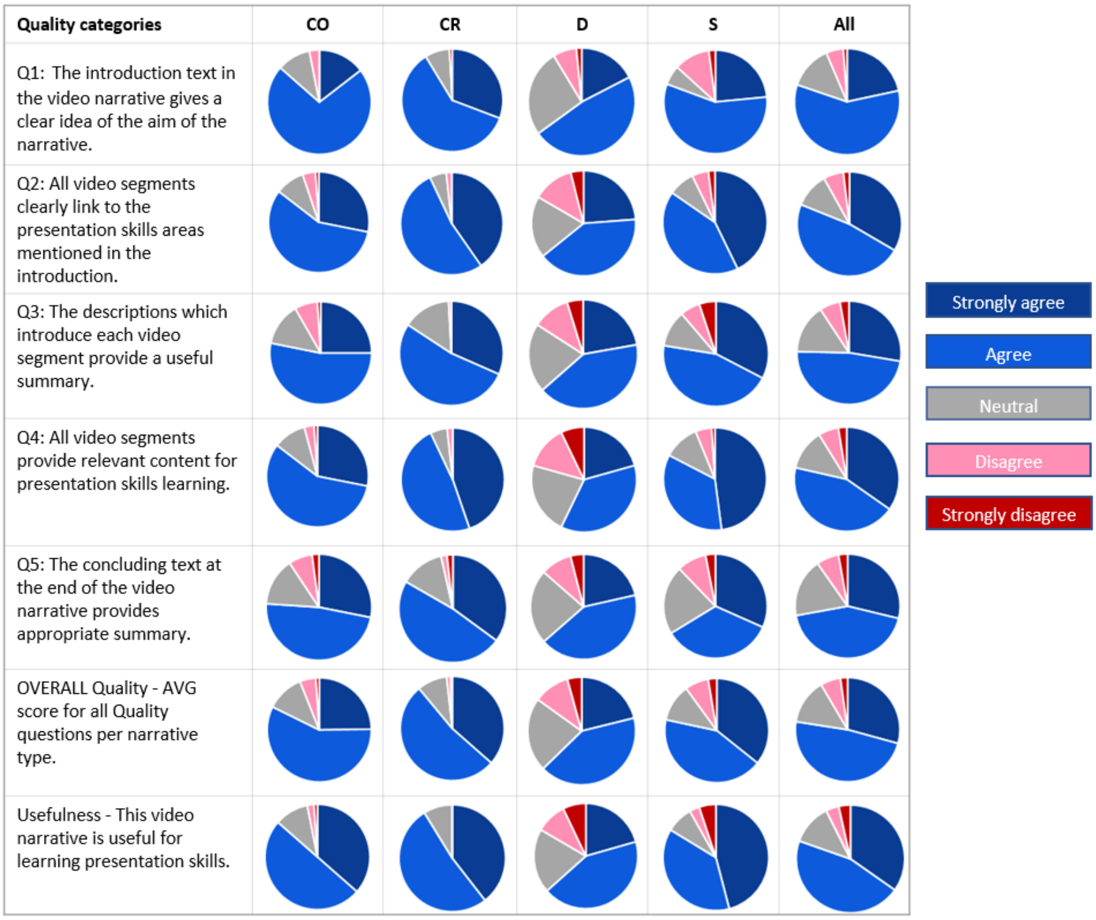


Figure 5.14: Quality of the generated narratives of the Giving Pitch Presentations domain as evaluated by learners.

Comparison between the Quality categories of the video narratives. We refer to the column 'All' in Table 5.4 where we can get an overview of the quality of each category based on the 434 responses. The learners found that segments within the video narratives and their content are with good quality and related to the domain (AVG of Q2 is 4.05 and AVG of Q4 is 4.02). Additionally, the learners found that the characterisation (Q3) of the video segments enables the identifying of the domain focus topic(s) and concept(s) that was mentioned in the introduction (Q1) and conclusion (Q5) of the video narratives; (AVG of Q1= 3.94, AVG of Q3= 3.91 and AVG of Q5= 3.88 out of 5). We can conclude that the overall quality of the video narratives is good ($3.96 \simeq 4$). Additionally, the learners agreed the the video narratives are useful (AVG ≥ 3.60) for learning. We ran the Kruskal Wallis test to compare the responses on each Quality category collected from each narrative type. The result was found to be statistically significant with a p value < 0.05 on all Quality categories. To further investigate the difference in the Quality results, we do a pair-wise comparison between the narrative types by running the Mann Whitney U Test.

Comparison between the narrative types. To analyse to which extent the narratives were different from each other based on their quality, we ran the Mann Whitney U test to compare between narratives pairs. The result was statistically significant with $p < 0.05$ except for the narrative pairs CO-S and CR-S. Referring to the definition of these narratives types, with CR and S, the focus is only on one topic and they mention different concepts belonging to it (in-breadth linking with CR and in-depth linking with S). Similarly with CO, defined as different concepts from specific topics being mentioned in the same narrative to show a relationship between said concepts. This can be expressed as learning via giving examples, as shown in the S and CR narratives. According to the average quality values presented in Table 5.4, the CR narratives seem to be the most preferable narratives to be used for learning over the CO, D or S narratives. On the other hand, the least preferable narratives are of type D where learning a specific concept starts by learning its generic concept first (starts learning from generic to specific). It seems that the learners did not benefit from the conceptual learning presented with D narratives.

In this comparison we did not consider comparing the video narratives with other learning styles which is counted as a limitation, similar to the limitations mentioned in (Section 5.4.1).

In addition to the Quality evaluation of the video narratives, we have also evaluated the Perceived Usefulness and the Cognitive Work Load of using the video narratives for domain learning. The results are analysed in the next section.

5.5.2 Perceived Usefulness of the generated video narratives

In this part, we analyse the Perceived Usefulness results of the generated video narratives based on the aggregated learners' responses to be able to answer RQ4.

We have aggregated the 217 learners' responses from the four surveys on the Perceived Usefulness of the generated video narratives and they are reported in Table 5.5 and presented in Figure 5.15. We ran the Kruskal Wallis test and the results showed that there is a statistically significant difference among the narratives types in regard to the Perceived Usefulness scales. To identify the narratives that caused this difference, we ran the Mann Whitney U Test.

Perceived Usefulness. Referring to the column 'All' in Table 5.5, we can get an overview of the Perceived Usefulness of each narrative type based on the 217 aggregated learners' responses. We can conclude that the learners found that the video narratives are ($=5.62 \simeq 6$) 'Quite Likely' to be useful when used to learn presentation skills. According to the scores of the individual narrative types, the CR narratives score the highest as they enable the learners to identify key domain areas (PU1), focus on them (PU2), identify the name of the focus topic and concept (PU3) and link them together (PU4). Similarly, the links between different concepts from different topics, mentioned in the same video segments, were obvious in the CO narratives. However, the D narratives score slightly below the other narrative types especially when the learners were not sure how to link (PU4) the generic concept to the specific concept. We took into consideration that the difference in the Quality categories is statistically significant with $p \leq 0.05$ meaning that there is a difference in the Quality of the narratives.

Table 5.5: Evaluation Results of the Perceived Usefulness of the narratives. The narrative type (CO=Combinational, CR=Correlative, D=Derivative, S=Super Ordinate) have assessed by the learners and the Median, AVG and STDV of their assessments per each Perceived Usefulness category (1= Extremely Unlikely, 2= Quite Unlikely, 3= Slightly Unlikely, 4= Neutral, 5= Slightly Likely, 6= Quite Likely and 7= Extremely Likely). The difference between the narrative types is based on the Perceived Usefulness scales and has been calculated using the Kruskal-Wallis test. The * indicates when $p<0.05$, the difference between video narratives is statistically significant.

Perceived usefulness scale items	CO N=48	CR N=57	D N=63	S N=49	All N=217
***PU1**–Identify key points related to giving presentations.	6.0 5.71 (0.92)	6.0 6.09 (0.79)	5.0 4.75 (1.79)	6.0 5.78 (1.30)	6.0 5.54 (1.38)
***PU2**–Focus on key points at a time.	6.0 5.83 (0.91)	6.0 6.19 (0.90)	5.0 4.75 (1.94)	6.0 5.86 (1.26)	6.0 5.62 (1.47)
***PU3**–Identify key topics and concepts to learn.	6.0 6.15 (0.87)	6.0 6.26 (0.81)	5.0 4.78 (1.71)	6.0 5.92 (1.35)	6.0 5.73 (1.40)
***PU4**–Link main points mentioned in the video.	6.0 5.92 (0.85)	6.0 6.12 (0.73)	5.0 4.75 (1.70)	6.0 5.82 (1.30)	6.0 5.61 (1.35)
Overall perceived usefulness (AVG score for all Perceived Usefulness scales per narrative type)	6.0 5.90 (0.89)	6.0 6.17 (0.81)	5.0 4.75 (1.79)	6.0 5.84 (1.30)	6.0 5.62 (1.40)

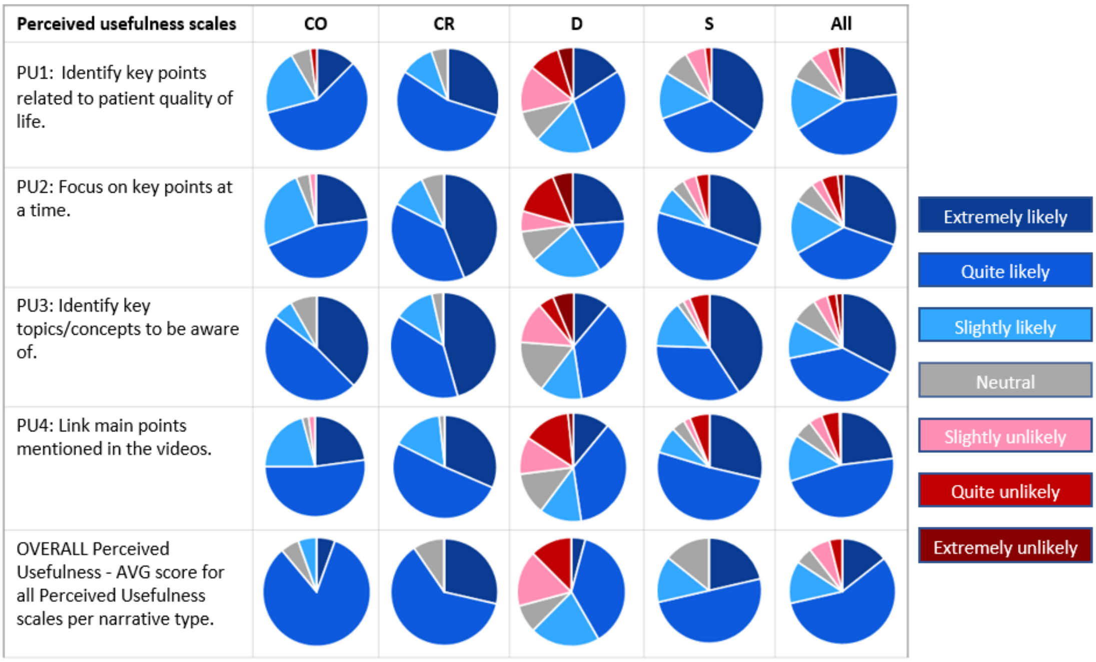


Figure 5.15: Perceived Usefulness of the generated narratives of Giving Pitch Presentation Domain as evaluated by the learners.

To ensure which video narrative(s) are different among the other narrative types, we ran the Mann Whitney test for a pair-wise comparison between the narratives. The results showed that there is a statistically significant difference among all the narrative pairs except for CO-S and CR-S. Based on the learners' feedback on the positives about CO, CR and S, we found that there is an agreement among the learners that these video narratives facilitate learning as presented in some of their responses; CR "easy to understand and absorb many key points.", CO "I like the brevity of the points. This makes things stand out and makes them easy to remember.", and S "Concept Learning Theory: the video narratives are created based on a theory for concept learning, suggesting a structured and methodical approach to presenting information effectively.". On the other hand, we found that the scores of the type D narratives were less than the scores for Usefulness of the other narrative types. Referring to the learners' feedback about what they did not like about the D narratives: "lack of human creativity: the narratives generated by AI models lack human creativity and intuition. This can result in predictable or formulaic story lines, which may limit engagement and fail to evoke an emotional connection with learners", "The generated derivative narratives can also be too generic and not tailored enough to the individual needs of the learners. Additionally, they can be difficult for learners to interpret as the generated narratives lack clarity and may fail to explain the concepts in a way that is meaningful to the learner." Next, we investigate whether this difference among the Quality and Usefulness of the video narratives affects the domain learning.

Learning effect of the video narratives. We compare between the learners' responses on the pre-test and post-test to assess the effect of the video narratives on domain learning. We have processed the terms of the pre-test and the post-test using our Semantic Tagging algorithm (Part of the VISC-L characterisation phase) to find a match between the learners' terms and taxonomy terms. Then, we counted only the new terms found in the post-test to show the possibility of using the video narratives to enhance domain learning. The results presented in Table 5.6 show that the learners managed to recall new domain terms after watching the video narratives. This result is in-line with the Quality scores presented in Table 5.4 where the learners found the video narratives are of good quality and hence useful for domain learning.

To help in clarifying in more depth the difference between the narrative types, we analyse the learners' feedback on the Cognitive Work Load of using the video narratives to support domain learning.

Cognitive Work Load. The aim of this part in the evaluation study is to assess the Cognitive Work Load expected while using the generated video narratives for domain learning. For this purpose, we have analysed the learners' responses on the NASA-TLX sub-scale items after watching the video narratives–we assessed the Mental Work Load, Effort, Frustration and Performance sub-scales and the results are presented in Figure 5.16. The results show that the D video narrative scores are the highest in all types of Work Load, whereas, the scores of the CO, CR and S video narratives were close to each other, to some extent, and generally lower than the scores of the D narratives.

Table 5.6: The domain related terms recalled by the learners after watching the video narratives (Combinational, Correlative, Derivative, Super Ordinate).

Narrative Type	Average (STDV) of new domain terms per learners	Number of learners with **New** terms
Combinational	4 (4)	40 out of 48
Correlative	4 (5)	52 out of 57
Derivative	4 (5)	49 out of 63
Super Ordinate	4 (3)	45 out of 49

Referring to the learners' feedback about the Mental Work Load, Effort, Frustration and Performance scales resulting from watching the D narratives, some learners said: "had to remember details from the videos, and pay attention to the overall narrative structure and thematic elements so I could gain the most knowledge from them", "I had to focus on the material and take notes in order to comprehend and remember what I was watching", "I felt I needed more explanation and context around the concepts being explained in order to really understand them", "I was able to identify a number of new terms that I was not familiar with before. This is a good indication that I was able to learn new information from the videos. The clarity of the definitions: the definitions of the new terms were clear and easy to understand. This made it easy for me to learn and remember the new terms."

The feedback demonstrates the results in Figure 5.16 showing that regardless the high Mental Work Load, Effort and Frustration, the learners managed to increase their performance. On the other hand, the learners' feedback for the Mental Work Load, Effort and Frustration of the CO narratives is > 10 and the reason is presented in some of their responses: "I had to pay attention and think about what was said, but not at some high level. It wasn't super complicated stuff", and for the performance Work Load some said "there were a lot of useful phrases and ideas with which I may have already been familiar under different analogous terms.". With the CR narratives, the learners found it challenging to remember the concepts mentioned and recognise the link between them as mentioned in some of the responses: "Content Complexity: If the concepts discussed in the videos are complex or new to the viewer, it might require more mental effort to understand and process the information".

In this evaluation study we did not consider the learning styles of the participants or their cognitive preferences which we consider as a future work, see (Section 7.4.2). In the next part we summarise the positives and negatives of the video narratives based on the learners' feedback. This helps us draw some insights on how to improve the narratives in future work and to which extent the design of the narratives was successful.

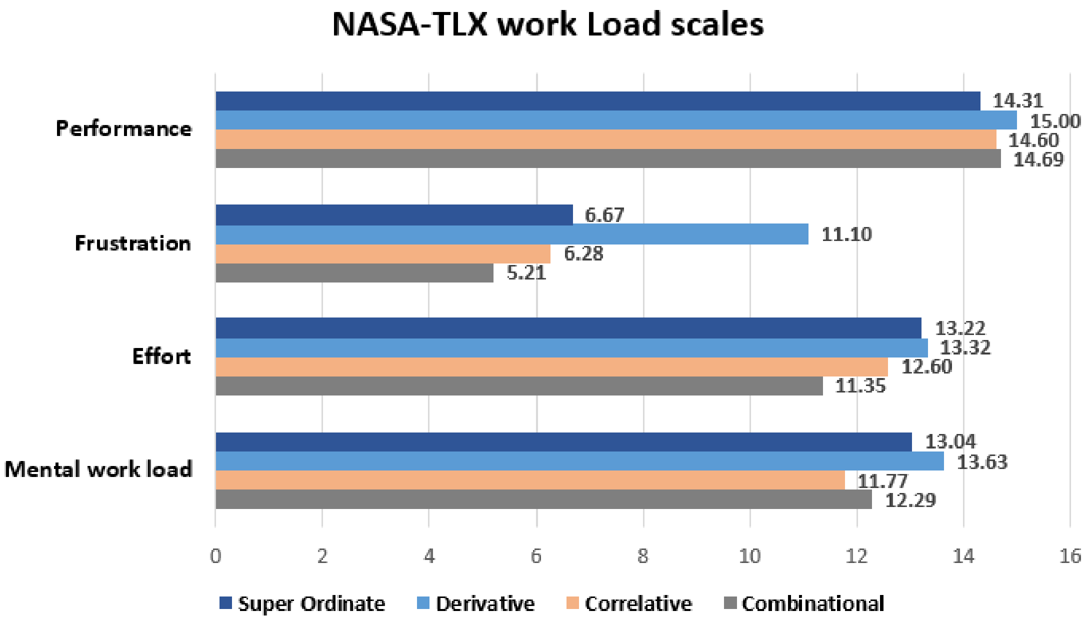


Figure 5.16: Cognitive Work Load estimation of the generated video narratives to support learning the Giving Pitch Presentations domain based on the evaluation study with the learners. The score range is 1-Low to 20-High.

5.5.3 Qualitative feedback from learners

We analysed the feedback written by the learners after they watched the video narratives to further assess their quality and effect to support learning. The learners found that the video narratives support domain learning by providing clarity through helping them to focus on specific domain areas, enhancement of their engagement, and the clarity of the transition between the segments to facilitate concept learning.

Positives. We have grouped the learners' positive feedback into three groups: (a) Clarity, (b) Engagement and (c) Transition between segments.

(a) Clarity. The clarity of the video narratives is shown by the video segments' content and textual format to present information which is delivered by various delivery methods. These segments that focus on a specific topic(s) and concept(s) provide concise and understandable learning materials. This enables the learners to identify specific presentation skill areas to learn and link to their prior knowledge.

There are 23 learners out of 48 who evaluated the **CO** video narratives and appreciated that these narratives gave them presentation delivery ideas and recommended steps on how to implement these ideas.

For the **CR** video narratives, 17 learners out of 57 appreciate that these narratives are understandable and provide some suggestions on how to improve pitching presentations.

There are 10 out of 63 learners who found that **D** video narratives provide understandable learning materials that are easy to absorb and use for self-reflection while practicing for delivering presentations.

24 out of 49 learners noticed that the **S** video narratives help them link new learning materials to their previous experience and gave them useful presentation ideas on what to focus on and what to prevent.

(b) Engagement. Maintaining a learner's engagement while watching the video narratives is one of the most vital aspects. This includes helping the learners be more organised while learning specific concepts and noticing the relationships between them to be able to apply them in their presentations. Furthermore, the different audiovisual video content supports a wide range of different learning styles.

With the **CO** video narratives, 7 out of 48 learners expressed their engagement with the video narratives as this narrative type offers ideas on how to organise presentations and understand which presentation's attribute to focus on while preparing for pitching.

For the **CR** video narratives, 12 out of 57 learners found that these narratives gather various related ideas from different videos where they have been delivered differently to facilitate their learning.

The engagement with the **D** video narratives is noticed by 21 out of 63 learners who suggest that these narratives can be beneficial for different learners based on their needs. If used in an educational environment, they will help in providing inclusiveness.

For the **S** video narratives, 5 out of 49 learners noticed that this type of narrative provides small parts of learning materials that are structured in a story-line which helps in enhancing learning specific concepts.

(c) Transition between segments. The relationship between the focus topic(s) and concept(s) mentioned in the segments represents a dynamic digital story for learning. The segments within the video narratives help in highlighting key areas and provide direct access to them which helps in easily digesting the information and reducing distraction.

With the **CO** video narratives, 8 out of 48 learners noticed that this type of narrative links several concepts from specific topics which helps learners understand the relationship between these concepts in a more memorable way.

For the **CR** video narratives, 13 out of 57 learners noticed that this narrative presents the similar concepts in a story-line way which helps in recognising the relationship between them.

The **D** video narratives have been found by 4 out of 63 learners to help in expanding their domain experience by providing a clear connection between the concepts mentioned within the video narratives.

Similarly, with the **S** video narratives, 6 out of 49 learners liked the structure of the concepts by linking them to their generic concept which helps to quickly learn some areas in the domain without losing concentration.

Negatives. There are some aspects in the video narratives where the learners found that improvement would be beneficial to boost the quality of the video narratives to better support learning. We have grouped the negative feedback of the learners into four groups: (a) Segment duration and ending point, (b) Segment Focus Topic and Focus Concept, (c) Video content and (d) Learner interactivity with the video narratives.

(a) Segment duration and ending point. The duration of the segments and their ending point within the videos caused some issues as shown the learners' feedback. With the **CO** narratives, these issues were: "not enough detail", "the clips sometimes stopped earlier than I think they maybe should have, but then I could always investigate the rest on my own." Meanwhile, with **CR** , the issues were: "sometimes the information was not obvious as the video played and I had to watch a couple times", "I could see some of the clips being a bit too shortened and not having proper information." With **D**, the issue was: "there is not enough time to successfully implement differentiated instruction." With **S**, the learners found that: "the videos cut off too quickly for me. I wanted to listen to more of the presenter's talk because they seemed to be very helpful."

(b) Segment Focus topic and Focus concept. With **CO**, this issue was: "some concepts are not relatable", "some videos couldn't connect the link properly and one of them seemed like it was chosen randomly." With **CR**, the learners did not notice this issue but they did notice it with the **D** narratives as they said: "while they provide a great overview of the main points and the relationships between them, they may miss some of the finer details that could be important for a successful presentation." With **S**, the learners found that: "some of the times they really did not deliver in the video segments according to the topics."

(c) Video content. The quality of the video itself might not suit many learners. With **CO**, the learners found that: "the worst part is that people are less likely to check the wrong facts when they are presented them in the form of story", "they can be a little dull, and they are teaching me to be the opposite." With **CR**, the poor delivery of the information affects the learning: "for videos about presentations, some of them were boring and with no charisma." With **S**, the learners also mention this issue: "the quality of the video might differ which affects the quality of the learning process."

(d) Learner interactivity with the video narratives. More interactivity tools would be beneficial for learners. With **CO**, they said: "can encourage passive learning, where learners simply watch the content without actively engaging with the material. This can limit critical thinking and problem-solving skills that active participation and hands-on activities promote." With **CR**, the learners found that: "interactive elements like quizzes, activities, and immediate feedback might be missing in the video-based learning approach, limiting the range of engagement". With **S**, the learners found: "Lack of Interaction: video narratives might not allow for direct interaction with instructors or peers, limiting opportunities for asking questions or discussing concepts."

However, with **D**, the learners did not notice the issues associated with the video contents or the learner interactivity. Alternatively, they asked for more clarification about the relationship between the generic and focus concept in the text used within the video narratives; "they lack the nuance and creativity present in human-created stories. Generated narratives are often formulaic and lack the emotional depth and resonance of real stories. Additionally, because of the data-driven approach used to generate these narratives, they may lack context relevant to a given situation or environment, which could lead to a poorly informed decision-making process. Lastly, the literature surrounding the use of generated narratives in education is still in its infancy, meaning that there is limited research-based evidence to support its use in educational practice", "Lack of human creativity: the narratives generated by AI models lack human creativity and intuition. This can result in predictable or formulaic story-lines, which may limit engagement and fail to evoke an emotional connection with learners."

5.6 Discussion

We have implemented the VIN-L framework in our prime domain 'Giving Pitch Presentations'. The input for this framework was the characterised video segments- the VISC-L output from Chapter 4. The domain taxonomy used to characterise the video segments in Chapter 4 is also used to link the video segments to generate the video narratives. The generated video narratives have been evaluated using two separate evaluation studies; Study-1 and Study-2. Study-1 involved 11 domain experts who are PhD researchers and a retired lecturer from the University of Leeds, along with PhD researchers and a professor from the University of Canterbury, New Zealand. Study-2 was conducted by inviting 217 workers (learners) via the Amazon Mechanical Turk marketplace to assess the generated video narratives to support perceiving domain learning. The aim of the evaluation studies was to be able to answer RQ3 and RQ4 when video narratives are used with learners with medium to advanced expertise but not beginners.

We discuss the effectiveness of the generated video narratives to support perceiving domain learning and the difference between them by comparing the video narrative evaluation results and feedback from both studies with experts and learners. We did not compare like with like and we did not compare with learning styles or cognitive preferences which can be considered as future work, see (Section 5.6.5).

5.6.1 RQ3: Quality of the video narratives.

In this part we discuss to what extent we have answered RQ3 by combining the evaluation results from Study-1 and Study-2. Both experts and learners expressed that the quality categories Q2 and Q4 of the generated video narratives differ significantly. For Q2, which is 'video segments are clearly linked to the presentation skills', mentioned in the introduction, there was not an unanimous agreement on it. This means that the introduction was not clear. Although there was different opinions about the quality of the introduction, they did not unanimously agree on which video narrative had the worse quality; either CR from the experts point of view or D from the learners point of view. The experts' qualitative data about the CR narratives mentioned some drawbacks about the **text** used to augment the video narratives, and not enough **elaboration** provided on the focus concept in the video segments. A sample of the expert qualitative data is: "might distract or confuse if concepts are on same level but not very similar", "some segments were not stand-alone in explaining a concept well. Can see that it was picked purely because the word was mentioned", "few of the videos are not about what the descriptions said." Similarly, the learners found that the D narratives had this issue as well which is expressed in the learners qualitative data: "Lack of human creativity: the narratives generated by AI models lack human creativity and intuition. This can result in predictable or formulaic story-lines, which may limit engagement and fail to evoke an emotional connection with learners", "there is not enough time to successfully implement differentiated instruction."

According to the qualitative data of the experts and learners, the narratives' introduction **text** needed more clarification. The clarification process includes clarifying in more depth the learning objectives of the video narratives especially for the D and CR video narratives. This includes clarifying the relationship between the **Focus topic and Focus concept** mentioned in the introduction. Although both experts and learners agree that they can notice the Focus topic and Focus concept mentioned in the video segments and link it to the introduction description, there are some exceptions found in the CR and D narratives. For example, the experts managed to notice the hierarchical connection between the Focus topic and Focus concepts based on their domain experience but the learners were not able to notice that. Hence, for the learners with a lack of domain knowledge, additional text in the introduction is necessary to better articulate the conceptual connection between the generic and specific concepts and notice the nature of the relationship in more depth.

The experts noticed a difference in two Quality criteria (Q2 and Q4) which is not the case with the learners who did not concur on any of the Quality criteria. We noticed that there is a statistically significant difference in the Quality of the generated video narratives when assessed with learners. For that reason, we ran the Mann Whitney U Test for a pair-wise comparison between the narrative types, (a) CR and CO and (b) D and S, based on the expert and learner results to identify which video narrative(s) is/ are different from the other types based on the two evaluations.

(a) CR and CO video narratives. The strength, as judged by the learners, is that these narratives are useful as they diversify the learning experience by highlighting different aspects of specific domain areas. Hence, with the CR narrative, they see same level concepts and with the CO narrative, they see the relationship between concepts from different topics. With both narrative types, there is a required improvement in the introduction and conclusion. This will help in better conceptualising the Focus topic and Focus concepts. On the other hand, the experts were more criticising about the CR and CO narratives as they found that linking many concepts together provides broad cover and a lack of in-depth focus.

(b) D and S video narratives. The experts prefer these narrative types for learning whereas the learners had some concerns about them. Referring to the definition of these narratives where the hierarchical Up-Down or Down-Up relationship was found to be useful for conceptual learning based on the experts' feedback, the learners found them challenging to grasp. This can be solved by clarifying said hierarchical relationships in the introduction.

The recommended changes to the introduction of the video narratives have been addressed when implementing VIN-L in the second domain. This was done by adding a shape to help visualise the type of linking in the introduction, thus clarifying the conceptual relationship between the Focus topics and concepts based on the domain taxonomy. Additionally, a further in-depth study can be conducted as future work to select the best text style for the introduction of the video narratives.

Furthermore, the duration of the selected segments should be ≥ 30 seconds and adding more segments to the video narratives should help in providing greater elaboration on the Focus topic and Focus concepts.

5.6.2 RQ4: Usefulness of the generated video narratives.

From the experts, we attained the Perceived Usefulness and from the learners, we analysed the actual usefulness and the Cognitive Work Load. Referring to Figures 5.13 and 5.15 (the actual numbers used to draw the pie-charts are in the tables included in Appendix L), the experts and learners had ranked the video narratives highly. They found that the video narratives are useful in helping to identify key domain points and in being able to focus in on the key points.

They also agreed that the narratives help them identify concepts to learn. The experts' perceptions were homogeneous, however, the learners agreed that the video narratives are useful but they found differences in the Perceived Usefulness among the video narratives. The learners had different perceptions about the narratives' Quality and this has been reflected in the Perceived Usefulness results. To identify the narrative type(s) that caused these differences, we ran the Mann Whitney U Test for a pair-wise comparison between the narratives. This showed that the D narrative result is significantly different from the other narrative type results. The Quality of the D narratives affected the grasping of the Focus Topic and Focus concept which affected this narrative's usefulness for learning.

Below, we will summarise the strengths and areas for improvement as recommended by the experts and learners.

5.6.3 Strengths

The video narratives, when used with learners with medium to advanced expertise to support domain learning, have a potential to enhance domain knowledge. Some insights have been inferred when analysing the evaluation responses from both experts and learners. The experts found that the video narratives offer a good focus on key domain areas and have a potential to support the linking between these areas. The learners also noticed some strengths in the video narratives; the videos provide a clear explanation of the domain's key points, and the transition between the segments helped them notice the link between the concepts.

5.6.4 Areas for video narratives' improvement

The experts and learners who evaluated the Derivative narratives found some issues in their quality that affects their usefulness for learning. Experts also found some issues in the Correlative video narratives that provide in-breadth learning and the learners found that the conceptual learning in D narratives needed more clarification. This can be seen clearly in the learners results about the narrative's Cognitive Work Load. They showed that the Frustration scale with the D narratives was the highest which can be linked to the lowest Quality and Usefulness rank of this type. Hence, more Mental Work Load and Effort is needed while using this narrative type.

Further improvements of the narratives, as recommended by the experts and learners, include: improving the text used to augment the video narratives to clarify the relationship between the Focus topic(s) and Focus concept(s) which is described in (Section 7.4.1), and selecting more video segments from the same videos that have the same Focus topic and Focus concept to elaborate more on them. Also, increasing the text window of the video segments to be more than 6 lines so the segment itself will add more elaboration on the Focus topic and concept, see (Section 5.6.5). According to the expert evaluation, there is a need for future work to conduct a study where we will automatically generate different summarisation styles–which we have not done in this study. Then, evaluate these summarisation styles with experts and learners to assess their effectiveness in conveying the narratives' learning objectives, see (Section 7.4.1).

5.6.5 Limitations of the studies

Expert-Participants convenient sampling. The selection of the experts number is done using a convenience sampling which is a non-probability sampling method. The participants were researchers and lecturers who were available at the time of the study and showed willingness to participate in the study.

Learner-participants selected in the study. The ideal number of participants from Amazon Turk, which will enable us using parametric statistics, is 385 participants according to sample size calculation. The actual number of the participants is a representative number which we see as a sufficient number in order to demonstrate some statistical significance using non parametric statistics.

Hence, the smaller size is selected in this study due to budget constraints and our decision for using the most expensive Amazon workers as they are more experienced and reliable participants. Those participants have domain knowledge which can be useful to give better quality answers for the questions about the learning effect of the video narratives. However, this knowledge can affect the result of measuring the learning effect of the video narratives as those participants managed to give high number of domain related concepts which are to some extent similar in both pre-test and post-test. Accordingly, those participants are classified as medium-advanced learners. Further research would be needed to validate the usefulness of the narratives for beginner learners who have no experience with presentation skills.

Comparing between both studies (expert and learners). We have used the experts results to filter out the video narratives that are used with learners study. This is to ensure that the good quality narratives are going to be presented to the learners and it also enables us to narrow down the number of the video narratives used with the Amazon Mechanical Turk workers. Hence, we are not comparing like to like in both evaluation studies (with experts and learners).

Sample Size of Study-2. The participants in the learner study are medium to advanced learners but not beginners. Those participants with high experience gave us good feedback about the narratives and appreciate them. However, we can not conclude that the narratives can be useful for beginner learners as we did not embed the study in a module which is considered as a future work, see (Section 7.4.2).

Experimental design. We do not have similar system to compare with. The only possible way is to compare between learners who watch only the video narratives with learners who watch the whole YouTube videos. This comparison is not applicable according to the time constrain where the learners who use YouTube will watch hours of video footage which is not fair for them. accordingly, we decided to compare between the narratives themselves.

Segment window size. The segment window size of 6 lines is not the final segment size as these segments are aggregated with adjacent segments with the same Focus Topic and Concept. We notice that we can increasing the size of starting with 6 text lines and deciding the segment cut-point to be where the nearest end of sentence punctuation is found. By doing this we aim to tackle the issue of segment duration and to avoid the abrupt segment ending. This decision on initial segments has been implemented in (Chapter 6).

5.7 Summary

In this chapter we have proved the applicability of the VIN-L framework by implementing it in our prime domain, 'Giving Pitch Presentations'. Our contribution to this domain is through generating video narratives relating to presentation skills by re-using the available YouTube videos and linking different parts of them for domain learning purposes. Thus, we have generated 85 domain related video narratives. A filtered group of these narratives has been used in two evaluation studies. The first study was conducted with experts from the University of Leeds and the University of Canterbury in New Zealand. The second evaluation study was conducted with learners invited using the Amazon Mechanical Turk marketplace and both studies aimed to answer the two research questions:

How to generate good quality narratives that can be used to support perceiving domain learning?

Are the generated narratives useful to support perceiving domain learning?

These research questions have been addressed in both studies and the findings showed some positives and areas for improvement. The results revealed that the generated narratives are of good quality and the video segment content is related to the domain key concepts. Furthermore, the video narratives are potentially useful if they are used as learning materials to identify key domain concepts and to realise the links between them. The experts results showed that the D narratives were preferred over the other types, and the CR narratives were the least preferred type. However, the result was not significantly different due to the limited number of experts who participated in the study. On the other hand, the learners preferred the CR narratives over the other types and the D narratives were the least preferred type. The result was significantly different except for the video narrative pairs CO-S and CR-S. According to the feedback from both experts and learners, areas for improvement have been indicated and are mostly about the quality of the narratives. From the experts' point of view, more elaboration on the Focus topic(s) and Focus concept(s) can be achieved if more domain videos are used. Whereas, from the learners' point of view, the reshaping of the text used inside the video narratives can be enhanced to be more user friendly. Hence, this can improve the interactivity of the learners with the video narratives to improve their learning outcomes. With regards to the usefulness, the overall ranking was positive from both the experts and learners. We found that improving the quality of the narratives will enhance their usefulness as whenever there were positives and negatives in the Quality, they were noticed in the Usefulness as well. The recommended improvements to the quality are addressed in our second domain in Chapter 6.

The learners managed to identify new domain terms after watching the video narratives but this cannot be used to ensure deep learning as can be otherwise assessed in different studies where the video narratives are parts of modules dedicated to teach presentation skills. This requires a larger study which is beyond the scope of work in this thesis.

For the next domain, the following improvements have been incorporated: including figures in the augmented narratives introduction, improving the semantic tagging algorithm to include n-grams to recognise long domain terms in the video transcript, increasing the size of the segments to be ≥ 6 lines as the segment cut-point is where the nearest end of sentence punctuation is found. By doing this we aim to tackle the issue of segment duration and abrupt ending.

To prove the generality of our methodology, in the next chapter we implement VISC-L and VIN-L in a different domain: Health Related Quality of Life Awareness.

Chapter 6

Implementation and Validation of VISC-L and VIN-L in the Health Domain

6.1 Introduction

In this chapter, we aim to prove the generality of our work by implementing our frameworks VISC-L and VIN-L in another domain as described in (Chapter 3). The second domain is called Health Related Quality of Life Awareness. The generated video narratives are used to learn domain topics and concepts and raise awareness of health related quality of life of patients need who live with chronic illness–respiratory illness. Our approach is knowledge driven and requires a taxonomy of domain knowledge. Since such a taxonomy is not available, we build it. Building the taxonomy manually caused our method to be semi-automatic; however, domain taxonomy can be created automatically using automatic ways which enables our method to be fully automatic. Similarly to the Presentation Skills domain (Chapter 4 and 5), we use this taxonomy to collect domain related videos and to aid the implementation our frameworks.

The application of VISC-L and VIN-L is part of the **InAdvance project**[1]. The goal of this project is to "propose a new model of palliative care (PC) based

[1] https://www.inadvanceproject.eu/[Accessed:April 2023]

on early integration and personalised pathways addressed specifically to older people with complex chronic conditions." Our contribution to **InAdvance project** is to help with the communication when addressing patients, which is part of ecosystem support. There is a need to analyse the palliative care conversations as they relate to a patient's quality of life and are complex as they can happen in different contexts. Consequently, the awareness of health related quality of life challenges faced by patients in need of palliative care will increase. Raising the awareness of this domain would benefiting the general public, patients' relatives and medical students. Consequently, in this chapter we generate video narratives to support learning main Health Related Quality of Life aspects and raise awareness of theses concepts and their possible impact on patients' health. For that purpose, we aim to answer the following research questions:

RQ3: How to generate good quality narratives that can be used to support perceiving domain learning?

RQ4: Are the generated narratives useful to support perceiving domain learning?

To be able to answer these questions, we generate the domain related video narratives and evaluate them with InAdvance project team and researchers from the University of Leeds. Accordingly, we first have collected videos where elderly patients with respiratory illnesses share their stories and tutorial videos designed by domain professionals. After that, we have implemented the VISC-L framework defined in (Section 3.5) to produce characterised video segments from the patient story videos. After that, we have implemented the VIN-L framework defined in (Section 3.6) where the characterised video segments (VISC-L output) were linked to generate video narratives. Additionally, the design of the frameworks presumes that the domain taxonomy is available. We have developed the domain taxonomy which is a key input for both VISC-L and VIN-L. It is used to automatically collect domain related videos by implementing the search schema presented in (Section 3.5.1). It guide the characterisation and aggregation phases of the VISC-L framework. Finally, to link the characterised video segments to generate the video narratives, the domain taxonomy help in implementing the subsumption linking algorithms presented in (Section 3.6).

The structure of this chapter is as follows: the building of the domain taxonomy is presented in (Section 6.2), in (Section 6.3) we use the domain taxonomy to collect the required domain related videos, (Section 6.4) presents the implementation of the VISC-L framework and in (Section 6.5) we present the implementation of the VIN-L framework. To evaluate the Quality (RQ3) and the Perceived Usefulness and the Cognitive Workload (RQ4) of the generated narratives, we have conducted an evaluation study with experts. The study and the results are presented in (Section 6.6). The work in this chapter is summarised in (Section 6.7).

6.2 Health Domain Taxonomy

Our approach is using computational knowledge to automate the generating of the video narratives which is our ultimate goal in this thesis. Therefore, any domain we tackle should be represented computationally via a domain taxonomy. Health taxonomies represent health related knowledge where they provide the description of the main medicinal terminologies (concepts in the domain taxonomy) and the relationships between them. In this way, health knowledge will be shareable and accessible to maintain effective communication between specialists and patients. Here we revise the design of health ontologies; although in our work we focus on the domain taxonomy only.

6.2.1 Background

To facilitate the communication between patients and service providers, health terminologies should be specified and their structure should be identified. This evokes the need to build domain related ontologies and taxonomies with a focus on their quality. To build a “Smart Health-Care Ontology” (Tiwari & Abraham, 2020) and to maintain its quality, different tools have been utilised: Themis, Test-Driven Development Onto (TDD)onto, Protégé and OOPs. Themis and

TDDonto have been used to verify the ontology and Protégé and OOPs have been used to validate the modelled knowledge of the ontology.

Researchers found it is easier to build ontologies for specific aspects in the domain where the required concepts are collected using different applications and technologies. For example, Shahzad *et al.* (2021) designed an ontology to find the differences and similarities between different health services and their activities based on the "Internet Of Things" health applications, e.g, in Disease, Monitoring, Telemedicine, and Remote Health. The building of such an ontology is to provide the construction that links the similarities and differences among health services in one place for the benefit of both patients and specialists. Similarly, Mohamad *et al.* (2021) presents an overview of the main concepts related to the Virtual Reality Training (VRT) for medical education in the healthcare domain. The aim is to help in establishing a strategy to design an ontology to aid the development of VRT for medical education.

Nevertheless, Spoladore & Pessot (2021) stated that among the most promising technologies used to manage health data in health systems are ontologies and semantic webs. However, the methodologies used to build such ontologies are not free of deficiencies (feasibility study, project management, reuse, and stakeholders involvement). To explore the possible solutions to the aforementioned deficiencies, a comparison between three methodologies (life cycle, waterfall, agile) have been conducted. The findings showed that each methodology managed to tackle the aforementioned deficiencies based on the approaches and tools used in them. Accordingly, a collaborative work between the stakeholders and the technical experts is required to decide the best methodology, approaches and tools to be used to build health ontologies.

For health related quality of life, there is no identified taxonomy that links all the domain concepts. Hence, we consolidated knowledge from different researches to design the domain taxonomy. This taxonomy identified the domain classes, topics (top classes in the domain taxonomy) and individuals. As we mentioned in (Section 3.4–Definition 2, we will refer to the domain taxonomy classes and individuals as concepts) and the top concepts in the taxonomy as topics. The taxonomy we build in this section focuses on health related quality of life of patients with respiratory illness. Though, it can be used with any chronic illness by adding illness-specific physical symptoms.

The design process of the health related quality of life taxonomy is presented below.

6.2.2 Taxonomy Design

The aim of this taxonomy is to provide a computational representation of the health related quality of life for patients with respiratory illnesses. Hence, it will identify the main concepts and their hierarchy. This taxonomy supports researches that consider health text as a source of information or input data in their work. It aids the process of identifying the presence of the domain concepts in different parts of the text and links these parts using the concepts hierarchy. This will allow for extracting different insights that can be adopted by health providers to determine which services to offer, e.g, how to maintain a patient's health, understand their disabilities, and to prevent possible diseases.

To build the health related quality of life taxonomy, we have been inspired by the iterative ontology development methodology (Fernández-López, 1999; Noy *et al.*, 2001). Since our aim is to build the domain taxonomy only, we are going to follow part of the steps of the iterative ontology development methodology as presented in Figure 6.1.

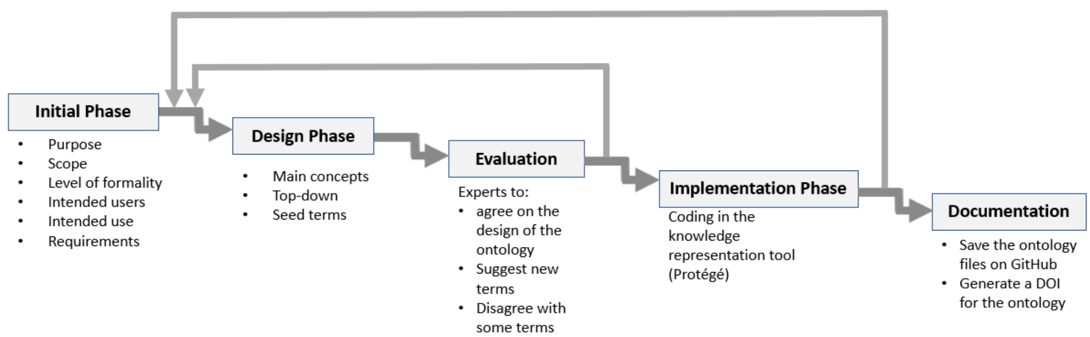


Figure 6.1: Iterative Taxonomy Development Methodology inspired by the ontology building steps (Fernández-López, 1999; Noy *et al.*, 2001).

The ontology has been saved using GitHub [1]

Initial Phase. In this phase, we will identify the: Purpose, Scope, Level of Formality, Intended Users and the Intended Use. We will also add the step Requirements.

(a) Purpose. The aim of this taxonomy is to support automating the analysis of conversations with patients/carers or patient/carer stories. With this analysis we can identify the main aspects related to the patient's quality of life. Additionally, this taxonomy can provide the knowledge source for analysing patient stories text corpora and conversations, and can also be helpful when supporting Personal Care (PC) needs. For this propose, it is essential to identify and provide the key terms (concepts) that relate to the health related quality of life domain taxonomy.

(b) Scope. The scope of the taxonomy is the Quality of Life of patients with Chronic Illnesses. The main chronic illness that we focus on in this thesis is the respiratory illness, but other groups of chronic illnesses can also be applied (e.g. cardiovascular). The main domain terms identified are linked to the WHO Health Related Quality of Life Knowledge sources (WHOQOL-100 [2]) and to the relevant ontologies (MESH [3], COPD ontology [4]).

(c) Level of formality. We decided to represent the domain purely as a taxonomy which means we will not consider some of the design aspects used when building ontologies (functions, individuals or instances and axioms).

(d) Intended users. They are those who would like to develop an analysis of patients' corpora (patient texts and stories) and want to identify the health related quality of life concepts present (in the text). Furthermore, people who

[1] https://github.com/Health-Related-Quality-of-Life-Ontology/Ontology.git[Accessed: January 2023]

[2] https://www.who.int/[Accessed:October 2022]

[3] https://www.ncbi.nlm.nih.gov/mesh/68008171[Accessed:October 2022]

[4] https://bioportal.bioontology.org/ontologies/COPDO/?p=summary[Accessed:October 2022]

seek in depth knowledge about health related quality of life for patients can also use this domain taxonomy as a guide.

(e) Intended uses. It can be used for text analytics, as guidance for application materials, for training (what aspects to include in the training), can be used for advice for other people who need it, and can be used by clinics to train patient carers about aspects of the patient's quality of life.

(f) Requirements. We need to make sure the domain taxonomy focuses on respiratory illness but it should be possible to expand it further to include other chronic illnesses.

Design Phase. In this phase, we will identify the main concepts, sub concepts and their hierarchy in the domain. The concepts in the domain taxonomy are linked as Top-Down where the top level concepts are the taxonomy topics, the second level includes the generic concepts and the remaining levels include the specific concepts within the generic concepts.

To identify the main domain concepts and their granularity, we used the following health related websites as knowledge sources: Assessing Health-related Quality of Life (HRQoL) in achondroplasia[1], Needs Assessment Tool: Progressive Disease (NAT: PD) User Guide[2], Physical Health Components[3]. Accordingly, six domain topics (top level concepts in the taxonomy) have been identified: PHYSICAL HEALTH, PSYCHOLOGICAL HEALTH, LEVEL OF INDEPENDENCE, SOCIAL RELATIONSHIP, ENVIRONMENT and PERSONAL VALUES AND BELIEFS. The main topics have been linked to their sub concepts following the granularity structure identified in the aforementioned health websites.

To evaluate the accuracy of the defined topics, concepts and their hierarchy, we have passed the taxonomy structure through iteration feedback–3 iterations.

[1] https://www.beyondachondroplasia.org/en/about/welcome[Accessed:November 2022]

[2] https://www.caresearch.com.au/Portals/20/Documents/Health-Professionals/NeedsAssessmentTool-ProgressiveDiseaseCHeRP.pdf[Accessed:November 2022]

[3] https://study.com/learn/lesson/what-is-physical-health.html[Accessed:November 2022]

The evaluation, following the iteration feedback, was with our InAdvance partners, where one evaluator participated in the first iteration, one evaluator participated in the second iteration and four evaluators participated in the third iteration. First, we assessed the taxonomy structure with the first evaluator who is a project officer at (Age [1], Brussels, Belgium). The feedback we had got was to make the following changes: expanded PERSONAL VALUES AND BELIEFS by adding 'LIVING ALONE', expand SOCIAL RELATIONSHIP by adding 'LONELINESS', 'ISOLATION', and add the sub concept 'SENSE OF ISOLATION' to the generic concept 'NEGATIVE FEELING' within the topic PSYCHOLOGICAL HEALTH. Additionally, we replaced the concept 'CLIMATE' within the generic concept 'PHYSICAL ENVIRONMENT' with the specific concepts; 'HEAT', 'DRAUGHT', 'HUMIDITY', 'COLD'and 'FLOOD'.

After the changes we have made to the domain taxonomy, we commenced the second iteration to get the second feedback to check the validity of the resulting taxonomy. For this purpose, we have asked the second evaluator, who is working in Medical Informatics Education in the School of Medicine in Aristotle University of Thessaloniki, Greece, for feedback. In response, new concepts have been recommended; the 'ACTIVITIES OF DAILY LIVING' and the 'INSTRUMENTAL ACTIVITIES OF DAILY LIVING' to the topic LEVEL OF INDEPENDENCE. We researched these generic concepts and found the most related concept to add to the domain taxonomy is 'ACTIVITIES OF DAILY LIVING' which includes 5 sub concepts: 'TOILETING', 'SHOWERING', 'BATHING', 'FOOD PREPARATION' and 'CAREGIVER ASSISTANCE'. After we made the changes, we sent the domain taxonomy to four doctors, who are also members of the InAdvance project, for a third feedback to evaluate the latest changes. The results stated that the domain taxonomy is now complete, well structured and ready to be implemented.

Implementation Phase. To implement the domain taxonomy, we used Protégé (Musen, 2015) the most widely used tool for ontology building. The main domain topics and their sub concepts, which have been proved by experts, have

[1] https://www.age-platform.eu/[Accessed:November 2022]

been linked as a taxonomy and are ready to be used in any software program to process health text, see Figures 6.2, 6.3 and 6.4.

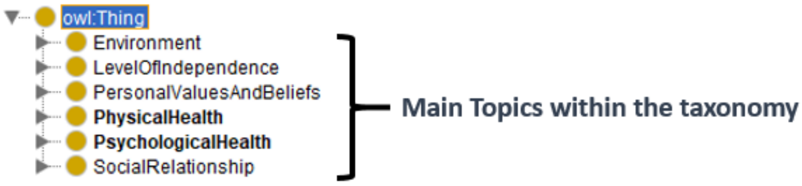


Figure 6.2: Main Topics of the in the Health Related Quality of Life Awareness taxonomy.

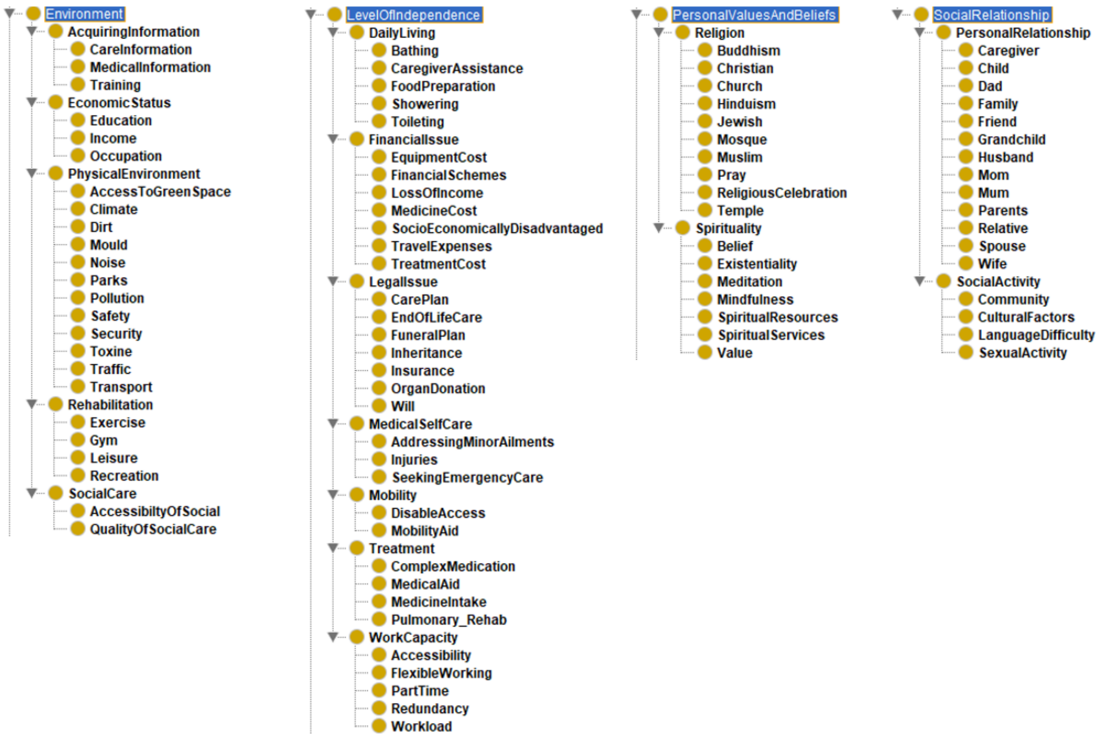


Figure 6.3: The concepts that belong to the topics ENVIRONMENT, LEVEL Of INDEPENDENCE, PERSONAL VALUES AND BELIEFS and SOCIAL RELATIONSHIP in the Health Related Quality of Life Awareness taxonomy.

The final number of the domain concepts are 212 and the main domain topics are: PHYSICAL HEALTH, PSYCHOLOGICAL HEALTH, LEVEL

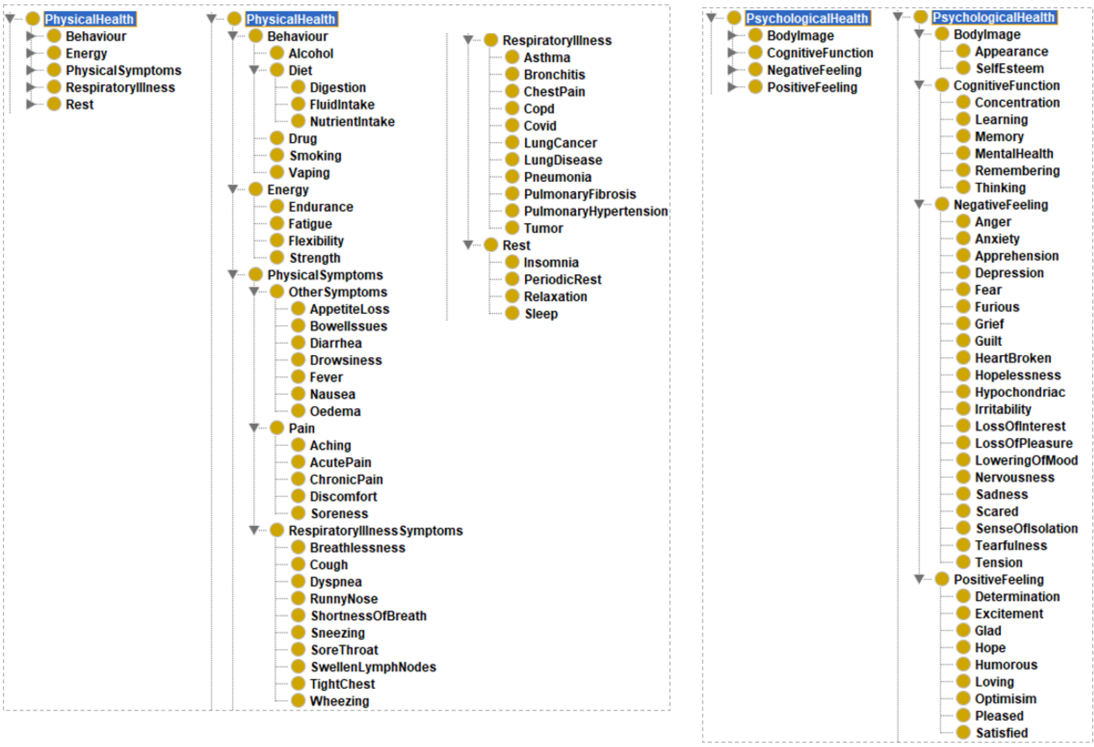


Figure 6.4: The concepts that belong to the topics PHYSICAL HEALTH and PSYCHOLOGICAL HEALTH in the Health Related Quality of Life Awareness taxonomy.

OF INDEPENDENCE, SOCIAL RELATIONSHIP, ENVIRONMENT and PERSONAL VALUES AND BELIEFS.

6.3 Data Collection

To generate health domain related video narratives, we first need the required data to be able to implement the VISC-L and VIN-L frameworks. The required data is: the domain taxonomy, patient story videos and training data.

For video collection, any pre-selected domain related videos can be used if they are associated with their transcript. Otherwise, we can use the domain taxonomy to collect videos from available social platforms (like YouTube) as illustrated in (Section 3.5.1) which we are using for this domain. We have used the search schema to collect two types of domain related videos:

Patient Stories and Tutorial Videos. Although we are collecting the videos automatically, we manually filtered the collected videos which makes this step as a semi-automatic and not fully automatic way, see (Section 7.3). The selection of the most suitable domain related videos is described in the next section.

6.3.1 Patient Stories.

To collect health related quality of life videos with patient stories, we utilised the domain taxonomy concepts to implement the search schema we designed (see Section 3.5.1). Using a combination of $\langle$ Domain, t_i, c_i, 'patient story' $\rangle$ as search terms, videos with patient stories related to the topic t_i and focus on the concept c_i have been collected. We have implemented this search schema using the library YouTube-search-python[1]. According to this library and to make sure we are collecting context related videos, we have to associate the search schema with the number of videos to be collected for each search term. For this purpose, we ran a test code and asked for number of videos ≥ 5 to be collected for each search term. We found that the program starts to collect videos which have the concept in their titles, but are in a different context. Consequently, we ran another experiment with number of videos $= 4$ but we still got the same issue. For that reason, we decided that the number of videos to be collected ≤ 3 per each search term. Inspired by the scoping review approach in (Damarell *et al.*, 2019), we have filtered the collected videos and the results are presented in Figure 6.5.

Videos retrieved. The number of first collected patient story videos, after implementing the search schema, was 543. We noticed that there were 295 duplicated videos which we excluded. The number of unique videos was now 248 which were passed on to the next stage of the scoping review.

Screened for relevancy and transcript availability. We found some irrelevant videos that includes some of domain related words in the title but they are domain irrelevant. For example, the videos: '10 Life Lessons From Buddha

[1] https://pypi.org/project/YouTube-search-python/[Accessed: December 2022]

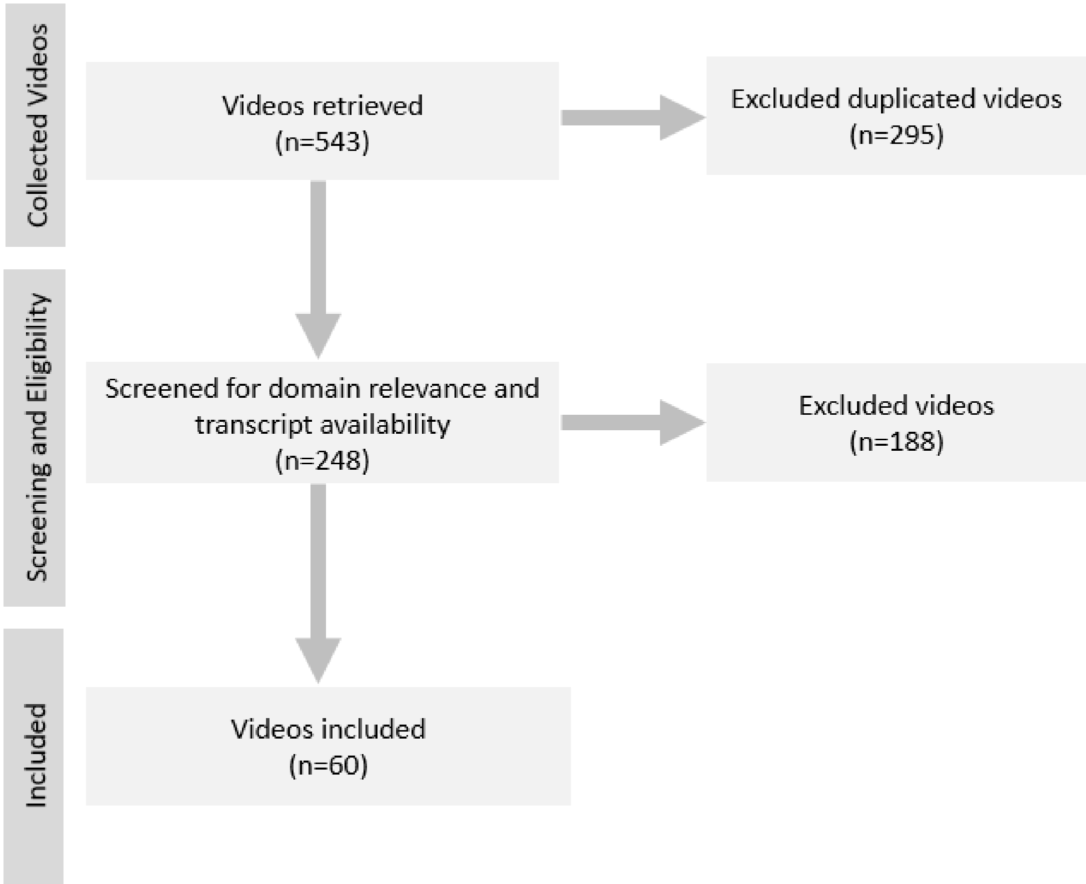


Figure 6.5: Filtering the collected domain related patient story videos using the scoping review approach.

(Buddhism)', which is talking about what it is Buddha; 'Stem Cells: Medical Miracle Or Science Gone Too Far? (Medical Documentary) — Real Stories' which is mainly about what stem cells are. Since we process the video transcripts only in our work, we decided to filter the 248 videos manually and select the videos that are associated with their transcripts that have been generated automatically by YouTube. Accordingly, 188 videos have been discarded, as they were not associated with their transcript–irrelevant videos.

Videos included. After applying all the filters (excluding the duplicated videos, and check for transcript availability condition), the final outcome was 60 videos which are unique and were associated with their transcript. These videos are the patient story videos which are passed to the VISC-L framework to be segmented, characterised and aggregated.

A sample of Patient Story videos, that are going to passed as input to VISC-L, are presented in the Table 6.1.

Table 6.1: Sample of the collected Patient Story videos. Note that due to the YouTube policy the creator of the videos can delete them at any time.

Video title	Summary of the video
Becca's lung cancer story [1]	Becca, was given just weeks to live but everything changed after the biopsy results. She has now come back to her normal life.
Lung Cancer: Patient Stories [2]	Patients living with lung cancer share their stories as well as the reasons why they chose to receive care at specific hospitals.
Young women can get lung cancer: Joanna's story [3]	Joanna was diagnosed with stage 4 lung cancer and she had symptoms for around 14 months.

6.3.2 Tutorial Videos

The last main input data required to implement VISC-L is the domain related training data. This type of data is required to fine-tune the Topic Classifier model within the characterisation phase in the VISC-L framework. Such training data is not available for this domain and for that reason we decided to create it automatically. Accordingly, we have to collect domain related tutorials to be able to use them to generate the training data. To collect the domain tutorials, we used the search schema combination of ⟨ Domain, t_i, c_i, 'tutorial' ⟩. Before passing these video tutorials to VISC-L, we had to filter them out as we did with

[1] https://www.youtube.com/watch?v=MxmrjLQvg7E[Accessed: December 2022]
[2] https://www.youtube.com/watch?v=rQutyErqBG0[Accessed: December 2022]
[3] https://www.youtube.com/watch?v=wwiwjZw7d6o[Accessed: December 2022]

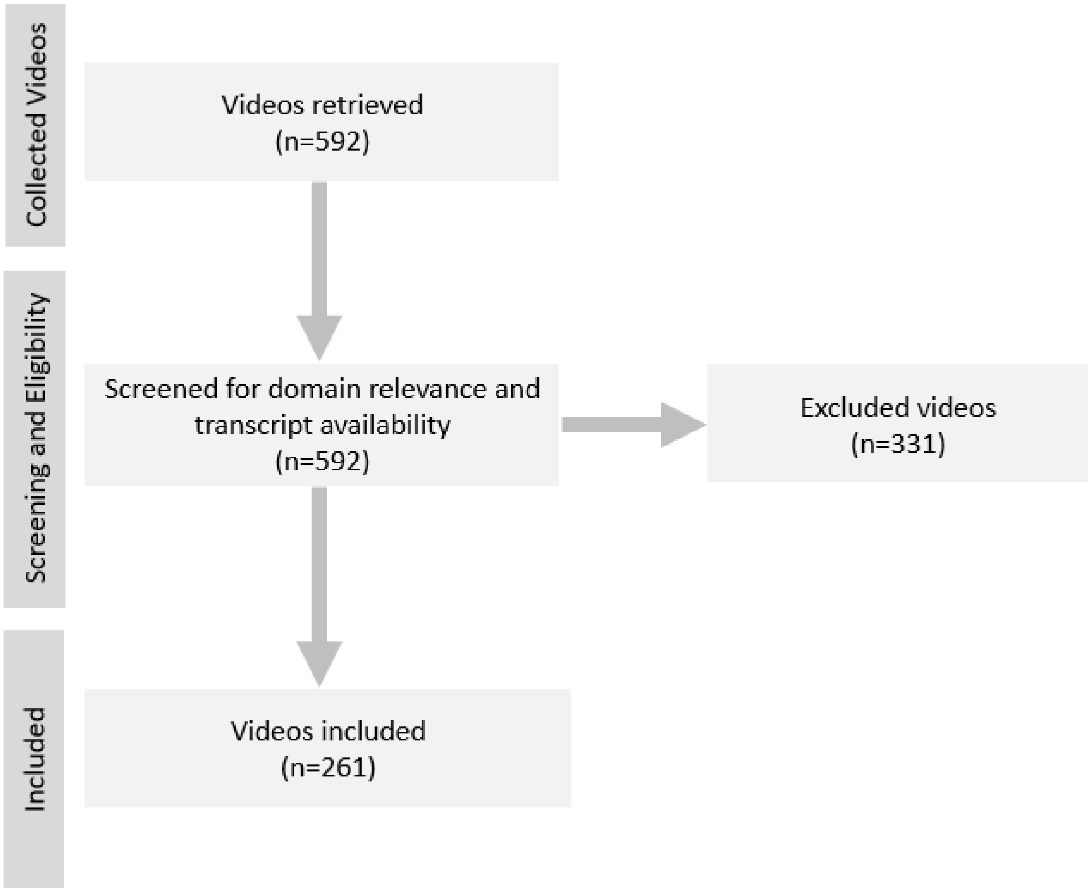


Figure 6.6: Filtering the collected domain related tutorial videos using the scoping review approach.

the patient story videos, using the scoping review approach as presented in Figure 6.6

Video retrieved. After implementing the search schema, we collected 592 videos. We noticed that some of the videos were not related to the domain context in spite of the presence of some of the domain concepts in their title. For example, the videos with the titles 'Natural Resources and Environment' and 'Improve Quality of Life and Environment with Cutting-Edge Building Technologies' .These irrelevant videos have been collected mistakenly because of a homonyms issue (words that are spelled the same but have different meanings).

Hence, 310 videos have been excluded from the collected videos.

Screened for relevancy and transcript availability. The outcome from the previous step was 282 domain related videos which have been screened manually to check the availability of their transcript, generated automatically by YouTube. Hence, 21 videos, have been excluded as they were not associated with their transcript.

Videos included. After applying all the filters, the final outcome was 261 videos which are domain related tutorial videos associated with their transcripts that have been automatically generated by Youtube. These videos are passed to VISC-L to generate the required training data.

A sample of the collected tutorial videos with a summary about each video is presented in table 6.2.

Table 6.2: Sample of the collected domain related tutorials. Note that due to the YouTube policy, the creator of the videos can delete them at any time.

Video title	Summary of the video
General impacts of green spaces on physical and mental health [1]	The effect of green space, urban and sustainability on mental health, physical health and psychology.
Lecture 2.3: Social and Environmental Determinants of Health [2]	The role of social and environment factors on everyday health.
Advanced Practice in Health and Social Care Quality of Life [3]	The advance practice in health and social care related to the quality of life.

The summary of the collected videos (patient stories and tutorials), after passing the scope review, is presented in Table 6.3. For each video type, we

[1]https://www.youtube.com/watch?v=ibyEHKnFTQ[Accessed: December 2022]
[2]https://www.youtube.com/watch?v=w2CmfIHNmV4[Accessed: December 2022]
[3]https://www.youtube.com/watch?v=cgc5uGqIgH8[Accessed: December 2022]

recorded the number of videos collected, the average (standard deviation) duration of the videos in seconds and the corpus size of each video type–the total number of tokens included in the transcripts of all videos in a group.

Table 6.3: Summary of the collected videos related to the domain of Health Related Quality of Life Awareness–Respiratory Illness

Video Type	No.Videos	AVG.(STDV) Duration in sec.	Corpus Size
Patient stories	60	572 (612)	10122 tokens
Tutorial Videos	261	1762 (2501)	1349205 tokens

These videos with the domain taxonomy are passed as input to the VISC-L framework as described in the next section.

6.4 Implementation of VISC-L

The proposed framework for Video Segmentation and Characterisation for Learning (VISC-L) in (Section 3.5) is implemented in this chapter for the health domain. It includes five main steps: Input, Initial Segments, Segment Characterisation, Segment Aggregation and Output. The implementation of these steps are presented below.

6.4.1 Input

The VISC-L framework is based on three assumptions as in (Chapter 4). The main group of videos we are using is the patient story videos which we used to generate the video narratives and the taxonomy of this domain is built as presented in (Section 6.2). For the health domain, we do not have training data but we generate it from the tutorial video transcripts we collected as presented in (Section 6.2). The process of labelling these transcripts is presented in (Section 6.4.3). Additionally, the transcript of the collected videos is pre-processed (adding punctuation) similar to the work in (Chapter 4). The punctuated video transcripts are ready to be passed to the Initial Segmentation phase of VISC-L.

6.4.2 Initial Segmentation.

Our video segmentation algorithm is the same one as described in (Section 4.4.2) but we improve it in this section. This is in responding to the expert evaluation of VISC-L implementation in the first domain where they complained that the segments are short and they would like to watch more. Hence, the initial segmentation algorithm starts by selecting a certain number of text lines (6). The video segment boundary is decided if the last line (the 6th text line) in the text-window includes one of the following, $[., ?, !]$. Otherwise, the algorithm add an extra line(s) to the text-window and stop when the required punctuation is found. Consequently, the size of the video segment varies with ≥ 6 text lines. The resulting video segment has three types of data: the transcript (≥ 6 text lines), starting time (the timestamp of the first text line in the video transcript) and end time (the timestamp of the last text line in the video transcript). The segmentation algorithm has been applied on the patient story and tutorial videos separately. After applying the segmentation algorithm on the 60 patient story videos, we generated 1483 segments with an average duration of 15 (STDV=7) seconds with an average number of segments, 68 (STDV=54), per video. On the other hand, after applying the segmentation algorithm on the tutorial videos, 25959 segments have been generated with average duration of 15 (STDV=28) seconds and an average number of segments, 297 (STDV=268), per video.

The generated segments are ready to be passed to the next phase of the the VISC-L framework which is Segment Characterisation.

6.4.3 Segment Characterisation

The aim of the Segment Characterisation phase is to aid the aggregation of the initial segments of the patient story videos, while also allowing us to generate training data from the tutorial video segments. For that purpose, we need to identify what domain content is presented in each video segment. This is done during this phase where each characterised video segment in a patient story video characterised video segment Ch=$\langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT, FC\rangle$ is linked with a set of focus topics FT and a set of concepts FC, where $FC \subset FT$.

The Segmentation Characterisation step in VISC-L includes two algorithms: Semantic Tagging and Topic Classification.

Semantic Tagging. The semantic tagging algorithm we designed in (Mohammed & Dimitrova, 2020) and illustrated in (Section 3.5) is used at this phase to characterise both the patient story and tutorial video segments. This algorithm has two inputs: the transcript of the video segments and the domain taxonomy illustrated in (Section 6.2).

(a) Patient Story Video Segments. At this stage in semantic tagging, we have used, as an input, the 1483 segments generated from the Initial Segmentation step on the patient story videos. The transcript of each segment has been tokenized, cleaned and PoStagged ('Part-of-Speech tagged') to get the resulted nouns and noun phrases. These nouns and noun phrases have been semantically tagged with the domain taxonomy terms to identify the focus topics and concepts in the video segments. The output is the characterised video segments with the domain focus topics and concepts Ch=$\langle VS_{\mathrm{Id}}, VS_{\mathrm{s}}, VS_{\mathrm{e}}, VS_{\mathrm{t}}, FT^1, FC^1\rangle$, where ^{1} means this the first characterisation result.

After screening the output, we found that some of the domain taxonomy terms have been mentioned in the video segment's transcript but in a different context. For example, the concept 'COMMUNITY' which is part of the topic SOCIAL RELATIONSHIP, is mentioned in the video as part of community centre name. This causes word sense ambiguity issue. This issue emerged when we collected a large number of domain related videos automatically where in some of these videos the speaker either digress from the topic or talks to the audience. To solve this issue, as presented in (Section 3.5.3), we use a Topic Classifier model and to do so we need training data. Such data is not available for this domain and we have to generate it. The process of generating the training data to fine tune the Topic Classifier model is presented in the next section.

(b) Tutorial Video Segments. To be able to fine-tune the Topic Classifier model to solve the word sense ambiguity issue, domain related training data is needed. For this purpose we apply the semantic tagging algorithm on the tutorial video segments to identify the focus topic(s) in them. Accordingly, we have passed the 25959 tutorial video segments resulted from the initial segmentation phase on the tutorial videos. These video segments have been characterised by: tokenizing their transcript, cleaning them from stop words and PoStagging them to get the nouns and noun phrases. These nouns and noun phrases have been semantically tagged with the domain taxonomy terms to identify the focus topics in the tutorial video segment transcripts. The output was 10441 tutorial video segments characterised with domain topics and 15518 discarded segments as they were irrelevant to the domain. These 10441 labelled video segments focus on different domain topics as presented in the Table 6.4 which is used as training data in the next step of the characterisation phase–Topic Classifier.

Table 6.4: Tutorial Video segments after applying the Semantic Tagging algorithm. The output is the training data to be used to fine-tune the BERT model in the Topic Classifier step in the VISC-L framework.

Focus Topic(s)	No.Segments	Duration in sec. AVG (STDV)
Physical Health	3399	15.0 (5.0)
Psychological Health	2131	16.0 (21.0)
Environment	1358	15.0 (5.0)
Social Relationship	2219	15.0 (8.0)
Level Of Independence	592	15.0 (6.0)
Personal Values and Beliefs	742	16.0 (5.0)

(c) Expert Evaluation of the Semantic Tagging Algorithm. We have conducted the evaluation study of the Semantic Tagging Algorithm with one domain expert, as we did in (Section 4.4.3). The evaluation of the Semantic Tagging algorithm output is crucial as it will affect the quality of the overall characterisation result. This is because the characterised patient story video segments will affect the selection of the focus concept. Meanwhile, the characterised tutorial video segments are used to fine-tune the Topic Classifier. The fine-tuned Topic Classifier is implemented on the patient story video segments to provide their second characterisation. Both patient story video segment characterisations are combined to get the final characterisation result. For this purpose, we have invited one expert to evaluate the characterised video segments of both video groups (patient stories and tutorials). The expert, who has participated in the evaluation process, is a member of the InAdvance project, and is different from the evaluators in (Section 6.6.1), who works as a health care psychologist and is an expert in the health related quality of life of patients with respiratory illnesses.

The **materials** are 160 segments from which (80 segments have been selected from the patient stories, and the other 80 segments have been selected from the tutorial videos). The expert has been provided with an Excel sheet that includes the video segments from both groups of videos with their characterisations, (see Appendix M). Additionally, we have provided her with domain taxonomy topics and concepts as in Figures 6.2, 6.3 and 6.4.

The **procedure** of the evaluation process that required to be followed by the expert is: if agree with the labelled data then do nothing, if disagree with the labelled data or to add a new/missed concept then highlight the concept in red, and if not sure about the assigned concept or the suggested concept then highlight in orange.

After receiving the evaluation **result**, we have designed three types of responses, similar to the evaluation study in (Section 4.4.3–Characterisation Evaluation step); 'To Fix the Domain taxonomy', 'To fix the Semantic Tagging Algorithm' and 'Ignore–the concept was picked for the segment'. The response 'To Fix the Domain taxonomy' means we have added the the new suggested concepts by the expert which we found were missed from the domain taxonomy. There were 4 new suggested concepts added to the taxonomy.

While the 'To fix the Semantic Tagging Algorithm' response is where we decided to modify our algorithm to be able to pick the multi-word concepts suggested by the expert and were missed from the characterisation, e.g, 'ACCESS

TO GREEN SPACES' from the topic ENVIRONMENT. For this purpose, we have used the n-gram library (where n= 2,3 and 4 to collect the concepts with compound words) from TextBlob[1], which is a free open source in the Python software function.

Furthermore, the 'Ignore–the concept was picked for the segment' response is to ignore the expert's new suggested concept/ disagreement with the assigned concepts. This is because the concepts assigned to the segments, by the algorithm, are included in the taxonomy and presented in the segment-transcript, similar to our work in (Section 4.4.3–Characterisation Evaluation step). Hence, we have ignored 9 suggestions from the experts.

Finally, to calculate the agreement between the expert responses and the output from the semantic tagging algorithm, we ran Cohen's Kappa Coefficient (Cohen, 1960), following the exact steps in (Section 4.4.3–Characterisation Evaluation step). Accordingly, the inner agreement result was very high (96%), (see Appendix M).

Thereafter, we made the required amendments to the Domain Taxonomy and Semantic Tagging Algorithm and re-implemented them to the patient stories and tutorial videos. To further improve the taxonomy concepts, we checked the transcript of each segment with its characterisation and found new domain related concepts present in the transcript but were missed from the taxonomy. We decided to add these concepts to the domain taxonomy. For example, we have added the super concept 'RESPIRATORY ILLNESS' to the topic PHYSICAL HEALTH. 'RESPIRATORY ILLNESS' now has the following sub concepts: 'ASTHMA', 'CHEST-PAIN', 'COPD', 'COVID', 'LUNG-CANCER', 'LUNG DISEASE', 'PNEUMONIA', 'PULMONARY-FIBROSIS', 'PULMONARY-HYPERTENSION' and 'TUMOR'. Additionally, we have added the concept 'PULMONARY-REHAB' to its super concept 'TREATMENT' and both belong to the topic LEVEL OF INDEPENDENCE. We also added the concept 'SORENESS' within the super concept 'PAIN' and both concepts belong to the topic PHYSICAL HEALTH. Finally, we have added the concepts 'GRIEF', 'HYPOCHONDRIAC' and

[1] https://buildmedia.readthedocs.org/media/pdf/textblob/latest/textblob.pdf[Accessed: January 2023]

'SADNESS' to their super concept 'NEGATIVE FEELING' and all concepts belong to the topic PSYCHOLOGICAL HEALTH. Consequently, the final number of concepts within the taxonomy 212.

The characterised tutorial video segments are passed to the second step of the characterisation phase of VISC-L to be used as training data for the Topic Classifier model.

Topic Classifier. This is the second step of the characterisation phase in VISC-L which considers the context of the segments to aid the resolving of the aforementioned issue of word sense ambiguity.

To be able to implement the BERT-BASE-Uncased model (Topic Classifier) used in (Section 4.4.3–Topic Classifier step), we need to fine-tune it with domain related training data. For this purpose, we use the characterised tutorial video segments labelled with their domain topic as training data, see Table 6.4. We fine tuned the BERT-BASE-Uncased model as a binary classifier for each topic in the domain. As we described in (Section 4.4.3–Topic Classifier step). We used the fine tuned model as a Topic classifier to characterise the patient stories segments. The characterisation output of each segment after implementing the Topic Classifier model is FT_i^2, where ^{2} means this characterisation is the second segment characterisation which identifies the focus topic only.

The characterisation output of the patient story video segments resulting from the Semantic Tagging algorithm and the Topic Classifier is ready to be combined in the final characterisation step of the VISC-L framework.

Combining the Characterisation. This is the last step of the characterisation phase of VISC-L where the characterisation of the segments is decided by the intersection between the semantic tagging algorithm results and the topic classifier result as follows: $\langle FT_i \rangle = \langle FT_i^1 \rangle \cap \langle FT_i^2 \rangle$. Thus, the output of the characterisation step for each video segment is the focus topic identified by the Semantic Tagging algorithm which is similar to the topic identified by the Topic Classifier. The focus concept(s) of the agreed focus topic can be extracted from the Semantic Tagging output $\langle FT_i, FC_i \rangle$. Following the work in (Section

Table 6.5: Evaluation result after fine tuning the BERT-BASE-Uncased model when applied as a binary classifier in the health domain–Health Related Quality of Life Awareness.

Topic	Precision	Recall	F1-score
Physical Health	0.98	0.99	0.99
Psychological Health	0.99	1.00	1.00
Environment	0.99	0.99	0.99
Social Relationship	1.00	0.98	0.99
Level of Independence	0.99	0.95	0.97
Personal Values and Beliefs	0.99	1.00	0.99

4.4.4) we aggregate the adjacent segments in the next section.

6.4.4 Segment Aggregation

We have implemented the Segment Aggregation step of VISC-L on the patient stories video segments in this domain following the methodology step described in (Section 3.5.4) which is implemented in (Section 4.4.4). An example of the aggregated segments is presented in Figure 6.7, where the fifth segment has been aggregated with the segments preceded. This segment matched the aggregation conditions as it is without characterisation and its duration is less than 30 seconds–the segment duration threshold used in this thesis as an aggregation condition.

6.4.5 Output

The last step in the VISC-L framework is the final output which is the 306 aggregated segments with an average duration of 56 (STDV=36) seconds, and their full details are presented in Table 6.6.

Start Time	End Time	Video segment transcript	Focus Concept	Focus Topic
0.03	0.15	Andy : There are a lot of thing that you give up when you 're diagnosed with a disease like **pulmonary fibrosis** .I wa an avid motorcycle rider for almost 30 year .I rode a Harley Sportster and I had to give it up because I would get sleepy while I wa driving .	**Pulmonary Fibrosis**	**Physical Health**
0.18	0.36	I 'd say I went from a 1200 Twin to a 3000 human machine .My name is Andy Vavra and I received a double lung transplant at Penn Medicine .Idiopathic **pulmonary fibrosis** is very rare .There are not a whole lot of casein the United States each year	**Pulmonary Fibrosis**	**Physical Health**
0.38	0.53	and it 's more or le considered an orphan disease .**Pulmonary fibrosis** is a lung condition where you get too much scarring inside the lung and if you have too much scar in the lung oxygen ca n't get from the air into your blood and so you get more and more short of breath .Initially I mean you wake up with splitting headache	**Pulmonary Fibrosis**	**Physical Health**
0.56	1.07	your mobility is impaired you ca n't go up step without oxygen .You ca n't walk . You ca n't talk .So it becomes really a limit on your lifestyle .Can you give me a deep breath and cough ?coughing In addition to having **pulmonary fibrosis**	**Pulmonary Fibrosis**	**Physical Health**
1.09	1.22	he also had aortic regurgitation and that 's a condition that long term can cause heart failure and also be life .Andy : As the surgeon said to me in the operating room That 's a showstopper .You ca n't get the transplant		
1.23	1.34	unless you take care of this problem .Dr. Vivek : What I remember is Andrew wa such an incredibly determined person .He underwent surgery with Dr. Bavariain our cardiac surgery department and did unbelievably well .Even though he had **pulmonary fibrosis**	**Pulmonary Fibrosis**	**Physical Health**

Gap segment with no focus topic and no focus concept and its duration is <= 26 seconds.

Figure 6.7: Example of aggregating adjacent segments with interpolating the gap segment.

Table 6.6: Linear aggregation with the interpolation results of the patient stories video segments.

Focus Topic(s)	No.Segments	Duration (AVG) in sec.	Duration (STDV) in sec.
Physical Health	127	62	41
Psychological Health	30	44	23
Environment	14	57	47
Social Relationship	108	53	31
Level Of Independence	24	49	22
Personal Values and Beliefs	3	62	33

It is clear that the number of initial segments decreases noticeably after applying the aggregation algorithm. In contrast, the average duration of the aggregated segments is greatly increased as presented in Table 6.7.

Table 6.7: Summary of the generated patient stories video segments after implementing the Initial Segment and the Linear Aggregation with Interpolations steps from VISC-L.

Video Segments	No.Segments	AVG.Duration	STDV Duration
Initial Segments	1483	15	7
Aggregation Result	306	56	36

The aggregation algorithm helps in better recognising the areas in the videos that elaborate the same focus topic and concepts. This can be beneficial to users to help them notice the main domain points.

More examples of VISC-L output which is the characterisation of video segments are in Figures 6.8, 6.9, 6.10.

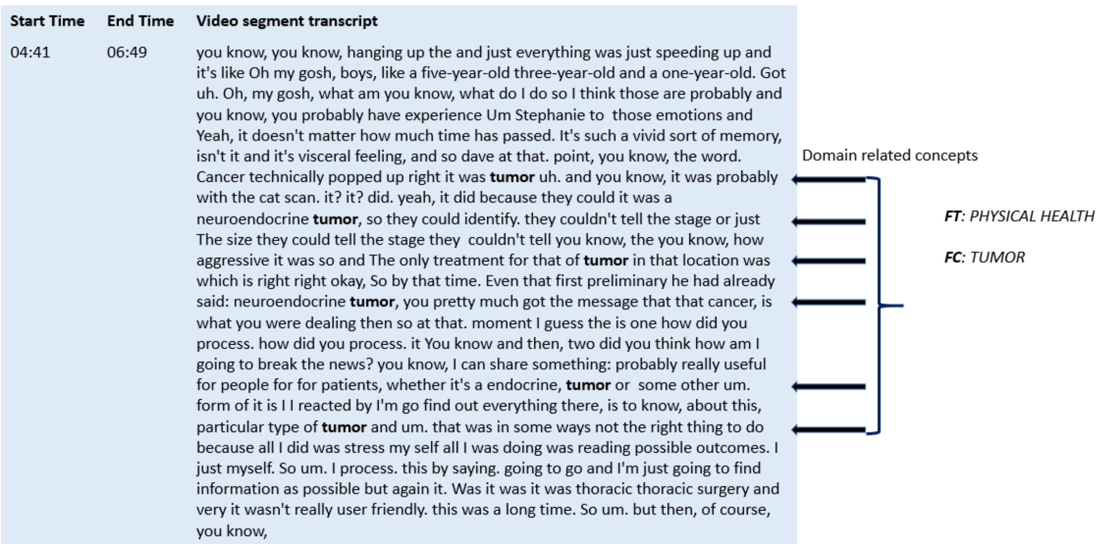
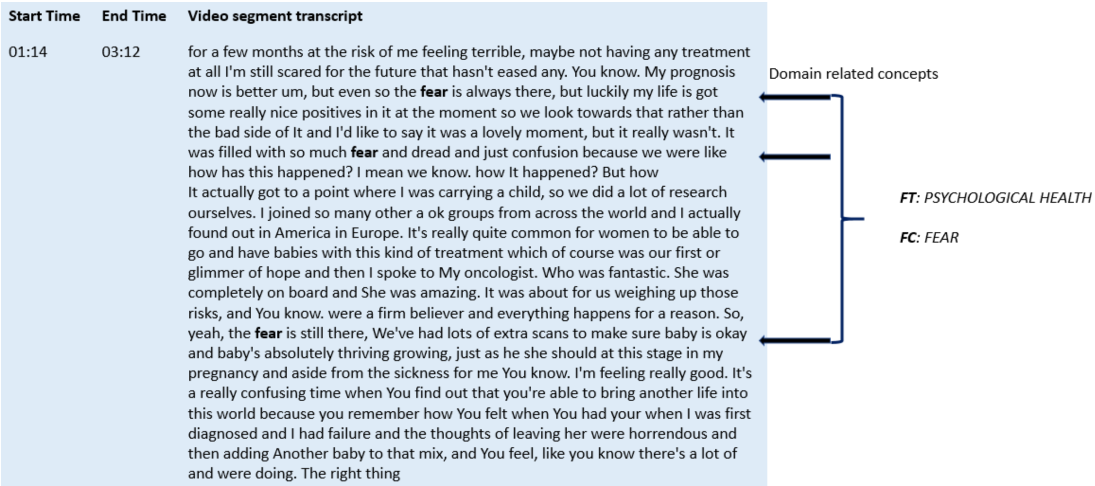


Figure 6.8: Example 1 of a segment characterisation by VISC-L. The segment has been taken from one of the patient story videos with YouTube video ID= hQQ5xQGZxdA–this is taken from the segment characterisation which saved the segment Id that is created using the video Id as described in Algorithm 1. It starts at 04 : 41 with duration of 128 seconds.

To be able to generate video narratives from the characterised video segments, we need to ensure that these videos can be uploaded to Google Cloud as we are



Start Time	End Time	Video segment transcript
01:14	03:12	for a few months at the risk of me feeling terrible, maybe not having any treatment at all I'm still scared for the future that hasn't eased any. You know. My prognosis now is better um, but even so the **fear** is always there, but luckily my life is got some really nice positives in it at the moment so we look towards that rather than the bad side of It and I'd like to say it was a lovely moment, but it really wasn't. It was filled with so much **fear** and dread and just confusion because we were like how has this happened? I mean we know. how It happened? But how It actually got to a point where I was carrying a child, so we did a lot of research ourselves. I joined so many other a ok groups from across the world and I actually found out in America in Europe. It's really quite common for women to be able to go and have babies with this kind of treatment which of course was our first or glimmer of hope and then I spoke to My oncologist. Who was fantastic. She was completely on board and She was amazing. It was about for us weighing up those risks, and You know. were a firm believer and everything happens for a reason. So, yeah, the **fear** is still there, We've had lots of extra scans to make sure baby is okay and baby's absolutely thriving growing, just as he she should at this stage in my pregnancy and aside from the sickness for me You know. I'm feeling really good. It's a really confusing time when You find out that you're able to bring another life into this world because you remember how You felt when You had your when I was first diagnosed and I had failure and the thoughts of leaving her were horrendous and then adding Another baby to that mix, and You feel, like you know there's a lot of and were doing. The right thing

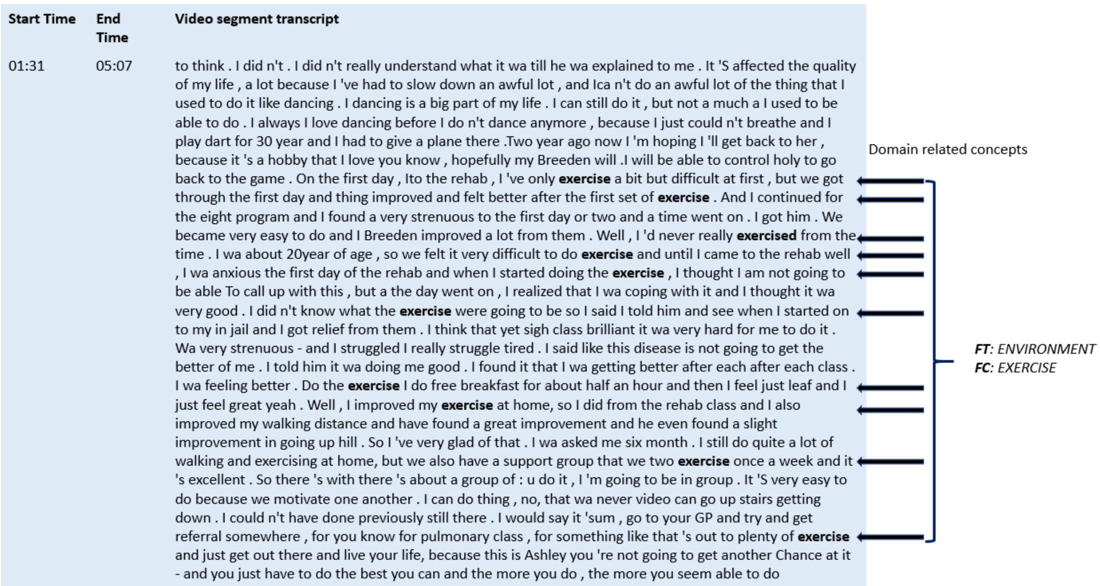
Figure 6.9: Example 2 of a segment characterisation by VISC-L. The segment has been taken from one of the patient story videos with YouTube video ID= wwiwjZw7d6o–this is taken from the segment characterisation which saved the segment Id that is created using the video Id as described in Algorithm 1. It starts at 01 : 14 with duration of 118 seconds.

using Google Drive to generate URLs for our video narratives to be used by users. Consequently, only 52 videos have been uploaded successfully to Google Cloud and 8 videos have been discarded with their 139 segments. Thus, the remaining video segments used to generate the narratives numbered 167 and focus on the main health topics as presented in the VISC-L output in Figure 6.15.

These characterised segments are used as the input to implement the subsumption linking algorithms as we describe in the next section.

6.5 Implementation of VIN-L

The aim of our research is to generate video narratives to help learners identify key domain points in the videos and be able to link them together. For this purpose we have designed the VIN-L framework to generate the video narratives which is underpinned by the Ausubel Subsumption theory for meaningful learning, as described in Section 3.6. The full VIN-L framework implementation steps are



Start Time	End Time	Video segment transcript
01:31	05:07	to think . I did n't . I did n't really understand what it wa till he wa explained to me . It 'S affected the quality of my life , a lot because I 've had to slow down an awful lot , and Ica n't do an awful lot of the thing that I used to do it like dancing . I dancing is a big part of my life . I can still do it , but not a much a I used to be able to do . I always I love dancing before I do n't dance anymore , because I just could n't breathe and I play dart for 30 year and I had to give a plane there .Two year ago now I 'm hoping I 'll get back to her , because it 's a hobby that I love you know , hopefully my Breeden will .I will be able to control holy to go back to the game . On the first day , Ito the rehab , I 've only **exercise** a bit but difficult at first , but we got through the first day and thing improved and felt better after the first set of **exercise** . And I continued for the eight program and I found a very strenuous to the first day or two and a time went on . I got him . We became very easy to do and I Breeden improved a lot from them . Well , I 'd never really **exercised** from the time . I wa about 20year of age , so we felt it very difficult to do **exercise** and until I came to the rehab well , I wa anxious the first day of the rehab and when I started doing the **exercise** , I thought I am not going to be able To call up with this , but a the day went on , I realized that I wa coping with it and I thought it wa very good . I did n't know what the **exercise** were going to be so I said I told him and see when I started on to my in jail and I got relief from them . I think that yet sigh class brilliant it wa very hard for me to do it . Wa very strenuous - and I struggled I really struggle tired . I said like this disease is not going to get the better of me . I told him it wa doing me good . I found it that I wa getting better after each after each class . I wa feeling better . Do the **exercise** I do free breakfast for about half an hour and then I feel just leaf and I just feel great yeah . Well , I improved my **exercise** at home, so I did from the rehab class and I also improved my walking distance and have found a great improvement and he even found a slight improvement in going up hill . So I 've very glad of that . I wa asked me six month . I still do quite a lot of walking and exercising at home, but we also have a support group that we two **exercise** once a week and it 's excellent . So there 's with there 's about a group of : u do it , I 'm going to be in group . It 'S very easy to do because we motivate one another . I can do thing , no, that wa never video can go up stairs getting down . I could n't have done previously still there . I would say it 'sum , go to your GP and try and get referral somewhere , for you know for pulmonary class , for something like that 's out to plenty of **exercise** and just get out there and live your life, because this is Ashley you 're not going to get another Chance at it - and you just have to do the best you can and the more you do , the more you seem able to do

Figure 6.10: Example 3 of a segment characterisation by VISC-L. The segment has been taken from one of the patient story videos with YouTube video ID= GV3Rew061FA–this is taken from the segment characterisation which saved the segment Id that is created using the video Id as described in Algorithm 1. It starts at 01 : 31 with a duration of 216 seconds.

presented below.

6.5.1 Input

To be able to implement the VIN-L framework in this health domain, we need the domain taxonomy which has been designed in (Section 6.2) and the 167 characterised patient stories video segments which are the VISC-L framework output. The video segments are linked by implementing the subsumption links defined in Section 3.6. The implementation of the subsumption linking algorithms on the video segments is presented next.

6.5.2 Subsumption Linking Algorithms

To guide the linking of the video segments, the subsumption theory of meaningful learning designed by Ausubel has been utilised as described in (Section 3.2.3). Four types of subsumption linking have been identified by Ausubel which are going to be used to generate the video narratives: Derivative, Super Ordinate, Correlative and Combinational. To implement these subsumption links, the four algorithms (Algorithms 4, 5, 6, 7) designed in (Section 3.6) are going to be implemented.

Referring to Figure 3.6, we demonstrate the implementation of each algorithm in column 2 titled 'Subsumption Linking Algorithms' following Ausubel's definition, as we did in (Section 5.2.2). Additionally, to augment the generated narratives with text, we have addressed the recommendation of improving the introduction part of the video narrative by including a figure clarifying the conceptual relationship between the Focus topic and the Focus concepts.

Derivative Linking is when the learning is determined by having the generic concept in the cognitive structure first before introducing one of its specific concepts (target concepts) to bind them together, (see Algorithm 4).

An example of the derivative narratives is in Figure 6.11 that shows one of the derivative narratives generated. In this example, the Derivative narrative aims to support learning the target concept 'EXERCISE'. It starts by firstly inculcating its generic concept 'REHABILITATION' into the cognitive structure then providing the segments that focus on the target concept 'EXERCISE'.

Super Ordinate Linking helps learning a concept by showing examples-its sub-concepts. with Super Ordinate Linking, the learning starts with the specific concepts before learning their parent concept, (see Algorithm 5). An example of the Super Ordinate narrative is presented in Figure 6.12. The video narrative aims to raise awareness of the generic concept 'ENERGY'. It starts by firstly inculcating one of its specific concepts, 'STRENGTH', into the cognitive structure then providing the segments that focus on the target (parent) concept 'ENERGY'.

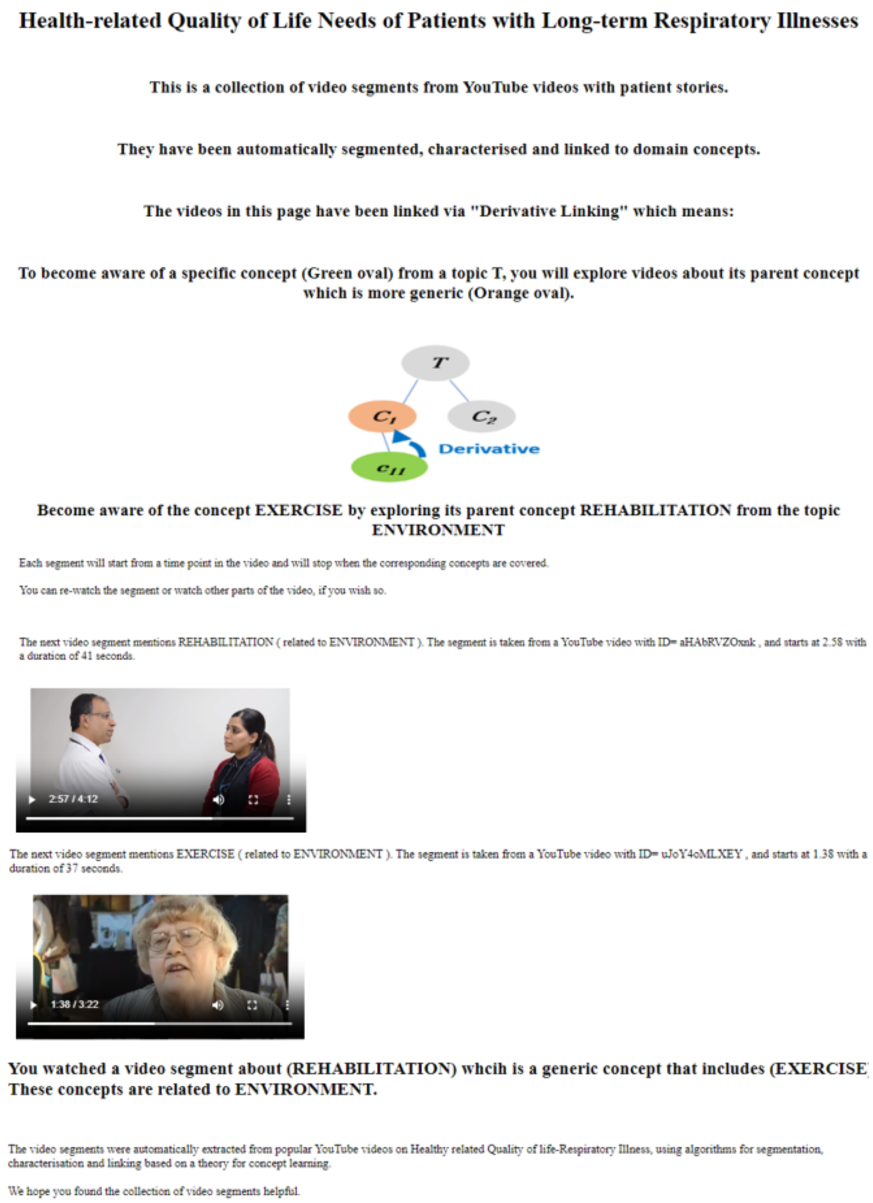
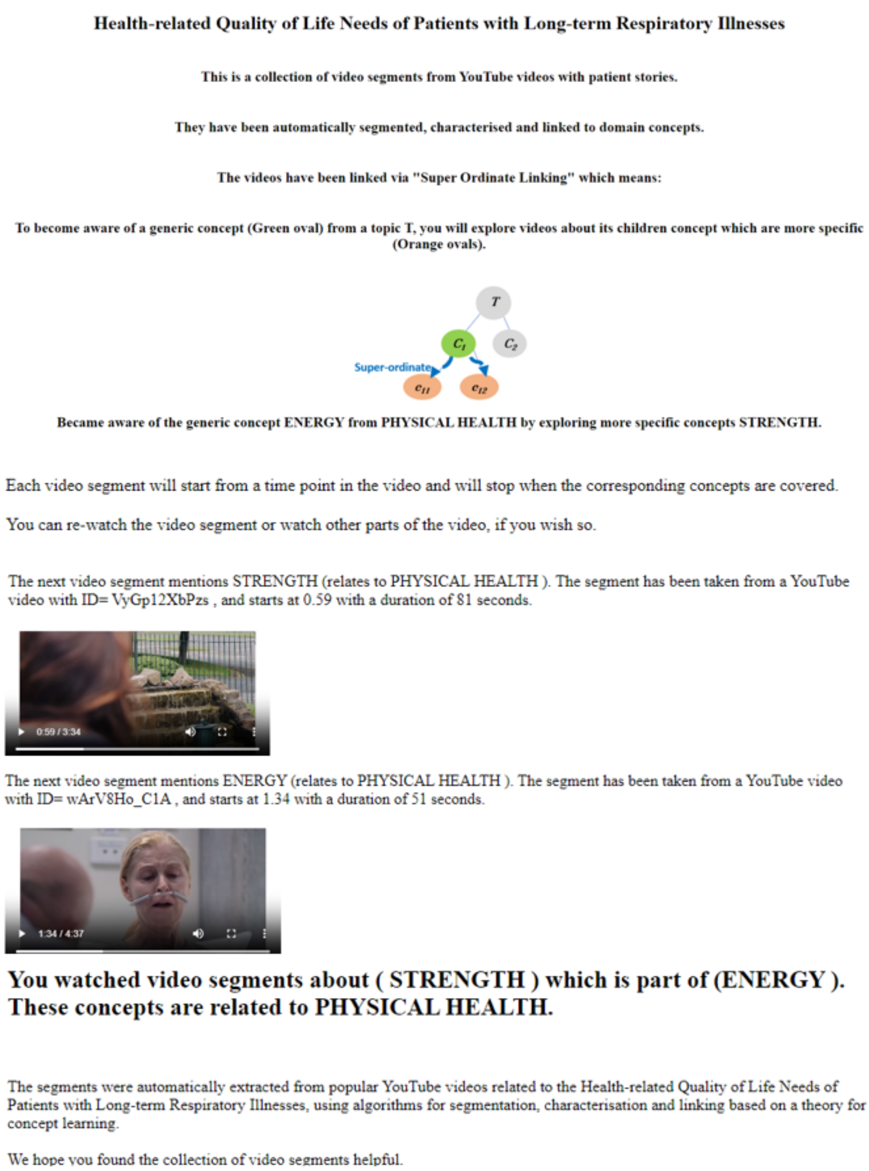


Figure 6.11: Example of the Derivative Narrative to support learning showing that to learn the concept 'EXERCISE', its generic (parent) concept 'REHABILITATION' must be introduced first before introducing the specific concept. All of the concepts belong to the topic 'ENVIRONMENT'.

Correlative Linking helps in learning a concept by showing different aspects related to it (its sibling concepts), (see Algorithm 6). An example of the generated



Health-related Quality of Life Needs of Patients with Long-term Respiratory Illnesses

This is a collection of video segments from YouTube videos with patient stories.

They have been automatically segmented, characterised and linked to domain concepts.

The videos have been linked via "Super Ordinate Linking" which means:

To become aware of a generic concept (Green oval) from a topic T, you will explore videos about its children concept which are more specific (Orange ovals).

Became aware of the generic concept ENERGY from PHYSICAL HEALTH by exploring more specific concepts STRENGTH.

Each video segment will start from a time point in the video and will stop when the corresponding concepts are covered.

You can re-watch the video segment or watch other parts of the video, if you wish so.

The next video segment mentions STRENGTH (relates to PHYSICAL HEALTH). The segment has been taken from a YouTube video with ID= VyGp12XbPzs , and starts at 0.59 with a duration of 81 seconds.

The next video segment mentions ENERGY (relates to PHYSICAL HEALTH). The segment has been taken from a YouTube video with ID= wArV8Ho_C1A , and starts at 1.34 with a duration of 51 seconds.

You watched video segments about (STRENGTH) which is part of (ENERGY). These concepts are related to PHYSICAL HEALTH.

The segments were automatically extracted from popular YouTube videos related to the Health-related Quality of Life Needs of Patients with Long-term Respiratory Illnesses, using algorithms for segmentation, characterisation and linking based on a theory for concept learning.

We hope you found the collection of video segments helpful.

Figure 6.12: Example of the Super Ordinate Narrative to support learning showing that to learn the generic (parent) concept ‘ENERGY’, its specific concept ‘STRENGTH’ must be introduced first before introducing the parent concept. All of the concepts belong to the topic ‘PHYSICAL HEALTH’.

Correlative narratives is presented in Figure 6.13. In this example the Correlative narrative aims to support learning the targeting concept ‘BELIEF’. It starts by introducing its sibling concept ‘MEDITATION’ and both concepts belong to the topic ‘PERSONAL VALUES AND BELIEFS’.

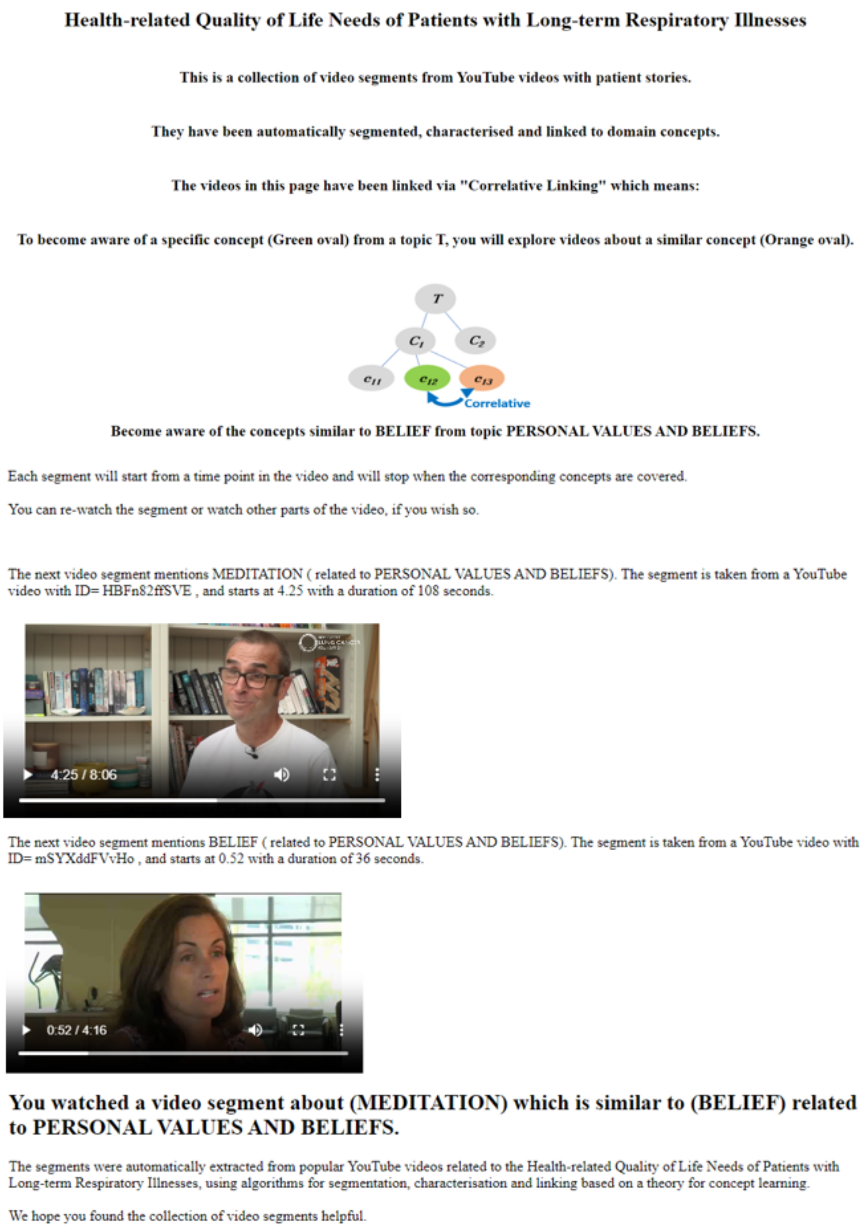


Figure 6.13: An example of one of the generated Correlative Narratives to support learning shows that to learn the concept ‘BELIEF’, a similar concept to it must be introduced first which is ‘MEDITATION’ and both concepts belong to the topic ‘PERSONAL VALUES AND BELIEFS’.

Combinational Linking aims to aid learning different concepts that belong to two different topics together to conceive the relationship between them, (see Algorithm 7). An example of the Combinational narrative is presented in Figure 6.14 and shows the relationship between the topics 'SOCIAL RELATIONSHIP' and 'PSYCHOLOGICAL HEALTH' by identifying the relationship between their concepts mentioned in the same segment.

Filtering Criteria. After following the improvement recommendation from (Chapter 5) which are to increase the video segment window size and the number of video segments within the video narrative. First, the segment window size boundary is decided when the end of sentence punctuation presents at the end of the 6th text line of the segment window size or at the end of the first text-line(s) after the 6th text-line. Second, select the video segments from the same video if they have the same Focus Topic and Focus Concept of the video narrative. This is to ensure that the generated video narratives fulfill their target by helping learners identify the key domain points and link them but without exceeding the video narrative duration condition ($\geq$ 3 minutes and $\leq$ 6 minutes) described in (Section 3.4–Definition 7) which is implemented in (Chapter 5).

6.5.3 Output

The final number of the generated video narratives, after applying the duration filtering criteria, is 59 video narratives with a minimum average duration of 143 (STDV=92) seconds and a maximum average duration of 349 (STDV=29) seconds. These narratives are distributed among the narrative types as follows (3 Derivative narratives, 3 Super Ordinate narratives, 43 Correlative narratives and 10 Combinational Narratives). The reason we have more Correlative narratives than any other type is because the same Correlative narrative is generated for a concept and its siblings. On the other hand, there are few Derivative narratives because not all of the generic (parent) concepts of the specific concepts were present as a focus in the video segments. Similarly, there are few Super Ordinate narratives because not all of the specific concepts of the generic (parent) concepts

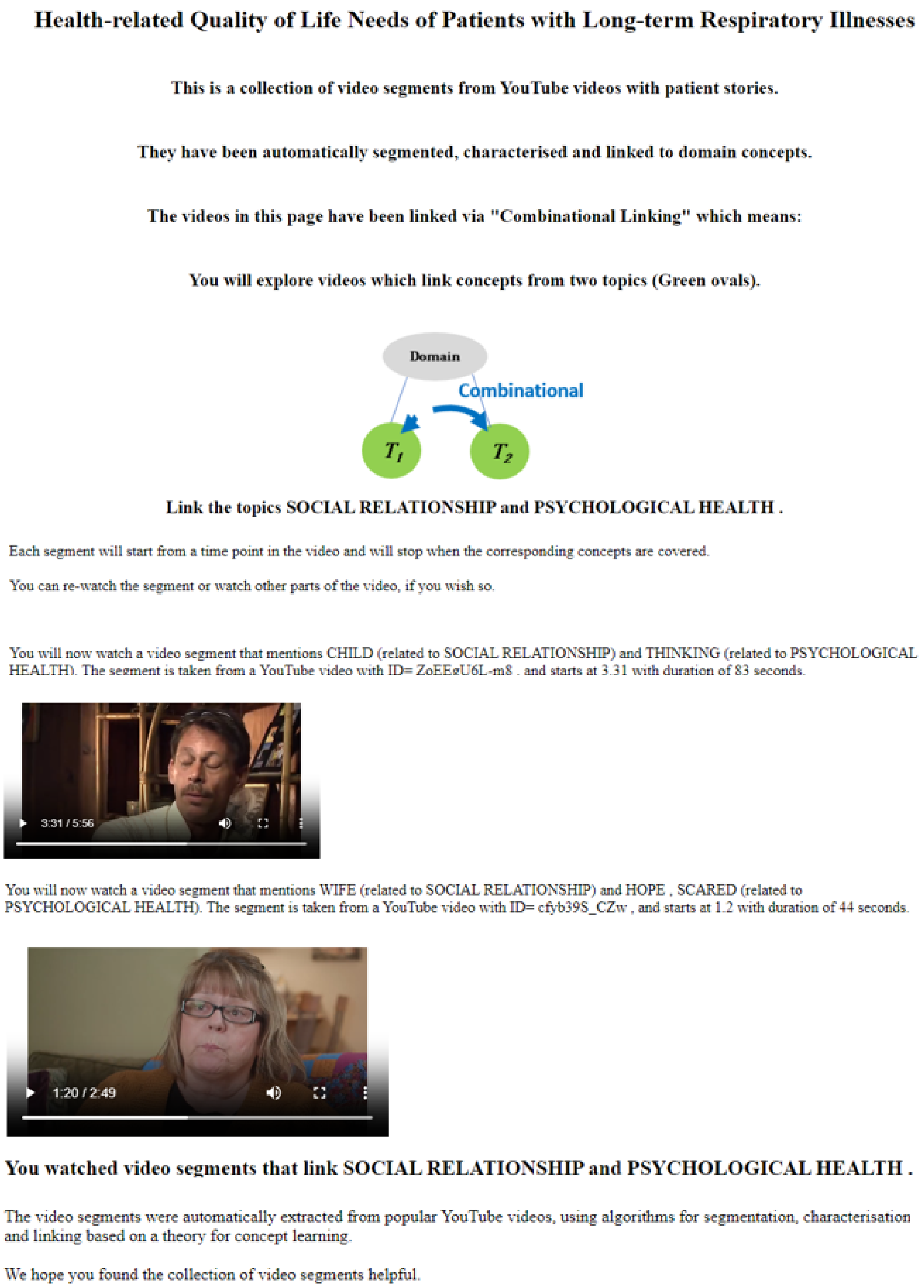


Figure 6.14: An example of a Combinational Narrative that supports the learning the topics 'SOCIAL RELATIONSHIP' and 'PSYCHOLOGICAL HEALTH' by introducing video segments that focus on different concepts belonging to these topics.

were presented as a focus in the video segments. The full details of the final output of the generated video narratives are presented in Figure 6.15.

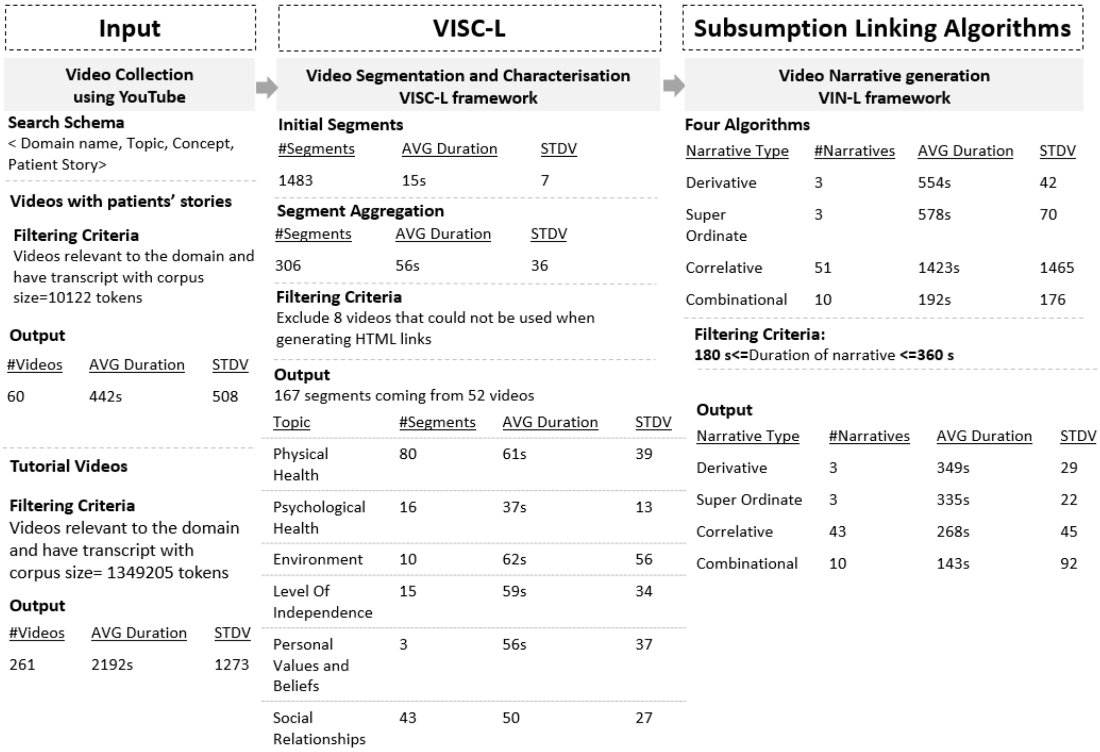


Figure 6.15: The output after implementing VIN-L following the research methodology.

These narratives are evaluated with experts to assess their Quality, Perceived Usefulness and Cognitive Work Load to raise awareness of the health related quality of life of patients living with a chronic illness-respiratory illness. The evaluation process and the results are presented in the next section.

6.6 Expert Evaluation

The main objective of this evaluation study is to assess the possibility of using the generated video narratives in the domain Health Related Quality of Life Awareness. For this reason, domain experts have been invited to participate in this evaluation study to assess the Quality, Perceived Usefulness and Cognitive Work Load of the video narratives.

6.6.1 Study Setup

To commence this evaluation study, we invited six experts to assess a selected number of video narratives following the evaluation procedure. All the details are given below.

Participants. We have followed the same process of using convenience sampling when selecting domain experts as described in (Section 5.6.5) and we have invited six domain experts. Three of whom are members of the InAdvance project (introduced in Section 6.1), two of them are researchers in AI related to patients quality of life and one of them is a nurse specialist also in patient' quality of life. The other 3 experts are from the University of Leeds who are PhD researchers (in their third year) focusing on AI related to patient quality of life. Their domain knowledge enables them to provide good quality answers for the questions about the quality of the video narratives and their potential usefulness if used to support domain learning. Following the ethics approval from the University of Leeds, see (Section 4.5.1), each participant was given a £30 Amazon voucher as gratitude for their participation as the study duration is around one hour which is less than the expert study in (Chapter 5) where its duration was around three hours.

Video Narratives Selection Criteria. To select the best video narratives for the evaluation study, we have filtered out the poor quality and duplicated video narratives. Poor quality video narratives mean that more than half of the included segments are too short (duration < 30 seconds) with more than one focus topic and concept or the focus concept is used in different context. The latter case happened with one Combinational video narrative that includes one segment where the focus concept is used in a different context. Hence, this video narrative will be excluded and nine out of ten Combinational video narratives are included in the evaluation study.

According to the duplication condition in the filtering criteria, some video narratives are duplicated; mainly in the Correlative video narratives group where concepts are linked to their siblings. This means the same video narrative is regenerated for all the siblings of the specific concept. Thus, 30 Correlative narratives have been excluded and 13 have been included in the evaluation study. On the other hand, we have included all the Derivative and super ordinate video narratives in the study. No duplicate was found in Derivative and Super Ordinate video narratives because we generate a single video narratives to learn a specific or a generic concept.

Materials. We have conducted two evaluation surveys where we used the 28 video narratives that passed the filtering criteria successfully. The first survey had been conducted with the experts from the InAdvance project where they evaluated 16 video narratives (3 Derivative, 3 Super-Ordinate, 6 Correlative and 4 Combinational). The URLs of these narratives can be accessed using our GitHub account[1] and the evaluation form is in (Appendix N) and both surveys have the same structure. In the second survey, the experts from the University of Leeds participated and evaluated 12 video narratives (5 Combinational and 7 Correlative). The surveys are fully compliant with General Data Protection Regulation (GDPR) and have been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences, University of Leeds, UK.

Both surveys have been designed using Google Forms with the following structure: a consent form, a section to collect user profiles, then the narrative section which is divided into four groups with each group representing a narrative type. In each narrative group there are three parts; the Quality categories after each video narrative link, the Perceived Usefulness and Cognitive Work Load scale items at the end. The Quality categories aim to assess each video narrative link and are designed using the LIKERT response labels (Taherdoost, 2019). To determine the user acceptance of the generated video narratives as learning materials, we have included two extra parts in the evaluation study.

[1] https://github.com/Generating-Video-Narratives/Generating-Video-Narratives.git[Accessed: April 2023]

One is to assess the Perceived Usefulness of the generated narratives using a TAM questionnaire (Davis, 1989). The second is to estimate the Cognitive Work Load required while using video narratives as a source of learning through a combination of NASA-TLX scales (Hart, 2006). Additionally, we have asked the experts to type feedback to identify the possible positives and negatives of the video narratives they have watched. These three parts (the Quality categories, the Perceived Usefulness and the Cognitive Work Load scale items) have been repeated for each narrative type.

Procedure. To commence the evaluation study, we sent the evaluation form link of form-1 [1], and form-2 [2] to the participants. Both surveys have the same structure but different URLs, and in the second survey we have only evaluated the 5 Combinational and 7 Correlative video narratives. Each participant should go through the following steps in the evaluation form: (1.) Read and accept the consent form; (2.) Complete a short pre-study section to collect their profiles; (3.) Click on the video narrative link which will open in a new tab. They can also copy the link and open it in a browser themselves; (4.) Go through the video narrative page by following the descriptions and watch the suggested video segments which have a duration of 3 to 6 minutes; (5.) Go back to the screen with the survey form and complete the Quality and the Perceived Usefulness sections; (6.) Repeat steps 3-5 for each of the four video narrative types.

The study was approved by the ethics committee of the Faculty of Engineering and Physical Sciences, University of Leeds. As the work is funded by the InAdvance project, we did not pay the InAdvance experts but we did pay the University of Leeds participants £30 each as a token of gratitude for the in participation in the evaluation study.

In the following sections we analyse the outcome from the evaluation studies where we aggregate the outcomes of the two surveys. We report and analyse the results of the Quality, Perceived Usefulness, Cognitive Work Load and the

[1] https://forms.gle/TwCs2BsbgPkT4vhv9[Accessed: April 2023]
[2] https://forms.gle/FApPjumbUihRuX1W6[Accessed: April 2023]

positives and negatives of the generated video narratives.

6.6.2 Results: Quality of Video Narratives

We analysed the quality of the generated video narratives based on the aggregated experts' responses to be able to answer RQ3.

How to generate good quality narratives that can be used to support perceiving domain learning?

The 84 aggregated responses from both evaluation surveys are reported in Table 6.8 and presented in Figure 6.16, the responses values of the evaluators is in (Appendix O). The aggregated experts' response per narrative type and per quality category is reported as the median, average (standard deviation) scores. The N value indicates the number of expert-responses per narrative type; each video narrative was assessed by 3 experts.

Table 6.8: Evaluation Results of the quality of the narratives. Each narrative type (CO=Combinational, CR=Correlative, D=Derivative, S=Super Ordinate) has a number of assessments (N) and the Median, AVG and (STDV) of each quality question based on the responses from the experts (1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree).

Video Narratives Quality Categories	CO N=27	CR N=39	D N=9	S N=9	All N=84
Q1–The introduction text in the video narrative gives a clear idea of the aim of the narrative.	4.0 4.0 (1.0)	4.0 4.3 (0.9)	4.0 3.9 (1.1)	4.0 3.6 (0.7)	4.0 4.7 (0.93)
Q2–All video segments clearly link to the health related quality of life areas mentioned in the introduction.	4.0 4.0 (1.0)	4.0 4.1 (0.9)	4.0 4.0 (1.0)	4.0 4.3 (0.5)	4.0 4.8 (0.95)
***Q3**–The descriptions which introduce each video segment provide a useful summary.	4.0 3.7 (1.0)	5.0 4.4 (0.8)	4.0 3.4 (0.7)	4.0 3.7 (0.7)	4.0 4.0 (0.91)
Q4–All video segments provide relevant content for health related quality of life areas.	4.0 4.0 (1.2)	5.0 4.4 (0.8)	5.0 4.4 (0.7)	4.0 4.4 (0.5)	5.0 4.25 (0.97)
Q5–The concluding text at the end of the video narrative provides appropriate summary.	4.0 3.8 (0.9)	4.0 4.2 (0.9)	4.0 3.7 (0.7)	4.0 3.9 (0.6)	4.0 3.96 (0.84)
OVERALL QUALITY–AVG score for all Quality categories per narrative type.	4.0 3.9 (1.0)	4.4 4.3 (0.9)	4.2 3.9 (0.8)	4.0 4.0 (0.6)	4.0 4.7 (0.93)
USEFULNESS–video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	5.0 4.3 (1.1)	5.0 4.6 (0.6)	5.0 4.8 (0.4)	5.0 4.7 (0.5)	5.0 4.54 (0.77)

In our analysis of the experts' responses, we do two comparisons. One comparison is between the quality categories and the other comparison is between the narrative types.

Comparison between the quality categories of the video narratives. We refer to the column (All) in Table 6.8 where we can get an overview of the quality of each category based on the aggregated experts' responses.

The experts found that a majority of the video segments within each video narrative provide content related to the domain (Q4) with a median 5 and an average score of 4.25 out of 5 (agree to strongly agree). As a result, the video segments are also found to be clearly linked to the health domain areas defined in the introduction of the video narrative (Q2), with a median of 4 and an average score of 4.8 (agree to strongly agree). Based on that, the experts found that the video narrative introduction part clarifies the aim of the narratives (Q1) with median of 4 and an average score of 4.7 (agree to strongly agree). The experts also agree with the quality of the description (characterisation) of the segments (Q3) with median of 4 and an average score of 4 (agree). However, the conclusion statement (Q5) was found to be of lower quality than the other quality categories with a median of 4 and an average score of 3.96 (neutral to agree). The overall video narrative quality indicates that the experts found the generated video narratives are of a good quality with a median score of 4 and an average score of 4.7 (agree to strongly agree). Based on that, there are pointers towards answering RQ3 positively. Additionally, the experts found the generated video narratives have a potential to be useful when used to raise awareness of Health Related Quality of Life needs with a median score of 5 and an average score of 4.54 (agree to strongly agree).

Comparison between the narrative types. We are referring to the columns in table 6.8. The experts found no huge difference in the quality of the Derivative, Super Ordinate and Correlative narrative types as the median score in all of them was 5 and the average score was ≥ 4.6 and ≤ 4.8 which is agree to strongly agree. This refers to the design of these narratives as the link between the concepts is obvious and all the concepts within a narrative belong to the same topic. However, in the Combinational narratives, this link between the concepts was less obvious as the concepts belong to different topics, see Figure 6.16.

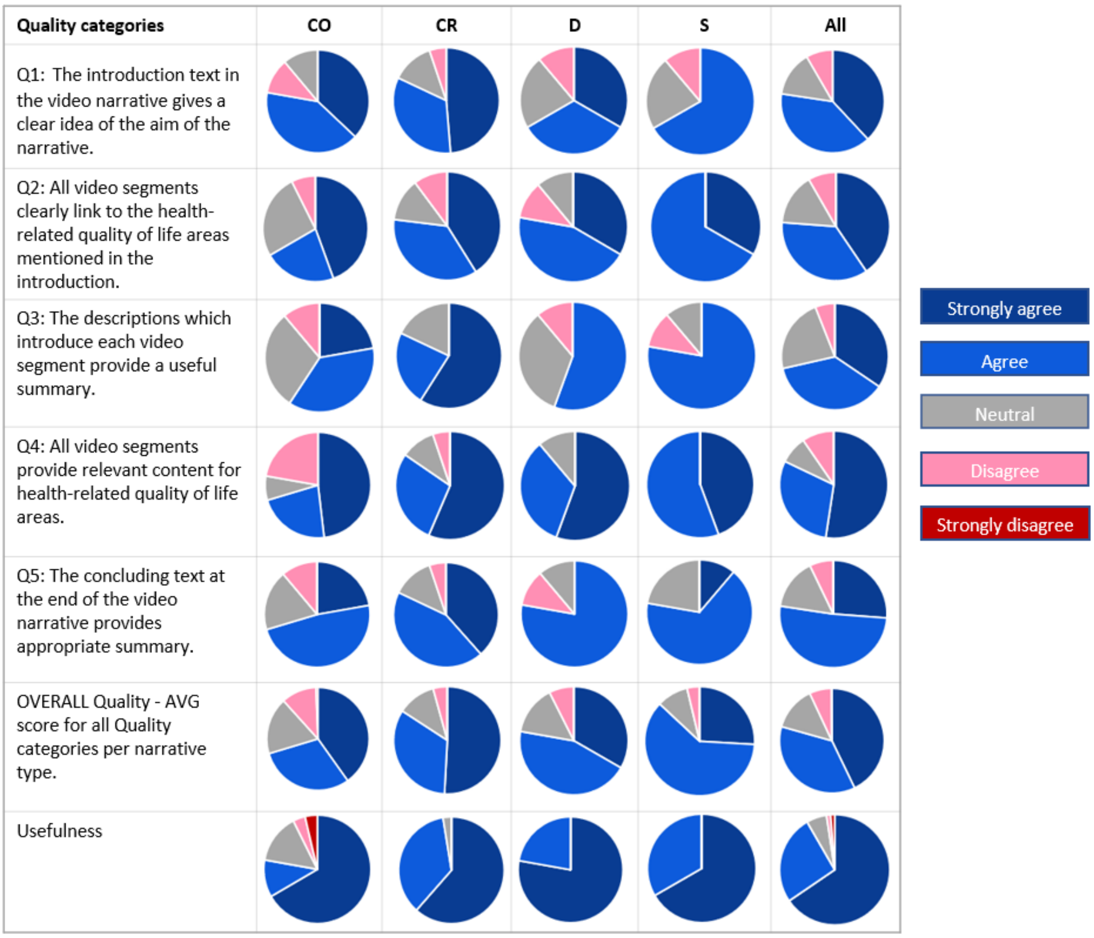


Figure 6.16: Evaluation results of the quality of the video narratives.

To add more explanations to the difference among the quality questions mentioned above, we run different tests (Kruskal-Wallis, Mann Whitney and Spearman's RHO). These tests help in confirming/ repudiating that the differences mentioned above are statistically significant.
The difference in the quality categories among the narratives types is not statistically significant, as the result shown after running Kruskal-Wallis (non parametric test). To compare between pairs of narrative types based on the quality categories (Q1-Q5) result, we have rum Mann Whitney Test. The

results showed that difference between the CR and CO narratives is statistically significant. The experts found that two focus concepts per a video segment affect the quality of the defined learning in the narrative introduction. For instance, the relationship between two focus concepts from different focus topics is not clear as one focus concept could be mentioned more than the other focus concept. Example of experts feedback on CO narratives “I don’t see any negatives, however it doesn’t show which concepts/topics are more important than others.”, “It does not always highlight all the points made in the video segment.” Additionally, the difference between the quality categories and the usefulness of the video narratives is not statistically significant as shown by the result of running Spearman RHO test (Spearman r_s = -0.10541).

Further investigation between the narratives types has been done by comparing their perceived usefulness.

6.6.3 Results: Perceived Usefulness of the generated Video Narratives

In this part, we analyse the Perceived Usefulness results of the generated video narratives based on the aggregated experts’ responses to be able to answer:

Are the generated narratives useful to support perceiving domain learning?

The 18 aggregated responses from both studies on the Perceived Usefulness of the generated video narratives are reported in Table 6.9 and presented in Figure 6.17.

We could not calculate the Kruskal Wallis, Mann Whitey and Spearman RHO tests because of the number of responses of the narrative types (D and S) which were < 5. Consequently, we compare between the Perceived Usefulness categories and between the narrative types based on the experts’ responses.

Table 6.9: Evaluation Results of the Perceived Usefulness of the narratives. Each narrative type (CO=Combinational, CR=Correlative, D=Derivative, S=Super Ordinate) has number of experts' assessments (N) and the Median, AVG and (STDV) of their assessments per each Perceived Usefulness category (1= Extremely Unlikely, 2= Quite Unlikely, 3= Slightly Unlikely, 4= Neutral, 5= Slightly Likely, 6= Quite Likely and 7= Extremely Likely).

Perceived usefulness scale items	CO N=6	CR N=6	D N=3	S N=3	All N=18
PU1–Identify key points related to patient quality of life.	6.0 5.83 (1.17)	6.50 6.33 (0.82)	7.0 6.67 (0.58)	7.0 6.67 (0.58)	6.5 6.28 (0.87)
PU2–Focus on key points at a time.	6.0 5.83 (0.75)	6.0 5.83 (0.41)	6.0 5.33 (1.15)	6.0 6.0 (0)	6.0 5.78 (0.63)
PU3–Identify key topics/concepts to be aware of.	6.0 6.0 (0.89)	6.50 6.50 (0.55)	7.0 6.67 (0.58)	7.0 6.67 (0.58)	6.5 6.39 (0.68)
PU4–Link main points mentioned in the videos.	6.5 6.0 (1.26)	6.0 5.83 (1.47)	6.0 5.67 (0.58)	6.0 5.33 (1.15)	6.0 5.78 (1.13)
Overall Perceived Usefulness usefulness–AVG score for all Perceived Usefulness scales per narrative type.	5.75 5.92 (0.65)	6.25 6.13 (0.44)	6.50 6.08 (0.72)	6.50 6.17 (0.58)	6.13 6.06 (0.54)

Perceived Usefulness. We refer to the column (All) in Table 6.9 where we can get an overview of the Perceived Usefulness of each narrative type based on the 18 experts' responses.

The median and the average experts' responses showed that they found the generated narratives help them to be aware of the key topics and concepts (PU3) with a median of 6.5 and an average score of 6.39 out of 7 (Quite likely to Extremely likely). This means that the video narratives enable the experts to identify key points related to patients' health related quality of life (PU1) with a median of 6.5 and an average score of 6.28 (Quite likely to Extremely likely). Hence, the experts thought that the video narratives can help to focus on these key points (PU2) and link them together (PU4). The overall Perceived Usefulness values of the generated narratives state that the narratives are Quite likely to raise awareness of health related quality of life if used with users. As a result, there are pointers towards the usefulness of the video narratives to support perceiving domain learning if used with learners to help answering RQ4.

We are referring to the columns in Table 6.9. the average scores showed that the experts found that the generated narratives (CR, D and S) are quite likely (AVG $\geq$ 6.25) to help the users be aware of the domain concepts. This can be traced to the design of the CR, D and S narratives which focus on specific concepts within one topic. Meanwhile, the CO narratives are slightly likely (AVG= 5.92) to be used to raise awareness of the domain concepts as they link different concepts from different topics. As a result, the relationship between the concepts might not be as obvious as with the other narratives.

These results have been visualised in Figure 6.17.

Cognitive Work Load. The aim of this part in the evaluation study is to assess the Cognitive Work Load expected while using the generated video narratives for the second domain. For this purpose, we have analysed the experts' responses on the NASA-TLX sub-scale items after watching the video narratives. We have assessed the Mental Work Load, Effort, Frustration and Performance sub-scales and the results are presented in Figure 6.18. The range of scores is from 1 (the lowest) to 20 (the highest). We illustrate the scores presented in Figure 6.18 based on the experts feedback. It is noticeable that the video narratives

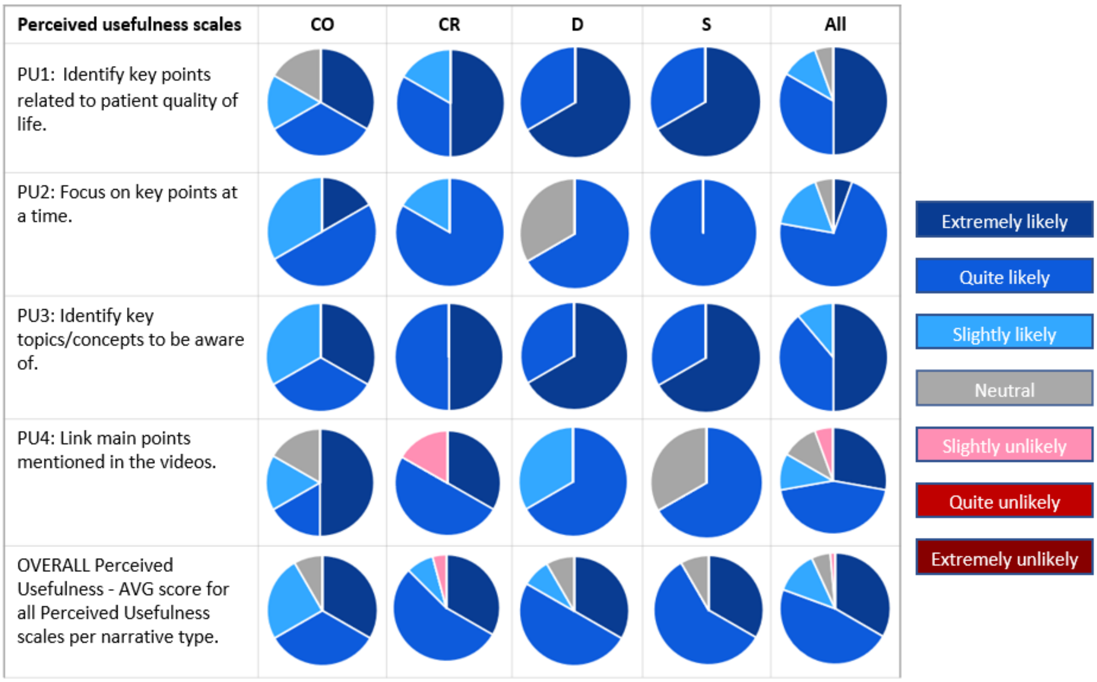


Figure 6.17: Evaluation results of the Perceived Usefulness of the video narratives.

have a positive impact on the experts' ability to identify domain concepts. The number of experts, who scores ≥ 15 out of 20 on the Performance scale, were 12 and all of the score is ≥ 10. Experts express these Performance scores in their feedback. Example of positive feedback "Using videos is a good way to notice quality of life needs of patients living with respiratory illnesses so I felt I was successful in identifying new terms", "I think the method used generates quite successful awareness.". Example of negative feedback "Some of the videos linked the concepts really well, but some were not very relevant", "The videos were extremely useful at identifying key terms listed in the introduction. However, not all narratives linked the areas of quality of life well. For example, in the narrative with treatment being a part of independence, the treatment was mentioned, but the quality of life area 'independence' was not really addressed."

On the Mental Work Load scale, 16 experts scores were ≤ 5 and 2 experts scores were > 5. Example of positive feedback "I felt virtually no mental demand from this method of raising awareness, other than feeling sympathy for those telling their stories.", "Not very demanding, but needed to keep my focus at all times." Example of negative feedback "Linking concepts in this section was a bit more demanding and required more concentration, as the links were not as obvious and did not apply to each segment", "It is simple but i need to be more focus to understand the key points."

For the Effort scale, 16 experts score ≤ 5 while 2 experts score ≥ 6. Experts' feedback illustrated these scores. Example of positive feedback: "Watching of the videos did not require much effort. Some of patients' experiences were interesting to listen to", "I feel like taking in information from videos makes the process very easy. Because there are lots of videos, it can be a little more tiresome but otherwise a great way to convey information.". Example of negative feedback: "More effort was needed watching these videos as due to looking for the links between the concepts."
Finally, for the Frustration scale, 15 experts score ≤ 5 and 3 experts score ≥ 6. Example of experts' positive feedback: "I didn't feel frustrated", "I would not say the videos were frustrating to watch, but they did cause slight discomfort when listening about difficulties of living with the disease." Example of experts' negative feedback: "Sometimes one of the topics in the description was not the important topic or mentioned briefly. This was often the cases with 'Thinking' and the video with 'child' as a concept", "In the case of the videos where you expected a link between the issues and really there wasn't any, it was frustrating due to created expectations."

Qualitative feedback from experts. We summarise the positive and negative feedback from the experts to highlight the overall strength and weakness points in the generated video narratives.

For the Combinational narratives, the experts' found that the strength points are the linking of two concepts from different topics to help to have a clear view about them and how they interact with each other. However, the weakness point is that the video narratives sometimes focus on one concept more than others which affects the quality of the link between the concepts. Example of the experts' positive feedback: "Most of the video segments provided some insight into the quality of life areas that usually are very important to patients. It is great that the videos can be segmented to automatically select the topics of interests", "It shows how different areas of quality of life needs often interact with each other." Example of the expert negative feedback: "In some cases, one issue is mentioned much more than the other. as a result, the video is mostly focused on one of the two issues and not necessarily the link between them","It does not always highlight all the points made in the video segment."

With the Correlative narratives, the experts found that the video segments provide an elaboration on a key point by exploring related concepts. Meanwhile, some video segments have been selected because the concepts are mentioned in them, but with no deep elucidation. Example of the experts' positive feedback:"Most of the identified videos were correctly identified and the links were obvious", "Some of the videos provide useful understanding of how different areas of quality of life can be linked. It is probably useful for patients to see that these dependencies relate to other people as well." Example of the expert negative feedback: "In some of the videos it seems that they only mention the point but do not delve into it", "Some of the videos were not that relevant to the introductory narrative."

The Derivative narrative was found useful to help in focusing on key concepts and show different levels of needs but in some segments, the relationship between the parent and its specific concept was not clear. Example of the experts' positive feedback: "you can easily focus on specific segments of a video rather than going through the entire videos, which can at times be quite lengthy", "It shows the different level's of needs that in the end turns the entire quality of life." Example of the experts' negative feedback: "Sometimes, the way a work is linked to its parent is not objective and needs to come out of the general concept of the video."

Finally, the Super Ordinate narratives were found to help in focusing on key domain concepts and being aware of them, but more domain details were missed in some segments. Example of the experts' positive feedback: "I felt like it was more targeted to the specific areas", "It helps to be aware of the key points in a concept." Example of the experts' negative feedback: "Does not take into advantage the general context."

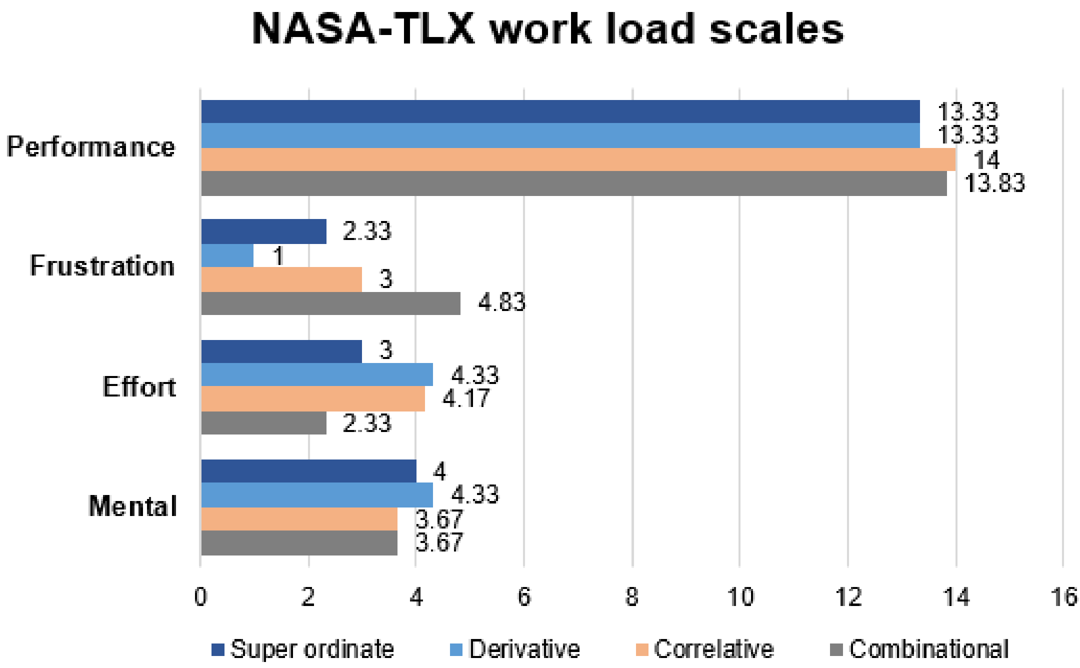


Figure 6.18: Cognitive workload estimation of the generated video narratives. The scores range is from 1-Low to 20-High.

6.6.4 Discussion

We have implemented the VISC-L and VIN-L frameworks in the second domain (Health Related Quality of Life awareness). The work in this domain is part of the InAdvance project. For this domain, we have designed a taxonomy which has been evaluated by experts from InAdvance project and used to implement the frameworks. The characterised video segments generated after implemented the VISC-L framework have been evaluated with an expert from In Advance project. Additionally, the video narratives generated after implementing the VIN-L framework have been evaluated with experts from InAdvance project and PhD researchers in the health domain from the University of Leeds.

The aim of the work conducted in this chapter is to answer RQ3 and RQ4. For RQ3:

How to generate good quality narratives that can be used to support

perceiving domain learning?

The results as presented in (Section 6.6.2) showed that the overall quality of the video narratives was good with an average quality 4.0 out of 5.0. This include assessing the quality of the video narrative's: Introduction, the link of the video segments to the domain, the description of the video segments, the content of the video segments and the conclusion statement. No statistically significant difference found between the quality categories among the video narratives and between the narrative types according to the difference in their quality categories.

To answer RQ4:

Are the generated narratives useful to support perceiving domain learning?

The results as presented in (Section 6.6.3) showed that the video narratives have a potential to raise awareness of Health Related Quality of Life needs with average score of 6.0 out of 7. This includes assessing the: clarity of the introduction statement, the video segments are linked to the domain aspects mentioned in the introduction, the characterisation of the video segments, the segments contents are linked to the domain and the narratives is clearly summarised via a conclusion statement.

However, there are some limitations related to the implementation of the frameworks (VISC-L and VIN-L) in this domain, and due to the evaluation studies conducted. For the VISC-L implementation, first the health domain was not presented via taxonomy; for that purpose we have designed the domain taxonomy as presented in (Section 6.2). The number of videos that passed the filters of (transcript availability and domain relevancy) were 60 patient stories only to be used as an input for VISC-L. This affect the coverage of the domain topic's concepts within the collected videos: PHYSICAL HEALTH (23 concepts covered out of 57), PSYCHOLOGICAL HEALTH (9 concepts covered out of 42), ENVIRONMENT (8 concepts covered out of 29), LEVEL OF INDEPENDENCE (4 concepts covered out of 40), SOCIAL RELATIONSHIP (11 concepts covered out of 19), and PERSONAL VALUES AND BELIEFS (5 concepts covered out of 19).

Additionally, three concepts only have their generic concepts presented as focus in the video segments which affect the number of Derivative narratives (3 only). Three generic concepts have some of their focus concepts present as a focus in the video segments which affect the number of Super Ordinate narratives (3 only). Additionally, many video segments focus on the same domain concepts because of their popularity, e.g, the concepts related to Physical Health are presented as a focus in the majority of the video segments. Adding to that, the duration of the narratives hinders us from selecting all possible video segments that focus on the target concept. Consequently, only 71 segments out of 306 have been used to generate the video narratives. Furthermore, some topics have not been widely represented in the video segment regarding to their unpopularity, e.g. Personal Values and Beliefs and Level Of Independence topics. As a consequence, we could not generate more video narratives to cover many of their concepts.

To compare the implementation of VISC-L and VIN-L in the two domains: in the first domain has been presented with a taxonomy which we used in our work while we build the taxonomy for the second domain. The number of the collected videos of the first domain was 63 tutorials with corpus size of 110594 tokens while with the second domain, the number of the collected videos was 60 with corpus size of 10122 tokens. The VISC-L output of the first domain was 247 characterised segments used as an input for VIN-L to generate: 51 Correlative narratives, 6 Combinational narratives, 15 Derivative narratives and 13 Super Ordinate narratives. While in the second domain, the VISC-L output was 306 segments used as an input to VIN-L to generate: 43 Correlative narratives, 10 Combinational narratives, 3 Derivative narratives and 3 Super Ordinate narratives. The VIN-L output of the first domain has been evaluated with experts and learners while with the second domain it was evaluated with experts only due to the time scale of this PhD research. In both domains, VIN-L expert evaluation results showed that it generates good quality of video narratives which has some pointers towards answering RQ3. In the second domain, the experts agreed that the video narratives have a potential to be support learning which is the same in the first domain when the learners proved that the generated video narratives also have a potential to support perceiving domain learning–RQ4. A future studies can be conducted to compare between the video narratives and the learning style theory, see (Section 7.4.2).

Thirdly, there was no high Cognitive Work Load (Mental, Effort, Frustration) with using video narratives, and the score of the Performance was high as the video narratives have a potential to be useful in supporting perceiving domain learning.

To summarise, in both domain the video narratives showed potential pointers towards helping experts focus on the key domain topics and concepts and being aware of some domains concepts. There is an agreement among the experts from both domains that there is a need for more elaboration on the focus topics and concepts within the video segments included in the video narrative. This can be tackled by selecting more domain specific videos by re running the search schema to collect more videos per search schema as now it is limited to 3 videos per a search schema and this number can be increased. Accordingly, more new concepts can be assigned for segment characterisation which can give more elaboration to the: generic concept when Super Ordinate narratives are used, domain topics when more concepts within the focus topics can be presented within the Combinational narratives, focus concept when more similar concepts can be presented within the Correlative narrative. In the second domain, the experts did not complain about the segments' abruption which we can explain by the segment boundary condition we use in this domain, see (Section 6.4.2).

The main limitation of the work in this domain is the evaluation study with learners which we have not conducted according to the thesis time constraints. This is affected us from answering the RQ4 with learners but instead the expert evaluation study gave pointers towards the potential usefulness of using the video narratives to support perceiving the domain learning. The other possible limitations are related to the: type of the experimental study which is just to compare between the narrative type not with other learning theories, and the participants size selection in the evaluation study. These issues are similar to limitations described in (Section 5.6.5) and added as limitations to (Section 7.3) and future work in (Section 7.4).

6.7 Summary

In this chapter we have presented the implementation of the research methodology in the Health Related Quality of Life of Awareness (HRQLA) domain. The aim is to prove the generality and the applicability of the VISC-L and VIN-L by implementing them in completely different domains related to soft skills. This domain is funded by the InAdvance project that proposes a new model of palliative care for elderly people. Our contribution to this project is by generating video narratives to be used to raise awareness of Health Related Quality of Life needs of patients having chronic illness–respiratory illness. We have generated 59 domain related video narratives. These narratives have been evaluated by experts from the InAdvance project and from the University of Leeds to answer the following research questions:

How to generate good quality narratives that can be used to support perceiving domain learning?

Are the generated narratives useful to support perceiving domain learning?

The results revealed that the generated narratives are of good quality and the video segment content is related to the domain key concepts. Furthermore, the video narratives have a potential to be useful if used as learning materials to identify key domain concepts and to realise the linking between them. The Cognitive work Load while watching the video narratives is very low in the scales (Mental, Effort and Frustration) while the Performance scale was high. The generated video narratives as evaluated by experts showed pointers to positively answer RQ3 and have a potential to answer RQ4.

Chapter 7

Conclusion and Future Work

7.1 Synopsis

This research aims to support video based learning to encourage learners to be interactive indirectly with the video content by identifying the domain key points and the relationships between them. For this purpose, our ultimate goal is to develop an automatic generic approach for generating video narratives to support learning.

To achieve this goal, in Chapter 1, we formulated four research questions: ***RQ1*** *How to automatically generate good quality characterisations of video segments that can be used for learning?;* ***RQ2.*** *Does the characterisation of video segments help in identifying and focusing on the key domain concepts?;* ***RQ3.*** *How to generate good quality narratives that can be used to support domain learning?; and* ***RQ4.*** *Are the generated narratives useful to support domain learning?*

In Chapter 2, we conducted background research to introduce the context of this thesis and presented some of the challenges associated with it. We reviewed the possible approaches to address the defined challenges, which are to segment and characterise videos for learning, and use narratives in learning. The gaps in the reviewed approaches have been identified and our approach has been defined and we explained our ultimate goal to solve the identified challenges.

In Chapter 3, we presented our methodology and the theories we adopted to design our generic and novel frameworks. Additionally, we have presented two domains and demonstrated their importance as domains for learning. These domains were used to implement our frameworks to prove their generality and applicability.

In Chapter 4, we implemented the first framework in the first domain. Accordingly, we demonstrated how we implemented the theories we have adopted to design the framework. For that purpose, we have implemented the three core algorithms we designed for this framework. The output from the first framework has been evaluated with experts and was used as an input for the second framework.

In Chapter 5, we have implemented and evaluated the second framework which represents the ultimate goal of this thesis. The output of the framework has been evaluated with experts and learners to prove its Quality and Usefulness for learning.

In Chapter 6, we implemented the first and the second frameworks in the second domain to prove their generality. The output has been evaluated with domain experts. The work in this domain is part of the InAdvance European Project, for which we have also designed a taxonomy which is publicly accessible and can be used as a domain knowledge representation.

In this chapter we have summarised the work conducted in this thesis, presented our contributions and detailed our future work.

7.2 Contributions

By addressing the research questions, which we presented in Chapter 1, we have contributed to:

- *Video segmentation and characterisation.* We proposed the generic video segmentation and characterisation framework VISC-L to support learning as described in (Section 3.5) and implemented in (Sections 4.4 and 6.4). Within this framework we have designed an algorithm for video transcript segmentation to generate initial segments where we adopted the Text Tiling approach. Since we are using the video transcript only to generate the segments, this makes our algorithm generic and can be applied in any soft skills educational context. To finalise the generation of the segments, we characterised the initial segments using a domain taxonomy. We used the semantic tagging algorithm we designed to identify the domain related terms in the video transcript by mapping them to the concepts from the domain taxonomy. For contextual characterisation to solve word sense ambiguity, we used the BERT model. To finalise the characterisation work, we combined the semantic and contextual characterisations. The adjacent segments that show a match in their focus topics and concepts were aggregated to finalise the segmentation work.

An evaluation study within the first domain examined the Quality and the Perceived Usefulness of video segmentation and characterisation by comparing VISC-L with Google methodology. The results from the study gave two indications. Firstly, they indicated that using characterised video segments could help learners identify new domain terms in the summaries they had written after watching the videos. Secondly, the results showed that there was no statistically significant difference between VISC-L and Google video segmentation and characterisation. The Perceived Usefulness of segmentation and characterisation with Google was slightly better than VISC-L. Participants' feedback indicated that the format used to present the characterisation has influenced the usefulness-the natural language descriptions offered by Google were easier to follow than the list of concepts offered in the VISC-L interface. Nevertheless, it is our conceptual characterisation that enables us to generate the video narratives while Google characterisation can not be used to generate the narratives using VIN-L. The Quality with both VISC-L and Google shows that their generated characterised segments were helpful. Having video segments characterised with domain concepts allow us to use the hierarchy of these concepts to link related segments together. We combined VISC-L with Google's approach:

VISC-L to extract the concepts and Google to formulate titles. We also applied VISC-L in our healthcare domain, focusing on patient quality of life awareness.

- *Video narratives for learning.* We have developed a novel generic framework (VIN-L) to link different segments from different videos following the Ausubel Subsumption Theory of meaningful learning as described in (Section 3.6) and implemented in (Chapter 5 and Section 6.5). Consequently, we have generated four types of video narratives.

  An evaluation study within the first domain with domain experts examined the Quality and the Perceived Usefulness of the generated video narratives. The second evaluation study involved advanced learners from Amazon Mechanical Turk in which we examined the Quality, Perceived Usefulness and the Cognitive Work Load of the generated video narratives. The results showed that there is a statistically significant difference among the video narratives in terms of their Quality and Perceived Usefulness. With regards to Learning Effect, the results from the study with the advanced learners showed that there was new unique terms mentioned in the summaries after watching the video narratives. The Perceived Usefulness results showed that participants' feedback (expert and advanced learner) indicated that the text format used to present the concepts and topics to be learnt, the type of linking used and the characterisation of the segments has influenced the Usefulness. The Cognitive Work Load from the study with the advanced learners showed that the video narratives were easy to watch, less frustrating than watching full videos, and their performance was high. We responded to the recommendations from both studies and added more clarification to the type of linking used for each narrative type. This includes adding a figure to visualise the type of linking used which is inspired from the taxonomy structure. We have added this change to the video narratives we generated in the second domain (the healthcare domain). The expert study showed that the linking was clear and no issues were raised about its clarity.

- *Video based learning environments.* We have two main contributions to this area. Firstly, by presenting an automatic way to search and collect domain related videos from online video platforms (e.g. YouTube). This included designing a search schema (Section 3.5.1) that is based on a domain taxonomy and implementing it using Python libraries in (Sections 4.3 and 6.3). This way of collecting domain related videos can help teachers to collect videos quickly and then run a quick manual check to decide their suitability as we did in (Sections 4.3 and 6.3). Secondly, we have evaluated VISC-L in the first domain to prove its generality and usefulness to aid using video segments for learning. Additionally, we have presented a pedagogical validation of the VIN-L framework in the first domain (Chapter 5) and the results proved that there pointers towards the good quality of the generated narratives and they have a potential to support perceiving domain learning. An expert evaluation study for the video narratives in the health domain (Section 6.6) is also presented, showing the narratives' good quality and potential usefulness to raise awareness of health related quality of life needs.

7.3 Limitations

In our work, there are limitations related to the following:

- The data we used is limited to video transcripts. However, the visual contents could enhance the segmentation and characterisation of the videos. This would require an improvement to the design of the algorithm to manipulate different video modalities.

- Our second domain is not computationally represented via a taxonomy, consequently we build this taxonomy manually which makes the VISC-L implementation semi-automatic. However, taxonomy automatic generation methods can be utilised as described in (Section 3.5.1).

- The collected videos need to be screened manually to exclude irrelevant videos. This part is not automated yet which could be automated in future by comparing the similarity, between the domain topics and concepts with the words in the meta data associated with the collected videos (e.g. title, key words, video description). To decide which videos to exclude, an experiment study is needed to decide the similarity threshold and to evaluate the relatedness of the collected videos to their domain.

- Limited number of videos which affect the coverage of the domain concepts–not all domain concepts presented in the videos.

- Limited number of experts and users participated in the studies affect the result to be not statistically significant. Moreover, we could not ask for more users from Amazon Turk to participate according to the limited funding available for the study. The number of the participants in the evaluation studies can be increased in future studies to give more statistically significant results.

- We have not evaluated the video narratives in the health domain with learners. This is due the scope of this thesis where we were able to prove the quality and the usefulness of the video narratives of the first domain with experts and learners.

- The video narratives provide indirect interactivity for the learners where we enable them to identify and recognise the relationships between different domain concepts. However, we did not provide active watching tools for learners.

- The textual format added to augment the video narratives needs more clarification to meet different students' needs and learning abilities.

The possible ways to overcome these limitations will be outlined in our future work.

7.4 Future Work

In response to the limitations of this thesis identified above, we discuss the future work (Immediately implementable and Long term).

7.4.1 Immediately implementable

According to the aim of this thesis which is to prove that the generated video narratives support learning, we would like to prove this with the second domain as well. This is can be done by commencing an evaluation study with learners who could be university students or workers from Amazon Mechanical Turk. All the resources which are: the video narratives of the second domain, the Google forms and the Mechanical Turk study design are all ready to be used. The reason for not being able to commence this study in this thesis and its implication on answering the RQ4 in the second domain based on learners responses is explained in (Section 6.6.4). Another study can be commenced to investigate different methods to automatically generate user-friendly textual data to better display the domain related information included in the video narratives and segment characterisations. We have already characterised the video segments automatically and augmented the video narratives with text. The source code which can be used to add the new amendments to both the video segment characterisation and video narratives is available on our GitHub account. Additionally, the Google forms to be used to evaluate the characterisation of the video segments (Section 4.5) and video narratives (Sections 5.3 and 6.6) are designed and ready to be re-used.

7.4.2 Long term

In the long term, the generated narratives can be included as learning materials in a learning platform, e.g, Active Video Watching (AVW). This will help in providing extra resources to help in further elaborating the domain's key areas. Also, the video narratives can be provided as personalised feedback based on a learner's learning style to help in clarifying domain related misconceptions. Accordingly, an evaluation study can be conducted to evaluate the difference between the video narratives types as style for learning with beginner learners to overcome the limitations described in (Sections 5.6.5 and 7.3).

With our video narratives evaluation we focus on one factor which is the familiarity with the skills. However, there could be other factors to consider in the evaluation study: learning styles, motivational styles (self regulated and non self regulated learners), automatically generate different summarisation styles, and familiarity with the interface which may influence how people are interacting with those narratives. This requires further researches to investigate them.

Furthermore, the work could be applied to generate narratives focusing on different chronic illnesses to raise awareness of health related quality of life needs. This is because the taxonomy we designed is generic and any specific chronic illness physical symptoms can be added. As a result, related video narratives would be generated and used as informative materials for patients, carers and specialists to explore illnesses from a patients' point of view. In our work, we have used domain tutorials delivered by expert to fine tune the classifier used in VISC-L; these tutorial segments can also be added to the video narratives. This would help in providing learning items and patient experience on different aspects of a specific illness.

References

ABOLKASIM, E.N.A. (2019). *Semantic Approach to Model Diversity in a Social Cloud*. Ph.D. thesis, University of Leeds. 111, 118

ABU-RASHEED, H., EFTHYMIOU, Y., FATHI, M., GHADAMIGHALANDARI, P., MEDINA, J.L., GARCÍA, C.O., TSARDANIDIS, G., ZENKERT, J. & ZGERAS, G. (2023). Supporting remote students through utilizing web-based exercise-templates and a mobile learning chatbot for creating and interacting with learning materials. In *European Conference on Technology Enhanced Learning*, 668–673, Springer. 34

ADOMA, A.F., HENRY, N.M. & CHEN, W. (2020). Comparative analyses of bert, roberta, distilbert, and xlnet for text-based emotion recognition. In *2020 17th International Computer Conference on Wavelet Active Media Technology and Information Processing (ICCWAMTIP)*, 117–121, IEEE. 123, 124

AL-TAWIL, M., DIMITROVA, V. & THAKKER, D. (2020). Using knowledge anchors to facilitate user exploration of data graphs. *Semantic Web*, **11**, 205–234. 65

ALLEN, J.F. (1983). Maintaining knowledge about temporal intervals. *Communications of the ACM*, **26**, 832–843. 46

ALSHARE, K. & HINDI, N.M. (2004). The importance of presentation skills in the classroom: Students and instructors perspectives. *Journal of Computing Sciences in Colleges*, **19**, 6–15. 103

AQQAL, A., RENSING, C. & STEINMETZ, R. (2007). The macro design as an own task in webtools production: Ideas, concepts and a tool. In *Creating*

New Learning Experiences on a Global Scale: Second European Conference on Technology Enhanced Learning, EC-TEL 2007, Crete, Greece, September 17-20, 2007. Proceedings 2, 420–425, Springer. 23, 48

Archambault, L., Leary, H. & Rice, K. (2022). Pillars of online pedagogy: A framework for teaching in online learning environments. *Educational Psychologist*, **57**, 178–191. 34, 52

Arksey, H. & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, **8**, 19–32. 113

Ausin, M.S., Maniktala, M., Barnes, T. & Chi, M. (2021). Tackling the credit assignment problem in reinforcement learning-induced pedagogical policies with neural networks. In *International Conference on Artificial Intelligence in Education*, 356–368, Springer. 34

Ausubel, D.P. (1963). *The psychology of meaningful verbal learning*. Grune & Stratton. 51

Ausubel, D.P. (2012). *The acquisition and retention of knowledge: A cognitive view*. Springer Science & Business Media. 53, 64

Ausubel, D.P., Novak, J.D., Hanesian, H. *et al.* (1968). *Educational psychology: A cognitive view*, vol. 6. Holt, Rinehart and Winston New York. 11, 25, 53, 55, 64, 85

Avron, U., Gershtein, S., Guy, I., Milo, T. & Novgorodov, S. (2022). Automated category tree construction in e-commerce. In *Proceedings of the 2022 International Conference on Management of Data*, 1770–1783. 72

Barzola, V., Alvarado, E., Loja, C., Velez, A., Silva, I. & Echeverria, V. (2022). Analyzing speech data to detect work environment in group activities. In *International Conference on Artificial Intelligence in Education*, 357–361, Springer. 35

Benkada, C. & Moccozet, L. (2017). Enriched interactive videos for teaching and learning. In *2017 21st International Conference Information Visualisation (IV)*, 344–349, IEEE. 40

Bianchi, C. & Ragonese, R. (2023). Accounting semiotically for new forms of textuality and narrativity in digital brand storytelling. *Advances in Brand Semiotics & Discourse Analysis*, 33. 23, 48, 52

Bloor, M. & Bloor, T. (2013). *The practice of critical discourse analysis: An introduction*. Routledge. 128

Bourguet, M.L. (2022). Measuring learners' self-regulated learning skills from their digital traces and learning pathways. In *European Conference on Technology Enhanced Learning*, 500–506, Springer. 36

Bourina, H.V. & Dunaeva, L.A. (2019). Role of hypertext in teaching foreign languages. *E-Learning and Digital Media*, **16**, 110–121. 50

Brame, C.J. (2016). Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE—Life Sciences Education*, **15**, es6. 69, 102

Bywater, J.P., Floryan, M. & Chiu, J.L. (2021). Discs: A new sequence segmentation method for open-ended learning environments. In *International Conference on Artificial Intelligence in Education*, 88–100, Springer. 23, 30, 33, 36, 42

Caeiro-Rodríguez, M., Manso-Vázquez, M., Mikic-Fonte, F.A., Llamas-Nistal, M., Fernández-Iglesias, M.J., Tsalapatas, H., Heidmann, O., De Carvalho, C.V., Jesmin, T., Terasmaa, J. *et al.* (2021). Teaching soft skills in engineering education: A European perspective. *IEEE Access*, **9**, 29222–29242. 103

Cagliero, L., Canale, L. & Farinetti, L. (2019). Visa: A supervised approach to indexing video lectures with semantic annotations. In *2019 IEEE 43rd Annual Computer Software and Applications Conference*, vol. 1, 226–235, IEEE. 44

Castro, M.D.B. & Tumibay, G.M. (2021). A literature review: efficacy of online learning courses for higher education institution using meta-analysis. *Educ. and Info. Techn.*, **26**, 1367–1385. 23, 40

Chiu, P.S., Chen, H.C., Huang, Y.M., Liu, C.J., Liu, M.C. & Shen, M.H. (2018). A video annotation learning approach to improve the effects of video learning. *Innovations in Education and Teaching International*, **55**, 459–469. 30, 40

Ciasullo, M.V., Lim, W.M., Manesh, M.F. & Palumbo, R. (2022). The patient as a prosumer of healthcare: insights from a bibliometric-interpretive review. *Journal of Health Organization and Management*. 107

Cinque, M. (2017). MOOCs and soft skills: a comparison of different courses on creativity. *Journal of E-learning and Knowledge Society*, **13**. 102

Cohen, G. & Cohen, A. (2023). Exploring students' problem-solving challenges in self-regulated learning through training video prompts. In *European Conference on Technology Enhanced Learning*, 536–541, Springer. 22, 34

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and psychological measurement*, **20**, 37–46. 120, 215

Colaço, A., Oliveira, A.P. & Zagalo, N. (2022). Know me: Promoting gender equality in education through an interactive digital narrative. In *International Conference on Technology and Innovation in Learning, Teaching and Education*, 213–226, Springer. 49

Colasante, M. & Douglas, K. (2016). Prepare-participate-connect: Active learning with video annotation. *Australasian Journal of Educational Technology*, **32**. 30, 40

Conkey, C.A., Bowers, C., Cannon-Bowers, J. & Sanchez, A. (2013). Machinima and video-based soft-skills training for frontline healthcare workers. *GAMES FOR HEALTH: Research, Development, and Clinical Applications*, **2**, 39–43. 103

Crosbie, R. (2005). Learning the soft skills of leadership. *Industrial and commercial training*, **37**, 45–51. 102, 103

Damarell, R.A., May, N., Hammond, S., Sladek, R.M. & Tieman, J.J. (2019). Topic search filters: a systematic scoping review. *Health Information & Libraries Journal*, **36**, 4–40. 205

Danes, F. (1974). Functional sentence perspective and the organization of the text. *Papers on functional sentence perspective*, **23**, 106–128. 10, 15, 55, 62, 63, 80

Das, A. & Das, P.P. (2019). Automatic semantic segmentation and annotation of MOOC lecture videos. In *Int. C. on Asian Digital Libraries*, 181–188, Springer. 23, 24, 30, 42, 47

Das, A. & Das, P.P. (2020). Semantic segmentation of MOOC lecture videos by analyzing concept change in domain knowledge graph. In *Int. C. on Asian Digital Libraries*, 55–70, Springer. 45

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319–340. 132, 135, 160, 231

Devarakonda, A., Naumov, M. & Garland, M. (2017). Adabatch: Adaptive batch sizes for training deep neural networks. *arXiv preprint arXiv:1712.02029*. 123

Dever, D.A., Sonnenfeld, N.A., Wiedbusch, M.D. & Azevedo, R. (2022). Pedagogical agent support and its relationship to learners' self-regulated learning strategy use with an intelligent tutoring system. In *International Conference on Artificial Intelligence in Education*, 332–343, Springer. 34

Devlin, J., Chang, M.W., Lee, K. & Toutanova, K. (2018). BERT: Pre-training of deep bidirectional transformers for language understanding. *arXiv:1810.04805*. 78, 121

Dey-Plissonneau, A., Lee, H., Pradier, V., Scriney, M. & Smeaton, A.F. (2021). The l2l system for second language learning using visualised zoom calls among students. In *European Conference on Technology Enhanced Learning*, 409–413, Springer. 50

Di Gangi, P.M., Goh, S.H. & Lewis, C.C. (2017). Using social media to support presentation skill development in traditional classroom environments. *Journal of Organiz. and End User Comput. (JOEUC)*, **29**, 68–91. 103, 111

Dimitrova, V. & Mitrovic, A. (2022). Choice architecture for nudges to support constructive learning in active video watching. *International Journal of Artificial Intelligence in Education*, **32**, 892–930. 132

Dimitrova, V., Mitrovic, A., Piotrkowicz, A., Lau, L. & Weerasinghe, A. (2017). Using learning analytics to devise interactive personalised nudges for active video watching. In *Proceedings of the 25th conference on user modeling, adaptation and personalization*, 22–31. 104

Dixon, J., Belnap, C., Albrecht, C. & Lee, K. (2010). The importance of soft skills. *Corporate finance review*, **14**, 35. 102

Dodson, S., Roll, I., Harandi, N.M., Fels, S. & Yoon, D. (2019). Weaving together media, technologies and people: Students' information practices in flipped classrooms. *Information and Learning Sciences*. 30, 40, 46

Dutta, A. & Zisserman, A. (2019). The via annotation software for images, audio and video. In *Proceedings of the 27th ACM international conference on multimedia*, 2276–2279. 30, 40, 46

Esterl, N., Berger, S. & Nistor, N. (2022). Digital media in schools during the covid-19 lockdown: Teachers' experiences with choosing teaching strategies. In *European Conference on Technology Enhanced Learning*, 507–513, Springer. 23, 35

Fajtl, J., Sokeh, H.S., Argyriou, V., Monekosso, D. & Remagnino, P. (2019). Summarizing videos with attention. In *Computer Vision–ACCV 2018 Workshops: 14th Asian Conference on Computer Vision, Perth, Australia, December 2–6, 2018, Revised Selected Papers 14*, 39–54, Springer. 38

Fernández-López, M. (1999). Overview of methodologies for building ontologies. In *Proc. 16th International Joint Conference on Artificial Intelligence (City*

Conference Center, Stockholm, Sweden, August 1999), CEUR Publications (1999). 19, 199

Fessl, A., Maitz, K., Dennerlein, S. & Pammer-Schindler, V. (2021). The impact of explicating learning goals on teaching and learning in higher education: Evaluating a learning goal visualization. In *European Conference on Technology Enhanced Learning*, 1–15, Springer. 50

Förster, M., Maur, A., Weiser, C. & Winkel, K. (2022). Pre-class video watching fosters achievement and knowledge retention in a flipped classroom. *Computers & Education*, **179**, 104399. 32

Gabbay, H. & Cohen, A. (2022). Exploring the connections between the use of an automated feedback system and learning behavior in a MOOC for programming. In *European Conference on Technology Enhanced Learning*, 116–130, Springer. 34

Ghinassi, I. (2021). Unsupervised text segmentation via deep sentence encoders: a first step towards a common framework for text-based segmentation, summarization and indexing of media content. In *ACM International Conference on Interactive Media Experiences (IMX 2021)*. 60, 61

Greenhalgh, T. & Hurwitz, B. (1999). Why study narrative? *BMJ*, **318**, 48–50. 48

Guo, S., Sun, T., Gong, J., Lu, Z., Zhang, L. & Wang, Q. (2022). Remote co-teaching in rural classroom: Current practices, impacts, and challenges. In *CHI Conference on Human Factors in Computing Systems*, 1–16. 50

Halliday, M.A.K.M.A.K. & Matthiessen, C.M.I.M. (2014). *Halliday's Introduction to functional grammar*. Routledge, London. 62

Hao, J., Zhao, L., Milisavljevic-Syed, J. & Ming, Z. (2021). Integrating and navigating engineering design decision-related knowledge using decision knowledge graph. *Advanced Engineering Informatics*, **50**, 101366. 24, 52

Haraldstad, K., Wahl, A., Andenæs, R., Andersen, J.R., Andersen, M.H., Beisland, E., Borge, C.R., Engebretsen, E., Eisemann, M., Halvorsrud, L. *et al.* (2019). A systematic review of quality of life research in medicine and health sciences. *Quality of life Research*, **28**, 2641–2650. 107

Haridakis, P. & Hanson, G. (2009). Social interaction and co-viewing with youtube: Blending mass communication reception and social connection. *Journal of broadcasting & electronic media*, **53**, 317–335. 22, 30, 32

Hart, S.G. (2006). Nasa-task load index (nasa-tlx); 20 years later. In *Proceedings of the human factors and ergonomics society annual meeting*, vol. 50, 904–908, Sage publications Sage CA: Los Angeles, CA. 132, 135, 231

He, X., Wang, J., Zhang, Q. & Ju, X. (2020). Improvement of text segmentation texttiling algorithm. In *Journal of Physics: Conference Series*, vol. 1453, 012008, IOP Publishing. 59

Hearst, M.A. (1993). Texttiling: A quantitative approach to discourse segmentation. Tech. rep., Citeseer. 10, 55, 58, 59, 61, 80

Hearst, M.A. (1997a). Text tiling: Segmenting text into multi-paragraph subtopic passages. *Computational linguistics*, **23**, 33–64. 58, 61, 73

Hearst, M.A. (1997b). Texttiling: A quantitative approach to discourse segmentation. *Computational Linguistics*, **23**, 33–64. 117, 128

Hsin, W.J. & Cigas, J. (2013). Short videos improve student learning in online education. *Journal of Computing Sciences in Colleges*, **28**, 253–259. 22

Hurst, J.R., Skolnik, N., Hansen, G.J., Anzueto, A., Donaldson, G.C., Dransfield, M.T. & Varghese, P. (2020). Understanding the impact of chronic obstructive pulmonary disease exacerbations on patient health and quality of life. *European journal of internal medicine*, **73**, 1–6. 107

Járomi, M., Szilágyi, B., Velényi, A., Leidecker, E., Raposa, B.L., Hock, M., Baumann, P., Ács, P. & Makai, A. (2021). Assessment of health-related quality of life and patient's knowledge in chronic non-specific low back pain. *BMC Public Health*, **21**, 1–8. 107

Jing, W. (2015). Theme and thematic progression in english writing teaching. *Journal of Education and Practice*, **6**, 178–187. 63

June, S., Yaacob, A. & Kheng, Y.K. (2014). Assessing the use of youtube videos and interactive activities as a critical thinking stimulator for tertiary students: An action research. *International Education Studies*, **7**, 56–67. 22

Katagall, R., Dadde, R., Goudar, R. & Rao, S. (2015). Concept mapping in education and semantic knowledge representation: an illustrative survey. *Procedia Computer Science*, **48**, 638–643. 65

Khan, M.L. (2017). Social media engagement: What motivates user participation and consumption on youtube? *Computers in human behavior*, **66**, 236–247. 22, 30, 32

Khatter, H., Sharma, A., Kushwaha, A.K. *et al.* (2022). Web scraping based product comparison model for e-commerce websites. In *2022 IEEE International Conference on Data Science and Information System (ICDSIS)*, 1–6, IEEE. 38

Kim, H.J., So, H.J. & Suh, Y.J. (2023). Examining the impact of flipped learning for developing young job seekers' AI literacy. In *International Conference on Artificial Intelligence in Education*, 817–823, Springer. 32

Kithmi, A. *et al.* (2016). Semantic video search by automatic video annotation using tensorflow. In *Manufacturing & Industrial Engineering Symposium (MIES)*. 44

Koć-Januchta, M.M., Schönborn, K.J., Tibell, L.A., Chaudhri, V.K. & Heller, H.C. (2020). Engaging with biology by asking questions: Investigating students' interaction and learning with an artificial intelligence-enriched textbook. *Journal of Educational Computing Research*, **58**, 1190–1224. 43

Koekenbier, K., Leino-Kilpi, H., Cabrera, E., Istomina, N., Stark, Å.J., Katajisto, J., Lemonidou, C., Papastavrou, E., Salanterä, S., Sigurdardottir, A. *et al.* (2016). Empowering knowledge and its connection to health-related quality of life: A cross-cultural study: A concise and informative title: Empowering knowledge and its connection to health-related quality of life. *Applied Nursing Research*, **29**, 211–216. 107

Köhler, D., Pünter, W. & Meinel, C. (2023). The "how" matters: Evaluating different video types for cybersecurity MOOCs. In *European Conference on Technology Enhanced Learning*, 149–163, Springer. 32

Kriksciuniene, D., Sakalauskas, V. & Lewandowski, R. (2019). Evaluating the interdependent effect for likert scale items. In *Business Information Systems Workshops: BIS 2019 International Workshops, Seville, Spain, June 26–28, 2019, Revised Papers 22*, 26–38, Springer. 131

Kuswoyo, H., Sujatna, E.T.S., Rido, A. & Indrayani, L.M. (2020). Theme choice and thematic progression of discussion section in engineering English lectures. In *Proceedings of the 4th International Conference on Learning Innovation and Quality Education*, 1–10. 63

Lange, C. & Costley, J. (2020). Improving online video lectures: learning challenges created by media. *International Journal of Educational Technology in Higher Education*, **17**, 1–18. 22, 33

Largent, E.A. & Lynch, H.F. (2017). Paying research participants: regulatory uncertainty, conceptual confusion, and a path forward. *Yale journal of health policy, law, and ethics*, **17**, 61. 133

Lau, L., Mitrovic, A., Weerasinghe, A. & Dimitrova, V. (2016). Usability of an active video watching system for soft skills training. In *Proc. 1st Int. Workshop on Intelligent Mentoring Systems, ITS*. 104

Lecuyer, G., Ragot, M., Martin, N., Launay, L. & Jannin, P. (2020). Assisted phase and step annotation for surgical videos. *International journal of computer assisted radiology and surgery*, 1–8. 52

Lee, H., Liu, M., Scriney, M. & Smeaton, A.F. (2021). Usage-based summaries of learning videos. In *European Conference on Technology Enhanced Learning*, 414–418, Springer. 23, 49

LEE, H.Y. & LIST, A. (2019). Processing of texts and videos: A strategy-focused analysis. *Journal of Computer Assisted Learning*, **35**, 268–282. 36

LEE, Y., LIMBU, B., RUSAK, Z. & SPECHT, M. (2023). Role of multimodal learning systems in technology-enhanced learning (tel): A scoping review. In *European Conference on Technology Enhanced Learning*, 164–182, Springer. 35

LI, Y., HE, H., WANG, J., CHEN, Y., WANG, C., LI, X., DAI, A., LIU, Y., XI, X., HUANG, J. *et al.* (2023). Effect of multidisciplinary health education based on lifestyle medicine on menopausal syndrome and lifestyle behaviors of menopausal women: A clinical controlled study. *Frontiers in Public Health*, **11**. 107

LINSON, A., XU, Y., ENGLISH, A.R. & FISHER, R.B. (2022). Identifying student struggle by analyzing facial movement during asynchronous video lecture viewing: Towards an automated tool to support instructors. In *International Conference on Artificial Intelligence in Education*, 53–65, Springer. 35

LIU, C., KIM, J. & WANG, H.C. (2018). Conceptscape: Collaborative concept mapping for video learning. In *Proceedings of the 2018 CHI conference on human factors in computing systems*, 1–12. 65

LIU, X., SONG, Y., LIU, S. & WANG, H. (2012). Automatic taxonomy construction from keywords. In *Proceedings of the 18th ACM SIGKDD international conference on Knowledge discovery and data mining*, 1433–1441. 72

LIU, Z. & LAUW, H.W. (2022). Towards aligning slides and video snippets: Mitigating sequence and content mismatches. In *International Conference on Artificial Intelligence in Education*, 533–539, Springer. 23, 24, 30, 41, 42, 47, 52

LUQUE, A., CARRASCO, A., MARTÍN, A. & DE LAS HERAS, A. (2019). The impact of class imbalance in classification performance metrics based on the binary confusion matrix. *Pattern Recognition*, **91**, 216–231. 120

Machado, C.T. & Carvalho, A.A. (2020). Concept mapping: Benefits and challenges in higher education. *The Journal of Continuing Higher Education*, **68**, 38–53. 51

Maican, C., Cazan, A.M., Lixandroiu, R., Dovleac, L. & Maican, M.A. (2021). Exploring the factors influencing the use of communication and collaboration applications. *Journal of Organizational and End User Computing (JOEUC)*, **33**, 94–124. 103, 111

Mainga, W., Murphy-Braynen, M.B., Moxey, R. & Quddus, S.A. (2022). Graduate employability of business students. *Administrative Sciences*, **12**, 72. 102

Majumdar, R., Prasad, P., Kadam, K., Gatare, K. & Warriem, J.M. (2023). La-reflect: A platform facilitating micro-learning and its multimodal learning analytics. In *European Conference on Technology Enhanced Learning*, 731–735, Springer. 22, 34

Mann, W.C. & Thompson, S.A. (1987). *Rhetorical structure theory: A theory of text organization*. University of Southern California, Information Sciences Institute Los Angeles. 49

Marques, A., Peralta, M., Santos, T., Martins, J. & de Matos, M.G. (2019). Self-rated health and health-related quality of life are related with adolescents' healthy lifestyle. *Public health*, **170**, 89–94. 106

Maziriri, E.T., Gapa, P. & Chuchu, T. (2020). Student perceptions towards the use of youtube as an educational tool for learning and tutorials. *International Journal of Instruction*, **13**, 119–138. 50

McQuiggan, S.W., Rowe, J.P., Lee, S. & Lester, J.C. (2008). Story-based learning: The impact of narrative on learning experiences and outcomes. In *Intelligent Tutoring Systems: 9th International Conference, ITS 2008, Montreal, Canada, June 23-27, 2008 Proceedings 9*, 530–539, Springer. 24, 31, 48

Meseguer-Martinez, A., Ros-Galvez, A. & Rosa-Garcia, A. (2017). Satisfaction with online teaching videos: A quantitative approach. *Innovations in Education and Teaching International*, **54**, 62–67. 22, 114

Mhamdi, C. (2017). What can video add to the learning experience? challenges and opportunities. *International Journal of Information Technology and Language Studies*, **1**, 17–24. 32

Michel, C. & Pierrot, L. (2022). Towards modelling the technology integration in elementary school. a diachronic study of teachers' digital practices during and after covid-19 lockdown. In *European Conference on Technology Enhanced Learning*, 201–214, Springer. 33

Miculicich, L. & Han, B. (2023). Document summarization with text segmentation. *arXiv preprint arXiv:2301.08817*. 60, 61

Mirriahi, N., Jovanović, J., Lim, L.A. & Lodge, J.M. (2021). Two sides of the same coin: video annotations and in-video questions for active learning. *Educa. Techn. Research and Develop.*, **69**, 2571–2588. 23, 40

Mirzababaei, B., Maitz, K., Fessl, A. & Pammer-Schindler, V. (2023). Interactive web-based learning materials vs. tutorial chatbot: Differences in user experience. In *European Conference on Technology Enhanced Learning*, 213–228, Springer. 34

Mitrovic, A., Dimitrova, V., Weerasinghe, A. & Lau, L. (2016). Reflective experiential learning: Using active video watching for soft skills training. In *Proceedings of the 24th international conference on computers in education*, Asia-Pacific Society for Computers in Education. 23, 41, 46, 104, 116, 132

Mitrovic, A., Dimitrova, V., Lau, L., Weerasinghe, A. & Mathews, M. (2017). Supporting constructive video-based learning: requirements elicitation from exploratory studies. In *Artificial Intelligence in Education: 18th International Conference, AIED 2017, Wuhan, China, June 28–July 1, 2017, Proceedings 18*, 224–237, Springer. 104, 116, 132

MOHAMAD, U.H., AHMAD, M.N., BENFERDIA, Y., SHAPI'I, A. & BAJURI, M.Y. (2021). An overview of ontologies in virtual reality-based training for healthcare domain. *Frontiers in Medicine*, **8**, 698855. 198

MOHAMMADHASSAN, N., MITROVIC, A. & NESHATIAN, K. (2022). Investigating the effect of nudges for improving comment quality in active video watching. *Computers & Education*, **176**, 104340. 16, 104, 105

MOHAMMED, A. & DIMITROVA, V. (2020). Characterising video segments to support learning. In *Proceedings of the 28th Inter. Conf. on Computers in Education. Asia-Pacific Society for Computers in Education (in print)*. 76, 112, 117, 121, 212

MONGKHONVANIT, K., KANOPKA, K. & LANG, D. (2019). Deep knowledge tracing and engagement with MOOCs. In *Proceedings of the 9th international conference on learning analytics & knowledge*, 340–342. 22

MUSEN, M.A. (2015). The Protégé project: a look back and a look forward. *AI matters*, **1**, 4–12. 202

NAUL, E. & LIU, M. (2020). Why story matters: A review of narrative in serious games. *Journal of Educational Computing Research*, **58**, 687–707. 49

NOVAK, J.D. (1964). Importance of conceptual schemes for science teaching. *The Science Teacher*, 10–10. 51

NOY, N.F., MCGUINNESS, D.L. *et al.* (2001). Ontology development 101: A guide to creating your first ontology. 19, 199

OEI, S.L., THRONICKE, A., MATTHES, H. & SCHAD, F. (2021). Assessment of integrative non-pharmacological interventions and quality of life in breast cancer patients using real-world data. *Breast Cancer*, **28**, 608–617. 107

OGHAZ, T.A., MUTLU, E.Ç., JASSER, J., YOUSEFI, N. & GARIBAY, I. (2020). Probabilistic model of narratives over topical trends in social media: A discrete time model. In *Proceedings of the 31st ACM Conference on Hypertext and Social Media*, 281–290. 49

Oravec, N., Monnin, C., Gregora, A., Bjorklund, B., Dave, M.G., Schultz, A.S. & Chudyk, A.M. (2022). Protocol for a scoping review to map patient engagement in scoping reviews. *Research Involvement and Engagement*, **8**, 1–8. 113

Otto, C., Yu, R., Pardi, G., von Hoyer, J., Rokicki, M., Hoppe, A., Holtz, P., Kammerer, Y., Dietze, S. & Ewerth, R. (2021). Predicting knowledge gain during web search based on multimedia resource consumption. In *International Conference on Artificial Intelligence in Education*, 318–330, Springer. 36

Palaigeorgiou, G., Papadopoulou, A. & Kazanidis, I. (2019). Interactive video for learning: A review of interaction types, commercial platforms, and design guidelines. In *Technology and Innovation in Learning, Teaching and Education: First International Conference, TECH-EDU 2018, Thessaloniki, Greece, June 20–22, 2018, Revised Selected Papers 1*, 503–518, Springer. 36

Paraschiv, A. & Cercel, D.C. (2019). UPB at GermEval-2019 Task 2: BERT-Based Offensive Language Classification of German Tweets. In *KONVENS*. 126

Pina, J., Mazur, R., Ellis, G., Rudnitsky, A., McGinnis-Cavanaugh, B., Ellis, S., Huff, I. & Ford, C. (2022). Adapting a narrative curriculum to a remote format in the context of socially distanced middle school education resulting from covid-19. *Journal of Pre-College Engineering Education Research (J-PEER)*, **12**, 4. 49, 52

Pinandito, A., Prasetya, D.D., Hayashi, Y. & Hirashima, T. (2021). Semi-automatic concept map generation approach of web-based kit-build concept map authoring tool. *International Journal of Interactive Mobile Technologies*, **15**. 24, 31, 51

Post, M. (2014). Definitions of quality of life: what has happened and how to move on. *Topics in spinal cord injury rehabilitation*, **20**, 167–180. 107

Prahladh, S. & van Wyk, J. (2020). Protocol for a scoping review of the current data practices in forensic medicine. *Systematic Reviews*, **9**, 1–8. 113

Pritoni, M., Paine, D., Fierro, G., Mosiman, C., Poplawski, M., Saha, A., Bender, J. & Granderson, J. (2021). Metadata schemas and ontologies for building energy applications: a critical review and use case analysis. *Energies*, **14**, 2024. 72

Rabin, E., Silber-Varod, V., Kalman, Y.M. & Kalz, M. (2019). Identifying learning activity sequences that are associated with high intention-fulfillment in MOOCs. In *European Conference on Technology Enhanced Learning*, 224–235, Springer. 35

Recke, M.P. & Perna, S. (2021). Emergent narratives in remote learning experiences for project based education. *Electronic Journal of e-Learning*, **19**, 59–70. 31, 49

Richtberg, S. & Girwidz, R. (2019). Learning physics with interactive videos–possibilities, perception, and challenges. In *Journal of Physics: Conference Series*, vol. 1287, 012057, IOP Publishing. 23, 36

Risko, E.F., Anderson, N., Sarwal, A., Engelhardt, M. & Kingstone, A. (2012). Everyday attention: Variation in mind wandering and memory in a lecture. *Applied Cognitive Psychology*, **26**, 234–242. 22, 114

Robin, C., O'Neill, J. & Buitelaar, P. (2017). Automatic taxonomy generation: A use-case in the legal domain. In *Language and Technology Conference*, 318–328, Springer. 72

Rochan, M. & Wang, Y. (2019). Video summarization by learning from unpaired data. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 7902–7911. 38

Rohloff, T. & Meinel, C. (2018). Towards personalized learning objectives in MOOCs. In *Lifelong Technology-Enhanced Learning: 13th European Conference on Technology Enhanced Learning, EC-TEL 2018, Leeds, UK, September 3-5, 2018, Proceedings 13*, 202–215, Springer. 23, 36

Schlotterbeck, D., Uribe, P., Jiménez, A., Araya, R., Molen Moris, J.v.d. & Caballero, D. (2021). Tarta: Teacher activity recognizer from transcriptions and audio. In *Int. Conf. on Artificial Intelligence in Education*, 369–380, Springer. 23, 24, 30, 33, 36, 41, 46

Schulten, C., Manske, S., Langner-Thiele, A. & Hoppe, H.U. (2020). Bridging over from learning videos to learning resources through automatic keyword extraction. In *International Conference on Artificial Intelligence in Education*, 382–386, Springer. 45

Seo, K., Dodson, S., Harandi, N.M., Roberson, N., Fels, S. & Roll, I. (2021). Active learning with online video: The impact of learning context on engagement. *Computers & Education*, **165**, 104132. 36

Serrano-Iglesias, S., Gómez-Sánchez, E., Bote-Lorenzo, M.L., Asensio-Pérez, J.I., Ruiz-Calleja, A. & Vega-Gorgojo, G. (2021). Demonstration of scarlett: A smart learning environment to support learners across formal and informal contexts. In *European Conference on Technology Enhanced Learning*, 404–408, Springer. 31, 50

Shahzad, S.K., Ahmed, D., Naqvi, M.R., Mushtaq, M.T., Iqbal, M.W. & Munir, F. (2021). Ontology driven smart health service integration. *Computer Methods and Programs in Biomedicine*, **207**, 106146. 198

Shao, Z., Li, Y., Wang, X., Zhao, X. & Guo, Y. (2020). Research on a new automatic generation algorithm of concept map based on text analysis and association rules mining. *Journal of ambient intelligence and humanized computing*, **11**, 539–551. 31, 52

Sikos, L.F. (2017). RDF-powered semantic video annotation tools with concept mapping to Linked Data for next-generation video indexing: a comprehensive review. *Multimedia Tools and Applications*, **76**, 14437–14460. 23, 24, 30, 44, 47

Sitlinger, A. & Zafar, S.Y. (2018). Health-related quality of life: the impact on morbidity and mortality. *Surgical Oncology Clinics*, **27**, 675–684. 106

Sosnovsky, S. (2022). Enriching intelligent textbooks with interactivity: When smart content allocation goes wrong. 43

Spicer, D.B., Thompson, K.H. & Kilgallen, S.M. (2020). Making the connection: using concept mapping to bring the basic sciences to the diagnosis. *Journal of Osteopathic Medicine*, **120**, 524–528. 31, 51

Spoladore, D. & Pessot, E. (2021). Collaborative ontology engineering methodologies for the development of decision support systems: Case studies in the healthcare domain. *Electronics*, **10**, 1060. 198

Sprenger, D.A. & Schwaninger, A. (2021). Technology acceptance of four digital learning technologies (classroom response system, classroom chat, e-lectures, and mobile virtual reality) after three months' usage. *International Journal of Educational Technology in Higher Education*, **18**, 8. 32

Taherdoost, H. (2019). What is the best response scale for survey and questionnaire design; review of different lengths of rating scale/attitude scale/likert scale. *Hamed Taherdoost*, 1–10. 132, 134, 160, 230

Talman, S., Boonman-de Winter, L., De Mol, M., Hoefman, E., Van Etten, R., De Backer, I. *et al.* (2021). Pulmonary function and health-related quality of life after covid-19 pneumonia. *Respiratory medicine*, **176**, 106272. 107

Tammets, K., Sarmiento-Márquez, E.M., Khulbe, M., Laanpere, M. & Ley, T. (2022). Integrating digital learning resources in classroom teaching: Effects on teaching practices and student perceptions. In *European conference on technology enhanced learning*, 379–392, Springer. 22, 35

Tang, C.L., Liao, J., Wang, H.C., Sung, C.Y. & Lin, W.C. (2021). Conceptguide: Supporting online video learning with concept map-based recommendation of learning path. In *Proceedings of the Web Conference 2021*, 2757–2768. 24, 31, 51, 52

Tilk, O. & Alumäe, T. (2016). Bidirectional recurrent neural network with attention mechanism for punctuation restoration. In *Interspeech*, 3047–3051. 116

Tiwari, S. & Abraham, A. (2020). Semantic assessment of smart healthcare ontology. *International Journal of Web Information Systems*, **16**, 475–491. 197

Torre, I., Mirenda, L., Vercelli, G. & Mastrogiovanni, F. (2022). Prerequisite graph extraction from lectures. In *International Conference on Artificial Intelligence in Education*, 616–619, Springer. 46

Tseng, H., Yi, X. & Yeh, H.T. (2019). Learning-related soft skills among online business students in higher education: Grade level and managerial role differences in self-regulation, motivation, and social skill. *Computers in Human Behavior*, **95**, 179–186. 102

Tseng, S.S. (2021). The influence of teacher annotations on student learning engagement and video watching behaviors. *Int. J. of Ed. Techn. in HE*, **18**, 1–17. 23, 36, 40

Tushev, M., Ebrahimi, F. & Mahmoud, A. (2022). Domain-specific analysis of mobile app reviews using keyword-assisted topic models. In *Proceedings of the 44th International Conference on Software Engineering*, 762–773. 38

van Alten, D.C., Phielix, C., Janssen, J. & Kester, L. (2020). Self-regulated learning support in flipped learning videos enhances learning outcomes. *Computers & Education*, **158**, 104000. 32

Van Emden, J. & Becker, L. (2017). *Presentation skills for students*. Bloomsbury Publishing. 103

Vasanthakumari, S. (2019). Soft skills and its application in work place. *World Journal of Advanced Research and Reviews*, **3**, 066–072. 102

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A.N., Kaiser, Ł. & Polosukhin, I. (2017). Attention is all you need. *Advances in neural information processing systems*, **30**. 122

Villagrán, I., Hernández, R., Fuentes, J., Torres, G., Silva, D., Araya, N., Delgado, M., Miranda, C., Neyem, A., Varas, J. *et al.* (2022). What kind and how many?: Exploring feedback in remote training of procedural skills in physiotherapy. In *European Conference on Technology Enhanced Learning*, 631–637, Springer. 22, 34

Villalobos, E., Pérez-Sanagustin, M., Sanza, C., Tricot, A. & Broisin, J. (2022). Supporting self-regulated learning in bl: Exploring learners' tactics and strategies. In *European Conference on Technology Enhanced Learning*, 407–420, Springer. 34

Walle-Hansen, M., Ranhoff, A.H., Mellingsæter, M., Wang-Hansen, M.S. & Myrstad, M. (2021). Health-related quality of life, functional decline, and long-term mortality in older patients following hospitalisation due to covid-19. *BMC geriatrics*, **21**, 1–10. 107

Xue, Y., Song, Y., Li, C., Chiang, A.T. & Ning, X. (2017). Automatic video annotation system for archival sports video. In *2017 IEEE Winter Applications of Computer Vision Workshops (WACVW)*, 23–28, IEEE. 38

Yacobson, E. & Alexandron, G. (2023). How do teachers search for learning resources? a mixed method field study. In *European Conference on Technology Enhanced Learning*, 489–503, Springer. 22, 33

Yarowsky, D. (1992). Word-sense disambiguation using statistical models of roget's categories trained on large corpora. In *COLING 1992 Volume 2: The 14th International Conference on Computational Linguistics*. 59

Yoon, M., Lee, J. & Jo, I.H. (2021). Video learning analytics: Investigating behavioral patterns and learner clusters in video-based online learning. *The Internet and Higher Education*, **50**, 100806. 36

Yuan, L., Tay, F.E., Li, P., Zhou, L. & Feng, J. (2019). Cycle-sum: Cycle-consistent adversarial lstm networks for unsupervised video summarization. In *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 33, 9143–9150. 38

Zapalska, A.M. & Dabb, H. (2002). Learning styles. *Journal of Teaching in International Business*, **13**, 77–97. 85

Appendix A

Algorithm 1 tracing (Initial Segments)

Video

V-ID	Vt	Vs
mWo-G3UQ-zU	My dad was always the rock of the family.	0.00
	So seeing him struggle to breathe, it was really heart-breaking.	0.03
	My dad was always so strong and independent.	0.11
	He fished with us, played tennis with us.	0.14
	He was always very active.	0.17
	A few years ago, we started to notice a change in my dad.	0.19
	He started to have less energy. He would lose his breath a little more easily.	0.23
	He was on the couch. He had the oxygen mask.	0.28
	He wasn't able to do those things.	0.31
	It really was a shock to us.	0.33
	My dad was going downhill very quickly, and we knew something had to be done.	0.36
	He was in and out of local	0.42
	Nobody was really able to accurately diagnose him.	0.45
	I think that was probably the scariest thing is not knowing what it was.	0.49
	We didn't know what was going to happen.	0.54
	Was he going to be OK? Was he going to make it?	0.56
	We knew we needed a place that had more experience.	0.58

Initial Segmentation Algorithm

Variable initialising: Vt=list of transcript-text lines, Vs=list of text-line's start time, θ=6, Length(Vt)=39 (Note, all the counters starts from position 0 which is the index of the first emenet in the list where we save the transcript of the video. Accordingly, the actual length of the video transcript is length(Vt)-1).

i	textLines	textCounter	segmentStartTime	n	segment-id	segmentEndTime	L
0	[]	0	0.00	0	` '	0.00	[]
0	[' My dad was always the rock of the family.']	1	0.00	1	mWo-G3UQ-zU1		
1	[' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.]	2					
2	[' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.']	3					
3	[' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.']	4					
4	[' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.']	5					
5	[' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']	6					
	There is a full stop at Vt[6-1] → , 'A few years ago, we started to notice a change in my dad.'					0.19	[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always

i	textLines	textCounter	segmentStartTime	n	segment-id
	[]	2. textCounter=6, 6+6 < 39 (length(Vt))			
			0.23	2	mWo-G3UQ-zU2
0	[' He started to have less energy. He would lose his breath a little more easily.']	7			
1	[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.']	8			
2	[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.']	9			
3	[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.']	10			

Data: V_{id}, V_t and V_s /* V_{id} *is a YouTube video id.* V_t *is a list of video transcript's text lines where each text line is a list of characters.* V_s *is a list of the start time of each text line in the video. Both* V_t *and* V_s *have the same length**/

Result: List of video segments L /* *List of lists where each list includes: segment Id, start time, end time, transcript of video segment**/

```
punctuationList = [ "." , "?", "!"] /* Used to smoothen the segment boundary */
textCounter = 0 /* Used to go through Vt */
segmentStartTime=0; segmentEndTime=0; n=0 /* used to number the segments */ ; segmentId=' ' /* It is a string which is a combination of Vid and n */; textLines = []; L=[]; θ = 6 /* Starting with 6 text lines */
while textCounter +θ < length(Vt) and textCounter < length(Vt) do
    /* length (Vt): returns the number of text lines in the video transcript. The loop should stop if the number of the remaining text lines in the transcript +θ ≥ length(Vt). The loop also should stop if there are no remaining lines where textCounter ≥ length (Vt)*/
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1; segmentId=string(Vid +n);
        for i = 0 to θ do
            textLines.append(Vt[textCounter]);
            textCounter = textCounter+1
    /* Check the segment boundary */
    if intersection(punctuationList, Vt [textCounter-1]) ≠ φ then
        segmentEndTime=Ve [textCounter-1]; L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
        textLines = [] /* To start new video segment */
    else
        textLine.append(Vt[textCounter]);
        textCounter = textCounter+1 /* Keep adding more text line to find any of the punctuationList */
if textCounter +θ ≥ length(Vt) then
    /* Either create a new segment to include the remaining text lines or add the remaining text lines to the current segment */
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1;
        segmentId=string(Vid +n);
    for i = textCounter − 1 to length (Vt) do
        textLines.append(Vt[i]);
        textCounter = textCounter+1;
segmentEndTime=Ve [textCounter-1];
L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
Return L
```

```
while textCounter +θ < length(Vt) and textCounter < length(Vt) do
    /* length (Vt): returns the number of text lines in the video transcript. The loop should stop if the number of the remaining text lines in the transcript +θ ≥ length(Vt). The loop also should stop if there are no remaining lines where textCounter ≥ length (Vt)*/
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1; segmentId=string(Vid +n);
        for i = 0 to θ do
            textLines.append(Vt[textCounter]);
            textCounter = textCounter+1
    /* Check the segment boundary */
    if intersection(punctuationList, Vt [textCounter-1]) ≠ φ then
        segmentEndTime=Ve [textCounter-1]; L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
        textLines = [] /* To start new video segment */
    else
        textLine.append(Vt[textCounter]);
```

OUTPUT (L)

Segment ID	Segment Start Time	Segment End Time	Segment Transcript
mWo-G3UQ-zU1	00:00	00:19	My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was

So they recommended the Temple Lung Center.	1.00	4	[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.']	11
And that was the best decision we ever made.	1.03	5	[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.']	12
Immediately you could feel a difference at Temple.	1.11			
From the doctors to the testing that was done there.	1.15		there is a full stop at Vt[textCounter-1] → ,'He was in and out of local hospitals a couple of times.'	
To even just sitting in the waiting room with the other lung patients.	1.19		[]	
We just knew he was in the right place. He was going to get the best care he could.	1.23		3. textCounter=12, and 12+6 < 39 (length(Vt))	
So I think at Temple Lung Center they just tend to see more cases like his.	1.28		[]	
Things that are a little bit more rare. So they seem to have more knowledge.	1.33	0	['Nobody was really able to accurately diagnose him.']	13
Just right off the bat they seemed to have a better understanding of what	1.37	1	['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.']	14
was going on with him.	1.40	2	['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.']	15
They really came up with a plan for him, how they could make him better,	1.45	3	['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.','Was he going to be OK? Was he going to make it?']	16
how they could treat him, and I felt like they found the right mix for him.	1.49	4	['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.','Was he going to be OK? Was he going to make it?','We knew we needed a place that had more experience.']	17

0.42

[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.']]

0.45 3 mWo-G3UQ-zU3

mWo-G3UQ-zU2	00:23	00:42	He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.

```
        textCounter = textCounter+1 /* Keep adding more text line to
          find any of the punctuationList */
if textCounter +θ ≥ length(Vt) then
    /* Either create a new segment to include the remaining text lines or
       add the remaining text lines to the current segment */
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1;
        segmentId=string(Vid +n);
    for i = textCounter − 1 to length (Vt) do
        textLines.append(Vt[i]);
        textCounter = textCounter+1;
segmentEndTime=Ve [textCounter-1];
L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
Return L
```

```
while textCounter +θ < length(Vt) and textCounter < length(Vt) do
    /* length (Vt): returns the number of text lines in the video transcript.
       The loop should stop if the number of the remaining text lines in the
       transcript +θ ≥ length(Vt). The loop also should stop if there are no
       remaining lines where textCounter ≥ length (Vt)*/
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1; segmentId=string(Vid +n);
        for i = 0 to θ do
            textLines.append(Vt[textCounter]);
            textCounter = textCounter+1
    /* Check the segment boundary */
    if intersection(punctuationList, Vt [textCounter-1]) ≠ φ then
        segmentEndTime=Ve [textCounter-1]; L.append([segmentId,
          segmentStartTime, segmentEndTime, textLines]);
        textLines = [] /* To start new video segment */
    else
        textLine.append(Vt[textCounter]);
        textCounter = textCounter+1 /* Keep adding more text line to
          find any of the punctuationList */
if textCounter +θ ≥ length(Vt) then
    /* Either create a new segment to include the remaining text lines or
       add the remaining text lines to the current segment */
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1;
        segmentId=string(Vid +n);
    for i = textCounter − 1 to length (Vt) do
        textLines.append(Vt[i]);
        textCounter = textCounter+1;
```

You know, it was a combination of medicine, pulmonary therapy, oxygen.	1.53
And they really knew what would get him back to where he was.	1.58
I love watching my kids with Grandpa and seeing them play with him and interact with him.	2.03
And now knowing that he'll be around to see all those special moments that are	2.09
still to come in their life is just amazing.	2.13
I'm grateful to Temple because without Temple I don't think my dad	2.16
would be where he is today.	2.22
They gave him his life back. We got our dad back.	2.25
The grandkids got Grandpa back.	2.28
They didn't just give us hope. They gave us him, which is great.	2.31

5 ['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.','Was he going to be OK? Was he going to make it?','We knew we needed a place that had more experience.','So they recommended the Temple Lung Center.'] 18

there is a full stop at Vt[textCounter-1] → ,'So they recommended the Temple Lung Center.'

1.00

LVS[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.'],[0.45, 1.00, ['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.','Was he going to be OK? Was he going to make it?','We knew we needed a place that had more experience.','So they recommended the Temple Lung Center.']]]

mWo-G3UQ-zU3	00:45	01:00	Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.

[]

4. textCounter=18, 18+6 < 39 (length(Vt))

[]

1.03 4 mWo-G3UQ-zU4

0	['And that was the best decision we ever made.']	19
1	['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.']	20
2	['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.', 'From the doctors to the testing that was done there.']	21
3	['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.', 'From the doctors to the testing that was done there.', 'To even just sitting in the waiting room with the other lung patients.']	22
4	['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.', 'From the doctors to the testing that was done there.', 'To even just sitting in the waiting room with the other lung patients.', 'We just knew he was in the right place. He was going to get the best care he could.']	23
5	['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.', 'From the doctors to the testing that was done there.', 'To even just sitting in the waiting room with the other lung patients.', 'We just knew he was in the right place. He was going to get the best care he could.', 'So I think at Temple Lung Center they just tend to see more cases like his.']	24

$segmentEndTime$=V_e [$textCounter$-1];
L.append([$segmentId$, $segmentStartTime$, $segmentEndTime$, $textLines$]);
Return L

while $textCounter + \theta < length(V_t)$ and $textCounter < length(V_t)$ **do**
/* length (V_t): returns the number of text lines in the video transcript. The loop should stop if the number of the remaining text lines in the transcript $+\theta \geq length(V_t)$. The loop also should stop if there are no remaining lines where $textCounter \geq length\ (V_t)$*/
if $textLines$ =[] **then**
$segmentStartTime$=V_s [$textCounter$];
$n = n+1$; $segmentId$=string(V_{id} +n);
for $i = 0$ to θ **do**
$textLines$.append(V_t[$textCounter$]);
$textCounter$ = $textCounter$+1
/* Check the segment boundary */
if $intersection(punctuationList,\ V_t\ [textCounter\text{-}1]) \neq \phi$ **then**
$segmentEndTime$=V_e [$textCounter$-1]; L.append([$segmentId$, $segmentStartTime$, $segmentEndTime$, $textLines$]);
$textLines$ = [] /* To start new video segment */
else
$textLine$.append(V_t[$textCounter$]);
$textCounter$ = $textCounter$+1 /* Keep adding more text line to find any of the punctuationList */
if $textCounter + \theta \geq length(V_t)$ **then**
/* Either create a new segment to include the remaining text lines or add the remaining text lines to the current segment */
if $textLines$ =[] **then**
$segmentStartTime$=V_s [$textCounter$];
$n = n+1$;
$segmentId$=string(V_{id} +n);
for $i = textCounter - 1$ to $length\ (V_t)$ **do**
$textLines$.append(V_t[i]);
$textCounter$ = $textCounter$+1;
$segmentEndTime$=V_e [$textCounter$-1];
L.append([$segmentId$, $segmentStartTime$, $segmentEndTime$, $textLines$]);
Return L

there is a full stop at Vt[textCounter-1] → ,'So I think at Temple Lung Center they just tend to see more cases like his.'

1.28

[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.'],[0.45, 1.00, ['Nobody was really able to accurately diagnose him.','I think that was probably the scariest thing is not knowing what it was.','We didn't know what was going to happen.','Was he going to be OK? Was he going to make it?','We knew we needed a place that had more experience.','So they recommended the Temple Lung Center.']], [1.03,1.28, ['And that was the best decision we ever made.','Immediately you could feel a difference at Temple.', 'From the doctors to the testing that was done there.', 'To even just sitting in the waiting room with the other lung patients.', 'We just knew he was in the right

mWo-G3UQ-zU4	01:03	01:28	And that was the best decision we ever made. Immediately you could feel a difference at Temple. From the doctors to the testing that was done there. We just knew he was in the right place. He was going to get the best care he could. So I think at Temple Lung Center they just tend to see more cases like his.

[]

5. textCounter=24, 24+6 < 39 (length(Vt))

[]

1.33	5	mWo-G3UQ-zU5

0	['Things that are a little bit more rare. So they seem to have more knowledge.']	25
1	['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what']	26
2	['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.']	27
3	['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,']	28
4	['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,', 'how they could treat him, and I felt like they found the right mix for him.']	29
5	['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,', 'how they could treat him, and I felt like they found the right mix for him.', 'You know, it was a combination of medicine, pulmonary therapy, oxygen.']	30

while $textCounter + \theta < length(V_t)$ and $textCounter < length(V_t)$ **do**
  /* $length\ (V_t)$: returns the number of text lines in the video transcript. The loop should stop if the number of the remaining text lines in the transcript $+\theta \geq length(V_t)$. The loop also should stop if there are no remaining lines where $textCounter \geq length\ (V_t)$ */
  if $textLines = []$ **then**
    $segmentStartTime = V_s\ [textCounter]$;
    $n = n + 1$; $segmentId = \text{string}(V_{id} + n)$;
    for $i = 0$ to θ **do**
      $textLines.\text{append}(V_t[textCounter])$;
      $textCounter = textCounter + 1$
  /* Check the segment boundary */
  if $intersection(punctuationList,\ V_t\ [textCounter\text{-}1]) \neq \phi$ **then**
    $segmentEndTime = V_e\ [textCounter\text{-}1]$; $L.\text{append}([segmentId, segmentStartTime, segmentEndTime, textLines])$;
    $textLines = []$ /* To start new video segment */
  else
    $textLine.\text{append}(V_t[textCounter])$;
    $textCounter = textCounter + 1$ /* Keep adding more text line to find any of the punctuationList */
if $textCounter + \theta \geq length(V_t)$ **then**
  /* Either create a new segment to include the remaining text lines or add the remaining text lines to the current segment */
  if $textLines = []$ **then**
    $segmentStartTime = V_s\ [textCounter]$;
    $n = n + 1$;
    $segmentId = \text{string}(V_{id} + n)$;
  for $i = textCounter - 1$ to $length\ (V_t)$ **do**
    $textLines.\text{append}(V_t[i])$;
    $textCounter = textCounter + 1$;
$segmentEndTime = V_e\ [textCounter\text{-}1]$;
$L.\text{append}([segmentId, segmentStartTime, segmentEndTime, textLines])$;
Return L

there is a full stop at Vt[textCounter-1] → ,'You know, it was a combination of medicine, pulmonary therapy, oxygen.'

1.53

LVS[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.'], [1.03,1.53,['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,', 'how they could treat him, and I felt like they found the right mix for him.', 'You know, it was a combination of medicine, pulmonary therapy, oxygen.']]]

mWo-G3UQ-zU5 | 01:33 | 1.53

Things that are a little bit more rare. So they seem to have more knowledge. Just right off the bat they seemed to have a better understanding of what was going on with him. They really came up with a plan for him, how they could make him better, how they could treat him, and I felt like they found the right mix for him. You know, it was a combination of medicine, pulmonary therapy, oxygen.

[]

6. textCounter=30, 30+6 < 39 (length(Vt))

[]

1.58 | 6 | mWo-G3UQ-zU6

0 ['And they really knew what would get him back to where he was.'] 31

1 ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.'] 32

2 ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And now knowing that he'll be around to see all those special moments that are'] 33

3 ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And now knowing that he'll be around to see all those special moments that are', 'still to come in their life is just amazing.'] 34

4 ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And now knowing that he'll be around to see all those special moments that are', 'still to come in their life is just amazing.', 'I'm grateful to Temple because without Temple I don't think my dad'] 35

5 ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And now knowing that he'll be around to see all those special moments that are', 'still to come in their life is just amazing.', 'I'm grateful to Temple because without Temple I don't think my dad', 'would be where he is today.'] 36

```
while textCounter +θ < length(Vt) and textCounter < length(Vt) do
    /* length (Vt): returns the number of text lines in the video transcript.
       The loop should stop if the number of the remaining text lines in the
       transcript +θ ≥ length(Vt). The loop also should stop if there are no
       remaining lines where textCounter ≥ length (Vt)*/
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1; segmentId=string(Vid +n);
    for i = 0 to θ do
        textLines.append(Vt[textCounter]);
        textCounter = textCounter+1
    /* Check the segment boundary */
    if intersection(punctuationList, Vt [textCounter-1]) ≠ φ then
        segmentEndTime=Ve [textCounter-1]; L.append([segmentId,
         segmentStartTime, segmentEndTime, textLines]);
        textLines = [] /* To start new video segment */
    else
        textLine.append(Vt[textCounter]);
        textCounter = textCounter+1 /* Keep adding more text line to
         find any of the punctuationList */
if textCounter +θ ≥ length(Vt) then
    /* Either create a new segment to include the remaining text lines or
     add the remaining text lines to the current segment */
    if textLines =[] then
        segmentStartTime=Vs [textCounter];
        n = n + 1;
        segmentId=string(Vid +n);
    for i = textCounter − 1 to length (Vt) do
        textLines.append(Vt[i]);
        textCounter = textCounter+1;
segmentEndTime=Ve [textCounter-1];
L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
Return L
```

there is a full stop at Vt[textCounter-1] → ,'would be where he is today.'

2.22

[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.'], [1.03,1.53,['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,', 'how they could treat him, and I felt like they found the right mix for him.', 'You know, it was a combination of medicine, pulmonary therapy, oxygen.']],[1.58,2.22, ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And

mWo-G3UQ-zU6	1.58	02:22	And they really knew what would get him back to where he was. I love watching my kids with Grandpa and seeing them play with him and interact with him. And now knowing that he'll be around to see all those special moments that are still to come in their life is just amazing. I'm grateful to Temple because without Temple I don't think my dad would be where he is today.

[]

[]

7. textCounter=36, 36+6 >= 39 (length(Vt))

2.25 7 mWo-G3UQ-zU7

36 ['They gave him his life back. We got our dad back.'] 37

37 ['They gave him his life back. We got our dad back.', 'The grandkids got Grandpa back.'] 38

38 ['They gave him his life back. We got our dad back.', 'The grandkids got Grandpa back.', 'They didn't just give us hope. They gave us him, which is great.'] 39

```
while textCounter +θ < length(V_t) and textCounter < length(V_t) do
    /* length (V_t): returns the number of text lines in the video transcript.
       The loop should stop if the number of the remaining text lines in the
       transcript +θ ≥ length(V_t). The loop also should stop if there are no
       remaining lines where textCounter ≥ length (V_t)*/
    if textLines =[] then
        segmentStartTime=V_s [textCounter];
        n = n + 1; segmentId=string(V_id +n);
        for i = 0 to θ do
            textLines.append(V_t[textCounter]);
            textCounter = textCounter+1
    /* Check the segment boundary */
    if intersection(punctuationList, V_t [textCounter-1]) ≠ ϕ then
        segmentEndTime=V_e [textCounter-1]; L.append([segmentId,
         segmentStartTime, segmentEndTime, textLines]);
        textLines = [] /* To start new video segment */
    else
        textLine.append(V_t[textCounter]);
        textCounter = textCounter+1 /* Keep adding more text line to
         find any of the punctuationList */
if textCounter +θ ≥ length(V_t) then
    /* Either create a new segment to include the remaining text lines or
     add the remaining text lines to the current segment */
    if textLines =[] then
        segmentStartTime=V_s [textCounter];
        n = n + 1;
        segmentId=string(V_id +n);
    for i = textCounter − 1 to length (V_t) do
        textLines.append(V_t[i]);
        textCounter = textCounter+1;
segmentEndTime=V_e [textCounter-1];
L.append([segmentId, segmentStartTime, segmentEndTime, textLines]);
Return L
```

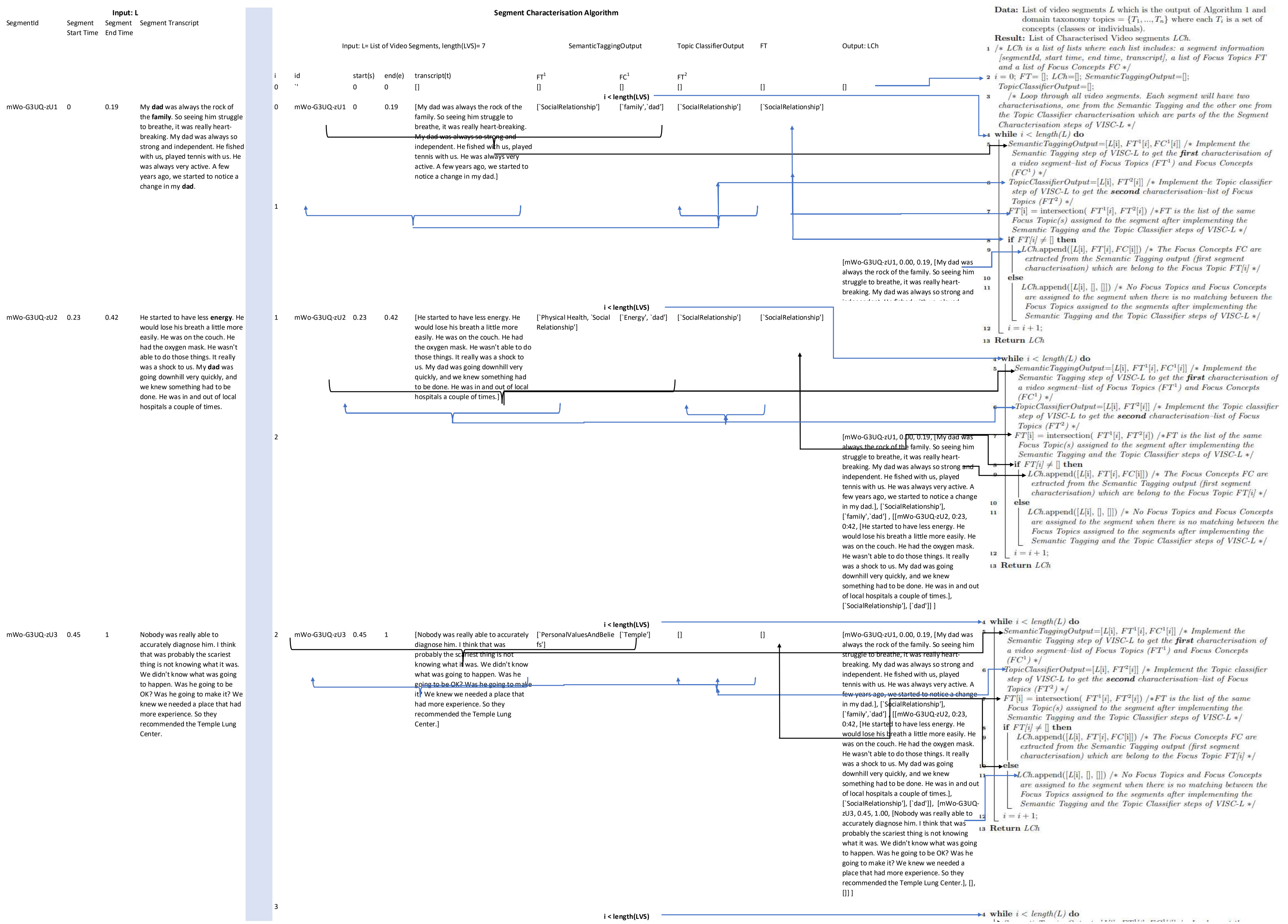
2.31

LVS[[0.00, 0.19, [' My dad was always the rock of the family.', 'So seeing him struggle to breathe, it was really heart-breaking.','My dad was always so strong and independent.','He fished with us, played tennis with us.','He was always very active.','A few years ago, we started to notice a change in my dad.']],[0.23, 0.42,[' He started to have less energy. He would lose his breath a little more easily.', 'He was on the couch. He had the oxygen mask.','He wasn't able to do those things.','It really was a shock to us.','My dad was going downhill very quickly, and we knew something had to be done.','He was in and out of local hospitals a couple of times.'], [1.03,1.53,['Things that are a little bit more rare. So they seem to have more knowledge.','Just right off the bat they seemed to have a better understanding of what', 'was going on with him.', 'They really came up with a plan for him, how they could make him better,', 'how they could treat him, and I felt like they found the right mix for him.', 'You know, it was a combination of medicine, pulmonary therapy, oxygen.']],[1.58,2.22, ['And they really knew what would get him back to where he was.', 'I love watching my kids with Grandpa and seeing them play with him and interact with him.', 'And

mWo-G3UQ-zU7	2.25	2.31	They gave him his life back. We got our dad back. The grandkids got Grandpa back. They didn't just give us hope. They gave us him, which is great.

Appendix B

Algorithm 2 tracing (Segment Characterisation)



Input: L
SegmentId | Segment Start Time | Segment End Time | Segment Transcript
mWo-G3UQ-zU1 | 0 | 0.19 | My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.
mWo-G3UQ-zU2 | 0.23 | 0.42 | He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.
mWo-G3UQ-zU3 | 0.45 | 1 | Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.
Segment Characterisation Algorithm
Input: L= List of Video Segments, length(LVS)= 7
SemanticTaggingOutput
Topic ClassifierOutput
FT
Output: LCh
i | id | start(s) | end(e) | transcript(t) | FT1 | FC1 | FT2 | FT | Output: LCh
0 | `` | 0 | 0 | [] | [] | [] | [] | [] | []
i < length(LVS)
0 | mWo-G3UQ-zU1 | 0 | 0.19 | [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.] | [`SocialRelationship'] | [`family',`dad'] | [`SocialRelationship'] | [`SocialRelationship']
1
[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and
i < length(LVS)
1 | mWo-G3UQ-zU2 | 0.23 | 0.42 | [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.] | [`Physical Health, `Social Relationship'] | [`Energy', `dad'] | [`SocialRelationship'] | [`SocialRelationship']
2
[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [`SocialRelationship'], [`family',`dad'] , [[mWo-G3UQ-zU2, 0:23, 0:42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], [`SocialRelationship'], [`dad']]]
i < length(LVS)
2 | mWo-G3UQ-zU3 | 0.45 | 1 | [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.] | [`PersonalValuesAndBeliefs'] | [`Temple'] | [] | []
[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [`SocialRelationship'], [`family',`dad'] , [[mWo-G3UQ-zU2, 0:23, 0:42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], [`SocialRelationship'], [`dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []]]
3
i < length(LVS)
Data: List of video segments L which is the output of Algorithm 1 and domain taxonomy topics = $\{T_1, ..., T_n\}$ where each T_i is a set of concepts (classes or individuals).
Result: List of Characterised Video segments LCh.
1 /* LCh is a list of lists where each list includes: a segment information [segmentId, start time, end time, transcript], a list of Focus Topics FT and a list of Focus Concepts FC */
2 $i = 0$; FT= []; LCh=[]; $SemanticTaggingOutput$=[]; $TopicClassifierOutput$=[];
3 /* Loop through all video segments. Each segment will have two characterisations, one from the Semantic Tagging and the other one from the Topic Classifier characterisation which are parts of the the Segment Characterisation steps of VISC-L */
4 while $i < length(L)$ do
5 $SemanticTaggingOutput$=[L[i], $FT^1[i]$, $FC^1[i]$] /* Implement the Semantic Tagging step of VISC-L to get the first characterisation of a video segment–list of Focus Topics (FT^1) and Focus Concepts (FC^1) */
6 $TopicClassifierOutput$=[L[i], $FT^2[i]$] /* Implement the Topic classifier step of VISC-L to get the second characterisation–list of Focus Topics (FT^2) */
7 FT[i] = intersection($FT^1[i]$, $FT^2[i]$) /*FT is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L */
8 if $FT[i] \neq []$ then
9 LCh.append([L[i], FT[i], FC[i]]) /* The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic FT[i] */
10 else
11 LCh.append([L[i], [], []]) /* No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L */
12 $i = i + 1$;
13 Return LCh

mWo-G3UQ-zU4	1.03	1.28	And that was the best decision we ever made. Immediately you could feel a difference at **Temple**. From the doctors to the testing that was done there. We just knew he was in the right place. He was going to get the best care he could. So I think at **Temple** Lung Center they just tend to see more cases like his.
mWo-G3UQ-zU5	1.33	1.53	Things that are a little bit more rare. So they seem to have more knowledge. Just right off the bat they seemed to have a better understanding of what was going on with him. They really came up with a plan for him, how they could make him better, how they could treat him, and I felt like they found the right mix for him. You know, it was a combination of medicine, pulmonary therapy, oxygen.
mWo-G3UQ-zU6	1.58	2.22	And they really knew what would get him back to where he was. I love watching my kids with Grandpa and seeing them play with him and interact with him. And now knowing that he'll be around to see all those special moments that are still to come in their life is just amazing. I'm grateful to **Temple** because without **Temple** I don't think my **dad** would be where he is today.

3	mWo-G3UQ-zU4	1.03	1.28	[And that was the best decision we ever made. Immediately you could feel a difference at Temple. From the doctors to the testing that was done there. We just knew he ~~was in the~~ right place. He was going to get the ~~best care he could. So I think at~~ Temple Lung Center they just tend to see more cases like his.]	[`PersonalValuesAndBeliefs']	[`Temple']	[`PersonalValuesAndBeliefs', `PhysicalHealth']	[`PersonalValuesAndBeliefs']	[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and ~~independent. He fished with us, played~~ tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [`SocialRelationship'], [`family',`dad'] , [[mWo-G3UQ-zU2, 0:23, ~~0:42, [He started to have less energy. He~~ would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], [`SocialRelationship'], [`dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []], [mWo-G3UQ-zU4, 1.03, 1.28, [And that

5 *SemanticTaggingOutput*=[L[i], FT^1[i], FC^1[i]] /* *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics* (FT^1) *and Focus Concepts* (FC^1) */

6 *TopicClassifierOutput*=[L[i], FT^2[i]] /* *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics* (FT^2) */

7 FT[i] = intersection(FT^1[i], FT^2[i]) /*FT *is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

8 **if** $FT[i] \neq []$ **then**

9 LCh.append([L[i], FT[i], FC[i]]) /* *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic* $FT[i]$ */

10 **else**

11 LCh.append([L[i], [], []]) /* *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

12 $i = i + 1$;

13 **Return** LCh

4

i < length(LVS)

4 **while** $i < length(L)$ **do**

4	mWo-G3UQ-zU5	1.33	1.53	[Things that are a little bit more rare. So they seem to have more ~~knowledge. Just right off the bat they~~ seemed to have a better understanding of what was going on ~~with him. They really came up with a~~ plan for him, how they could make him better, how they could treat him, and I felt like they found the right mix for him. You know, it was a combination of medicine, pulmonary therapy, oxygen.]	[]	[]	[Physical Health]	[]	[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him ~~struggle to breathe, it was really heart-~~ breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A ~~few years ago, we started to notice a change~~ in my dad.], [`SocialRelationship'], [`family',`dad'] , [[mWo-G3UQ-zU2, 0:23, ~~0:42, [He started to have less energy. He~~ would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], [`SocialRelationship'], [`dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []], [mWo-G3UQ-zU4, 1.03, 1.28, [And that

5 *SemanticTaggingOutput*=[L[i], FT^1[i], FC^1[i]] /* *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics* (FT^1) *and Focus Concepts* (FC^1) */

6 *TopicClassifierOutput*=[L[i], FT^2[i]] /* *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics* (FT^2) */

7 FT[i] = intersection(FT^1[i], FT^2[i]) /*FT *is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

8 **if** $FT[i] \neq []$ **then**

9 LCh.append([L[i], FT[i], FC[i]]) /* *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic* $FT[i]$ */

10 **else**

11 LCh.append([L[i], [], []]) /* *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

12 $i = i + 1$;

13 **Return** LCh

5

i < length(LVS)

4 **while** $i < length(L)$ **do**

5	mWo-G3UQ-zU6	1.58	2.22	[And they really knew what would get him back to where he was. I love watching my kids with Grandpa and seeing them play with him and interact with him. And now knowing that he'll ~~be around to see all those special moments that are still to come in their~~ life is just amazing. I'm grateful to Temple because without Temple I don't think my dad would be where he is today.]	[`PersonalValuesAndBeliefs', `SocialRelationship']	[`Temple',`dad']	[`PersonalValuesAndBeliefs', `SocialRelationship']	[`PersonalValuesAndBeliefs', `SocialRelationship']	[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-~~breaking. My dad was always so strong and~~ independent. He fished with us, played tennis with us. He was always very active. A ~~few years ago, we started to notice a change~~ in my dad.], [`SocialRelationship'], [`family',`dad'] , [[mWo-G3UQ-zU2, 0:23, 0:42, [He started to have less energy. He ~~would lose his breath a little more easily. He~~ was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], [`SocialRelationship'], [`dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []], [mWo-G3UQ-zU4, 1.03, 1.28, [And that

5 *SemanticTaggingOutput*=[L[i], FT^1[i], FC^1[i]] /* *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics* (FT^1) *and Focus Concepts* (FC^1) */

6 *TopicClassifierOutput*=[L[i], FT^2[i]] /* *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics* (FT^2) */

7 FT[i] = intersection(FT^1[i], FT^2[i]) /*FT *is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

8 **if** $FT[i] \neq []$ **then**

9 LCh.append([L[i], FT[i], FC[i]]) /* *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic* $FT[i]$ */

10 **else**

11 LCh.append([L[i], [], []]) /* *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

12 $i = i + 1$;

13 **Return** LCh

6

i < length(LVS)

4 **while** $i < length(L)$ **do**

mWo-G3UQ-zU7	2.25	2.31	They gave him his life back. We got our **dad** back. The grandkids got Grandpa back. They didn't just give us **hope**. They gave us him, which is great.

6	mWo-G3UQ-zU7	2.25	2.31	[They gave him his life back. We got ~~our **dad** back. The grandkids got~~ Grandpa back. They didn't ~~just give us~~ **hope**. They gave us him, which is great.]	['SocialRelationship', ~~'PsychologicalHealth'~~]	['dad', 'hope']	['SocialRelationship', 'PsychologicalHealth']	['SocialRelationship', 'PsychologicalHealth']	[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him ~~struggle to breathe, it was really heart-~~ breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], ['SocialRelationship'], ['family','dad'] , [[mWo-G3UQ-zU2, 0:23, 0:42, [He started to have less energy. He ~~would lose his breath a little more easily.~~ He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], ['SocialRelationship'], ['dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []], [mWo-G3UQ-zU4, 1.03, 1.28, [And that

SemanticTaggingOutput$=[L[\mathrm{i}], FT^1[i], FC^1[i]]$ /* *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics (FT^1) and Focus Concepts (FC^1)* */

TopicClassifierOutput$=[L[\mathrm{i}], FT^2[i]]$ /* *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics (FT^2)* */

$FT[\mathrm{i}]$ = intersection($FT^1[i]$, $FT^2[i]$) /**FT is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

if $FT[i] \neq []$ **then**

LCh.append($[L[\mathrm{i}], FT[i], FC[\mathrm{i}]]$) /* *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic FT[i]* */

else

LCh.append($[L[\mathrm{i}], [], []]$) /* *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

$i = i + 1$;

Return *LCh*

7

i=7 and NOT < 7 length(LVS)

while $i <$ *length(L)* **do**

SemanticTaggingOutput$=[L[\mathrm{i}], FT^1[i], FC^1[i]]$ /* *Implement the Semantic Tagging step of VISC-L to get the* ***first*** *characterisation of a video segment–list of Focus Topics (FT^1) and Focus Concepts (FC^1)* */

TopicClassifierOutput$=[L[\mathrm{i}], FT^2[i]]$ /* *Implement the Topic classifier step of VISC-L to get the* ***second*** *characterisation–list of Focus Topics (FT^2)* */

$FT[\mathrm{i}]$ = intersection($FT^1[i]$, $FT^2[i]$) /**FT is the list of the same Focus Topic(s) assigned to the segment after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

if $FT[i] \neq []$ **then**

LCh.append($[L[\mathrm{i}], FT[i], FC[\mathrm{i}]]$) /* *The Focus Concepts FC are extracted from the Semantic Tagging output (first segment characterisation) which are belong to the Focus Topic FT[i]* */

else

LCh.append($[L[\mathrm{i}], [], []]$) /* *No Focus Topics and Focus Concepts are assigned to the segment when there is no matching between the Focus Topics assigned to the segments after implementing the Semantic Tagging and the Topic Classifier steps of VISC-L* */

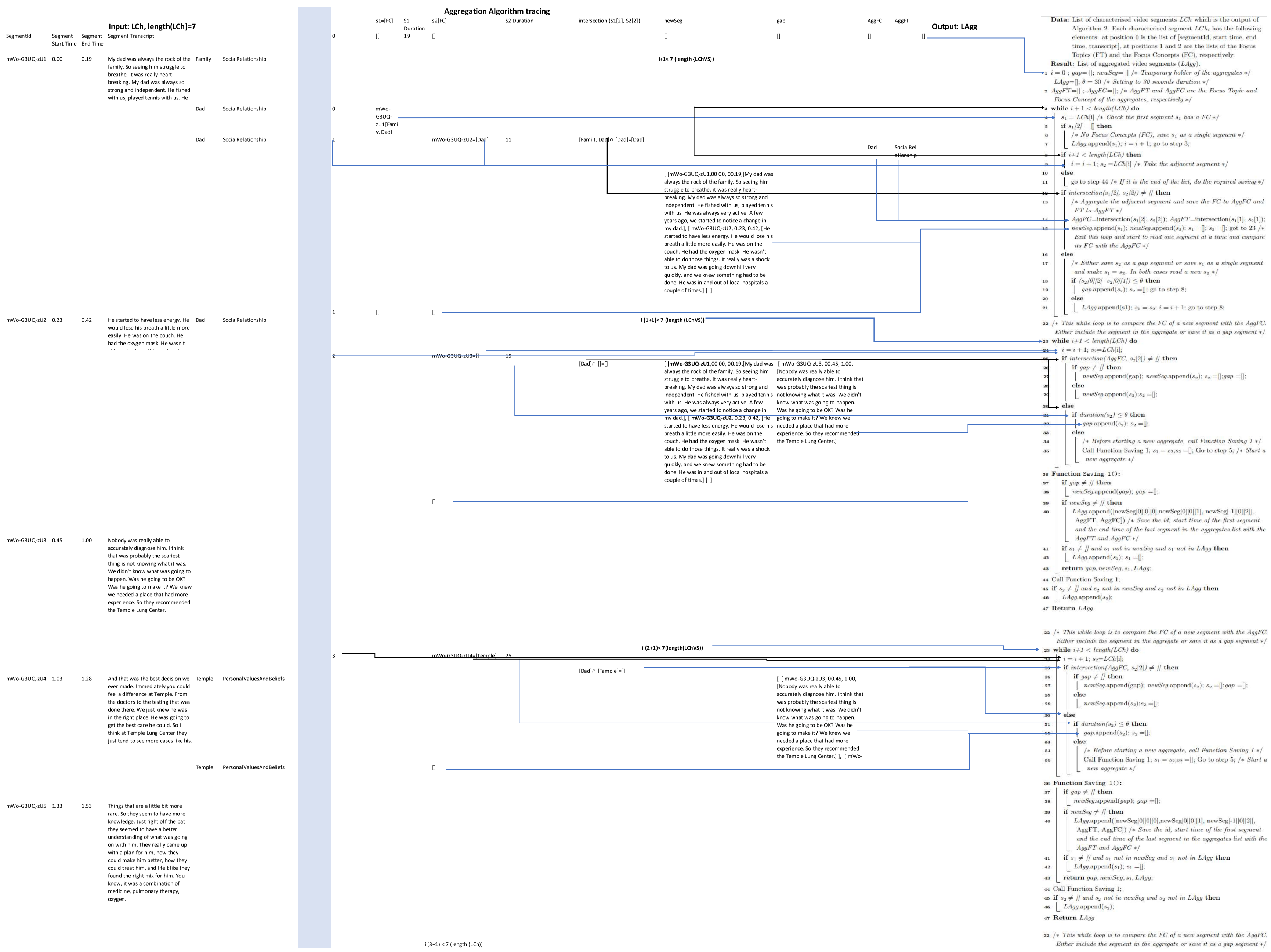
$i = i + 1$;

Return *LCh*

[mWo-G3UQ-zU1, 0.00, 0.19, [My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], ['SocialRelationship'], ['family','dad'] , [[mWo-G3UQ-zU2, 0:23, 0:42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.], ['SocialRelationship'], ['dad']], [mWo-G3UQ-zU3, 0.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.], [], []], [mWo-G3UQ-zU4, 1.03, 1.28, [And that

Appendix C

Algorithm 3 tracing (Segment Aggregation)


Input: LCh, length(LCh)=7
SegmentId
Segment Start Time
Segment End Time
Segment Transcript
mWo-G3UQ-zU1 0.00 0.19 My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He
Family SocialRelationship
Dad SocialRelationship
Dad SocialRelationship
mWo-G3UQ-zU2 0.23 0.42 He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't
Dad SocialRelationship
mWo-G3UQ-zU3 0.45 1.00 Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.
mWo-G3UQ-zU4 1.03 1.28 And that was the best decision we ever made. Immediately you could feel a difference at Temple. From the doctors to the testing that was done there. We just knew he was in the right place. He was going to get the best care he could. So I think at Temple Lung Center they just tend to see more cases like his.
Temple PersonalValuesAndBeliefs
Temple PersonalValuesAndBeliefs
mWo-G3UQ-zU5 1.33 1.53 Things that are a little bit more rare. So they seem to have more knowledge. Just right off the bat they seemed to have a better understanding of what was going on with him. They really came up with a plan for him, how they could make him better, how they could treat him, and I felt like they found the right mix for him. You know, it was a combination of medicine, pulmonary therapy, oxygen.
Aggregation Algorithm tracing
i
s1=[FC]
S1 Duration
s2[FC]
S2 Duration
intersection (S1[2], S2[2])
newSeg
gap
AggFC
AggFT
Output: LAgg
0 [] 19 [] [] [] [] []
i+1< 7 (length (LChVS))
0 mWo-G3UQ-zU1[Family, Dad]
1 mWo-G3UQ-zU2=[Dad] 11 [Familt, Dad]∩ [Dad]=[Dad]
Dad SocialRelationship
[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.]]]
1 [] []
i (1+1)< 7 (length (LChVS))
2 mWo-G3UQ-zU3=[] 15
[Dad]∩ []=[]
[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.]]]
[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.]
[]
i (2+1)< 7(length(LChVS))
3 mWo-G3UQ-zU4=[Temple] 25
[Dad]∩ [Tample]=[]
[[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.]], [mWo-
[]
i (3+1) < 7 (length (LCh))
Data: List of characterised video segments LCh which is the output of Algorithm 2. Each characterised segment LCh_i has the following elements: at position 0 is the list of [segmentId, start time, end time, transcript], at positions 1 and 2 are the lists of the Focus Topics (FT) and the Focus Concepts (FC), respectively.
Result: List of aggregated video segments (LAgg).
1 i = 0 ; gap= []; newSeg= [] /* Temporary holder of the aggregates */ LAgg=[]; θ = 30 /* Setting to 30 seconds duration */
2 AggFT=[] ; AggFC=[]; /* AggFT and AggFC are the Focus Topic and Focus Concept of the aggregates, respectively */
3 while i + 1 < length(LCh) do
4 s1 = LCh[i] /* Check the first segment s1 has a FC */
5 if s1[2] = [] then
6 /* No Focus Concepts (FC), save s1 as a single segment */
7 LAgg.append(s1); i = i + 1; go to step 3;
8 if i+1 < length(LCh) then
9 i = i + 1; s2 =LCh[i] /* Take the adjacent segment */
10 else
11 go to step 44 /* If it is the end of the list, do the required saving */
12 if intersection(s1[2], s2[2]) ≠ [] then
13 /* Aggregate the adjacent segment and save the FC to AggFC and FT to AggFT */
14 AggFC=intersection(s1[2], s2[2]); AggFT=intersection(s1[1], s2[1]);
15 newSeg.append(s1); newSeg.append(s2); s1 =[]; s2 =[]; got to 23 /* Exit this loop and start to read one segment at a time and compare its FC with the AggFC */
16 else
17 /* Either save s2 as a gap segment or save s1 as a single segment and make s1 = s2. In both cases read a new s2 */
18 if (s2[0][2]- s2[0][1]) ≤ θ then
19 gap.append(s2); s2 =[]; go to step 8;
20 else
21 LAgg.append(s1); s1 = s2; i = i + 1; go to step 8;
22 /* This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment */
23 while i+1 < length(LCh) do
24 i = i + 1; s2=LCh[i];
25 if intersection(AggFC, s2[2]) ≠ [] then
26 if gap ≠ [] then
27 newSeg.append(gap); newSeg.append(s2); s2 =[];gap =[];
28 else
29 newSeg.append(s2);s2 =[];
30 else
31 if duration(s2) ≤ θ then
32 gap.append(s2); s2 =[];
33 else
34 /* Before starting a new aggregate, call Function Saving 1 */
35 Call Function Saving 1; s1 = s2;s2 =[]; Go to step 5; /* Start a new aggregate */
36 Function Saving 1():
37 if gap ≠ [] then
38 newSeg.append(gap); gap =[];
39 if newSeg ≠ [] then
40 LAgg.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]], AggFT, AggFC]) /* Save the id, start time of the first segment and the end time of the last segment in the aggregates list with the AggFT and AggFC */
41 if s1 ≠ [] and s1 not in newSeg and s1 not in LAgg then
42 LAgg.append(s1); s1 =[];
43 return gap, newSeg, s1, LAgg;
44 Call Function Saving 1;
45 if s2 ≠ [] and s2 not in newSeg and s2 not in LAgg then
46 LAgg.append(s2);
47 Return LAgg
22 /* This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment */
23 while i+1 < length(LCh) do
24 i = i + 1; s2=LCh[i];
25 if intersection(AggFC, s2[2]) ≠ [] then
26 if gap ≠ [] then
27 newSeg.append(gap); newSeg.append(s2); s2 =[];gap =[];
28 else
29 newSeg.append(s2);s2 =[];
30 else
31 if duration(s2) ≤ θ then
32 gap.append(s2); s2 =[];
33 else
34 /* Before starting a new aggregate, call Function Saving 1 */
35 Call Function Saving 1; s1 = s2;s2 =[]; Go to step 5; /* Start a new aggregate */
36 Function Saving 1():
37 if gap ≠ [] then
38 newSeg.append(gap); gap =[];
39 if newSeg ≠ [] then
40 LAgg.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]], AggFT, AggFC]) /* Save the id, start time of the first segment and the end time of the last segment in the aggregates list with the AggFT and AggFC */
41 if s1 ≠ [] and s1 not in newSeg and s1 not in LAgg then
42 LAgg.append(s1); s1 =[];
43 return gap, newSeg, s1, LAgg;
44 Call Function Saving 1;
45 if s2 ≠ [] and s2 not in newSeg and s2 not in LAgg then
46 LAgg.append(s2);
47 Return LAgg
22 /* This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment */

mWo-G3UQ-zU6	1.58	2.22	And they really knew what would get him back to where he was. I love watching my kids with Grandpa and seeing them play with him and interact with him. And now knowing that he'll be around to see all those special moments that are still to come in their life is just amazing. I'm grateful to Temple because without Temple I don't think my dad would be where he is today.	Temple	PersonalValuesAndBeliefs
				Temple Dad	PersonalValuesAndBeliefs SocialRelationship
mWo-G3UQ-zU7	2.25	2.31	They gave him his life back. We got our dad back. The grandkids got Grandpa back. They didn't just give us hope. They gave us him, which is great.	Dad	SocialRelationship
				Hope	PsychologicalHealth

4

mWo-G3UQ-zU5=[]

[]

20

[Dad]∩ []=[]

[[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we

while i+1 < $length(LCh)$ **do**
$i = i + 1$; s_2=LCh[i];
if $intersection(AggFC,\ s_2[2]) \neq []$ **then**
if $gap \neq []$ **then**
$newSeg$.append(gap); $newSeg$.append(s_2); s_2 =[];gap =[];
else
$newSeg$.append(s_2);s_2 =[];
else
if $duration(s_2) \leq \theta$ **then**
gap.append(s_2); s_2 =[];
else
/* *Before starting a new aggregate, call Function Saving 1* */
Call Function Saving 1; $s_1 = s_2$;s_2 =[]; Go to step 5; /* *Start a new aggregate* */
Function Saving 1():
if $gap \neq []$ **then**
$newSeg$.append(gap); gap =[];
if $newSeg \neq []$ **then**
$LAgg$.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]], AggFT, AggFC]) /* *Save the id, start time of the first segment and the end time of the last segment in the aggregates list with the AggFT and AggFC* */
if $s_1 \neq []$ *and* s_1 *not in* $newSeg$ *and* s_1 *not in* $LAgg$ **then**
$LAgg$.append(s_1); s_1 =[];
return $gap, newSeg, s_1, LAgg$;
Call Function Saving 1;
if $s_2 \neq []$ *and* s_2 *not in* $newSeg$ *and* s_2 *not in* $LAgg$ **then**
$LAgg$.append(s_2);
Return $LAgg$

i (4+1) < 7 (length (LChVS))

5

mWo-G3UQ-zU6[Temple, Dad]

24

[Dad]∩ [Temple, Dad]=[Dad]

[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.]], [[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.]], [mWo-G3UQ-zU4, 1.03, 1.28, [And that was the best decision we ever made. Immediately you could feel a difference at Temple. From

[]

[]

/* *This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment* */
while i+1 < $length(LCh)$ **do**
$i = i + 1$; s_2=LCh[i];
if $intersection(AggFC,\ s_2[2]) \neq []$ **then**
if $gap \neq []$ **then**
$newSeg$.append(gap); $newSeg$.append(s_2); s_2 =[];gap =[];
else
$newSeg$.append(s_2);s_2 =[];
else
if $duration(s_2) \leq \theta$ **then**
gap.append(s_2); s_2 =[];
else
/* *Before starting a new aggregate, call Function Saving 1* */
Call Function Saving 1; $s_1 = s_2$;s_2 =[]; Go to step 5; /* *Start a new aggregate* */
Function Saving 1():
if $gap \neq []$ **then**
$newSeg$.append(gap); gap =[];
if $newSeg \neq []$ **then**
$LAgg$.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]], AggFT, AggFC]) /* *Save the id, start time of the first segment and the end time of the last segment in the aggregates list with the AggFT and AggFC* */
if $s_1 \neq []$ *and* s_1 *not in* $newSeg$ *and* s_1 *not in* $LAgg$ **then**
$LAgg$.append(s_1); s_1 =[];
return $gap, newSeg, s_1, LAgg$;
Call Function Saving 1;
if $s_2 \neq []$ *and* s_2 *not in* $newSeg$ *and* s_2 *not in* $LAgg$ **then**
$LAgg$.append(s_2);
Return $LAgg$

i (5+1) < 7 (length (LChVS))

6

mWo-G3UQ-zU7[Dad, Hope]

6

[Dad]∩ [Dad, Hope]=[Dad]

[]

/* *This while loop is to compare the FC of a new segment with the AggFC. Either include the segment in the aggregate or save it as a gap segment* */
while i+1 < $length(LCh)$ **do**
$i = i + 1$; s_2=LCh[i];
if $intersection(AggFC,\ s_2[2]) \neq []$ **then**
if $gap \neq []$ **then**
$newSeg$.append(gap); $newSeg$.append(s_2); s_2 =[];gap =[];
else
$newSeg$.append(s_2);s_2 =[];
else

[]

[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.]], [[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.]], [mWo-G3UQ-zU4, 1.03, 1.28, [And that was the best decision we ever made. Immediately you could feel a difference at Temple. From

```
    else
        if duration(s2) ≤ θ then
            gap.append(s2); s2 =[];
        else
            /* Before starting a new aggregate, call Function Saving 1 */
            Call Function Saving 1; s1 = s2;s2 =[]; Go to step 5; /* Start a
             new aggregate */
Function Saving 1():
    if gap ≠ [] then
        newSeg.append(gap); gap =[];
    if newSeg ≠ [] then
        LAgg.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]],
         AggFT, AggFC]) /* Save the id, start time of the first segment
         and the end time of the last segment in the aggregates list with the
         AggFT and AggFC */
    if s1 ≠ [] and s1 not in newSeg and s1 not in LAgg then
        LAgg.append(s1); s1 =[];
    return gap, newSeg, s1, LAgg;
Call Function Saving 1;
if s2 ≠ [] and s2 not in newSeg and s2 not in LAgg then
    LAgg.append(s2);
Return LAgg
```

i (6+1) = 7 (length (LChVS))

```
/* This while loop is to compare the FC of a new segment with the AggFC.
 Either include the segment in the aggregate or save it as a gap segment */
while i+1 < length(LCh) do
    i = i + 1; s2=LCh[i];
    if intersection(AggFC, s2[2]) ≠ [] then
        if gap ≠ [] then
            newSeg.append(gap); newSeg.append(s2); s2 =[];gap =[];
        else
            newSeg.append(s2);s2 =[];
    else
        if duration(s2) ≤ θ then
            gap.append(s2); s2 =[];
        else
            /* Before starting a new aggregate, call Function Saving 1 */
            Call Function Saving 1; s1 = s2;s2 =[]; Go to step 5; /* Start a
             new aggregate */
Function Saving 1():
    if gap ≠ [] then
        newSeg.append(gap); gap =[];
    if newSeg ≠ [] then
        LAgg.append([newSeg[0][0][0],newSeg[0][0][1], newSeg[-1][0][2]],
         AggFT, AggFC]) /* Save the id, start time of the first segment
         and the end time of the last segment in the aggregates list with the
         AggFT and AggFC */
    if s1 ≠ [] and s1 not in newSeg and s1 not in LAgg then
        LAgg.append(s1); s1 =[];
    return gap, newSeg, s1, LAgg;
Call Function Saving 1;
if s2 ≠ [] and s2 not in newSeg and s2 not in LAgg then
    LAgg.append(s2);
Return LAgg
```

[] []

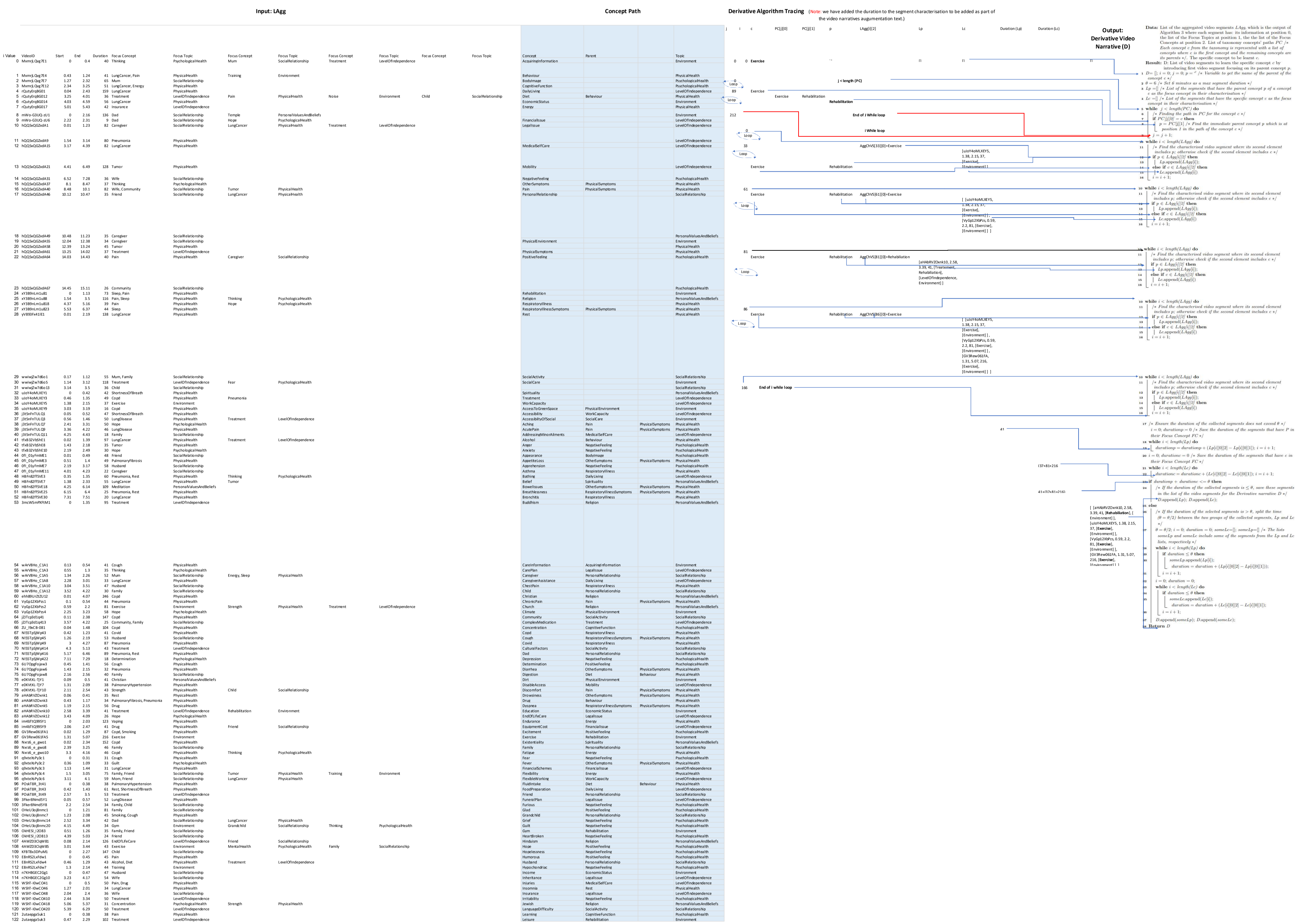
[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of times.]], [[mWo-G3UQ-zU3, 00.45, 1.00, [Nobody was really able to accurately diagnose him. I think that was probably the scariest thing is not knowing what it was. We didn't know what was going to happen. Was he going to be OK? Was he going to make it? We knew we needed a place that had more experience. So they recommended the Temple Lung Center.]], [mWo-G3UQ-zU4, 1.03, 1.28, [And that was the best decision we ever made. Immediately you could feel a difference at Temple. From []

[[mWo-G3UQ-zU1,00.00, 00.19,[My dad was always the rock of the family. So seeing him struggle to breathe, it was really heart-breaking. My dad was always so strong and independent. He fished with us, played tennis with us. He was always very active. A few years ago, we started to notice a change in my dad.], [mWo-G3UQ-zU2, 0.23, 0.42, [He started to have less energy. He would lose his breath a little more easily. He was on the couch. He had the oxygen mask. He wasn't able to do those things. It really was a shock to us. My dad was going downhill very quickly, and we knew something had to be done. He was in and out of local hospitals a couple of

[]

Appendix D

Derivative Algorithm tracing


Input: LAgg
Concept Path
Derivative Algorithm Tracing (Note: we have added the duration to the segment characterisation to be added as part of the video narratives augmentation text.)
Output: Derivative Video Narrative (D)
End of J While loop
i While loop
End of i while loop

123	2utaepga5uk11	3.22	4.09	47	Thinking	PsychologicalHealth				
124	2utaepga5uk14	4.11	4.53	42	Family, Friend	SocialRelationship				
125	2utaepga5uk18	5.34	5.43	9	Thinking	PsychologicalHealth				
126	pmuUnQ5Zi4Q1	0.05	0.57	52	LungCancer, Pain	PhysicalHealth	Mom	SocialRelationship		
127	pmuUnQ5Zi4Q4	1	1.52	52	Energy	PhysicalHealth				
128	pmuUnQ5Zi4Q7	1.56	2.51	55	Husband	SocialRelationship	LungCancer	PhysicalHealth		
129	dyRmGVgG7_84	0.47	1.17	30	Copd	PhysicalHealth				
130	dyRmGVgG7_86	1.19	2.17	58	LungCancer, Drug	PhysicalHealth				
131	dyRmGVgG7_89	2.2	3.02	42	Gym	Environment	Treatment	LevelOfIndependence	Thinking	PsychologicalHealth
132	aREqsWoX-EY1	0.05	1	55	Wife	SocialRelationship	LungCancer	PhysicalHealth		
133	aREqsWoX-EY8	2.2	3.04	44	Family	SocialRelationship				
134	9nRhehMpODk3	0.39	1.3	51	Hope	PsychologicalHealth	Treatment	LevelOfIndependence	Pain	PhysicalHealth
135	9nRhehMpODk8	2.11	2.59	48	Hope	PsychologicalHealth				
136	Tyo2YsA0Y01	0.05	0.38	33	Treatment	LevelOfIndependence	LungCancer	PhysicalHealth		
137	Tyo2YsA0Y02	0.43	1.19	36	Hope	PsychologicalHealth				
138	Tyo2YsA0Y03	1.25	2.49	84	Energy	PhysicalHealth	Treatment	LevelOfIndependence		
139	Tyo2YsA0Y05	2.52	3.51	59	LungCancer	PhysicalHealth	Family	SocialRelationship	Fear, Hope	PsychologicalHealth
140	ZoEEgU6L-m81	0.11	1.02	51	Energy, LungCancer, Strength	PhysicalHealth				
141	ZoEEgU6L-m85	1.47	2.35	48	Treatment	LevelOfIndependence				
142	ZoEEgU6L-m87	2.39	3.29	50	Exercise	Environment				
143	ZoEEgU6L-m89	3.31	4.54	83	Child	SocialRelationship	Thinking	PsychologicalHealth		
144	FH7aHDHnkjU1	0.03	1.34	91	PulmonaryFibrosis, Cough	PhysicalHealth	Mobility	LevelOfIndependence		
145	FH7aHDHnkjU7	1.36	2.06	30	Exercise	Environment				
146	FH7aHDHnkjU9	2.08	2.57	49	Wife	SocialRelationship				
147	FH7aHDHnkjU14	3.35	4.22	47	Exercise	Environment				
148	FH7aHDHnkjU17	4.24	4.45	21	Family	SocialRelationship	Rest	PhysicalHealth		
149	cfyb39S_CZw1	0.06	1.19	73	LungCancer, Smoking	PhysicalHealth				
150	cfyb39S_CZw5	1.2	2.05	45	Hope, Scared	PsychologicalHealth	Wife	SocialRelationship		
151	cfyb39S_CZw7	2.07	2.4	33	LungCancer	PhysicalHealth	Grandchild	SocialRelationship		
152	mSYXddFVvHo1	0.03	0.5	47	LungDisease	PhysicalHealth	Exercise, Training	Environment	Family	SocialRelationship
153	mSYXddFVvHo4	0.52	1.28	36	Belief	PersonalValuesAndBeliefs	Hope	PsychologicalHealth		
154	323hkORG0OM1	0.02	0.37	35	Smoking	PhysicalHealth				
155	323hkORG0OM3	0.4	1.57	77	Tumor	PhysicalHealth				
156	323hkORG0OM9	2.19	2.31	12	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence		
157	LYwQdM-2ok41	0	2.27	147	LungCancer	PhysicalHealth				
158	LYwQdM-2ok49	2.32	3.08	36	Tumor, Drug, Pain	PhysicalHealth				
159	LYwQdM-2ok411	3.12	3.26	14	Insurance	LevelOfIndependence				
160	bqkquNb5Z8A1	0.03	0.41	38	Pain	PhysicalHealth				
161	bqkquNb5Z8A10	2.47	3.31	44	Drug	PhysicalHealth				
162	bqkquNb5Z8A13	3.33	4.04	31	Pain	PhysicalHealth				
163	qsAnlV8DUXo1	0	0.42	42	PulmonaryFibrosis	PhysicalHealth				
164	qsAnlV8DUXo4	0.47	1.31	44	Family	SocialRelationship				
165	2pzHkvmRSW81	0.08	1.16	68						
166	2pzHkvmRSW86	1.38	2.24	46	Friend	SocialRelationship				
167	2pzHkvmRSW812	3.19	3.53	34	LungDisease	PhysicalHealth				

LossOfIncome	FinancialIssue		LevelOfIndependence
LossOfInterest	NegativeFeeling		PsychologicalHealth
LossOfPleasure	NegativeFeeling		PsychologicalHealth
Loving	PositiveFeeling		PsychologicalHealth
LoweringOfMood	NegativeFeeling		PsychologicalHealth
LungCancer	RespiratoryIllness		PhysicalHealth
LungDisease	RespiratoryIllness		PhysicalHealth
MedicalAid	Treatment		LevelOfIndependence
MedicalInformation	AcquiringInformation		Environment
MedicineCost	FinancialIssue		LevelOfIndependence
MedicineIntake	Treatment		LevelOfIndependence
Meditation	Spirituality		PersonalValuesAndBeliefs
Memory	CognitiveFunction		PsychologicalHealth
MentalHealth	CognitiveFunction		PsychologicalHealth
Mindfulness	Spirituality		PersonalValuesAndBeliefs
MobilityAid	Mobility		LevelOfIndependence
Mom	PersonalRelationship		SocialRelationship
Mosque	Religion		PersonalValuesAndBeliefs
Mould	PhysicalEnvironment		Environment
Mum	PersonalRelationship		SocialRelationship
Muslim	Religion		PersonalValuesAndBeliefs
Nausea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Nervousness	NegativeFeeling		PsychologicalHealth
Noise	PhysicalEnvironment		Environment
NutrientIntake	Diet	Behaviour	PhysicalHealth
Occupation	EconomicStatus		Environment
Oedema	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Optimisim	PositiveFeeling		PsychologicalHealth
OrganDonation	LegalIssue		LevelOfIndependence
Parents	PersonalRelationship		SocialRelationship
Parks	PhysicalEnvironment		Environment
PartTime	WorkCapacity		LevelOfIndependence
PeriodicRest	Rest		PhysicalHealth
Pleased	PositiveFeeling		PsychologicalHealth
Pneumonia	RespiratoryIllness		PhysicalHealth
Pollution	PhysicalEnvironment		Environment
Pray	Religion		PersonalValuesAndBeliefs
PulmonaryFibrosis	RespiratoryIllness		PhysicalHealth
PulmonaryHypertension	RespiratoryIllness		PhysicalHealth
Pulmonary_Rehab	Treatment		LevelOfIndependence
QualityOfSocialCare	SocialCare		Environment
Recreation	Rehabilitation		Environment
Redundancy	WorkCapacity		LevelOfIndependence
Relative	PersonalRelationship		SocialRelationship
Relaxation	Rest		PhysicalHealth
ReligiousCelebration	Religion		PersonalValuesAndBeliefs
Remembering	CognitiveFunction		PsychologicalHealth
RunnyNose	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Sadness	NegativeFeeling		PsychologicalHealth
Safety	PhysicalEnvironment		Environment
Satisfied	PositiveFeeling		PsychologicalHealth
Scared	NegativeFeeling		PsychologicalHealth
Security	PhysicalEnvironment		Environment
SeekingEmergencyCare	MedicalSelfCare		LevelOfIndependence
SelfEsteem	BodyImage		PsychologicalHealth
SenseOfIsolation	NegativeFeeling		PsychologicalHealth
SexualActivity	SocialActivity		SocialRelationship
ShortnessOfBreath	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Showering	DailyLiving		LevelOfIndependence
Sleep	Rest		PhysicalHealth
Smoking	Behaviour		PhysicalHealth
Sneezing	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
SocioEconomicallyDisadvantaged	FinancialIssue		LevelOfIndependence
SoreThroat	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Soreness	Pain	PhysicalSymptoms	PhysicalHealth
SpiritualResources	Spirituality		PersonalValuesAndBeliefs
SpiritualServices	Spirituality		PersonalValuesAndBeliefs
Spouse	PersonalRelationship		SocialRelationship
Strength	Energy		PhysicalHealth
SwellenLymphNodes	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Tearfulness	NegativeFeeling		PsychologicalHealth
Temple	Religion		PersonalValuesAndBeliefs
Tension	NegativeFeeling		PsychologicalHealth
Thinking	CognitiveFunction		PsychologicalHealth
TightChest	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Toileting	DailyLiving		LevelOfIndependence
Toxine	PhysicalEnvironment		Environment
Traffic	PhysicalEnvironment		Environment
Training	AcquiringInformation		Environment
Transport	PhysicalEnvironment		Environment
TravelExpenses	FinancialIssue		LevelOfIndependence
TreatmentCost	FinancialIssue		LevelOfIndependence
Tumor	RespiratoryIllness		PhysicalHealth
Value	Spirituality		PersonalValuesAndBeliefs
Vaping	Behaviour		PhysicalHealth
Wheezing	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Wife	PersonalRelationship		SocialRelationship
Will	LegalIssue		LevelOfIndependence
Workload	WorkCapacity		LevelOfIndependence

Appendix E

Super Ordinate Algorithm tracing


Input: LAgg
Concept Path
Super Ordinate Algorithm Tracing (Note: we have added the duration to the segment characterization to be added as part of the video narratives augmentation text.)
Output: Super Ordinate Video Narrative (S)
End of j While loop
i While loop
end of i While loop

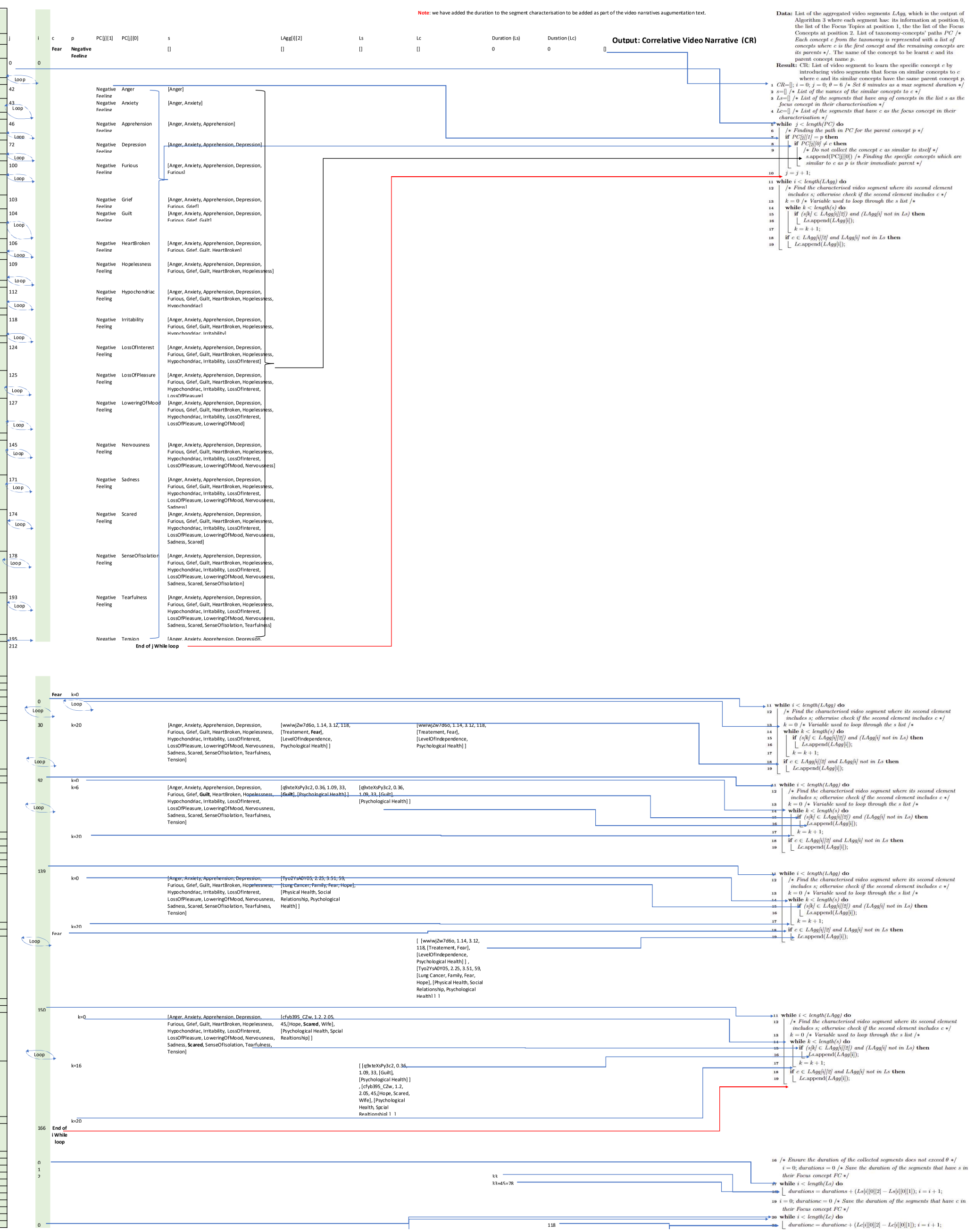
86	GV3Rew061FA1	0.02	1.29	87	Copd, Smoking	PhysicalHealth				
87	GV3Rew061FA5	1.31	5.07	216	Exercise	Environment				
88	Nxrz6_e_gwo1	0.02	2.34	152	Copd	PhysicalHealth				
89	Nxrz6_e_gwo8	2.39	3.25	46	Family	SocialRelationship				
90	Nxrz6_e_gwo10	3.3	4.16	46	Copd	PhysicalHealth	Thinking	PsychologicalHealth		
91	q9xteXsPy3c1	0	0.31	31	Cough	PhysicalHealth				
92	q9xteXsPy3c2	0.36	1.09	33	Guilt	PsychologicalHealth				
93	q9xteXsPy3c3	1.13	1.44	31	LungCancer	PhysicalHealth				
94	q9xteXsPy3c4	1.5	3.05	75	Family, Friend	SocialRelationship	Tumor	PhysicalHealth	Training	Environment
95	q9xteXsPy3c6	3.11	4.1	59	Mom, Friend	SocialRelationship	LungCancer	PhysicalHealth		
96	POskT8R_3t41	0	0.38	38	PulmonaryHypertension	PhysicalHealth				
97	POskT8R_3t43	0.42	1.43	61	Rest, ShortnessOfBreath	PhysicalHealth				
98	POskT8R_3t49	2.57	3.5	53	Treatment	LevelOfIndependence				
99	3Fker8Nmd5Y1	0.05	0.57	52	LungDisease	PhysicalHealth				
100	3Fker8Nmd5Y8	2.2	2.54	34	Family, Child	SocialRelationship				
101	OHeU3oj8nmc1	0	1.21	81	Family	SocialRelationship				
102	OHeU3oj8nmc7	1.23	2.08	45	Smoking, Cough	PhysicalHealth				
103	OHeU3oj8nmc14	2.52	3.34	42	Dad	SocialRelationship	LungCancer	PhysicalHealth		
104	OHeU3oj8nmc20	4.15	4.49	34	Gym	Environment	Grandchild	SocialRelationship	Thinking	PsychologicalHealth
105	OkHESl_I2O83	0.51	1.26	35	Family, Friend	SocialRelationship				
106	OkHESl_I2O813	4.39	5.03	24	Friend	SocialRelationship				
107	4AWZD3ClqW81	0.08	2.14	126	EndOfLifeCare	LevelOfIndependence	Friend	SocialRelationship		
108	4AWZD3ClqW85	3.01	3.44	43	Exercise	Environment	MentalHealth	PsychologicalHealth	Family	SocialRelationship
109	KFBT8x3DPuM1	0	2.27	147	Child	SocialRelationship				
110	E8nRS2LxFdw1	0	0.45	45	Pain	PhysicalHealth				
111	E8nRS2LxFdw4	0.46	1.29	43	Alcohol, Diet	PhysicalHealth	Treatment	LevelOfIndependence		
112	E8nRS2LxFdw7	1.3	2.14	44	Training	Environment				
113	n7KHBGEC2Gg1	0	0.47	47	Husband	SocialRelationship				
114	n7KHBGEC2Gg10	3.23	4.17	54	Wife	SocialRelationship				
115	WShT-I0wCO41	0	0.5	50	Pain, Drug	PhysicalHealth				
116	WShT-I0wCO46	1.27	2.01	34	LungCancer	PhysicalHealth				
117	WShT-I0wCO48	2.04	2.4	36	Wife	SocialRelationship				
118	WShT-I0wCO410	2.44	3.34	50	Treatment	LevelOfIndependence				
119	WShT-I0wCO418	5.06	5.37	31	Concentration	PsychologicalHealth	Strength	PhysicalHealth		
120	WShT-I0wCO420	5.39	6.29	50	Treatment	LevelOfIndependence				
121	2utaepga5uk1	0	0.38	38	Pain	PhysicalHealth				
122	2utaepga5uk3	0.47	2.29	102	Treatment	LevelOfIndependence				
123	2utaepga5uk11	3.22	4.09	47	Thinking	PsychologicalHealth				
124	2utaepga5uk14	4.11	4.53	42	Family, Friend	SocialRelationship				
125	2utaepga5uk18	5.34	5.43	9	Thinking	PsychologicalHealth				
126	pmuUnQ5Zi4Q1	0.05	0.57	52	LungCancer, Pain	PhysicalHealth	Mom	SocialRelationship		
127	pmuUnQ5Zi4Q4	1	1.52	52	Energy	PhysicalHealth				
128	pmuUnQ5Zi4Q7	1.56	2.51	55	Husband	SocialRelationship	LungCancer	PhysicalHealth		
129	dyRmGVgG7_84	0.47	1.17	30	Copd	PhysicalHealth				
130	dyRmGVgG7_86	1.19	2.17	58	LungCancer, Drug	PhysicalHealth				
131	dyRmGVgG7_89	2.2	3.02	42	Gym	Environment	Treatment	LevelOfIndependence	Thinking	PsychologicalHealth
132	aREqsWoX-EY1	0.05	1	55	Wife	SocialRelationship	LungCancer	PhysicalHealth		
133	aREqsWoX-EY8	2.2	3.04	44	Family	SocialRelationship				
134	9nRhehMpODk3	0.39	1.3	51	Hope	PsychologicalHealth	Treatment	LevelOfIndependence	Pain	PhysicalHealth
135	9nRhehMpODk8	2.11	2.59	48	Hope	PsychologicalHealth				
136	Tyo2YsA0Y01	0.05	0.38	33	Treatment	LevelOfIndependence	LungCancer	PhysicalHealth		
137	Tyo2YsA0Y02	0.43	1.19	36	Hope	PsychologicalHealth				
138	Tyo2YsA0Y03	1.25	2.49	84	Energy	PhysicalHealth	Treatment	LevelOfIndependence		
139	Tyo2YsA0Y05	2.52	3.51	59	LungCancer	PhysicalHealth	Family	SocialRelationship	Fear, Hope	PsychologicalHealth
140	ZoEEgU6L-m81	0.11	1.02	51	Energy, LungCancer, Strength	PhysicalHealth				
141	ZoEEgU6L-m85	1.47	2.35	48	Treatment	LevelOfIndependence				
142	ZoEEgU6L-m87	2.39	3.29	50	Exercise	Environment				
143	ZoEEgU6L-m89	3.31	4.54	83	Child	SocialRelationship	Thinking	PsychologicalHealth		
144	FH7aHDHnkjU1	0.03	1.34	91	PulmonaryFibrosis, Cough	PhysicalHealth	Mobility	LevelOfIndependence		
145	FH7aHDHnkjU7	1.36	2.06	30	Exercise	Environment				
146	FH7aHDHnkjU9	2.08	2.57	49	Wife	SocialRelationship				
147	FH7aHDHnkjU14	3.35	4.22	47	Exercise	Environment				
148	FH7aHDHnkjU17	4.24	4.45	21	Family	SocialRelationship	Rest	PhysicalHealth		
149	cfyb39S_CZw1	0.06	1.19	73	LungCancer, Smoking	PhysicalHealth				
150	cfyb39S_CZw5	1.2	2.05	45	Hope, Scared	PsychologicalHealth	Wife	SocialRelationship		
151	cfyb39S_CZw7	2.07	2.4	33	LungCancer	PhysicalHealth	Grandchild	SocialRelationship		
152	mSYXddFVvHo1	0.03	0.5	47	LungDisease	PhysicalHealth	Exercise, Training	Environment	Family	SocialRelationship
153	mSYXddFVvHo4	0.52	1.28	36	Belief	PersonalValuesAndBeliefs	Hope	PsychologicalHealth		
154	323hkORG0OM1	0.02	0.37	35	Smoking	PhysicalHealth				
155	323hkORG0OM3	0.4	1.57	77	Tumor	PhysicalHealth				
156	323hkORG0OM9	2.19	2.31	12	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence		
157	LYwQdM-2ok41	0	2.27	147	LungCancer	PhysicalHealth				
158	LYwQdM-2ok49	2.32	3.08	36	Tumor, Drug, Pain	PhysicalHealth				
159	LYwQdM-2ok411	3.12	3.26	14	Insurance	LevelOfIndependence				
160	bqkquNb5Z8A1	0.03	0.41	38	Pain	PhysicalHealth				
161	bqkquNb5Z8A10	2.47	3.31	44	Drug	PhysicalHealth				
162	bqkquNb5Z8A13	3.33	4.04	31	Pain	PhysicalHealth				
163	qsAnlV8DUXo1	0	0.42	42	PulmonaryFibrosis	PhysicalHealth				
164	qsAnlV8DUXo4	0.47	1.31	44	Family	SocialRelationship				
165	2pzHkvmRSW81	0.08	1.16	68						
166	2pzHkvmRSW86	1.38	2.24	46	Friend	SocialRelationship				
167	2pzHkvmRSW812	3.19	3.53	34	LungDisease	PhysicalHealth				

Excitement	PositiveFeeling		PsychologicalHealth
Exercise	Rehabilitation		Environment
Existentiality	Spirituality		PersonalValuesAndBeliefs
Family	PersonalRelationship		SocialRelationship
Fatigue	Energy		PhysicalHealth
Fear	NegativeFeeling		PsychologicalHealth
Fever	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
FinancialSchemes	FinancialIssue		LevelOfIndependence
Flexibility	Energy		PhysicalHealth
FlexibleWorking	WorkCapacity		LevelOfIndependence
FluidIntake	Diet	Behaviour	PhysicalHealth
FoodPreparation	DailyLiving		LevelOfIndependence
Friend	PersonalRelationship		SocialRelationship
FuneralPlan	LegalIssue		LevelOfIndependence
Furious	NegativeFeeling		PsychologicalHealth
Glad	PositiveFeeling		PsychologicalHealth
Grandchild	PersonalRelationship		SocialRelationship
Grief	NegativeFeeling		PsychologicalHealth
Guilt	NegativeFeeling		PsychologicalHealth
Gym	Rehabilitation		Environment
HeartBroken	NegativeFeeling		PsychologicalHealth
Hinduism	Religion		PersonalValuesAndBeliefs
Hope	PositiveFeeling		PsychologicalHealth
Hopelessness	NegativeFeeling		PsychologicalHealth
Humorous	PositiveFeeling		PsychologicalHealth
Husband	PersonalRelationship		SocialRelationship
Hypochondriac	NegativeFeeling		PsychologicalHealth
Income	EconomicStatus		Environment
Inheritance	LegalIssue		LevelOfIndependence
Injuries	MedicalSelfCare		LevelOfIndependence
Insomnia	Rest		PhysicalHealth
Insurance	LegalIssue		LevelOfIndependence
Irritability	NegativeFeeling		PsychologicalHealth
Jewish	Religion		PersonalValuesAndBeliefs
LanguageDifficulty	SocialActivity		SocialRelationship
Learning	CognitiveFunction		PsychologicalHealth
Leisure	Rehabilitation		Environment
LossOfIncome	FinancialIssue		LevelOfIndependence
LossOfInterest	NegativeFeeling		PsychologicalHealth
LossOfPleasure	NegativeFeeling		PsychologicalHealth
Loving	PositiveFeeling		PsychologicalHealth
LoweringOfMood	NegativeFeeling		PsychologicalHealth
LungCancer	RespiratoryIllness		PhysicalHealth
LungDisease	RespiratoryIllness		PhysicalHealth
MedicalAid	Treatment		LevelOfIndependence
MedicalInformation	AcquiringInformation		Environment
MedicineCost	FinancialIssue		LevelOfIndependence
MedicineIntake	Treatment		LevelOfIndependence
Meditation	Spirituality		PersonalValuesAndBeliefs
Memory	CognitiveFunction		PsychologicalHealth
MentalHealth	CognitiveFunction		PsychologicalHealth
Mindfulness	Spirituality		PersonalValuesAndBeliefs
MobilityAid	Mobility		LevelOfIndependence
Mom	PersonalRelationship		SocialRelationship
Mosque	Religion		PersonalValuesAndBeliefs
Mould	PhysicalEnvironment		Environment
Mum	PersonalRelationship		SocialRelationship
Muslim	Religion		PersonalValuesAndBeliefs
Nausea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Nervousness	NegativeFeeling		PsychologicalHealth
Noise	PhysicalEnvironment		Environment
NutrientIntake	Diet	Behaviour	PhysicalHealth
Occupation	EconomicStatus		Environment
Oedema	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Optimisim	PositiveFeeling		PsychologicalHealth
OrganDonation	LegalIssue		LevelOfIndependence
Parents	PersonalRelationship		SocialRelationship
Parks	PhysicalEnvironment		Environment
PartTime	WorkCapacity		LevelOfIndependence
PeriodicRest	Rest		PhysicalHealth
Pleased	PositiveFeeling		PsychologicalHealth
Pneumonia	RespiratoryIllness		PhysicalHealth
Pollution	PhysicalEnvironment		Environment
Pray	Religion		PersonalValuesAndBeliefs
PulmonaryFibrosis	RespiratoryIllness		PhysicalHealth
PulmonaryHypertension	RespiratoryIllness		PhysicalHealth
Pulmonary_Rehab	Treatment		LevelOfIndependence
QualityOfSocialCare	SocialCare		Environment
Recreation	Rehabilitation		Environment
Redundancy	WorkCapacity		LevelOfIndependence
Relative	PersonalRelationship		SocialRelationship
Relaxation	Rest		PhysicalHealth
ReligiousCelebration	Religion		PersonalValuesAndBeliefs
Remembering	CognitiveFunction		PsychologicalHealth
RunnyNose	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Sadness	NegativeFeeling		PsychologicalHealth
Safety	PhysicalEnvironment		Environment
Satisfied	PositiveFeeling		PsychologicalHealth
Scared	NegativeFeeling		PsychologicalHealth
Security	PhysicalEnvironment		Environment
SeekingEmergencyCare	MedicalSelfCare		LevelOfIndependence
SelfEsteem	BodyImage		PsychologicalHealth
SenseOfIsolation	NegativeFeeling		PsychologicalHealth
SexualActivity	SocialActivity		SocialRelationship
ShortnessOfBreath	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Showering	DailyLiving		LevelOfIndependence
Sleep	Rest		PhysicalHealth
Smoking	Behaviour		PhysicalHealth
Sneezing	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
SocioEconomicallyDisadvantaged	FinancialIssue		LevelOfIndependence
SoreThroat	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Soreness	Pain	PhysicalSymptoms	PhysicalHealth
SpiritualResources	Spirituality		PersonalValuesAndBeliefs
SpiritualServices	Spirituality		PersonalValuesAndBeliefs
Spouse	PersonalRelationship		SocialRelationship
Strength	Energy		PhysicalHealth
SwellenLymphNodes	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Tearfulness	NegativeFeeling		PsychologicalHealth
Temple	Religion		PersonalValuesAndBeliefs
Tension	NegativeFeeling		PsychologicalHealth
Thinking	CognitiveFunction		PsychologicalHealth
TightChest	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Toileting	DailyLiving		LevelOfIndependence
Toxine	PhysicalEnvironment		Environment
Traffic	PhysicalEnvironment		Environment
Training	AcquiringInformation		Environment
Transport	PhysicalEnvironment		Environment
TravelExpenses	FinancialIssue		LevelOfIndependence
TreatmentCost	FinancialIssue		LevelOfIndependence
Tumor	RespiratoryIllness		PhysicalHealth
Value	Spirituality		PersonalValuesAndBeliefs
Vaping	Behaviour		PhysicalHealth
Wheezing	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
Wife	PersonalRelationship		SocialRelationship
Will	LegalIssue		LevelOfIndependence
Workload	WorkCapacity		LevelOfIndependence

Appendix F

Correlative Algorithm tracing

	Input: LAgg												Concept Path			
i Value	VideoID	Start	End	Duration	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Concept	Parent		Topic
0	MxmrjLQvg7E1	0	0.4	40	Thinking	PsychologicalHealth	Mum	SocialRelationship	Treatment	LevelOfIndependence			AcquiringInformation			Environment
1	MxmrjLQvg7E4	0.4	1.2	41	LungCancer, Pain	PhysicalHealth	Training	Environment					Behaviour			PhysicalHealth
2	MxmrjLQvg7E7	1.3	2.3	65	Mum	SocialRelationship							BodyImage			PsychologicalHealth
3	MxmrjLQvg7E12	2.3	3.3	51	LungCancer, Energy	PhysicalHealth							CognitiveFunction			PsychologicalHealth
4	rQutyErqBG01	0	2.4	159	LungCancer	PhysicalHealth							DailyLiving			LevelOfIndependence
5	rQutyErqBG012	3.3	4	36	Treatment	LevelOfIndependence	Pain	PhysicalHealth	Noise	Environment	Child	SocialRelationship	Diet	Behaviour		PhysicalHealth
6	rQutyErqBG014	4	4.6	56	LungCancer	PhysicalHealth							EconomicStatus			Environment
7	rQutyErqBG017	5	5.4	42	Insurance	LevelOfIndependence							Energy			PhysicalHealth
8	mWo-G3UQ-zU1	0	2.2	136	Dad	SocialRelationship	Temple	PersonalValuesAndBeliefs								Environment
9	mWo-G3UQ-zU6	2.2	2.3	9	Dad	SocialRelationship	Hope	PsychologicalHealth					FinancialIssue			LevelOfIndependence
10	hQQ5xQGZxdA1	0	1.2	82	Caregiver	SocialRelationship	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence			LegalIssue			LevelOfIndependence
11	hQQ5xQGZxdA9	1.5	3.1	80	Pneumonia	PhysicalHealth										LevelOfIndependence
12	hQQ5xQGZxdA15	3.2	4.4	82	LungCancer	PhysicalHealth							MedicalSelfCare			LevelOfIndependence
13	hQQ5xQGZxdA21	4.4	6.5	128	Tumor	PhysicalHealth							Mobility			LevelOfIndependence
14	hQQ5xQGZxdA31	6.5	7.3	36	Wife	SocialRelationship							NegativeFeeling			PsychologicalHealth
15	hQQ5xQGZxdA37	8.1	8.5	37	Thinking	PsychologicalHealth							OtherSymptoms	PhysicalSymptoms		PhysicalHealth
16	hQQ5xQGZxdA40	8.5	10	82	Wife, Community	SocialRelationship	Tumor	PhysicalHealth					Pain	PhysicalSymptoms		PhysicalHealth
17	hQQ5xQGZxdA46	10	10	35	Friend	SocialRelationship	LungCancer	PhysicalHealth					PersonalRelationship			SocialRelationship
18	hQQ5xQGZxdA49	10	11	35	Caregiver	SocialRelationship										PersonalValuesAndBeliefs
19	hQQ5xQGZxdA55	12	12	34	Caregiver	SocialRelationship							PhysicalEnvironment			Environment
20	hQQ5xQGZxdA58	12	13	45	Tumor	PhysicalHealth										PhysicalHealth
21	hQQ5xQGZxdA61	13	14	37	Treatment	LevelOfIndependence							PhysicalSymptoms			PhysicalHealth
22	hQQ5xQGZxdA64	14	14	40	Pain	PhysicalHealth	Caregiver	SocialRelationship					PositiveFeeling			PsychologicalHealth
23	hQQ5xQGZxdA67	14	15	26	Community	SocialRelationship										PsychologicalHealth
24	xY3B9nLm1u81	0	1.1	73	Sleep, Pain	PhysicalHealth							Rehabilitation			Environment
25	xY3B9nLm1u88	1.5	3.5	116	Pain, Sleep	PhysicalHealth	Thinking	PsychologicalHealth					Religion			PersonalValuesAndBeliefs
26	xY3B9nLm1u818	4.4	5.2	39	Pain	PhysicalHealth	Hope	PsychologicalHealth					RespiratoryIllness			PhysicalHealth
27	xY3B9nLm1u823	5.5	6.4	44	Sleep	PhysicalHealth							RespiratoryIllnessSympt	PhysicalSymptoms		PhysicalHealth
28	yV893Fx41lE1	0	2.2	138	LungCancer	PhysicalHealth							Rest			PhysicalHealth
29	wwiwjZw7d6o1	0.2	1.1	55	Mum, Family	SocialRelationship							SocialActivity			SocialRelationship
30	wwiwjZw7d6o5	1.1	3.1	118	Treatment	LevelOfIndependence	Fear	PsychologicalHealth					SocialCare			Environment
31	wwiwjZw7d6o13	3.1	3.5	36	Child	SocialRelationship										SocialRelationship
32	uJoY4oMLXEY1	0	0.4	42	ShortnessOfBreath	PhysicalHealth							Spirituality			PersonalValuesAndBeliefs
33	uJoY4oMLXEY3	0.5	1.4	49	Copd	PhysicalHealth	Pneumonia						Treatment			LevelOfIndependence
34	uJoY4oMLXEY5	1.4	2.2	37	Exercise	Environment							WorkCapacity			LevelOfIndependence
35	uJoY4oMLXEY9	3	3.2	16	Copd	PhysicalHealth							AccessToGreenSpace	PhysicalEnvironment		Environment
36	j3t5nFnTULQ1	0.1	0.5	47	ShortnessOfBreath	PhysicalHealth							Accessibility	WorkCapacity		LevelOfIndependence
37	j3t5nFnTULQ3	0.6	1.5	50	LungDisease	PhysicalHealth	Treatment	LevelOfIndependence					AccessibiltyOfSocial	SocialCare		Environment
38	j3t5nFnTULQ7	2.4	3.3	50	Hope	PsychologicalHealth							Aching	Pain	PhysicalSymptoms	PhysicalHealth
39	j3t5nFnTULQ9	3.4	4.2	46	LungDisease	PhysicalHealth							AcutePain	Pain	PhysicalSymptoms	PhysicalHealth
40	j3t5nFnTULQ11	4.3	4.4	18	Family	SocialRelationship							AddressingMinorAilment	MedicalSelfCare		LevelOfIndependence
41	tfxB32Vb5hE1	0	1.4	97	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence					Alcohol	Behaviour		PhysicalHealth
42	tfxB32Vb5hE8	1.4	2.2	35	Tumor	PhysicalHealth							Anger	NegativeFeeling		PsychologicalHealth
43	tfxB32Vb5hE10	2.2	2.5	30	Hope	PsychologicalHealth							Anxiety	NegativeFeeling		PsychologicalHealth
44	0fI_01yFmME1	0	0.5	48	Friend	SocialRelationship							Appearance	BodyImage		PsychologicalHealth
45	0fI_01yFmME3	0.5	1.4	49	PulmonaryFibrosis	PhysicalHealth							AppetiteLoss	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
46	0fI_01yFmME7	2.2	3.2	58	Husband	SocialRelationship							Apprehension	NegativeFeeling		PsychologicalHealth
47	0fI_01yFmME11	4	4.2	22	Caregiver	SocialRelationship							Asthma	RespiratoryIllness		PhysicalHealth
48	HBFn82ffSVE3	0.4	1.4	60	Pneumonia, Rest	PhysicalHealth	Thinking	PsychologicalHealth					Bathing	DailyLiving		LevelOfIndependence
49	HBFn82ffSVE7	1.4	2.3	55	LungCancer	PhysicalHealth	Tumor						Belief	Spirituality		PersonalValuesAndBeliefs
50	HBFn82ffSVE18	4.3	6.1	109	Meditation	PersonalValuesAndBeliefs							BowelIssues	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
51	HBFn82ffSVE25	6.2	6.4	25	Pneumonia, Rest	PhysicalHealth							Breathlessness	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
52	HBFn82ffSVE30	7.3	7.5	20	LungCancer	PhysicalHealth							Bronchitis	RespiratoryIllness		PhysicalHealth
53	3mcWSmPXFtM1	0	1.4	95	Treatment	LevelOfIndependence							Buddhism	Religion		PersonalValuesAndBeliefs
54	wArV8Ho_C1A1	0.1	0.5	41	Cough	PhysicalHealth							CareInformation	AcquiringInformation		Environment
55	wArV8Ho_C1A3	0.6	1.3	35	Thinking	PsychologicalHealth							CarePlan	LegalIssue		LevelOfIndependence
56	wArV8Ho_C1A5	1.3	2.3	52	Mum	SocialRelationship	Energy, Sleep	PhysicalHealth					Caregiver	PersonalRelationship		SocialRelationship
57	wArV8Ho_C1A8	2.3	3	33	LungCancer	PhysicalHealth							CaregiverAssistance	DailyLiving		LevelOfIndependence
58	wArV8Ho_C1A10	3	3.5	47	Husband	SocialRelationship							ChestPain	RespiratoryIllness		PhysicalHealth
59	wArV8Ho_C1A12	3.5	4.2	30	Family	SocialRelationship							Child	PersonalRelationship		SocialRelationship
60	ehh89UrZtZU12	0	4.1	246	Copd	PhysicalHealth							Christian	Religion		PersonalValuesAndBeliefs
61	VyGp12XbPzs1	0.1	0.5	44	Pneumonia	PhysicalHealth							ChronicPain	Pain	PhysicalSymptoms	PhysicalHealth
62	VyGp12XbPzs2	0.6	2.2	81	Exercise	Environment	Strength	PhysicalHealth	Treatment	LevelOfIndependence			Church	Religion		PersonalValuesAndBeliefs
63	VyGp12XbPzs4	2.3	3.2	58	Hope	PsychologicalHealth							Climate	PhysicalEnvironment		Environment
64	jZJTcp3d1q41	0.1	2.4	147	Copd	PhysicalHealth							Community	SocialActivity		SocialRelationship
65	jZJTcp3d1q413	3.6	4.2	25	Community, Family	SocialRelationship							ComplexMedication	Treatment		LevelOfIndependence
66	ZU_l9xCB-081	0	1.5	104	Copd	PhysicalHealth							Concentration	CognitiveFunction		PsychologicalHealth
67	NI55TpSjWp43	0.4	1.2	41	Covid	PhysicalHealth							Copd	RespiratoryIllness		PhysicalHealth
68	NI55TpSjWp45	1.3	2.2	53	Husband	SocialRelationship							Cough	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
69	NI55TpSjWp49	3	4.3	87	Pneumonia	PhysicalHealth							Covid	RespiratoryIllness		PhysicalHealth
70	NI55TpSjWp414	4.3	5.1	43	Treatment	LevelOfIndependence							CulturalFactors	SocialActivity		SocialRelationship



71	NI55TpSjWp416	5.2	6.5	89	Pneumonia, Rest	PhysicalHealth							Dad	PersonalRelationship		SocialRelationship
72	NI55TpSjWp422	7.1	7.3	18	Determination	PsychologicalHealth							Depression	NegativeFeeling		PsychologicalHealth
73	6U7OpgFojaw3	0.5	1.4	56	Cough	PhysicalHealth							Determination	PositiveFeeling		PsychologicalHealth
74	6U7OpgFojaw6	1.4	2.2	32	Pneumonia	PhysicalHealth							Diarrhea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
75	6U7OpgFojaw8	2.2	2.6	40	Family	SocialRelationship							Digestion	Diet	Behaviour	PhysicalHealth
76	e0KVtXL-TjY1	0.1	0.5	41	Christian	PersonalValuesAndBeliefs							Dirt	PhysicalEnvironment		Environment
77	e0KVtXL-TjY7	1.3	2.1	38	PulmonaryHypertensi	PhysicalHealth							DisableAccess	Mobility		LevelOfIndependence
78	e0KVtXL-TjY10	2.1	2.5	43	Strength	PhysicalHealth	Child	SocialRelationship					Discomfort	Pain	PhysicalSymptoms	PhysicalHealth
79	aHAbRVZOxnk1	0.1	0.4	35	Rest	PhysicalHealth							Drowsiness	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
80	aHAbRVZOxnk3	0.4	1.2	34	PulmonaryFibrosis, Pn	PhysicalHealth							Drug	Behaviour		PhysicalHealth
81	aHAbRVZOxnk5	1.2	2.2	56	Drug	PhysicalHealth							Dyspnea	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
82	aHAbRVZOxnk10	2.6	3.4	41	Treatment	LevelOfIndependence	Rehabilitation	Environment					Education	EconomicStatus		Environment
83	aHAbRVZOxnk12	3.4	4.1	26	Hope	PsychologicalHealth							EndOfLifeCare	LegalIssue		LevelOfIndependence
84	im4bTtQ99SY1	0	2	123	Vaping	PhysicalHealth							Endurance	Energy		PhysicalHealth
85	im4bTtQ99SY9	2.1	2.5	41	Drug	PhysicalHealth	Friend	SocialRelationship					EquipmentCost	FinancialIssue		LevelOfIndependence
86	GV3Rew061FA1	0	1.3	87	Copd, Smoking	PhysicalHealth							Excitement	PositiveFeeling		PsychologicalHealth
87	GV3Rew061FA5	1.3	5.1	216	Exercise	Environment							Exercise	Rehabilitation		Environment
88	Nxrz6_e_gwo1	0	2.3	152	Copd	PhysicalHealth							Existentiality	Spirituality		PersonalValuesAndBeliefs
89	Nxrz6_e_gwo8	2.4	3.3	46	Family	SocialRelationship							Family	PersonalRelationship		SocialRelationship
90	Nxrz6_e_gwo10	3.3	4.2	46	Copd	PhysicalHealth	Thinking	PsychologicalHealth					Fatigue	Energy		PhysicalHealth
91	q9xteXsPy3c1	0	0.3	31	Cough	PhysicalHealth							Fear	NegativeFeeling		PsychologicalHealth
92	q9xteXsPy3c2	0.4	1.1	33	Guilt	PsychologicalHealth							Fever	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
93	q9xteXsPy3c3	1.1	1.4	31	LungCancer	PhysicalHealth							FinancialSchemes	FinancialIssue		LevelOfIndependence
94	q9xteXsPy3c4	1.5	3.1	75	Family, Friend	SocialRelationship	Tumor	PhysicalHealth	Training	Environment			Flexibility	Energy		PhysicalHealth
95	q9xteXsPy3c6	3.1	4.1	59	Mom, Friend	SocialRelationship	LungCancer	PhysicalHealth					FlexibleWorking	WorkCapacity		LevelOfIndependence
96	POskT8R_3t41	0	0.4	38	PulmonaryHypertensi	PhysicalHealth							FluidIntake	Diet	Behaviour	PhysicalHealth
97	POskT8R_3t43	0.4	1.4	61	Rest, ShortnessOfBrea	PhysicalHealth							FoodPreparation	DailyLiving		LevelOfIndependence
98	POskT8R_3t49	2.6	3.5	53	Treatment	LevelOfIndependence							Friend	PersonalRelationship		SocialRelationship
99	3Fker8Nmd5Y1	0.1	0.6	52	LungDisease	PhysicalHealth							FuneralPlan	LegalIssue		LevelOfIndependence
100	3Fker8Nmd5Y8	2.2	2.5	34	Family, Child	SocialRelationship							Furious	NegativeFeeling		PsychologicalHealth
101	OHeU3oj8nmc1	0	1.2	81	Family	SocialRelationship							Glad	PositiveFeeling		PsychologicalHealth
102	OHeU3oj8nmc7	1.2	2.1	45	Smoking, Cough	PhysicalHealth							Grandchild	PersonalRelationship		SocialRelationship
103	OHeU3oj8nmc14	2.5	3.3	42	Dad	SocialRelationship	LungCancer	PhysicalHealth					Grief	NegativeFeeling		PsychologicalHealth
104	OHeU3oj8nmc20	4.2	4.5	34	Gym	Environment	Grandchild	SocialRelationship	Thinking	PsychologicalHealth			Guilt	NegativeFeeling		PsychologicalHealth
105	OkHESl_I2O83	0.5	1.3	35	Family, Friend	SocialRelationship							Gym	Rehabilitation		Environment
106	OkHESl_I2O813	4.4	5	24	Friend	SocialRelationship							HeartBroken	NegativeFeeling		PsychologicalHealth
107	4AWZD3ClqW81	0.1	2.1	126	EndOfLifeCare	LevelOfIndependence	Friend	SocialRelationship					Hinduism	Religion		PersonalValuesAndBeliefs
108	4AWZD3ClqW85	3	3.4	43	Exercise	Environment	MentalHealth	PsychologicalHealth	Family	SocialRelationship			Hope	PositiveFeeling		PsychologicalHealth
109	KFBT8x3DPuM1	0	2.3	147	Child	SocialRelationship							Hopelessness	NegativeFeeling		PsychologicalHealth
110	E8nRS2LxFdw1	0	0.5	45	Pain	PhysicalHealth							Humorous	PositiveFeeling		PsychologicalHealth
111	E8nRS2LxFdw4	0.5	1.3	43	Alcohol, Diet	PhysicalHealth	Treatment	LevelOfIndependence					Husband	PersonalRelationship		SocialRelationship
112	E8nRS2LxFdw7	1.3	2.1	44	Training	Environment							Hypochondriac	NegativeFeeling		PsychologicalHealth
113	n7KHBGEC2Gg1	0	0.5	47	Husband	SocialRelationship							Income	EconomicStatus		Environment
114	n7KHBGEC2Gg10	3.2	4.2	54	Wife	SocialRelationship							Inheritance	LegalIssue		LevelOfIndependence
115	WShT-I0wCO41	0	0.5	50	Pain, Drug	PhysicalHealth							Injuries	MedicalSelfCare		LevelOfIndependence
116	WShT-I0wCO46	1.3	2	34	LungCancer	PhysicalHealth							Insomnia	Rest		PhysicalHealth
117	WShT-I0wCO48	2	2.4	36	Wife	SocialRelationship							Insurance	LegalIssue		LevelOfIndependence
118	WShT-I0wCO410	2.4	3.3	50	Treatment	LevelOfIndependence							Irritability	NegativeFeeling		PsychologicalHealth
119	WShT-I0wCO418	5.1	5.4	31	Concentration	PsychologicalHealth	Strength	PhysicalHealth					Jewish	Religion		PersonalValuesAndBeliefs
120	WShT-I0wCO420	5.4	6.3	50	Treatment	LevelOfIndependence							LanguageDifficulty	SocialActivity		SocialRelationship
121	2utaepga5uk1	0	0.4	38	Pain	PhysicalHealth							Learning	CognitiveFunction		PsychologicalHealth
122	2utaepga5uk3	0.5	2.3	102	Treatment	LevelOfIndependence							Leisure	Rehabilitation		Environment
123	2utaepga5uk11	3.2	4.1	47	Thinking	PsychologicalHealth							LossOfIncome	FinancialIssue		LevelOfIndependence
124	2utaepga5uk14	4.1	4.5	42	Family, Friend	SocialRelationship							LossOfInterest	NegativeFeeling		PsychologicalHealth
125	2utaepga5uk18	5.3	5.4	9	Thinking	PsychologicalHealth							LossOfPleasure	NegativeFeeling		PsychologicalHealth
126	pmuUnQ5Zi4Q1	0.1	0.6	52	LungCancer, Pain	PhysicalHealth	Mom	SocialRelationship					Loving	PositiveFeeling		PsychologicalHealth
127	pmuUnQ5Zi4Q4	1	1.5	52	Energy	PhysicalHealth							LoweringOfMood	NegativeFeeling		PsychologicalHealth
128	pmuUnQ5Zi4Q7	1.6	2.5	55	Husband	SocialRelationship	LungCancer	PhysicalHealth					LungCancer	RespiratoryIllness		PhysicalHealth
129	dyRmGVgG7_84	0.5	1.2	30	Copd	PhysicalHealth							LungDisease	RespiratoryIllness		PhysicalHealth
130	dyRmGVgG7_86	1.2	2.2	58	LungCancer, Drug	PhysicalHealth							MedicalAid	Treatment		LevelOfIndependence
131	dyRmGVgG7_89	2.2	3	42	Gym	Environment	Treatment	LevelOfIndependence	Thinking	PsychologicalHealth			MedicalInformation	AcquiringInformation		Environment
132	aREqsWoX-EY1	0.1	1	55	Wife	SocialRelationship	LungCancer	PhysicalHealth					MedicineCost	FinancialIssue		LevelOfIndependence
133	aREqsWoX-EY8	2.2	3	44	Family	SocialRelationship							MedicineIntake	Treatment		LevelOfIndependence
134	9nRhehMpODk3	0.4	1.3	51	Hope	PsychologicalHealth	Treatment	LevelOfIndependence	Pain	PhysicalHealth			Meditation	Spirituality		PersonalValuesAndBeliefs
135	9nRhehMpODk8	2.1	2.6	48	Hope	PsychologicalHealth							Memory	CognitiveFunction		PsychologicalHealth
136	Tyo2YsA0Y01	0.1	0.4	33	Treatment	LevelOfIndependence	LungCancer	PhysicalHealth					MentalHealth	CognitiveFunction		PsychologicalHealth
137	Tyo2YsA0Y02	0.4	1.2	36	Hope	PsychologicalHealth							Mindfulness	Spirituality		PersonalValuesAndBeliefs
138	Tyo2YsA0Y03	1.3	2.5	84	Energy	PhysicalHealth	Treatment	LevelOfIndependence					MobilityAid	Mobility		LevelOfIndependence
139	Tyo2YsA0Y05	2.5	3.5	59	LungCancer	PhysicalHealth	Family	SocialRelationship	Fear, Hope	PsychologicalHealth			Mom	PersonalRelationship		SocialRelationship
140	ZoEEgU6L-m81	0.1	1	51	Energy, LungCancer, S	PhysicalHealth							Mosque	Religion		PersonalValuesAndBeliefs
141	ZoEEgU6L-m85	1.5	2.4	48	Treatment	LevelOfIndependence							Mould	PhysicalEnvironment		Environment
142	ZoEEgU6L-m87	2.4	3.3	50	Exercise	Environment							Mum	PersonalRelationship		SocialRelationship
143	ZoEEgU6L-m89	3.3	4.5	83	Child	SocialRelationship	Thinking	PsychologicalHealth					Muslim	Religion		PersonalValuesAndBeliefs
144	FH7aHDHnkjU1	0	1.3	91	PulmonaryFibrosis, Cc	PhysicalHealth	Mobility	LevelOfIndependence					Nausea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
145	FH7aHDHnkjU7	1.4	2.1	30	Exercise	Environment							Nervousness	NegativeFeeling		PsychologicalHealth
146	FH7aHDHnkjU9	2.1	2.6	49	Wife	SocialRelationship							Noise	PhysicalEnvironment		Environment
147	FH7aHDHnkjU14	3.4	4.2	47	Exercise	Environment							NutrientIntake	Diet	Behaviour	PhysicalHealth
148	FH7aHDHnkjU17	4.2	4.5	21	Family	SocialRelationship	Rest	PhysicalHealth					Occupation	EconomicStatus		Environment
149	cfyb39S_CZw1	0.1	1.2	73	LungCancer, Smoking	PhysicalHealth							Oedema	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
150	cfyb39S_CZw5	1.2	2.1	45	Hope, Scared	PsychologicalHealth	Wife	SocialRelationship					Optimisim	PositiveFeeling		PsychologicalHealth
151	cfyb39S_CZw7	2.1	2.4	33	LungCancer	PhysicalHealth	Grandchild	SocialRelationship					OrganDonation	LegalIssue		LevelOfIndependence
152	mSYXddFVvHo1	0	0.5	47	LungDisease	PhysicalHealth	Exercise, Traini	Environment	Family	SocialRelationship			Parents	PersonalRelationship		SocialRelationship
153	mSYXddFVvHo4	0.5	1.3	36	Belief	PersonalValuesAndBelie	Hope	PsychologicalHealth					Parks	PhysicalEnvironment		Environment
154	323hkORG0OM1	0	0.4	35	Smoking	PhysicalHealth							PartTime	WorkCapacity		LevelOfIndependence
155	323hkORG0OM3	0.4	1.6	77	Tumor	PhysicalHealth							PeriodicRest	Rest		PhysicalHealth
156	323hkORG0OM9	2.2	2.3	12	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence					Pleased	PositiveFeeling		PsychologicalHealth
157	LYwQdM-2ok41	0	2.3	147	LungCancer	PhysicalHealth							Pneumonia	RespiratoryIllness		PhysicalHealth
158	LYwQdM-2ok49	2.3	3.1	36	Tumor, Drug, Pain	PhysicalHealth							Pollution	PhysicalEnvironment		Environment
159	LYwQdM-2ok411	3.1	3.3	14	Insurance	LevelOfIndependence							Pray	Religion		PersonalValuesAndBeliefs
160	bqkquNb5Z8A1	0	0.4	38	Pain	PhysicalHealth							PulmonaryFibrosis	RespiratoryIllness		PhysicalHealth
161	bqkquNb5Z8A10	2.5	3.3	44	Drug	PhysicalHealth							PulmonaryHypertension	RespiratoryIllness		PhysicalHealth
162	bqkquNb5Z8A13	3.3	4	31	Pain	PhysicalHealth							Pulmonary_Rehab	Treatment		LevelOfIndependence
163	qsAnlV8DUXo1	0	0.4	42	PulmonaryFibrosis	PhysicalHealth							QualityOfSocialCare	SocialCare		Environment
164	qsAnlV8DUXo4	0.5	1.3	44	Family	SocialRelationship							Recreation	Rehabilitation		Environment
165	2pzHkvmRSW81	0.1	1.2	68									Redundancy	WorkCapacity		LevelOfIndependence
166	2pzHkvmRSW86	1.4	2.2	46	Friend	SocialRelationship							Relative	PersonalRelationship		SocialRelationship
167	2pzHkvmRSW812	3.2	3.5	34	LungDisease	PhysicalHealth							Relaxation	Rest		PhysicalHealth
													ReligiousCelebration	Religion		PersonalValuesAndBeliefs
													Remembering	CognitiveFunction		PsychologicalHealth
													RunnyNose	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Sadness	NegativeFeeling		PsychologicalHealth
													Safety	PhysicalEnvironment		Environment
													Satisfied	PositiveFeeling		PsychologicalHealth
													Scared	NegativeFeeling		PsychologicalHealth
													Security	PhysicalEnvironment		Environment
													SeekingEmergencyCare	MedicalSelfCare		LevelOfIndependence
													SelfEsteem	BodyImage		PsychologicalHealth
													SenseOfIsolation	NegativeFeeling		PsychologicalHealth
													SexualActivity	SocialActivity		SocialRelationship
													ShortnessOfBreath	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Showering	DailyLiving		LevelOfIndependence
													Sleep	Rest		PhysicalHealth
													Smoking	Behaviour		PhysicalHealth
													Sneezing	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													SocioEconomicallyDisac	FinancialIssue		LevelOfIndependence
													SoreThroat	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Soreness	Pain	PhysicalSymptoms	PhysicalHealth
													SpiritualResources	Spirituality		PersonalValuesAndBeliefs
													SpiritualServices	Spirituality		PersonalValuesAndBeliefs
													Spouse	PersonalRelationship		SocialRelationship
													Strength	Energy		PhysicalHealth
													SwellenLymphNodes	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Tearfulness	NegativeFeeling		PsychologicalHealth
													Temple	Religion		PersonalValuesAndBeliefs
													Tension	NegativeFeeling		PsychologicalHealth
													Thinking	CognitiveFunction		PsychologicalHealth
													TightChest	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Toileting	DailyLiving		LevelOfIndependence
													Toxine	PhysicalEnvironment		Environment
													Traffic	PhysicalEnvironment		Environment
													Training	AcquiringInformation		Environment
													Transport	PhysicalEnvironment		Environment
													TravelExpenses	FinancialIssue		LevelOfIndependence
													TreatmentCost	FinancialIssue		LevelOfIndependence
													Tumor	RespiratoryIllness		PhysicalHealth
													Value	Spirituality		PersonalValuesAndBeliefs
													Vaping	Behaviour		PhysicalHealth
													Wheezing	RespiratoryIllnessSyr	PhysicalSymptoms	PhysicalHealth
													Wife	PersonalRelationship		SocialRelationship
													Will	LegalIssue		LevelOfIndependence
													Workload	WorkCapacity		LevelOfIndependence

1

118+59=177

78+177=255 seconds < 6 minutes (360 seconds)

(118+59)= 4.25 minutes

[[[q9xteXsPy3c2, 0.36, 1.09, 33, [Guilt], [Psychological Health]], [cfyb39S_CZw, 1.2, 2.05, 45,[Hope, Scared, Wife], [Psychological Health, Spcial Realtionship]]], [[wwiwjZw7d6o, 1.14, 3.12, 118, [Treatement, Fear], [LevelOfIndependence, Psychological Health]], [Tyo2YsA0Y05, 2.25, 3.51, 59, [Lung Cancer, Family, Fear, Hope], [Physical Health, Social Relationship, Psychological Health]]]]

if $durations + durationc <= \theta$ **then**
    /* *If the duration of the collected segments is $\leq \theta$, save these segments in the list of the video segments for the Correlative narrative CR* */
    CR.append(Ls); CR.append(Lc);
else
    /* *If the duration of the selected segments is $> \theta$, split the time ($\theta = \theta/2$) between Ls and Lc* */
    $i = 0$; $duration = 0$; $\theta = \theta/2$; $someLs$=[]; $someLc$=[] /* *The lists someLs and someLc include some of the segments from the Ls and Lc lists, respectively* */
    while $i < length(Ls)$ **do**
        if $duration \leq \theta$ **then**
            $someLs$.append(Ls[i]);
            $duration = duration + (Ls[i][0][2] - Ls[i][0][1])$;
        $i = i + 1$;
    $i = 0$; $duration = 0$;
    while $i < length(Lc)$ **do**
        if $duration \leq \theta$ **then**
            $someLc$.append(Lc[i]);
            $duration = duration + (Lc[i][0][2] - Lc[i][0][1])$;
        $i = i + 1$;
    CR.append($someLs$); CR.append($someLc$);
Return CR

Appendix G

Combinational Algorithm tracing

Note: we have added the duration to the segment characterisation to be added as part of the video narratives augumentation text.

Input: LAgg

Concept Path

i Value	VideoID	Start	End	Duration	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Focus Concept	Focus Topic	Concept	Parent		Topic
0	MxmrjLQvg7E1	0	0.4	40	Thinking	PsychologicalHealth	Mum	SocialRelationship	Treatment	LevelOfIndependence			AcquiringInformation			Environment
1	MxmrjLQvg7E4	0.43	1.2	41	LungCancer, Pain	PhysicalHealth	Training	Environment					Behaviour			PhysicalHealth
2	MxmrjLQvg7E7	1.27	2.3	65	Mum	SocialRelationship							BodyImage			PsychologicalHealth
3	MxmrjLQvg7E12	2.34	3.3	51	LungCancer, Energy	PhysicalHealth							CognitiveFunction			PsychologicalHealth
4	rQutyErqBG01	0.04	2.4	159	LungCancer	PhysicalHealth							DailyLiving			LevelOfIndependence
5	rQutyErqBG012	3.25	4	36	Treatment	LevelOfIndependence	Pain	PhysicalHealth	Noise	Environment	Child	SocialRelationship	Diet	Behaviour		PhysicalHealth
6	rQutyErqBG014	4.03	4.6	56	LungCancer	PhysicalHealth							EconomicStatus			Environment
7	rQutyErqBG017	5.01	5.4	42	Insurance	LevelOfIndependence							Energy			PhysicalHealth
8	mWo-G3UQ-zU1	0	2.2	136	Dad	SocialRelationship	Temple	PersonalValuesAndBeliefs								Environment
9	mWo-G3UQ-zU6	2.22	2.3	9	Dad	SocialRelationship	Hope	PsychologicalHealth					FinancialIssue			LevelOfIndependence
10	hQQ5xQGZxdA1	0.01	1.2	82	Caregiver	SocialRelationship	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence			LegalIssue			LevelOfIndependence
11	hQQ5xQGZxdA9	1.54	3.1	80	Pneumonia	PhysicalHealth										LevelOfIndependence
12	hQQ5xQGZxdA15	3.17	4.4	82	LungCancer	PhysicalHealth							MedicalSelfCare			LevelOfIndependence
13	hQQ5xQGZxdA21	4.41	6.5	128	Tumor	PhysicalHealth							Mobility			LevelOfIndependence
14	hQQ5xQGZxdA31	6.52	7.3	36	Wife	SocialRelationship							NegativeFeeling			PsychologicalHealth
15	hQQ5xQGZxdA37	8.1	8.5	37	Thinking	PsychologicalHealth							OtherSymptoms	PhysicalSymptoms		PhysicalHealth
16	hQQ5xQGZxdA40	8.48	10	82	Wife, Community	SocialRelationship	Tumor	PhysicalHealth					Pain	PhysicalSymptoms		PhysicalHealth
17	hQQ5xQGZxdA46	10.1	10	35	Friend	SocialRelationship	LungCancer	PhysicalHealth					PersonalRelationship			SocialRelationship
18	hQQ5xQGZxdA49	10.5	11	35	Caregiver	SocialRelationship										PersonalValuesAndBeliefs
19	hQQ5xQGZxdA55	12	12	34	Caregiver	SocialRelationship							PhysicalEnvironment			Environment
20	hQQ5xQGZxdA58	12.4	13	45	Tumor	PhysicalHealth										PhysicalHealth
21	hQQ5xQGZxdA61	13.3	14	37	Treatment	LevelOfIndependence							PhysicalSymptoms			PhysicalHealth
22	hQQ5xQGZxdA64	14	14	40	Pain	PhysicalHealth	Caregiver	SocialRelationship					PositiveFeeling			PsychologicalHealth
23	hQQ5xQGZxdA67	14.5	15	26	Community	SocialRelationship										PsychologicalHealth
24	xY3B9nLm1u81	0	1.1	73	Sleep, Pain	PhysicalHealth							Rehabilitation			Environment
25	xY3B9nLm1u88	1.54	3.5	116	Pain, Sleep	PhysicalHealth	Thinking	PsychologicalHealth					Religion			PersonalValuesAndBeliefs
26	xY3B9nLm1u818	4.37	5.2	39	Pain	PhysicalHealth	Hope	PsychologicalHealth					RespiratoryIllness			PhysicalHealth
27	xY3B9nLm1u823	5.53	6.4	44	Sleep	PhysicalHealth							RespiratoryIllnessSymptc	PhysicalSymptoms		PhysicalHealth
28	yV893Fx41lE1	0.01	2.2	138	LungCancer	PhysicalHealth							Rest			PhysicalHealth
29	wwiwjZw7d6o1	0.17	1.1	55	Mum, Family	SocialRelationship							SocialActivity			SocialRelationship
30	wwiwjZw7d6o5	1.14	3.1	118	Treatment	LevelOfIndependence	Fear	PsychologicalHealth					SocialCare			Environment
31	wwiwjZw7d6o13	3.14	3.5	36	Child	SocialRelationship										SocialRelationship
32	uJoY4oMLXEY1	0	0.4	42	ShortnessOfBreath	PhysicalHealth							Spirituality			PersonalValuesAndBeliefs
33	uJoY4oMLXEY3	0.46	1.4	49	Copd	PhysicalHealth	Pneumonia						Treatment			LevelOfIndependence
34	uJoY4oMLXEY5	1.38	2.2	37	Exercise	Environment							WorkCapacity			LevelOfIndependence
35	uJoY4oMLXEY9	3.03	3.2	16	Copd	PhysicalHealth							AccessToGreenSpace	PhysicalEnvironment		Environment
36	j3t5nFnTULQ1	0.05	0.5	47	ShortnessOfBreath	PhysicalHealth							Accessibility	WorkCapacity		LevelOfIndependence
37	j3t5nFnTULQ3	0.56	1.5	50	LungDisease	PhysicalHealth	Treatment	LevelOfIndependence					AccessibiltyOfSocial	SocialCare		Environment
38	j3t5nFnTULQ7	2.41	3.3	50	Hope	PsychologicalHealth							Aching	Pain	PhysicalSymptoms	PhysicalHealth
39	j3t5nFnTULQ9	3.36	4.2	46	LungDisease	PhysicalHealth							AcutePain	Pain	PhysicalSymptoms	PhysicalHealth
40	j3t5nFnTULQ11	4.25	4.4	18	Family	SocialRelationship							AddressingMinorAilment	MedicalSelfCare		LevelOfIndependence
41	tfxB32Vb5hE1	0.02	1.4	97	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence					Alcohol	Behaviour		PhysicalHealth
42	tfxB32Vb5hE8	1.43	2.2	35	Tumor	PhysicalHealth							Anger	NegativeFeeling		PsychologicalHealth
43	tfxB32Vb5hE10	2.19	2.5	30	Hope	PsychologicalHealth							Anxiety	NegativeFeeling		PsychologicalHealth
44	0fI_01yFmME1	0.01	0.5	48	Friend	SocialRelationship							Appearance	BodyImage		PsychologicalHealth
45	0fI_01yFmME3	0.51	1.4	49	PulmonaryFibrosis	PhysicalHealth							AppetiteLoss	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
46	0fI_01yFmME7	2.19	3.2	58	Husband	SocialRelationship							Apprehension	NegativeFeeling		PsychologicalHealth
47	0fI_01yFmME11	4.01	4.2	22	Caregiver	SocialRelationship							Asthma	RespiratoryIllness		PhysicalHealth
48	HBFn82ffSVE3	0.35	1.4	60	Pneumonia, Rest	PhysicalHealth	Thinking	PsychologicalHealth					Bathing	DailyLiving		LevelOfIndependence
49	HBFn82ffSVE7	1.38	2.3	55	LungCancer	PhysicalHealth	Tumor						Belief	Spirituality		PersonalValuesAndBeliefs
50	HBFn82ffSVE18	4.25	6.1	109	Meditation	PersonalValuesAndBeliefs							BowelIssues	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
51	HBFn82ffSVE25	6.15	6.4	25	Pneumonia, Rest	PhysicalHealth							Breathlessness	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
52	HBFn82ffSVE30	7.31	7.5	20	LungCancer	PhysicalHealth							Bronchitis	RespiratoryIllness		PhysicalHealth
53	3mcWSmPXFtM1	0	1.4	95	Treatment	LevelOfIndependence							Buddhism	Religion		PersonalValuesAndBeliefs
54	wArV8Ho_C1A1	0.13	0.5	41	Cough	PhysicalHealth							CareInformation	AcquiringInformation		Environment
55	wArV8Ho_C1A3	0.55	1.3	35	Thinking	PsychologicalHealth							CarePlan	LegalIssue		LevelOfIndependence
56	wArV8Ho_C1A5	1.34	2.3	52	Mum	SocialRelationship	Energy, Sleep	PhysicalHealth					Caregiver	PersonalRelationship		SocialRelationship
57	wArV8Ho_C1A8	2.28	3	33	LungCancer	PhysicalHealth							CaregiverAssistance	DailyLiving		LevelOfIndependence
58	wArV8Ho_C1A10	3.04	3.5	47	Husband	SocialRelationship							ChestPain	RespiratoryIllness		PhysicalHealth
59	wArV8Ho_C1A12	3.52	4.2	30	Family	SocialRelationship							Child	PersonalRelationship		SocialRelationship
60	ehh89UrZtZU12	0.01	4.1	246	Copd	PhysicalHealth							Christian	Religion		PersonalValuesAndBeliefs
61	VyGp12XbPzs1	0.1	0.5	44	Pneumonia	PhysicalHealth							ChronicPain	Pain	PhysicalSymptoms	PhysicalHealth
62	VyGp12XbPzs2	0.59	2.2	81	Exercise	Environment	Strength	PhysicalHealth	Treatment	LevelOfIndependence			Church	Religion		PersonalValuesAndBeliefs
63	VyGp12XbPzs4	2.25	3.2	58	Hope	PsychologicalHealth							Climate	PhysicalEnvironment		Environment
64	jZJTcp3d1q41	0.11	2.4	147	Copd	PhysicalHealth							Community	SocialActivity		SocialRelationship
65	jZJTcp3d1q413	3.57	4.2	25	Community, Family	SocialRelationship							ComplexMedication	Treatment		LevelOfIndependence
66	ZU_I9xCB-081	0.04	1.5	104	Copd	PhysicalHealth							Concentration	CognitiveFunction		PsychologicalHealth
67	NI55TpSjWp43	0.42	1.2	41	Covid	PhysicalHealth							Copd	RespiratoryIllness		PhysicalHealth
68	NI55TpSjWp45	1.26	2.2	53	Husband	SocialRelationship							Cough	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
69	NI55TpSjWp49	3	4.3	87	Pneumonia	PhysicalHealth							Covid	RespiratoryIllness		PhysicalHealth
70	NI55TpSjWp414	4.3	5.1	43	Treatment	LevelOfIndependence							CulturalFactors	SocialActivity		SocialRelationship
71	NI55TpSjWp416	5.17	6.5	89	Pneumonia, Rest	PhysicalHealth							Dad	PersonalRelationship		SocialRelationship
72	NI55TpSjWp422	7.11	7.3	18	Determination	PsychologicalHealth							Depression	NegativeFeeling		PsychologicalHealth
73	6U7OpgFojaw3	0.45	1.4	56	Cough	PhysicalHealth							Determination	PositiveFeeling		PsychologicalHealth
74	6U7OpgFojaw6	1.43	2.2	32	Pneumonia	PhysicalHealth							Diarrhea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
75	6U7OpgFojaw8	2.16	2.6	40	Family	SocialRelationship							Digestion	Diet	Behaviour	PhysicalHealth
76	e0KVtXL-TjY1	0.09	0.5	41	Christian	PersonalValuesAndBeliefs							Dirt	PhysicalEnvironment		Environment
77	e0KVtXL-TjY7	1.31	2.1	38	PulmonaryHypertensic	PhysicalHealth							DisableAccess	Mobility		LevelOfIndependence
78	e0KVtXL-TjY10	2.11	2.5	43	Strength	PhysicalHealth	Child	SocialRelationship					Discomfort	Pain	PhysicalSymptoms	PhysicalHealth
79	aHAbRVZOxnk1	0.06	0.4	35	Rest	PhysicalHealth							Drowsiness	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
80	aHAbRVZOxnk3	0.43	1.2	34	PulmonaryFibrosis, Pn	PhysicalHealth							Drug	Behaviour		PhysicalHealth
81	aHAbRVZOxnk5	1.19	2.2	56	Drug	PhysicalHealth							Dyspnea	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
82	aHAbRVZOxnk10	2.58	3.4	41	Treatment	LevelOfIndependence	Rehabilitation	Environment					Education	EconomicStatus		Environment
83	aHAbRVZOxnk12	3.43	4.1	26	Hope	PsychologicalHealth							EndOfLifeCare	LegalIssue		LevelOfIndependence
84	im4bTtQ99SY1	0	2	123	Vaping	PhysicalHealth							Endurance	Energy		PhysicalHealth
85	im4bTtQ99SY9	2.06	2.5	41	Drug	PhysicalHealth	Friend	SocialRelationship					EquipmentCost	FinancialIssue		LevelOfIndependence
86	GV3Rew061FA1	0.02	1.3	87	Copd, Smoking	PhysicalHealth							Excitement	PositiveFeeling		PsychologicalHealth
87	GV3Rew061FA5	1.31	5.1	216	Exercise	Environment							Exercise	Rehabilitation		Environment
88	Nxrz6_e_gwo1	0.02	2.3	152	Copd	PhysicalHealth							Existentiality	Spirituality		PersonalValuesAndBeliefs
89	Nxrz6_e_gwo8	2.39	3.3	46	Family	SocialRelationship							Family	PersonalRelationship		SocialRelationship
90	Nxrz6_e_gwo10	3.3	4.2	46	Copd	PhysicalHealth	Thinking	PsychologicalHealth					Fatigue	Energy		PhysicalHealth
91	q9xteXsPy3c1	0	0.3	31	Cough	PhysicalHealth							Fear	NegativeFeeling		PsychologicalHealth
92	q9xteXsPy3c2	0.36	1.1	33	Guilt	PsychologicalHealth							Fever	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
93	q9xteXsPy3c3	1.13	1.4	31	LungCancer	PhysicalHealth							FinancialSchemes	FinancialIssue		LevelOfIndependence
94	q9xteXsPy3c4	1.5	3.1	75	Family, Friend	SocialRelationship	Tumor	PhysicalHealth	Training	Environment			Flexibility	Energy		PhysicalHealth
95	q9xteXsPy3c6	3.11	4.1	59	Mom, Friend	SocialRelationship	LungCancer	PhysicalHealth					FlexibleWorking	WorkCapacity		LevelOfIndependence
96	POskT8R_3t41	0	0.4	38	PulmonaryHypertensic	PhysicalHealth							FluidIntake	Diet	Behaviour	PhysicalHealth
97	POskT8R_3t43	0.42	1.4	61	Rest, ShortnessOfBrea	PhysicalHealth							FoodPreparation	DailyLiving		LevelOfIndependence
98	POskT8R_3t49	2.57	3.5	53	Treatment	LevelOfIndependence							Friend	PersonalRelationship		SocialRelationship
99	3Fker8Nmd5Y1	0.05	0.6	52	LungDisease	PhysicalHealth							FuneralPlan	LegalIssue		LevelOfIndependence
100	3Fker8Nmd5Y8	2.2	2.5	34	Family, Child	SocialRelationship							Furious	NegativeFeeling		PsychologicalHealth
101	OHeU3oj8nmc1	0	1.2	81	Family	SocialRelationship							Glad	PositiveFeeling		PsychologicalHealth
102	OHeU3oj8nmc7	1.23	2.1	45	Smoking, Cough	PhysicalHealth							Grandchild	PersonalRelationship		SocialRelationship
103	OHeU3oj8nmc14	2.52	3.3	42	Dad	SocialRelationship	LungCancer	PhysicalHealth					Grief	NegativeFeeling		PsychologicalHealth
104	OHeU3oj8nmc20	4.15	4.5	34	Gym	Environment	Grandchild	SocialRelationship	Thinking	PsychologicalHealth			Guilt	NegativeFeeling		PsychologicalHealth
105	OkHESl_I2O83	0.51	1.3	35	Family, Friend	SocialRelationship							Gym	Rehabilitation		Environment
106	OkHESl_I2O813	4.39	5	24	Friend	SocialRelationship							HeartBroken	NegativeFeeling		PsychologicalHealth
107	4AWZD3ClqW81	0.08	2.1	126	EndOfLifeCare	LevelOfIndependence	Friend	SocialRelationship					Hinduism	Religion		PersonalValuesAndBeliefs
108	4AWZD3ClqW85	3.01	3.4	43	Exercise	Environment	MentalHealth	PsychologicalHealth	Family	SocialRelationship			Hope	PositiveFeeling		PsychologicalHealth
109	KFBT8x3DPuM1	0	2.3	147	Child	SocialRelationship							Hopelessness	NegativeFeeling		PsychologicalHealth
110	E8nRS2LxFdw1	0	0.5	45	Pain	PhysicalHealth							Humorous	PositiveFeeling		PsychologicalHealth
111	E8nRS2LxFdw4	0.46	1.3	43	Alcohol, Diet	PhysicalHealth	Treatment	LevelOfIndependence					Husband	PersonalRelationship		SocialRelationship
112	E8nRS2LxFdw7	1.3	2.1	44	Training	Environment							Hypochondriac	NegativeFeeling		PsychologicalHealth
113	n7KHBGEC2Gg1	0	0.5	47	Husband	SocialRelationship							Income	EconomicStatus		Environment
114	n7KHBGEC2Gg10	3.23	4.2	54	Wife	SocialRelationship							Inheritance	LegalIssue		LevelOfIndependence
115	WShT-I0wCO41	0	0.5	50	Pain, Drug	PhysicalHealth							Injuries	MedicalSelfCare		LevelOfIndependence
116	WShT-I0wCO46	1.27	2	34	LungCancer	PhysicalHealth							Insomnia	Rest		PhysicalHealth

Output: Combination Video Narrative CO

j	i	t1	t2	LAgg[i][1]	Lt	Duration(Lt)	
0	0	**Physical Health**	**Level Of Independence**	[]	[]	0	[]
Loop							
37				[Physical Health, Level Of Independence]			
Loop							
41				[Physical Health, Level Of Independence]	[j3t5nFnTULQ, 0.56, 1.50, 50, [Lung Disease, Treatement], [Physical Health, Level Of Independence]] [tfxB32Vb5hE, 0.02, 1.40, 97, [Lung Cancer, Treatement], [Physical Health, Level Of Independence]] [E8nRS2LxFdw, 0.46, 1.30, 43, [Alcoholo, Diet, Treatement], [Physical Health, Level Of Independence]] [Tyo2YsA0Y0, 0.05, 0.40, 33, [Treatement, Lung Cancer],[Level Of		
Loop							
111				[Physical Health, Level Of Independence]			
Loop							
136				[Physical Health, Level Of Independence]			
Loop							
166				**End of i While loop**			
0						50	
1						97	
2						43	
3						33	
4							

(50+97+43+33)=223 < θ (6 minutes)

[[j3t5nFnTULQ, 0.56, 1.50, 50, [Lung Disease, Treatement], [Physical Health, Level Of Independence]], [tfxB32Vb5hE, 0.02, 1.40, 97, [Lung Cancer, Treatement], [Physical Health, Level Of Independence]], [E8nRS2LxFdw, 0.46, 1.30, 43, [Alcoholo, Diet, Treatement], [Physical Health, Level Of Independence]], [Tyo2YsA0Y0, 0.05, 0.40, 33, [Treatement, Lung Cancer],[Level Of Independence, Physical Health]]]

Data: List of the aggregated video segments *LAgg*, which is the output of Algorithm 3 where each segment has: its information at position 0, the list of the Focus Topics at position 1, the the list of the Focus Concepts at position 2. The name of the topics to be learnt t_1 and t_2.

Result: CO: List of video segments to learn the topics t_1 and t_2 by introducing video segments focusing on these topics.

CO=[]; $i = 0$;
$j = 0$;
$\theta = 6$ /* *Set 6 minutes as a max segment duration* */
Lt= [] /* *List of the segments that have the topics t_1 and t_2 as the focus topics in their characterisation* */
while $i < length(LAgg)$ **do**
  /* *Find the characterised video segments where its first element includes both t_1 and t_2* */
  if $t_1 \in LAgg[i][1]$ and $t_2 \in LAgg[i][1]$ **then**
    Lt.append($LAgg$[i]) /* *Each collected segment has, in its second element, focus concepts that belong to t_1 and t_2* */
  $i = i + 1$;
/**Ensure the duration of the collected segments does not exceed θ* */
$i = 0$; $durationt = 0$ /* *Save the duration of the collected segments that have t_1 and t_2 in their Focus Topics FT* */
while $i < length(Lt)$ **do**
  $durationt = durationt + (Lt[i][0][2] - Lt[i][0][1])$;
  $i = i + 1$;
if $durationt \leq \theta$ **then**
  $CO = Lt$;
else
  /* *If the duration of the collected segments is > θ, select some of the collected segment where their duration do not exceed θ* */
  $j = 0$;
  $duration = 0$;
  while $j < length(Lt)$ and $duration \leq \theta$ **do**
    CO.append(Lt[j]) ;
    $duration = duration + (Lt[j][0][2] - Lt[j][0][1])$;
    $j = j + 1$;
Return CO

117	WShT-I0wCO48	2.04	2.4	36	Wife	SocialRelationship				
118	WShT-I0wCO410	2.44	3.3	50	Treatment	LevelOfIndependence				
119	WShT-I0wCO418	5.06	5.4	31	Concentration	PsychologicalHealth	Strength	PhysicalHealth		
120	WShT-I0wCO420	5.39	6.3	50	Treatment	LevelOfIndependence				
121	2utaepga5uk1	0	0.4	38	Pain	PhysicalHealth				
122	2utaepga5uk3	0.47	2.3	102	Treatment	LevelOfIndependence				
123	2utaepga5uk11	3.22	4.1	47	Thinking	PsychologicalHealth				
124	2utaepga5uk14	4.11	4.5	42	Family, Friend	SocialRelationship				
125	2utaepga5uk18	5.34	5.4	9	Thinking	PsychologicalHealth				
126	pmuUnQ5Zi4Q1	0.05	0.6	52	LungCancer, Pain	PhysicalHealth	Mom	SocialRelationship		
127	pmuUnQ5Zi4Q4	1	1.5	52	Energy	PhysicalHealth				
128	pmuUnQ5Zi4Q7	1.56	2.5	55	Husband	SocialRelationship	LungCancer	PhysicalHealth		
129	dyRmGVgG7_84	0.47	1.2	30	Copd	PhysicalHealth				
130	dyRmGVgG7_86	1.19	2.2	58	LungCancer, Drug	PhysicalHealth				
131	dyRmGVgG7_89	2.2	3	42	Gym	Environment	Treatment	LevelOfIndependence	Thinking	PsychologicalHealth
132	aREqsWoX-EY1	0.05	1	55	Wife	SocialRelationship	LungCancer	PhysicalHealth		
133	aREqsWoX-EY8	2.2	3	44	Family	SocialRelationship				
134	9nRhehMpODk3	0.39	1.3	51	Hope	PsychologicalHealth	Treatment	LevelOfIndependence	Pain	PhysicalHealth
135	9nRhehMpODk8	2.11	2.6	48	Hope	PsychologicalHealth				
136	Tyo2YsA0Y01	0.05	0.4	33	Treatment	LevelOfIndependence	LungCancer	PhysicalHealth		
137	Tyo2YsA0Y02	0.43	1.2	36	Hope	PsychologicalHealth				
138	Tyo2YsA0Y03	1.25	2.5	84	Energy	PhysicalHealth	Treatment	LevelOfIndependence		
139	Tyo2YsA0Y05	2.52	3.5	59	LungCancer	PhysicalHealth	Family	SocialRelationship	Fear, Hope	PsychologicalHealth
140	ZoEEgU6L-m81	0.11	1	51	Energy, LungCancer, St	PhysicalHealth				
141	ZoEEgU6L-m85	1.47	2.4	48	Treatment	LevelOfIndependence				
142	ZoEEgU6L-m87	2.39	3.3	50	Exercise	Environment				
143	ZoEEgU6L-m89	3.31	4.5	83	Child	SocialRelationship	Thinking	PsychologicalHealth		
144	FH7aHDHnkjU1	0.03	1.3	91	PulmonaryFibrosis, Co	PhysicalHealth	Mobility	LevelOfIndependence		
145	FH7aHDHnkjU7	1.36	2.1	30	Exercise	Environment				
146	FH7aHDHnkjU9	2.08	2.6	49	Wife	SocialRelationship				
147	FH7aHDHnkjU14	3.35	4.2	47	Exercise	Environment				
148	FH7aHDHnkjU17	4.24	4.5	21	Family	SocialRelationship	Rest	PhysicalHealth		
149	cfyb39S_CZw1	0.06	1.2	73	LungCancer, Smoking	PhysicalHealth				
150	cfyb39S_CZw5	1.2	2.1	45	Hope, Scared	PsychologicalHealth	Wife	SocialRelationship		
151	cfyb39S_CZw7	2.07	2.4	33	LungCancer	PhysicalHealth	Grandchild	SocialRelationship		
152	mSYXddFVvHo1	0.03	0.5	47	LungDisease	PhysicalHealth	Exercise, Trainin	Environment	Family	SocialRelationship
153	mSYXddFVvHo4	0.52	1.3	36	Belief	PersonalValuesAndBelief	Hope	PsychologicalHealth		
154	323hkORG0OM1	0.02	0.4	35	Smoking	PhysicalHealth				
155	323hkORG0OM3	0.4	1.6	77	Tumor	PhysicalHealth				
156	323hkORG0OM9	2.19	2.3	12	LungCancer	PhysicalHealth	Treatment	LevelOfIndependence		
157	LYwQdM-2ok41	0	2.3	147	LungCancer	PhysicalHealth				
158	LYwQdM-2ok49	2.32	3.1	36	Tumor, Drug, Pain	PhysicalHealth				
159	LYwQdM-2ok411	3.12	3.3	14	Insurance	LevelOfIndependence				
160	bqkquNb5Z8A1	0.03	0.4	38	Pain	PhysicalHealth				
161	bqkquNb5Z8A10	2.47	3.3	44	Drug	PhysicalHealth				
162	bqkquNb5Z8A13	3.33	4	31	Pain	PhysicalHealth				
163	qsAnlV8DUXo1	0	0.4	42	PulmonaryFibrosis	PhysicalHealth				
164	qsAnlV8DUXo4	0.47	1.3	44	Family	SocialRelationship				
165	2pzHkvmRSW81	0.08	1.2	68						
166	2pzHkvmRSW86	1.38	2.2	46	Friend	SocialRelationship				
167	2pzHkvmRSW812	3.19	3.5	34	LungDisease	PhysicalHealth				

Insurance	LegalIssue		LevelOfIndependence
Irritability	NegativeFeeling		PsychologicalHealth
Jewish	Religion		PersonalValuesAndBeliefs
LanguageDifficulty	SocialActivity		SocialRelationship
Learning	CognitiveFunction		PsychologicalHealth
Leisure	Rehabilitation		Environment
LossOfIncome	FinancialIssue		LevelOfIndependence
LossOfInterest	NegativeFeeling		PsychologicalHealth
LossOfPleasure	NegativeFeeling		PsychologicalHealth
Loving	PositiveFeeling		PsychologicalHealth
LoweringOfMood	NegativeFeeling		PsychologicalHealth
LungCancer	RespiratoryIllness		PhysicalHealth
LungDisease	RespiratoryIllness		PhysicalHealth
MedicalAid	Treatment		LevelOfIndependence
MedicalInformation	AcquiringInformation		Environment
MedicineCost	FinancialIssue		LevelOfIndependence
MedicineIntake	Treatment		LevelOfIndependence
Meditation	Spirituality		PersonalValuesAndBeliefs
Memory	CognitiveFunction		PsychologicalHealth
MentalHealth	CognitiveFunction		PsychologicalHealth
Mindfulness	Spirituality		PersonalValuesAndBeliefs
MobilityAid	Mobility		LevelOfIndependence
Mom	PersonalRelationship		SocialRelationship
Mosque	Religion		PersonalValuesAndBeliefs
Mould	PhysicalEnvironment		Environment
Mum	PersonalRelationship		SocialRelationship
Muslim	Religion		PersonalValuesAndBeliefs
Nausea	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Nervousness	NegativeFeeling		PsychologicalHealth
Noise	PhysicalEnvironment		Environment
NutrientIntake	Diet	Behaviour	PhysicalHealth
Occupation	EconomicStatus		Environment
Oedema	OtherSymptoms	PhysicalSymptoms	PhysicalHealth
Optimisim	PositiveFeeling		PsychologicalHealth
OrganDonation	LegalIssue		LevelOfIndependence
Parents	PersonalRelationship		SocialRelationship
Parks	PhysicalEnvironment		Environment
PartTime	WorkCapacity		LevelOfIndependence
PeriodicRest	Rest		PhysicalHealth
Pleased	PositiveFeeling		PsychologicalHealth
Pneumonia	RespiratoryIllness		PhysicalHealth
Pollution	PhysicalEnvironment		Environment
Pray	Religion		PersonalValuesAndBeliefs
PulmonaryFibrosis	RespiratoryIllness		PhysicalHealth
PulmonaryHypertension	RespiratoryIllness		PhysicalHealth
Pulmonary_Rehab	Treatment		LevelOfIndependence
QualityOfSocialCare	SocialCare		Environment
Recreation	Rehabilitation		Environment
Redundancy	WorkCapacity		LevelOfIndependence
Relative	PersonalRelationship		SocialRelationship
Relaxation	Rest		PhysicalHealth
ReligiousCelebration	Religion		PersonalValuesAndBeliefs
Remembering	CognitiveFunction		PsychologicalHealth
RunnyNose	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Sadness	NegativeFeeling		PsychologicalHealth
Safety	PhysicalEnvironment		Environment
Satisfied	PositiveFeeling		PsychologicalHealth
Scared	NegativeFeeling		PsychologicalHealth
Security	PhysicalEnvironment		Environment
SeekingEmergencyCare	MedicalSelfCare		LevelOfIndependence
SelfEsteem	BodyImage		PsychologicalHealth
SenseOfIsolation	NegativeFeeling		PsychologicalHealth
SexualActivity	SocialActivity		SocialRelationship
ShortnessOfBreath	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Showering	DailyLiving		LevelOfIndependence
Sleep	Rest		PhysicalHealth
Smoking	Behaviour		PhysicalHealth
Sneezing	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
SocioEconomicallyDisadv	FinancialIssue		LevelOfIndependence
SoreThroat	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Soreness	Pain	PhysicalSymptoms	PhysicalHealth
SpiritualResources	Spirituality		PersonalValuesAndBeliefs
SpiritualServices	Spirituality		PersonalValuesAndBeliefs
Spouse	PersonalRelationship		SocialRelationship
Strength	Energy		PhysicalHealth
SwellenLymphNodes	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Tearfulness	NegativeFeeling		PsychologicalHealth
Temple	Religion		PersonalValuesAndBeliefs
Tension	NegativeFeeling		PsychologicalHealth
Thinking	CognitiveFunction		PsychologicalHealth
TightChest	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Toileting	DailyLiving		LevelOfIndependence
Toxine	PhysicalEnvironment		Environment
Traffic	PhysicalEnvironment		Environment
Training	AcquiringInformation		Environment
Transport	PhysicalEnvironment		Environment
TravelExpenses	FinancialIssue		LevelOfIndependence
TreatmentCost	FinancialIssue		LevelOfIndependence
Tumor	RespiratoryIllness		PhysicalHealth
Value	Spirituality		PersonalValuesAndBeliefs
Vaping	Behaviour		PhysicalHealth
Wheezing	RespiratoryIllnessSym	PhysicalSymptoms	PhysicalHealth
Wife	PersonalRelationship		SocialRelationship
Will	LegalIssue		LevelOfIndependence
Workload	WorkCapacity		LevelOfIndependence

Appendix H

Expert's Evaluation Results of the Semantic Tagging Algorithm (First Domain)

The evaluation result of the Semantic Tagging Algorithm with an expert after implementing it in the first domain (Giving Pitch Presentation)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	SegmentId from a vi	StartT	End	Transcript	Do nothing if you agree with the cocnept and the topic Or highlight the concept or the topic you find incorrect with red or highlight it with Orange if you are not sure								The main topic of the							
2																				
3					Concept1	Missed Concept	My note on the evaluation result	Concept2	Concept3	Concept4	Concept5	Concept6	Topic	Missed Topic						
4	TmbQFWBvTtY1	0	0.2	When we stand and present we want to come across a confident and composed .	Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
5				And one of the great way to do that is by working on our body language . Let 's	Confident			SpeakerEmotion					Delivery							
6				look at three way to improve your nonverbal body language in presentation .	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
7				Coming up .	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
8				Hello again friend . If you never seen one of my video I 'm Alex Lyon .	Communication			Interactivity					PresentationAttribute							
9				And this channel Communication Coach is here to help you increase																
10																				
11	TmbQFWBvTtY2	0.25	0.4	your impact so you can lead your team to higher level of excellence . And I	Impact								PresentationAttribute							
12				believe that presentation skill are a really important part of leadership .	Standing			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
13				You 're going to be standing and presenting quite frequently if you 're in	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
14				any kind of leadership position . So we want to get just a little bit better at	Confident			SpeakerEmotion					Delivery							
15				this . Let 's look at three way you can improve your nonverbal body language so																
16				that people can hear your message in a much more confident and composed way .		Composure	To fix- Domain ontology (composed)							Delivery						
17																				
18	TmbQFWBvTtY3	0.47	1.1	And these tip by the way go together . So each of the three tip have a couple of	Eye		Ignore - It was picked for the segment	EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
19				piece a you 'll see . So the first tip is eye contact and smile . So eye contact .	Smile			FacialExpression	Gesture	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication	Delivery							
20				You have to look directly into somebody 's eye that 's listening about	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
21				99 % of the time . You do n't want to look too much at your note . You do n't want to	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
22				look back at your slide really . You certainly do n't want to look at the	Slide			VisualAidArtefact					VisualAid							
23				floor over their head . A lot of bad habit out there in term of eye contact .	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
24																				
25	TmbQFWBvTtY4	1.13	1.3	You want to look directly in someone 's eye almost the whole time and that	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
26				really take quite a bit of practice . The other thing you want to do is look	Practice			Preparation					Delivery							
27				directly into somebody 's eye long enough to finish a thought and then move	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
28				on to the next person . So you do n't want to just stare at one person the whole	Communication			Interactivity					PresentationAttribute							
29				time and you do n't want to scan so that you 're never locking in . A communication																
30				coach actually once told me `` One thought one look . " So long enough to finish about																
31																				
32	1VCaJ4dSHak1	0.01	0.3	Using gesture when give a public speech is a very important part of your presentation .	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
33				If you fail to use gesture properly and you do awkward gesture throughout your presentat	Speech			LanguageElement	VerbalCommunication				Delivery							
34				you are probably going to distract your audience and you are not going to get the impact t	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
35				you want when you presenting .	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
36				So what are four gesture that we use and how can we use them and use them effectively	Impact								PresentationAttribute							
37				during our presentation ?	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
38																				
39	1VCaJ4dSHak2	0.29	0.5	Hi I am Ryan McLean and I am from publicspeakingpower.com where we teach people lik	Walk		To fix- Domain ontology (walk)	BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
40				powerful public speaker .	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
41				So I am going to walk you through the four gesture that you can use in your presentation	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
42				and so you can become more powerful and effective public speaker .	Gestures			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
43				Gesture number one are descriptive Gestures so these are gesture that we are using to	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
44				describe something or situation .We might draw comparison between something thatâ€™s		SpeakerAura ?	Ignore- Suggested new concept is irrelevant							Delivery?						
45																				
46	1VCaJ4dSHak3	1	1.2	really big and something thatâ€™s really small or we might use it to contrast certain item	Metaphor	SpeakerAura ?	Ignore- Suggested new concept is irrelevant	RhetoricalDevice	VerbalCommunication				Delivery							
47				or to depict the size .	Stand		To fix- Domain ontology (stand)	BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
48				A great example that I am taking from toy master is if you are using a metaphor somethinc	Metaphor			RhetoricalDevice	VerbalCommunication				Delivery							
49				is like a tiny little bird and you are holding like cup stand stating the metaphor of the	Gesture			BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
50				bird and also implying size being small .																
51				You can also use descriptive gesture to say shape say it wa the box this big back																
52																				
53	h6sm47j-Am42	0.2	0.3	and there are a lotta reason why .	Reason		To fix- Domain ontology	ContentIntroduction	OpeningComponent	StructureComponent			Structure	NA						
54				Now at the same time I am 100 % in favor	Humor			RhetoricalDevice	VerbalCommunication				Delivery							
55				of using lighthearted humor in a presentation																
56				and I do it often when I do professional presentation																
57				and when I teach in college .																
58				So there are some difference here																
59																				
60	h6sm47j-Am43	0.35	0.5	but I can give you a really straight ahead way	Humor			RhetoricalDevice	VerbalCommunication				Delivery							
61				to add humor without the big risk of a punchline joke .	Communication			Interactivity					PresentationAttribute	Delivery	both topics are covered here.					
62				So let 's take a look .	Impact								PresentationAttribute	NA						
63				(light music)																
64				Hi I 'm Alex Lyon and this is Communication Coach .																
65				We 're here to help you increase your impact		Impact	Ignore- It was picked for the segment							PresentationAttribute						
66																				
67	dEDcc0aCjaA1	0.01	0.1	`` Hi I 'm Jason Teteak .	Opener			StructureComponent					Structure							
68				I help people overcome their fear of public speaking and deliver amazing presentation																
69				and today I 'm going to show you how to captivate your audience within the first 5 minute of																
70				your presentation .																
71				Here 's how I 'm going to do it . "																
72				`` I 'm going to show you 5 step to deliver a killer opener . "																
73																				
74	dEDcc0aCjaA3	0.43	0.5	What am I going to do ?	Opener			StructureComponent					Structure							
75				Hi Jim .	Practice		Ignore- It was picked for the segment	Preparation					Delivery							
76				How 's it going ?																
77				I 'm freaking out about this big presentation I have to give tomorrow .																
78				Well did you write out your opener and practice it three time ?										Delivery						
79				No .																
80																				
81	dEDcc0aCjaA5	1.1	1.3	Let 's start off with step number one which is `` Give a Confident Introduction . "	Start			StructureComponent					Structure							
82				One of the biggest mistake people make when they start their presentation is showing ner	Confident			SpeakerEmotion					Delivery							
83				Here 's the key : It 's not whether you 're nervous it 's whether you show it .	Introduction			OpeningComponent	StructureComponent				Structure							
84				The first thing you need to do is stand STILL .	Start			StructureComponent					Structure							
85				Do n't move .	Nervousness			SpeakerEmotion					Delivery							
86				Do n't pace and keep your hand at your side .	Nervous			SpeakerEmotion					Delivery							
87					Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
88					Pace	Guesture	To fix- Domain ontology (hand)	Paralanguage	NonVerbalCommunication				Delivery							
89																				
90	MnIPpUiTcRc35	5.56	6	confidence add an authority to	Confidence			SpeakerEmotion					Delivery							
91				everything you say during your	Confidence			SpeakerEmotion					Delivery							
92				presentation but you 're not going to	Practice			Preparation					Delivery							
93				develop the confidence you need if you	Practice			Preparation					Delivery							
94				do n't practice and practice a lot																
95				whatever Dana give a talk or																
96																				
97	MnIPpUiTcRc36	6.05	6.2	presentation he practice he say for	Practice			Preparation					Delivery							
98				hour they do n't want to make sure he	Slide			VisualAidArtefact					VisualAid							
99				ha the timing down that he know every	Slide	Length or Organisation	Ignore- Suggested new concept is irrelevant	VisualAidArtefact					VisualAid	PresentationAttribute						
100				slide so he doe n't have to read off																
101				them he know what the next slide is so																
102				he can smoothly transition between them		TransitionComponent	Ignore- Suggested new concept is irrelevant							Structure						
103																				
104	gaoxXFju6uo20	5.46	6	feeling it ; basically everything that fall under the realm of socializing and personal	Charisma			SpeakerAura					Delivery							
105				development ; that stuff that I 'm interested in and want to help you with .		interactivity	Ignore- Suggested new concept is irrelevant							PresentationAttribute						
106				So go ahead and subscribe .																
107				You need to get our newest video including Charisma Breakdowns and again these talking																
108				head style video .																
109				A question for you guy and for a request is that you write in the comment thing that																
110																				
111	gaoxXFju6uo22	6.24	6.4	up the channel ?	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
112				What make a good video and what go into it ?	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
113				And I 've learned a little bit about not only you know the psychology behind it which																
114				is my bag but also how to do it at a technical level .																
115				So if you 're interested in either of those the psychological piece that might go into																
116				making a video that 's shared virally or if you 're just into the technical aspect of it																
117																				
118	d812a7qG9Kw27	6.12	6.2	you 're going to be boosting	Practice			Preparation					Delivery							
119				your overall performance up quite a bit	Practice			Preparation					Delivery							
120				even if you do n't get to practice it a few extra session .	Speech			LanguageElement	VerbalCommunication				Delivery							
121				So those are the five tip I recommend																
122				in term of how to practice for a speech .																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
123				These are the one I use personally																
124																				
125	d812a7qG9Kw28	6.24	6.4	and I have coached a lot of people over the year	Practice			Preparation					Delivery							
126				to use them and they really do work	Beginning		To fix- Domain ontology	StructureComponent					Structure							
127				so put them into practice a soon a possible .																
128				So I mentioned a couple of resource at the beginning																
129				I wanted to tell you about that are for you .																
130				The first one is a free PDF download .																
131																				
132	d812a7qG9Kw29	6.38	6.5	It 's instant tip to make you a more confident	Confident	composure	To fix- Domain ontology (composure)	SpeakerEmotion					Delivery							
133				and composed public speaker .																
134				You put your email address in																
135				and I email you those instant tip .																
136				It 's a PDF download .																
137				The second resource is a full course that I have created																
138																				
139	eRg3Nq2kRug8	2.17	2.4	there 's a gear shift in what you 're	Nervous			SpeakerEmotion					Delivery							
140				saying a movement which is just nervous	Nervous			SpeakerEmotion					Delivery							
141				pacing this nervous pacing movement will	Clarity								PresentationAttribute							
142				detract your audience away from the		AudienceIntrest,AudienceEmotion	To fix- Domain ontology (audience)							Delivery						
143				clarity of your message all too often		Start,Beginning	Ignore- Suggested new concept is irrelevant							Structure						
144				people start a presentation and from																
145																				
146	eRg3Nq2kRug9	2.4	2.6	beginning to end they barely draw breath	Beginning			StructureComponent					Structure							
147				the full stop is a crucial tool for good	End			StructureComponent					Structure							
148				presentation not only doe the full stop	Breath			MentalPreparation	Preparation				Delivery							
149				allow you to take a breath but more	Breath			MentalPreparation	Preparation				Delivery							
150				importantly it give your audience a		AudienceEmotion	To fix- Domain ontology (audience)							Delivery						
151				chance to catch up to absorb the		Understandability?	Ignore- Suggested new concept is irrelevant							PresentationAttribute						
152																				
153	eRg3Nq2kRug10	3.01	3.2	information that you 've just given them	Information			BodyComponent	StructureComponent				Structure							
154				remember any presentation is a journey	Information			BodyComponent	StructureComponent				Structure							
155				we need to give our audience information	Information			BodyComponent	StructureComponent				Structure							
156				and allow them to absorb it give them		Understandability?	Ignore- Suggested new concept is irrelevant													
157				the next piece of information and allow																
158				them to absorb it that moment of																
159																				
160	6A3qofuTUGQ14	3.36	3.6	despite the fact that it ' s obvious there ' s still a reason why this stuff happens .	Reason		To fix- Domain ontology (reason)	ContentIntroduction	OpeningComponent	StructureComponent			Structure							
161				And you still see it every single year and I ' m sure you know exactly what I mean .	Start			StructureComponent					Structure							
162				There ' s always that one classmate that doe the big no or that one classmate that ' s										PresentationAttribute						
163				you know talking like this talk behind paper .																
164				Whatever it is hopefully if you ' re one of these people what you learned from today																
165				or what ha been reiterated into your head for today Start applying that into your oral .																
166																				
167	6A3qofuTUGQ15	4.01	4.2	If you guy like this video please give it a thumb up because that will let me know	Thumb		To fix- Domain ontology (Thumb)	BodyLanguageSignal	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
168				that you guy are more interested in deeper oral presentation topic .	Topic		To fix- Domain ontology (Topic)	BodyComponent	StructureComponent				Structure							
169				So whether that is structuring an argument or how to present in front of different audience	Persuasive			Impact					PresentationAttribute							
170				I know some school do it in front of the classroom but other school just do it in	Topic			BodyComponent	StructureComponent				Structure							
171				front of teacher or small group of student or how to formulate argument to be more persuasive .																
172				So if you actually needed some help with what topic you should do for this year ' s oral																
173																				
174	eHhqWbl0y4M10	6.02	6.3	It 's not meant to be fun . You want to have the title and the word very easy to read .	Fun		To fix- Domain ontology (Fun)	RhetoricalDevice	VerbalCommunication				Delivery	PresentationAttribute						
175				You do n't want them to be difficult and you do n't want to have people straining their	Title			Text	VisualAidArtefact				VisualAid							
176				eye to figure out what word that is .	Eye			EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
177				I will never forget my grade 4 art teacher telling me that you can never use different	Figure			Illustration	VisualAidArtefact				VisualAid							
178				colour in one word . As an 8 year old I wa just taken back . I wa like :	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
179				`` Oh my god I use different colour all the time Mr . Riley . '' No . So I remember this . Tha	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
180						Clarity, Understandability	Ignore- Suggested new concept is irrelevant													
181																				
182	eHhqWbl0y4M11	6.33	7	if you 're still out there for teaching me this very important lesson .	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
183				But what you can do is you can definitely use different colour one different colour	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
184				to highlight or emphasize one word . So down here you can use one different colour to	Highlight			EmphasisedText	Text	VisualAidArtefact			VisualAid							
185				emphasize important word . So a you can see I want you to focus on the word `` one '' and	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
186				emphasize . The other word I 'm keeping black . So one different colour will really help thi	Focus			Paralanguage	NonVerbalCommunication				Delivery							
187				pop out or stand out . If you use too many colour again get confused . So ...	Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
188					Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
189					Colour			EmphasisedText	Text	VisualAidArtefact			VisualAid							
190																				
191	41ZBTgYSl0c15	6.18	6.4	put face and paper on top of them and then when they were practicing that	Practice			Preparation					Delivery							
192				presentation they were looking at their stuffed animal and looking at those																
193				dummy they made . And during the presentation it wa much easier because they																
194				practice that way to connect because they made their practicing realistic . Now																
195				obviously they 're not real people but maybe you have a roommate or even a dog																
196				that you can present to to keep it real . Once you 're really comfortable and																
197																				
198	41ZBTgYSl0c16	6.42	7	you 've kept it real sometimes people will even add distraction so they might	Distraction			Attention					PresentationAttribute							
199				turn the television on in the background are some music on in the background or	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
200				do it in a somewhat public area . You might look a little crazy but if you can	Distraction			Attention					PresentationAttribute							
201				present conversationally and get through your outline in a nice extemporaneous		practice	Ignore- Suggested new concept is irrelevant							Delivery						
202				fashion even with distraction then you 're much more likely to speak																
203				conversationally in the moment . You never know for example when there 's going to be																
204																				
205	wVcxAhbeMWc11	2.27	2.4	the moment but they 're about to drop	Image			Picture	Figure	Illustration	VisualAidArtefact		VisualAid							
206				like a stone and that 's the moment you	Analogy			RhetoricalDevice	VerbalCommunication				Delivery							
207				want to get out again not always the		Attention	Ignore- Suggested new concept is irrelevant							PresentationAttributes						
208				case but a great image a great analogy		Metaphor,Analogy	Ignore - It was picked for the segment							Delivery						
209				for someone like me for someone like you																
210				to hold on to so think about a complex																
211																				
212	wVcxAhbeMWc12	2.4	2.5	concept that you have that you take for	Image			Picture	Figure	Illustration	VisualAidArtefact		VisualAid							
213				granted that you understand anything how	Analogy			RhetoricalDevice	VerbalCommunication				Delivery							
214				can I create this in an image and																
215				analogy that my audience can grasp here		understandability	Ignore- Suggested new concept is irrelevant							presnetationAttributes						
216				two more this come from a tech company		AudienceEmotion	To fix- Domain ontology (audience)							Delivery						
217				who wa in the process of acquiring																
218																				
219	Q5WT2vweFRY18	4.44	4.6	number 9 tell a story	Story			StructureApproach					Structure							
220				forget the corporate spiel and all those	Text			VisualAidArtefact					VisualAid							
221				text slide that nobody will read tell	Slide			VisualAidArtefact					VisualAid							
222				the audience a story engage in a	Story			StructureApproach					Structure							
223				conversation with the audience and then		Tagret,MainIdea	To fix- Domain ontology (Target)							Structure						
224				and only then talk about target and																
225																				
226	Q5WT2vweFRY19	5	5.1	measurable goal I guarantee you that	Story			StructureApproach					Structure							
227				the audience will remember a story that	KeyMessage			Conclusion	ClosingComponent	StructureComponent			Structure							
228				relates to your key message rather than	Slide			VisualAidArtefact					VisualAid							
229				a barrage load of slide the final point		enthusiasm,SpeakerEmotion,VerbalCommunication ?	Ignore- Suggested new concept is irrelevant							Delivery						
230				that will make you an even better																
231				presenter is be enthusiastic nothing																
232																				
233	T-dbUrluW0M14	3.01	3.1	first couple of sentence where you	Message			Conclusion	ClosingComponent	StructureComponent			Structure							
234				introduce your message a first couple	Nervous			SpeakerEmotion					Delivery							
235				of sentence are so key because they																
236				help you get off on the right foot they																
237				help you relax if you 're nervous and																
238				they help key to the audience what																
239																				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
240	T-dbUrluW0M15	3.13	3.3	you 're going to be talking about so even	Practice			Preparation					Delivery							
241				just practice that part and your	Conclusion			ClosingComponent	StructureComponent				Structure							
242				transition and the conclusion because	Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
243				then you 're anchoring the presentation		Transition	To fix- Domain ontology (Transition)							Structure						
244				now people say well I 've got to talk for																
245				an hour I 'm not going to stand up and do																
246																				
247	El2bHe0GuZQ5	1	1.1	that you are a bit nervous they'll	Nervous			SpeakerEmotion					Delivery							
248				appreciate and respect the fact that	VisualAids								VisualAid							
249				you're doing your best for them	VisualAids								VisualAid							
250				principle number two use visual aids																
251				make sure that your use of visual aids																
252				is skilled and smooth and not excessive																
253																				
254	El2bHe0GuZQ6	1.15	1.3	remember that a picture speaks a	Picture			Figure	Illustration	VisualAidArtefact			VisualAid							
255				thousand words using visual aids will	VisualAids								VisualAid							
256				make things clearer and will also free																
257				up a significant amount of time that you																
258				do I have to spend explaining this time																
259				is better spent interacting with your																
260																				
261	9IEys7g2YFc24	5.13	5.3	like just do it until you're comfortable	Voice			Paralanguage	NonVerbalCommunication				Delivery							
262				that something in your voice has changed	Voice			Paralanguage	NonVerbalCommunication				Delivery							
263				I don't want you to do this without																
264				using a warm-up or some kind of physical																
265				exercises that get your body and your																
266				voice ready to speak now you can do this																
267																				
268	9IEys7g2YFc27	5.51	6	go through all my videos find everything	Practice			Preparation					Delivery							
269				you can practice daily	Practice			Preparation					Delivery							
270				make something up maybe just do one																
271				video a day failing that if you really																
272				don't want to do these exercises and you																
273				don't want to practice daily you're not																
274																				
275	Js7-OWd19PE160	42.3	42	an impression of you your pitch and your	Pitch			Tone	Paralanguage	NonVerbalCommunication			Delivery							
276				idea within the first five to ten	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
277				seconds ten seconds I already have an		Impresseion	Ignore- Suggested new concept is irrelevant							Presentation attribute						
278				impression of you sometimes one second		Beginning	Ignore- Suggested new concept is irrelevant							Structure						
279				there is actually a video application																
280				that is online that helps people look at																
281																				
282	Js7-OWd19PE164	43.4	44	i was looking at in this application was	Pitch			Tone	Paralanguage	NonVerbalCommunication			Delivery							
283				less than a second very fast so when		Opening, beginning,Introduction	Ignore- Suggested new concept is irrelevant							Structure						
284				you're giving your pitch make sure you		impression	Ignore- Suggested new concept is irrelevant							Presentation attribute						
285				don't waste those opening moments and																
286				give people time to let their mind																
287				wander or make an impression about you																
288																				
289	Js7-OWd19PE165	43.5	44	and put you in a box that has nothing to	Nervous			SpeakerEmotion					Delivery							
290				do with who you are but rather that box																
291				might be a reflection of the fact that																
292				you are a little nervous about starting																
293				and you didn't want to seem rude come																
294				right out there with the hook now I want																
295																				
296	3ozZnT72XbM105	28.1	28	challenges that you've spoken about	Summarize			ClosingComponent	StructureComponent				Structure							
297				throughout the presentation	Summarize			ClosingComponent	StructureComponent				Structure							
298				now it's time to summarize that																
299				to recap so you just go over it again																
300				very quickly okay or you can say let's																
301				summarize briefly what we've looked at																
302																				
303	3ozZnT72XbM106	28.3	28	let's summarize briefly what we've	Summarize			ClosingComponent	StructureComponent				Structure							
304				looked at	Conclusion			ClosingComponent	StructureComponent				Structure							
305				right or you can say in conclusion	Conclusion			ClosingComponent	StructureComponent				Structure							
306				okay um in conclusion																
307				there are three big challenges																
308				that international students encounter																
309																				
310	XyRjKCT_wrk11	2.35	2.5	so deliver a performance by standing up	Standing			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
311				now if you're going to stand up you need	Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
312				to raise your laptop up higher so that	Laptop		Ignore - It was picked for the segment	Computer	VisualAidDevice				VisualAid							
313				the lens of the camera is in your direct		Eyeline, Eye,NonVerbalCommunication	Ignore- Suggested new concept is irrelevant							Delivery						
314				eyeline you do not want to be looking																
315				down at your camera lens because then																
316																				
317	XyRjKCT_wrk12	2.52	3.1	all your audience can see is the inside	Standing			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
318				of your nose cavity so standing up will	Stand			BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication			Delivery							
319				just naturally make you deliver a better																
320				presentation and that is key when																
321				delivering a presentation online you are																
322				still performing so stand up and perform																
323																				
324	WufMj1xHX3027	5.49	5.6	with your audience .	Speech			LanguageElement	VerbalCommunication				Delivery							
325				So the final point	Projection			Paralanguage	NonVerbalCommunication				Delivery							
326				is that most of the time when people deliver speech																
327				they speak really quietly																
328				and no one can hear them .																
329				Right so vocal projection really really important .																
330																				
331	WufMj1xHX3030	6.23	6.3	before going out to deliver a speech	Speech			LanguageElement	VerbalCommunication				Delivery							
332				is actually go to the toilet		Projection	Ignore- Suggested new concept is irrelevant													
333				go to like the back oval somewhere at school																
334				and I want you to just shout .																
335				The whole point of this is to just																
336				go crazy and go extreme for a moment																
337																				
338	Rua5eBaX4gw13	2.18	2.3	something that we are going to be	Engagement			Interactivity					PresentationAttribute							
339				covering in depth and in detail	Charisma			SpeakerAura					Delivery							
340				during this course audience engagement																
341				and speaker charisma																
342				is everything like literally everything																
343				if you ca n't keep your audience engaged																
344																				
345	Rua5eBaX4gw16	2.55	3	you need to start acing them	Start		Ignore - It was picked for the segment	StructureComponent					Structure							
346				and if you are someone who doe n't have	Charisma			SpeakerAura					Delivery							
347				charisma																
348				or who doe n't have the ability to keep																
349				your audience engaged																
350				consider doing this course okay																
351																				
352	cj5aSWeJFj42	0.24	0.4	first thing to look more confident is	Confident			SpeakerEmotion					Delivery							
353				believe in yourself but that do n't	Confident			SpeakerEmotion					Delivery							
354				student that day another technique to																
355				look more confident when you 're speaking																
356				is to breathe sound silly but you need																
357				to turn it and bring on the life not																
358																				
359	cj5aSWeJFj43	0.43	0.6	tell me to breathe but here 's something	Nervous			SpeakerEmotion					Delivery							
360				to keep in mind	Breath			MentalPreparation	Preparation				Delivery							
361				number one when we get nervous we tense																
362				up and we tend to hold our breath it 's a																
363				normal reaction we hear noise hear you																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
364				breathe we do the same thing up there on																
365																				
366	cj5aSWeJFj44	1	1.1	stage how many get nervous so remember	Nervous			SpeakerEmotion					Delivery							
367				to remind celebrate and the second thing	Breath			MentalPreparation	Preparation				Delivery							
368				is to read member or house that we read																
369				correctly do we have any singer in the																
370				room																
371				okay so tell me the belly breath you get																
372																				
373	0EI3rSYARpQ174	49.2	49	where it is if I 'm using them a engaged	Communication			Interactivity					PresentationAttribute							
374				but webinars are the hardest when they																
375				CP asked me to do this I 've done this																
376				for them in person in the national my																
377				marketing team did a great immediate																
378				communication she did an awesome job of																
379																				
380	0EI3rSYARpQ177	50.1	50	I 'll do is hey that 's great I 'll kind of	Slide			VisualAidArtefact					VisualAid							
381				bring it back in by saying you know can																
382				we table that here can you talk to me																
383				afterwards about it cuz I know where I 'm																
384				at with my debt I can see my powerpoint																
385				I know what my next slide is and they																
386																				
387	ryXOW1QS0ZM2	0.27	0.5	Now I tell you this because there is this huge misunderstanding	Nervous			SpeakerEmotion					Delivery							
388				that experienced speaker they are not nervous . When you see that speaker on	Nervous			SpeakerEmotion					Delivery							
389				stage and you say like like : `` Well they do it in a natural way ''																
390				No they do n't . They are nervous . But the difference to me																
391				between an experienced and inexperienced speaker is that experience people																
392				know how to handle the nerve . I want to give you this insight because it																
393																				
394	ryXOW1QS0ZM4	1.12	1.3	So a soon a the antenna perceive a kind of danger	Color		Ignore - It was picked for the segment	EmphasisedText	Text	VisualAidArtefact			VisualAid							
395				a button is pushed . It 's a button somewhere here																
396				in your head in your brain and it 's called the amygdala . It ha to shape																
397				of an almond the color of an almond .																
398				It is small a an almond It is a very important button																
399				because a soon a the button is pushed that 's what we call the fight or flight reaction		I think it is about getting Nervous	Ignore- Suggested new concept is irrelevant							Delivery						
400																				
401	wd9reH4g--Y109	32	32	else anybody want to know yes	Feedback			AudienceDesire	AudienceEmotion				Delivery							
402				absolutely involved in with you Carol																
403				what would you suggest to the presenter																
404				about asking their audience to put in a																
405				short feedback form to their future																
406				improvement who I 'm wondering what do																
407																				
408	wd9reH4g--Y111	32.3	32	to the material and how how they felt	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
409				their pacing went and how they thought		Pace	To fix- Domain ontology (Pacing)													
410				they were expressive in body language																
411				I 'm not sure if that answer your																
412				question		QnA?	To fix- Domain ontology (QuestionAnswer)													
413				sure other audience question with we 've																
414																				
415	wd9reH4g--Y125	36.4	37	character that 's relevant to your topic	Topic			BodyComponent	StructureComponent				Structure							
416				and they want to know more they want to	Rehearsal			Preparation					Delivery							
417				see what that person is like they want																
418				to know how they talk they want to																
419				experience their behavior that 's true																
420				from rehearsal something to listen to																
421																				
422	wd9reH4g--Y128	37	37	so each each section each chapter ha	Section			BodyComponent	StructureComponent				Structure							
423				it own color story image alongside	Color			EmphasisedText	Text	VisualAidArtefact			VisualAid							
424				it you 're very very welcome thank you	Story			StructureApproach					Structure							
425				for thanking anything anybody need	Image			Picture	Figure	Illustration	VisualAidArtefact		VisualAid							
426				before we go great fantastic so unless		Thanking ?	To fix- Domain ontology (Thanking)													
427				there 's anything else I 'm going to hand																
428				back to Henry and guy nice thank you																
429																				
430	ISn4Fip9aH810	3.25	3.4	a visual aid even something on the screen could be a powerful way to start									VisualAid							
431				something that help the visual learner in your audience to get on board with	Start			StructureComponent					Structure							
432				what you 're about to say can be a really great way to start . And the last way is	Board			VisualAidDevice					VisualAid							
433				quotation .	Start			StructureComponent					Structure							
434				Now you can start with it a well quotation but I do n't think the	Start			StructureComponent					Structure							
435				well quotation are always best .		Qoutation	To fix- Domain ontology (Quotation)							VisualAid						
436																				
437	ISn4Fip9aH811	3.46	4.1	It 's true the Abraham Lincoln	Impact								PresentationAttribute							
438				and Einstein they all said some amazing thing but the problem with using a		Qoutation	Ignore- Suggested new concept is irrelevant							VisualAid						
439				common quotation is that people have probably already heard it . And it might																
440				not have the impact that you 're trying to have . I think it 's best if you look																
441				for a unique or off quotation . for example I saw a speaker recently give a																
442				quote from Bruce Lee to begin his presentation . His presentation wa n't																
443																				
444	2OBewm5guJk1	0	0.2	I 'm Alex Lyon and you 're about to start a seven mini on Concise	Start		Ignore - It was picked for the segment	StructureComponent					Structure							
445				Clear and Confident Communication . I put this course together because I believe	Confident			SpeakerEmotion					Delivery							
446				It 's really the best first step for you in your professional development laying	Communication			Interactivity					PresentationAttribute							
447				that foundation to develop strong communication skill . Moving forward I	Communication			Interactivity					PresentationAttribute							
448				encourage you to watch all seven lesson .	Practice			Preparation					Delivery							
449				There 's a little practice involved in each one so you can actually hear and																
450																				
451	2OBewm5guJk2	0.24	0.5	then try the idea out . Let 's jump right into the first lesson .	Communication			Interactivity					PresentationAttribute							
452				In lesson one we 're going after long . I encourage you to watch this and go	Communication			Interactivity					PresentationAttribute							
453				through a many time a you need to to make this material a habit . Tip one . Long																
454				windedness is a key enemy of good communication . I 'm always surprised that																
455				really talkative people assume that they 're good communicator . But more																
456				talking doe not equal good communication . In fact a lot of time if																
457																				
458	a5KYIHNKQB85	1.41	2	White space help you define and separate different section ; it give your content	Breath			MentalPreparation	Preparation				Delivery							
459				room to breath .	Text		Ignore - It was picked for the segment	VisualAidArtefact					VisualAid							
460				If your work ever start to feel cluttered or uncomfortable… a little white space might																
461				be just what the doctor ordered .		Section	Ignore- Suggested new concept is irrelevant							structure						
462				Alignment is something you deal with all the time even if you do n't realize it .																
463				Whenever you type an email or create a document the text is aligned automatically .																
464																				
465	a5KYIHNKQB87	2.3	2.6	Each grouping is also evenly spaced and aligned with equal margin .	Attention								PresentationAttribute							
466				It 's that attention to detail that make the composition easier to navigate .	Start			StructureComponent					Structure							
467				Without consistent alignment your work could start to feel disorganized .	Layout			Clarity					PresentationAttribute							
468				Contrast simply mean that one item is different from another .	Eye		Ignore - It was picked for the segment	EyeMotion	BodyMotion	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery							
469				In layout and composition contrast can help you do many thing ; for example catch the	Attention								PresentationAttribute							
470				reader 's eye create emphasis or call attention to something important .		Space, Margin, Alignment	Ignore- Suggested new concept is irrelevant							VisualAids						
471																				
472	a7nz55f9MUY2	0.18	0.3	formal outline with you if you do I got	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
473				some news for you that 's probably not																
474				going to be allowed instead you 're gon na																
475				need to take your speaking note with		note, prepration	Ignore- Suggested new concept is irrelevant							delivery/structure?						
476				you something like this now you might																
477				ask why in the world are speaking note																
478																				
479	a7nz55f9MUY3	0.31	0.4	speaking note are an abbreviated	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
480				version of your formal outline that our	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
481				note card that you take with you to the	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
482				podium now you might be wondering well		note, prepration, cue cards	Ignore- Suggested new concept is irrelevant							delivery/structure?						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
483				why ca n't I just take my outline my																
484				formal outline with me well the primary																
485																				
486	qFLL-XB56UU14	4.38	5	Tell them the story . Okay ? So what is the logical sequence for it ?	Story	body	Ignore- Suggested new concept is irrelevant	StructureApproach					Structure							
487				And the conclusion should make clear	Conclusion			ClosingComponent	StructureComponent				Structure							
488				the body should a well what the takeaway message is .	Message			Conclusion	ClosingComponent	StructureComponent			Structure							
489				So I always say treat this like a	Narrative			StructureApproach					Structure							
490				narrative and tell the story logically .	Story			StructureApproach					Structure							
491				There 're two type of language essentially that you 're using in your writing . It 's the same when		sequence,transition	Ignore- Suggested new concept is irrelevant							structure						
492																				
493	qFLL-XB56UU15	5.04	5.2	you 're speaking in this sort of semi situation .	Topic			BodyComponent	StructureComponent				Structure							
494				There 's content language : that 's what you 're talking about the topic ;	FunctionalLanguage			StructureComponent					Structure							
495				and there 's functional language which give u																
496				the listener the audience signal about what you 're saying .																
497				It might be thing like sectioning .																
498				You know `` First I want to talk about ... '' `` The next thing I want to move on to ... ''																
499																				
500	qFLL-XB56UU17	5.24	5.5	It could be transition : `` Let me move on '' or `` Having said that let me move on to the ne	Summary			ClosingComponent	StructureComponent				Structure							
501				It might be rephrasing or clarifying .	Section			BodyComponent	StructureComponent				Structure							
502				`` Let me rephrase that ... '' `` Let me point out that ... ''	FunctionalLanguage			StructureComponent					Structure							
503				These thing give signal to the audience that something important is about to be said .		transition	To fix- Domain ontology (Transition)							structure						
504				Emphasis ; summary ; concluding ;																
505				moving between section ; giving example ...																
506				All of that type of functional language is extremely important .																
507																				
508	wp4ho9raVjA1	0	0.2	not a long time ago there wa this	Statistic			Analysis	BodyComponent	StructureComponent			Structure							
509				famous survey which concluded that most																
510				people fear public speaking more than																
511				they feared death the American comedian																
512				Jerry Seinfeld summed up the statistic																
513				brilliantly when he said so for the																
514																				
515	wp4ho9raVjA4	0.55	1.1	along now pay attention and take your	Attention		Ignore - It was picked for the segment						PresentationAttribute							
516				first step to becoming a presentation																
517				ninja																
518				you																
519				like with any project you can divide																
520				your presentation into three distinct		devide into ...	Ignore- Suggested new concept is irrelevant							I think it is talking about the Structure but there is no word to explicitly indicate that.						
521																				
522	wp4ho9raVjA6	1.34	1.5	about your listener their bias and	Topic			BodyComponent	StructureComponent				Structure							
523				their expectation address your topic	Objective			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
524				from the audience 's perspective identify	Outline			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
525				the presentation objective the next																
526				step is to outline your presentation so																
527				that you get a clear overview of it																
528																				
529	taifW0vJmZk5	1.32	1.5	think about that and apply that to your	Message			Conclusion	ClosingComponent	StructureComponent			Structure							
530				presentation your public speaking and																
531				even go bit deeper think about the time																
532				you 've been in an audience where you																
533				have pushed back against the presenter																
534				on their message now think of why that																
535																				
536	taifW0vJmZk7	2.14	2.3	communication not only in public	Communication			Interactivity					PresentationAttribute							
537				speaking and front																
538				audience but within small team at work																
539				anytime we need to persuade someone to																
540				take action think of this exercise you																
541				just went through and again when you																
542																				
543	XqOC58-strg2	0.13	0.3	to the computer and drill down on this	Computer			VisualAidDevice					VisualAid							
544				welcome back friend in this video we 're	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
545				going to talk about how to organize the	Approach			BodyComponent	StructureComponent				Structure							
546				main point of a presentation we 'll talk		organize, prepration	Ignore- Suggested new concept is irrelevant							delivery, presentationAttribute?						
547				about several approach and we 'll drill																
548				down a little deeper on the topical																
549																				
550	XqOC58-strg3	0.3	0.4	approach which is often the most tricky	Approach			BodyComponent	StructureComponent				Structure							
551				for people we 're assuming here you have	Introduction			OpeningComponent	StructureComponent				Structure							
552				an introduction body and conclusion to	Conclusion			ClosingComponent	StructureComponent				Structure							
553				your presentation and we 're only talking		Main point	To fix- Domain ontology (MainPoint)							Sructure						
554				about how to arrange the main point of																
555				the presentation we 're not talking about																
556																				
557	bWfN-nczoJI1	0.04	0.1	hey there welcome back to project									Structure							
558				management made easy today we 're going																
559				to be talking about how you can																
560				structure your presentation so let 's		structure	Ignore- Suggested new concept is irrelevant													
561				get to it																
562				now that we 've had a chance to talk																
563																				
564	bWfN-nczoJI2	0.16	0.3	about visuals and body language we can	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
565				now get into the presentation itself	Start			StructureComponent					Structure							
566				where do you start regardless of	PresentationGoal			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
567				different presentation goal there 's one	Story			StructureApproach					Structure							
568				thing everyone love a good story I 'm									Structure							
569				going to show you how you can structure																
570																				
571	RVPW9MWPO3Y2	0.15	0.3	some of the secret here with the three	Slide			VisualAidArtefact					VisualAid							
572				core quote unquote secret I 'll teach																
573				you here and the whole goal is to avoid																
574				presentation like this if you 've ever																
575				been in a presentation where somebody 's																
576				presenting a slide like this you know																
577																				
578	RVPW9MWPO3Y3	0.3	0.5	how painful it is to be in the audience	Information			BodyComponent	StructureComponent				Structure							
579				let 's avoid that so what make McKinsey																
580				presentation different I would argue																
581				it 's something I 'm calling flow which is																
582				that the presentation is easy to digest		undrestandablity	To fix- Domain ontology (undrestandablity)							presentationAttribute						
583				even though it ha complex information																
584																				
585	4prTn3SnLyl2	0.15	0.3	however one of the key fact of an									Structure							
586				effective presentation is it									Structure							
587				structure a good structure help you	Topic			BodyComponent	StructureComponent				Structure							
588				remain	Silence			Paralanguage	NonVerbalCommunication				Delivery							
589				calm stay on topic and avoid any awkward																
590				silence																
591																				
592	4prTn3SnLyl3	0.28	0.4	during the presentation a typical									Structure							
593				presentation structure cover	Section			BodyComponent	StructureComponent				Structure							
594				all the vital section and is a good																
595				starting point for yours		start	To fix- Domain ontology (StartingPoint)							structure						
596				it allows your audience to easily follow																
597				you during the presentation																
598																				
599	df2XcxcdE1A1	0	0.1	hello i am Ram Gopal from presentation	Diagram			Figure	Illustration	VisualAidArtefact			VisualAid							
600				process calm in this edition of																
601				PowerPoint diagram tutorial series you																
602				will learn how to create brick wall																
603				texture in PowerPoint the brick wall																
604				texture you will learn to create look																
605																				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
606	df2XcxcdE1A3	0.34	0.5	to a new slide the first step is to go	Slide			VisualAidArtefact					VisualAid							
607				to auto ship menu and under rectangle																
608				pick up this basic rectangle shape and																
609				draw the size of a brick so this this is																
610				the brick that you are going to																
611				replicate now select that one and while																
612																				
613	7sLXTR9AxKg3	0.34	0.5	presentation in this video we 'll talk	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
614				about the oral presentation component of																
615				the PG online you can expect to have																
616				about 40 to 60 minute for your PG		QnA.closing component	Ignore- Suggested new concept is irrelevant							Structure						
617				online presentation including time for																
618				question and answer you can use visual																
619																				
620	7sLXTR9AxKg6	1.19	1.3	all the detail in your written research	Close			StructureComponent					Structure							
621				proposal instead of giving a close view	Focus			Paralanguage	NonVerbalCommunication				Delivery							
622				of all the detail focus on the big	Picture	biggerpicture, KeyIdea	Ignore - It was picked for the segment	Figure	Illustration	VisualAidArtefact			VisualAid	Structure						
623				picture the heading in the written PG	Heading			Text	VisualAidArtefact				VisualAid							
624				online proposal can guide the structure	Guide			ContentIntroduction	OpeningComponent	StructureComponent			Structure							
625				of your presentation of these heading									Structure							
626					Heading			Text	VisualAidArtefact				VisualAid							
627																				
628	Ujw_21AuU5k1	0	0.1	Everybody love a good story	Story			StructureApproach					Structure							
629				and story are a great way to open a presentation .	Story			StructureApproach					Structure							
630				That attention is a key moment	Attention								PresentationAttribute							
631				in every presentation .		Open,Beginning	To fix- Domain ontology (StartingPoint)							Structure						
632				A lot of people tell me though I 'm just not																
633				a good storyteller .																
634																				
635	Ujw_21AuU5k2	0.14	0.3	Well I 'm going to show you a very simple recipe	Communication		Ignore - It was picked for the segment	Interactivity					PresentationAttribute	Commmunication Coach is different from Communication concept in presentation skills ontology?						
636				that 'll help you improve .	Impact								PresentationAttribute							
637				Hello I 'm Alex Lyon and this is Communication Coach .																
638				We 're here to help you increase your impact																
639				to lead your team to higher level of excellence																
640																				
641	dXWRPWcxvGU1	0	0.2	my next speaker need no introduction unless you are david letterman yes your	Introduction			OpeningComponent	StructureComponent				Structure							
642				guest need that introduction more often than not guest speaker	Introduction			OpeningComponent	StructureComponent				Structure							
643				introduction miss the mark a they are riddled with basic bio	Introduction			OpeningComponent	StructureComponent				Structure							
644				point lack emotional intensity and sometimes people just say the speaker 's		SpeakerIntroduction	Ignore- Suggested new concept is irrelevant							structure						
645				name and fail to create any momentum																
646				whatsoever in this video we look at a proven																
647																				
648	dXWRPWcxvGU2	0.24	0.4	four formula to deliver a memorable speaker introduction that will	Memorable			Impact					PresentationAttribute							
649				captivate your audience hey i 'm Riaz Meghji	SpeakerIntroduction			OpeningComponent	StructureComponent				Structure							
650				founder of the every conversation count platform	Confidence			SpeakerEmotion					Delivery							
651				this is the channel that help you present with confidence	Impact								PresentationAttribute							
652				maximize your impact and connect authentically with your audience																
653				on camera and on stage if you 're new here subscribe to the channel and hit																
654																				
655	KVbRQ0cE0Ok1	0.03	0.2	you have to also use a visual aid do n't									VisualAid							
656				panic I 'm here to help but first thing									VisualAid							
657				first what is a visual aid a visual aid	Speech			LanguageElement	VerbalCommunication				Delivery							
658				is a clarifying device that help your									VisualAid							
659				audience to understand your speech your																
660				visual aid should be a supplement to																
661																				
662	KVbRQ0cE0Ok2	0.25	0.4	what you are saying it should enhance	Message			Conclusion	ClosingComponent	StructureComponent			Structure							
663				and help your audience to understand									VisualAid							
664				your message a visual aid could be a	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
665				PowerPoint presentation a video clip a	Handout			VisualAidArtefact					VisualAid							
666				handout an artifact or even some sort of	Prop			VisualAidArtefact					VisualAid							
667				prop that you bring to class for most																
668																				
669	WHH8Gx0u9ls1	0.17	0.3	welcome to my youtube channel PowerPoint	Diagram			Figure	Illustration	VisualAidArtefact			VisualAid							
670				University in this tutorial I am going		PowerPoint	To fix- Domain ontology (PowerPoint)							VisualAid						
671				to show you a process flow diagram in																
672				PowerPoint which you can do it in le																
673				than five minute you can see here I																
674				have just created the symbol for the																
675																				
676	WHH8Gx0u9ls2	0.31	0.4	start then the decision and then after	Start			StructureComponent					Structure							
677				ated process three process process 1	End			StructureComponent					Structure							
678				process to a process 3 and based on the	Diagram			Figure	Illustration	VisualAidArtefact			VisualAid							
679				process the action will be taken and the		PowerPoint	To fix- Domain ontology (PowerPoint)							VisualAid						
680				end so let 's see how to create this																
681				process flow diagram in PowerPoint in																
682																				
683	k4dEKe6OMWw1	0	0.1	ready to take your infographics to a	Infographics			Diagram	Figure	Illustration	VisualAidArtefact		VisualAid							
684				completely different level	Animation			MovingImage	Illustration	VisualAidArtefact			VisualAid							
685				animation can take you there and visme	Infographics			Diagram	Figure	Illustration	VisualAidArtefact		VisualAid							
686				can help																
687				on this very youtube channel we 've																
688				discussed building infographics for																
689																				
690	k4dEKe6OMWw2	0.16	0.3	quite some time now i could read off	Infographics			Diagram	Figure	Illustration	VisualAidArtefact		VisualAid							
691				reason after reason	Suit		To fix- Semantic Tagging Algorithm	SpeakerAppearance	BodyPosition	BodyLangugenamebodylanguage	NonVerbalCommunication		Delivery	suit is a verb here						
692				after reason a to why you should be																
693				building infographics																
694				to display your information if you 've																
695				been listening and following suit																
696																				
697	Q4SCn6J4ako1	0	0.3	today we 're going to talk about how you	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
698				can most effectively build visual note																
699				into a presentation that you 're giving																
700				let 's sketch it out welcome to purple to																
701				visual video I am your host Doug Neil																
702				and this question of how to build in																
703																				
704	Q4SCn6J4ako2	0.32	1	more visuals into a talk that you 're	Visuals			VisualAidArtefact					VisualAid							
705				giving is one of the question that I	Start			StructureComponent					Structure							
706				most frequently get asked so let 's jump		takeaway,keyIdea	To fix- Domain ontology (Takeaway)							Structure						
707				right into it first up I think it 's																
708				important to start with the takeaway in																
709				mind and then build your presentation																
710																				
711	17alhDQ1k8s2	0.22	0.3	of presentation	Objective		Ignore - It was picked for the segment	ContentIntroduction	OpeningComponent	StructureComponent			Structure							
712				to help do that for today we 're going to	Feedback			AudienceDesire	AudienceEmotion				Delivery							
713				go through some objective																
714				the first one which would be learning																
715				how to be an active listener and to give																
716				feedback to our own peer																
717																				
718	17alhDQ1k8s3	0.35	0.4	we 're going to also learn about how we	Story			StructureApproach					Structure							
719				use presentation a an aid to tell our																
720				own story																
721				and lastly we 'll go over some key																
722				technical presentation																
723				skill on how we can effectively tell																
724																				
725	d5jhyhZ9pZ02	0.28	0.6	visual aid but Oh tell me carry can									VisualAid							
726				see now oh we 're not going to be talking									VisualAid							
727				about that visual aid we 're going to be									VisualAid							
728				talking about visual aid that you can									VisualAid							

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
729				use in your presentation																
730				according to research with visual aid																
731																				
732	d5jhyhZ9pZ03	1	1.2	you can say something without even	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
733				seeing you know so today in this video I									VisualAid							
734				am going to tell you about visual aid	Speech			LanguageElement	VerbalCommunication				Delivery							
735				you can use in your speech firstly									VisualAid							
736				know what a visual aid is now visual																
737				aid are thing or object that you use																
738																				
739	F977vuuxAGA1	0	0.1	hello and congratulation on getting	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
740				access to this video course	Engaging			Interactivity					PresentationAttribute							
741				on how to create engaging presentation	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
742				so this video course is all about prezi	Prezi			Slide	VisualAidArtefact				VisualAid							
743				which is																
744				the software platform that enables you																
745																				
746	F977vuuxAGA2	0.13	0.2	to create	Engaging			Interactivity					PresentationAttribute							
747				engaging presentation now why did we	Engaging			Interactivity					PresentationAttribute							
748				choose this over powerpoint well	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
749				i 'll talk about that in just a minute a																
750				you know																
751				creating engaging video and																
752																				
753	kw_udjD2xwo1	0.09	0.3	If you really want to add some excitement to your presentation try adding some animation	Excitement			SpeakerEmotion					Delivery							
754				PowerPoint ha a wide variety of animated effect that can be applied to text and other	Animation			MovingImage	Illustration	VisualAidArtefact			VisualAid							
755				object .	Text			VisualAidArtefact					VisualAid							
756				In this example I 'm creating a very basic quiz that ha a question on each slide .	Slide			VisualAidArtefact					VisualAid							
757				I 'd like to add animation to these two text box ... and also the man on top of the moon .	Animation			MovingImage	Illustration	VisualAidArtefact			VisualAid							
758				To get started select the first object you want you want to animate ... then go to the	Text			VisualAidArtefact					VisualAid							
759																				
760	kw_udjD2xwo2	0.37	0.6	Animations tab .	Slide			VisualAidArtefact					VisualAid							
761				Next click the drop down arrow to see all the available effect .		Animation	To fix- Domain ontology (Animations)							VisualAids						
762				There are four different category : Entrance which will happen when the object																
763				first appears ...																
764				Emphasis which happens while the object is on the slide ...																
765				Exit which will cause the object to disappear ...																
766																				
767	MdLMLMzudbM1	0.01	0.1	mark pen can be used for producing	MarkPen			VisualAidDevice					VisualAid							
768				highly realistic presentation drawing	Drawing			Diagram	Figure	Illustration	VisualAidArtefact		VisualAid							
769				of product but here we 're using them	Product			Prop	VisualAidArtefact				VisualAid							
770				for quickly adding information to our	Information			BodyComponent	StructureComponent				Structure							
771				design idea to help convey our thought																
772				to a third party																
773																				
774	MdLMLMzudbM2	0.19	0.4	marker pen come in a big range of	Marker			VisualAidDevice					VisualAid							
775				color but they also come in a range of	Color			EmphasisedText	Text	VisualAidArtefact			VisualAid							
776				tone here we 're looking at a range of	Tone			Paralanguage	NonVerbalCommunication				Delivery							
777				gray tone and you can see that with	Tone			Paralanguage	NonVerbalCommunication				Delivery							
778				each pen the gray is a tone darker	Tone			Paralanguage	NonVerbalCommunication				Delivery							
779				to understand how marker pen can add	Marker	MarkerPen	Ignore - It was picked for the segment	VisualAidDevice					VisualAid							
780																				
781	KBXOzq0OpS01	0	0.2	okay start with a blank presentation	Start		Ignore - It was picked for the segment	StructureComponent					Structure							
782				that 's going to open up and give you	Start		Ignore - It was picked for the segment	StructureComponent					Structure							
783				this automatic setup you do n't want this		ContentPrepration	Ignore- Suggested new concept is irrelevant							delivery						
784				so click on each of these box and																
785				delete them you want to start from																
786				scratch next up insert																
787																				
788	KBXOzq0OpS02	0.22	0.4	your video okay so you 've already	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
789				recorded your video you 're going to go	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
790				and get your video from your computer	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
791				here 's mine I 'm going to insert it you	Computer			VisualAidDevice					VisualAid							
792				can put it anywhere you want most people																
793				read from left to right so it 's best to																
794																				
795	i2of4_ZnqS81	0.05	0.2	Hello I 'm Callie .	Speech			LanguageElement	VerbalCommunication				Delivery							
796				What 's the fastest way to tell the difference between a speech and a presentation ?	Audio			VisualAidArtefact					VisualAid							
797				It 's audio .									VisualAid							
798				Today we 'll talk about the importance of visual aid .	Confidence			SpeakerEmotion					Delivery							
799				Thanks for visiting Toastmasters International .																
800				Since 1924 we 've helped more than 4 million people gain the confidence to communicate																
801																				
802	i2of4_ZnqS82	0.27	0.5	in all circumstance .	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
803				One of the most demanding situation you 'll ever face is speaking to an audience .	Confident			SpeakerEmotion					Delivery							
804				This video is part of a series of Toastmasters ' time tip that will help you become	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
805				a more confident speaker .									VisualAid							
806				In this video we 'll explore simple and effective way to make the most of visual aid .	Speech			LanguageElement	VerbalCommunication				Delivery							
807				Let 's begin with a few simple way to add flare to your next speech by incorporating																
808																				
809	i2of4_ZnqS83	0.56	1.2	visual aid .									VisualAid							
810				When presenting for business the most commonly tool are a computer and projector and	Computer			VisualAidDevice					VisualAid							
811				the help of presentation software image can be projected in sequence on a large screen	Projector	Screen	Ignore- Suggested new concept is irrelevant	VisualAidDevice					VisualAid							
812				that even people in the back of the room can easily see .	Image			Picture	Figure	Illustration	VisualAidArtefact		VisualAid							
813				Additionally presentation software make it easier for you to include a short video ;	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
814				however keep in mind that when you play a video that ha audio you 'll need to have a	Video			Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
815					Audio			VisualAidArtefact					VisualAid							
816																				
817																				
818	4pymfPHQ6SA3	0.34	0.5	million text all of this data is	Information			BodyComponent	StructureComponent				Structure							
819				created no not just in a day in 60																
820				second which is why we want to let the																
821				data scientist decipher this																
822				never feed of information but it																
823				is important for all of u to know how																
824																				
825	4pymfPHQ6SA4	0.47	0.6	to present this information in a	Information			BodyComponent	StructureComponent				Structure							
826				visually appealing way that 's why I 'm																
827				here																
828				hello world my name is Mike plugger here																
829				with viz me and I 'm here to show you how																
830				you can create data that appeal to your		VisualAids?	Ignore- Suggested new concept is irrelevant													
831																				
832	S3tuT0yimfM1	0.05	0.2	Designing effective visual aid : so you need to make some visual aid to									VisualAid							
833				enhance your presentation									VisualAid							
834				after you have planned your content it 's time to think about how you will present	Prezi			Slide	VisualAidArtefact				VisualAid							
835				it		PowerPoint?	To fix- Domain ontology (PowerPoint)													
836				first decide which software to use																
837				most student use PowerPoint but there are other option such a prezi																
838																				
839	S3tuT0yimfM2	0.25	0.4	and you can consider that	Video		To fix- Semantic Tagging Algorithm	Film	MovingImage	Illustration	VisualAidArtefact		VisualAid							
840				this video us PowerPoint but the same idea can be used in prezis or other	Start			StructureComponent					Structure							
841				type of software	Font			EmphasisedText	Text	VisualAidArtefact			VisualAid							
842				OK when it come to designing your PowerPoint		Prezi	To fix- Domain ontology (Prezis)							VisualAids						
843				there are some main point to keep in mind		PowerPoint	To fix- Domain ontology (PowerPoint)							VisualAids						
844				you should start with choosing a background and font																
845																				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
846	RJCp-ttFpd41	0	0.2	one way to make your presentation more	KeyIdea			BodyComponent	StructureComponent				Structure							
847				impactful is to use some key idea and	Graphic			Diagram	Figure	Illustration	VisualAidArtefact		VisualAid							
848				principle from the realm of graphic	Start		Ignore - It was picked for the segment	StructureComponent					Structure							
849				design first let 's start with a typical	Slide			VisualAidArtefact					VisualAid							
850				slide what do you think and perhaps more																
851				importantly what will your audience take																
852																				
853	RJCp-ttFpd42	0.19	0.3	yes that 's probably a pretty common form	Text			VisualAidArtefact					VisualAid							
854				but not specifically what 's wrong with		Background	To fix- Domain ontology (Background)							VisualAids						
855				it other than the obvious		Bullet	To fix- Domain ontology (Bullet)							VisualAids						
856				well the solid white background can be																
857				really harsh most of the time there 's																
858				copious amount of text in the bullet																
859																				
860	VCr7ZXNKz6A3	0.55	1.1	of expertise any other specialist	Material			Prop	VisualAidArtefact				VisualAid							
861				knowledge do they know you or each other	KeyMessage			Conclusion	ClosingComponent	StructureComponent			Structure							
862				this will help determine the material																
863				example and the amount of detail you																
864				can use in your presentation number two																
865				one key message there should only be one																
866																				
867	VCr7ZXNKz6A4	1.16	1.3	key message in your presentation which	KeyMessage			Conclusion	ClosingComponent	StructureComponent			Structure							
868				act like the spinal cord to the	Summarize			ClosingComponent	StructureComponent				Structure							
869				presentation and hold everything else																
870				together summarize this in one powerful																
871				sentence and keep it foremost in your																
872				mind throughout the presentation number																
873																				
874	P4zxWqC_fCY2	0.13	0.3	they believe	Information			BodyComponent	StructureComponent				Structure							
875				there ha to be a power point if you		PowerPoint	Ignore- Suggested new concept is irrelevant							VisualAids						
876				think that is presentation																
877				you are wrong presentation mean																
878				any idea any information that is there																
879				in your mind when you want to share it																
880																				
881	P4zxWqC_fCY6	1.08	1.2	attract the audience in order to grab	Attention								PresentationAttribute							
882				the attention of the audience																
883				through different aid are just																
884				acting a assistance to your																
885				presentation																
886				so if somebody say that you should be																
887																				
888	yGQrYH9XOSE1	0	0.1	hello and welcome to this video on	Story			StructureApproach					Structure							
889				presentation skill from the Department																
890				of Engineering Library University of																
891				Cambridge in this video we will cover																
892				the following point telling your story																
893				managing your time planning presenting		prepration/organisation	Ignore- Suggested new concept is irrelevant							Delivery/presentationAttribute						
894																				
895	yGQrYH9XOSE2	0.15	0.3	with style presenting with confidence	Confidence			SpeakerEmotion					Delivery							
896				dealing with question want to learn to	Color			EmphasisedText	Text	VisualAidArtefact			VisualAid							
897				avoid this how many of you have seen																
898				something like this in presentation the																
899				problem is that it 's too cluttered it 's																
900				difficult to read and too many color		Cluttered,Overload, Clarity	Ignore- Suggested new concept is irrelevant							PresentatioAttributes						
901																				
902	Uk_FtRshypl1	0	0.2	In this lecture we 're looking at									VisualAid							
903				highlighting visual aid and that mean																
904				two thing : first focusing the audience 's	Attention								PresentationAttribute							
905				attention on your visual aid ; and second									VisualAid							
906				stating the visual 's general meaning . When																
907				you are presenting a visual aid to the	Meaning		Ignore - It was picked for the segment	LanguageElement	VerbalCommunication				Delivery							
908													VisualAid							
909																				
910	Uk_FtRshypl2	0.17	0.3	audience and you want them to look at it	Attention								PresentationAttribute							
911				to pay attention to it there are some	Expression			SpeakerAura					Delivery							
912				key expression that you can use .	Slide			VisualAidArtefact					VisualAid							
913				Probably the most common is this :	Chart			Figure	Illustration	VisualAidArtefact			VisualAid							
914				`` Ok let 's take a look at this slide ; '' or `` Ok		FunctionalLanguate	Ignore- Suggested new concept is irrelevant							Delivery						
915				let 's take a look at this chart . ''																
916																				
917	upzjPKmMU8I1	0	0.1	hi quasi Millington here is speaker and	Speech			LanguageElement	VerbalCommunication				Delivery							
918				speech coach and today we 're going to									VisualAid							
919				talk about how to use visual aid									VisualAid							
920				effectively in the presentation when it																
921				come to using visual aid in a																
922				presentation I 'm reminded of a quote I																
923																				
924	upzjPKmMU8I2	0.15	0.3	once heard and said that audience will									VisualAid							
925				forgive you for anything during a																
926				presentation except being boring and		boring/SpeakerEmotion	Ignore- Suggested new concept is irrelevant													
927				you 've probably seen it a boring										delivery						
928				presentation that had visual aid and																
929				there are so many mistake that are made																
930																				
931	JF_m8AhkxuM1	0.13	0.5	hello everyone welcome back to n p t e l mock course on developing soft skill and person	Visuals			VisualAidArtefact					VisualAid							
932				this is week eight module number four lecture number forty six i am doctor ravichandran	Visuals			VisualAidArtefact					VisualAid							
933				from the department of humanity and social science of i i t kanpur giving you this course	VerbalCommunication								Delivery							
934				now for the past eight week this is the concluding week and then i started with presentation																
935				skill and this module this lecture will conclude our discussion on presentation skill giving																
936				you more input on how to use visuals visuals is an aspect of non verbal communication along																
937																				
938	JF_m8AhkxuM2	0.55	1.3	with body language we also need to know how you can use this effectively before i start	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
939				let take a quick review of what i do in the previous lecture in the previous lecture i	Start			StructureComponent					Structure							
940				ah addressed the issue of body language in public speaking i told you that the role of	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
941				body language is so crucial that some people use very effective body language and get a	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
942				with ah very fraudulent content also many politician for example they develop just	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
943				skill with le content and use powerful body language to convince the audience but	BodyLanguageSignal			BodyLangugenamebodylanguage	NonVerbalCommunication				Delivery							
944																				
945	ivaja7-MprQ2	0.12	0.2	advantage of using presenter view the	Slide			VisualAidArtefact					VisualAid							
946				first one is																
947				you get note alongside your slide so		note	To fix- Domain ontology (Note)							delivery/structure?						
948				let 's say that you have a big																
949				presentation coming up at work																
950				or maybe you 're a teacher presenting to																
951																				
952	ivaja7-MprQ3	0.23	0.3	your class and you want to make sure	Slide			VisualAidArtefact					VisualAid							
953				that you hit certain point																
954				with the note you can make sure you																
955				cover all the point that you want to																
956				cover																
957				on that slide also you see what 's coming																
958																				
959	rvlfl5Q66T01	0	0.1	so let 's do those and then after you	Excitement		Ignore - It was picked for the segment	SpeakerEmotion					Delivery							
960				know you can just believe they 're kind																
961				of with your name duck in excitement																
962				here 's what 's going to happen today i																
963				will talk to you about presentation aid																
964				and then i will talk to you briefly																
965																				
966	rvlfl5Q66T03	0.34	0.5	you have some question that arise about									Structure							
967				structure about presentation aid about																
968				audience about any of the thing that I																
969				talk to you about revive any other																

	D	E	F
970	issue that you might have with		
971	presentation please ask me and of		
975		345	71
982			**Summary:**
983			**Evaluator results: she said**
984			7.5% (**26** concepts) of the (**345** concepts) are wrongley picked
985			2% (7 concepts) of the concepts wasn't sure about
986			71 new concept suggested

	New concepts suggested by Annotator
To fix - Domain taxonomy	34
To fix - Semantic Tagging Algorithm	5
Ignore- Suggested new concept is irrelevant	40
Ignore - it was picked for the segment	21
Total	100

Appendix I

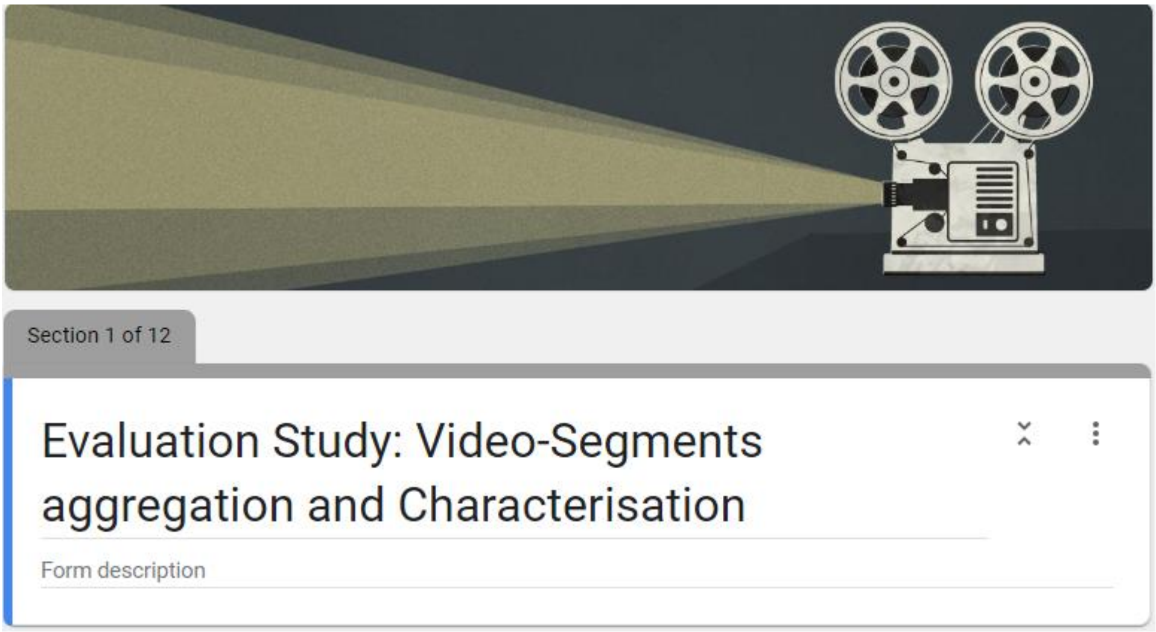
Google Forms for VISC-L Evaluation with experts (First Domain)

Two Google Forms designed and shared with domain expert to evaluate VISC-L by comparing it with the Google Segmentation and Characterisation within the first domain (Giving Pitch Presentation)

First Domain- Giving Pitch Presentation

Evaluate VISC-L in comparable with Google video segmentation and characterisation.

Here, we have included two forms. In the first form we have include 4 videos characterised via Google. Then, we include other 4 videos characterised via VISC-L.



Section 2 of 12

Consent Form

INFORMATION

You are invited to take part in a study on using videos for learning soft skills. The aim of the study is to assess the learning effect and the usefulness of video-segment characterisation and linking to support video-based learning. We have chosen a set of video segments aimed at improving presentation skills.

Your involvement in this study will include the following steps:

1. Read and accept the consent form.

2. Complete a short pre-study section about your profile.

3. Watch several suggested videos with recommended video-segments and their short description related to presentation skills generated using the first computer algorithm.

4. Give your feedback on the video-segments you have watched and their description.

5. Give short video summary.

6. Answer questions providing feedback on the usability and usefulness of recommended video-segments for learning about giving presentations.

7. Repeat the steps from 3-6 with segments from the second computer algorithm.

On completion, you will be entered into a prize draw for one of six £50 Amazon vouchers.

Participation in this study is voluntary and fully anonymous. The study will be conducted using the Google Forms Survey which is fully compliant with all current UK data protection laws. All data that we collect about you during the course of the research will be anonymous (no names, no email addresses, no personal data will be collected). All responses will be saved on the University of Leeds secured OneDrive, which will be accessed only by the members of the research team. The results will be published in conference papers and will be part of PhD research. Your personal response will not be recognised as they will be part of the group of responses which will be analysed together. However, the name of the organisations that we ask to help us conduct the survey might be mentioned.

You are under no obligation to take part in the study. Once you start the online study you may withdraw at any point provided you have not clicked on the 'Submit' button at the end. If you withdraw, your responses will not be used for analysis or for any other purposes. You do not need to give a reason for discontinuing with the survey. Once you click on 'Submit' it will not be possible to withdraw your responses because they are anonymised.

There will be no risks to you regarding your participation in this survey as no personal data will be collected and all your data will be fully anonymised and accessed only by the research group - PhD researcher Abrar Mohammed and the supervisor Prof. Vania Dimitrova. If you wish to enter the prize draw, you will have to leave your email. It will be deleted after choosing the winner and will not be part of your responses on the study.

This evaluation study is part of research carried out at the University of Leeds by PhD researcher Abrar Mohammed (a.mohammed1@leeds.ac.uk) supervised by Prof. Vania Dimitrova (v.g.dimitrova@leeds.ac.uk). They will be pleased to discuss any concerns or feedback you may have about participation in the study.

Thank you for your time. We hope you will join the survey and will enjoy doing it.

Best wishes,
Abrar Mohammed and Vania Dimitrova
School of Computing
University of Leeds

CONSENT

I have read and understood the information about the evaluation of research on characterising video-segments for learning based on user interaction and video content, conducted at the School of Computing, University of Leeds, UK. On this basis I agree to participate in this online survey, and I consent to publication of the results of the evaluation with the understanding that confidentiality will be preserved. I also understand that I may at any time withdraw from the online survey, including withdrawal of any information I have provided. I note that the survey has been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences , University of Leeds.

Please tick Proceed to carry on with the survey *

- [ ] Proceed

After section 2 Continue to next section

Section 3 of 12

Your Profile

Note that all your answers are kept in an anonymous way.

Occupation *

- ○ Student: Undergraduate
- ○ Student: Master
- ○ Student: PhD
- ○ University Staff
- ○ Industry
- ○ Other...

Subject area or job sector *

Short answer text

What is your gender *

- [ ] Female
- [ ] Male
- [ ] Prefer not to say
- [ ] Other...

What is your age? *

	18-23	24-29	30-35	36-41	42-47	48-53	54+
Your choice	☐	☐	☐	☐	☐	☐	☐

Is English your native language? *

- ○ Yes
- ○ No

How often do you watch Youtube videos? *

	Never	Occasionally	Once a month	Every week	Every day
Your answer	☐	☐	☐	☐	☐

How often do you watch videos for learning? *

	Never	Occasionally	Once a month	Every week	Every day
Your answer	☐	☐	☐	☐	☐

How much training have you had on presentation skills? *

	Not at all	Some training	Quite a bit	A lot	Extensive traini...
Your answer	☐	☐	☐	☐	☐

Select the type(s) of training about presenting you have had: *

- ☐ Training at high school
- ☐ Training at university
- ☐ Practice with feedback
- ☐ Professional development training
- ☐ Other...

Please indicate your experience in giving presentations: *

	Not experienced	A little	Medium level	Experienced	Highly experie...
Your answer	☐	☐	☐	☐	☐

Please specify the type of presentations you have given: *

- [ ] Project presentation
- [ ] Course work presentation
- [ ] Seminar
- [ ] Conference presentation
- [ ] Pitching an idea
- [ ] Outreach presentation
- [ ] Presentation for a general audience
- [ ] Other...

After section 3 Go to section 4 (List terms that re...ing presentations)

Section 4 of 12

List terms that relate to giving presentations

Description (optional)

Write all words/phrases (separated by commas) that you can think of which associate with STRUCTURE (as related to giving presentations): *

Long answer text

Write all words/phrases (separated by commas) that you can think of which associate with DELIVERY (as related to giving presentations): *

Long answer text

Write all words/phrases (separated by commas) that you can think of which associate with VISUAL AIDS (as related to giving presentations): *

Long answer text

Write all words/phrases (separated by commas) that you can think of which associate with PRESENTATION CHARACTERISTICS (as related to giving presentations):

Long answer text

After section 4 Continue to next section

Section 5 of 12

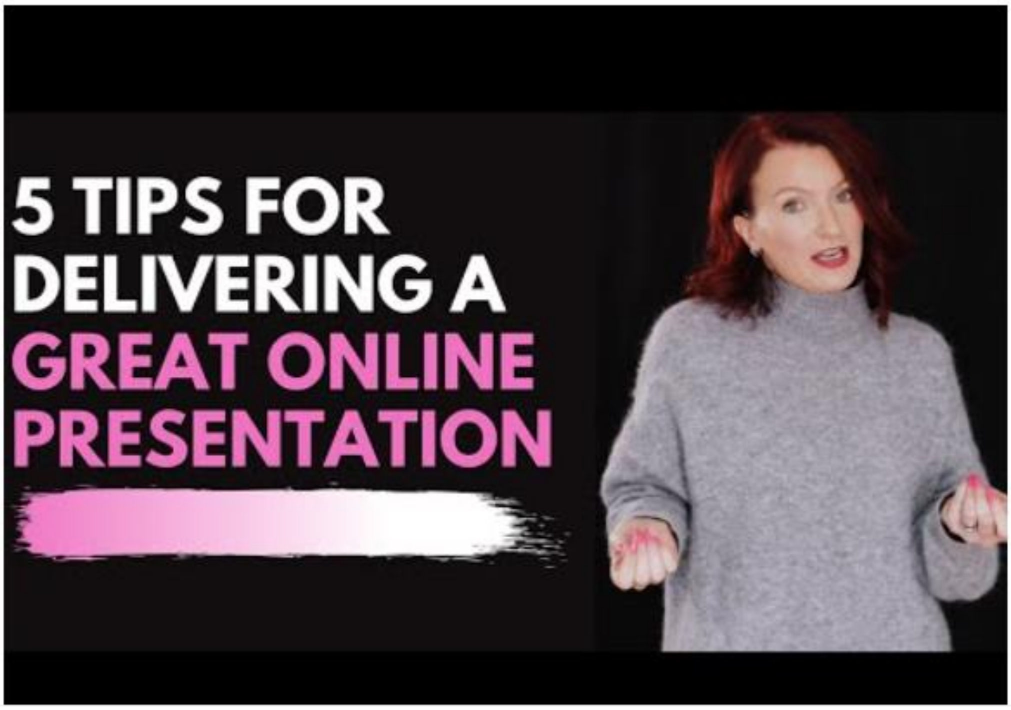
In this Section you will watch 4 videos about presentation skills. Please pay attention to the terms related to giving presentations - Structure, Delivery, Visual Aids and Presentation Characteristics.

Description (optional)

You will also be provided with a list of interesting segments in the video which were identified by a computer algorithm. For each segment, you will see the start as well as a short description what information is covered. The segments and the short description are aimed to assist with your video watching experience by showing main points related to presentation skills.

Description (optional)

Video 1: 5 Tips for delivering a great online presentation



Recommended segments to watch with a short description:

From 0.30 Know the setting you' re in
From 1.13 How quiet is the area?
From 1.29 LIGHTING
From 1.53 Stand up and recite your speech with...
From 2.40 Raise your laptop
From 3.11 Rehearse
From 3.30 Dress to impress
From 4.26 CONSIDER YOUR SUPPORTI....
From 4.59 HAVE A BACKUP

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.30 Know the setting you' re in	☐	☐	☐	☐	☐
From 1.13 How quiet is the area?	☐	☐	☐	☐	☐
From 1.29 LIGHTING	☐	☐	☐	☐	☐
From 1.53 Stand up and recite your speech with...	☐	☐	☐	☐	☐
From 2.40 Raise your laptop	☐	☐	☐	☐	☐
From 3.11 Rehearse	☐	☐	☐	☐	☐
From 3.30 Dress to impress	☐	☐	☐	☐	☐
From 4.26 CONSIDER YOUR SUPPORTI....	☐	☐	☐	☐	☐
From 4.59 HAVE A BACKUP	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 2: How to prepare Speaking Notes From Thinkwell's Public Speaking

Recommended segments to watch:

From 0.28 Why are Speaking Notes...
From 1.15 How to prepare speaking...
From 1.43 What is a Quotation?
From 2.18 Speaking Note Examples
From 2.58 Note Card Size and Spacing
From 3.29 Use a few note cards
From 3.48 Why you should have only a few ...
From 3.58 Note card layouts
From 4.06 Use Large Font
From 4.41 Using Speaking Notes with ...

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

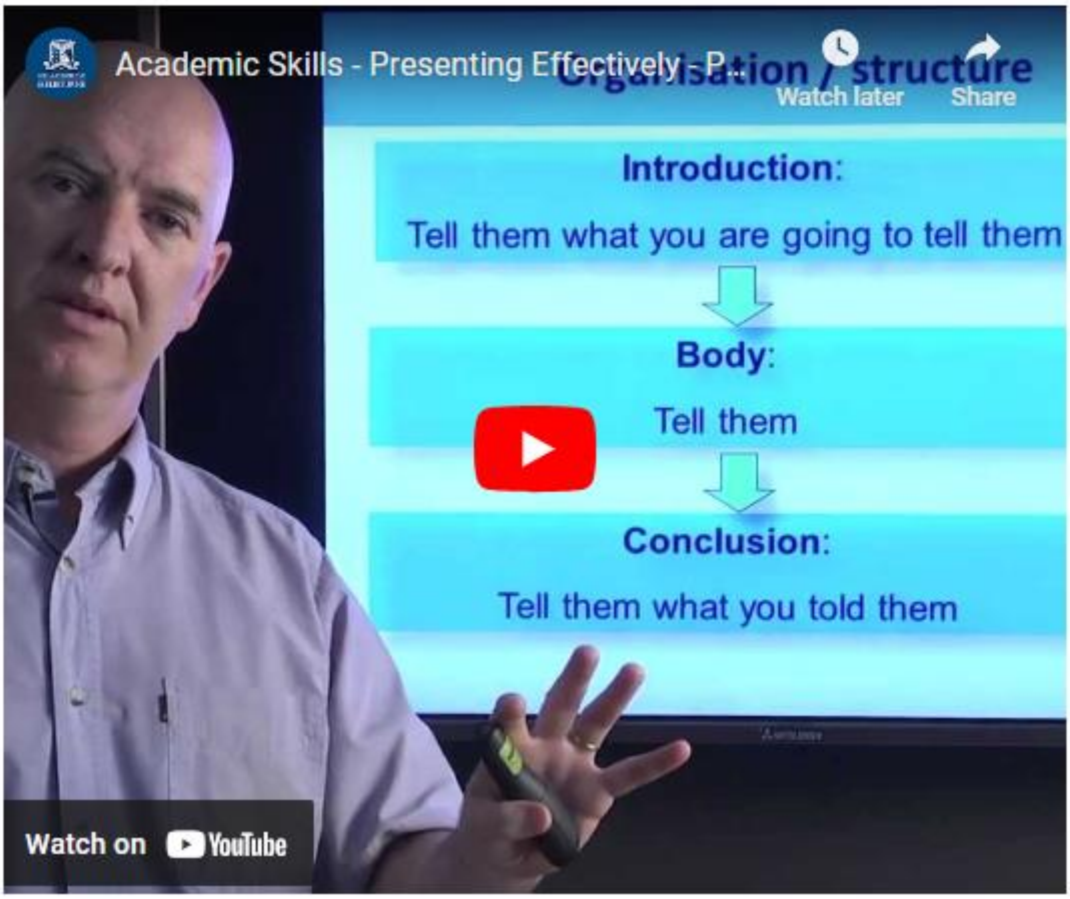
	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.28 Why are Speaking Notes...	☐	☐	☐	☐	☐
From 1.15 How to prepare speaking...	☐	☐	☐	☐	☐
From 1.43 What is a Quotation?	☐	☐	☐	☐	☐
From 2.18 Speaking Note Examples	☐	☐	☐	☐	☐
From 2.58 Note Card Size and Spacing	☐	☐	☐	☐	☐
From 3.29 Use a few note cards	☐	☐	☐	☐	☐
From 3.48 Why you should have only a few ...	☐	☐	☐	☐	☐
From 3.58 Note card layouts	☐	☐	☐	☐	☐

From 4.06 Use Large Font	☐	☐	☐	☐	☐
From 4.41 Using Speaking Notes with ...	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 3: Academic Skills - Presenting Effectively - Part 1



Recommended segments to watch:

From 0.13 Presentation Preparation
From 0.45 Divide Your Talk into Sequenced...
From 1.15 Examples of Presentation Formats
From 1.31 Three – Minute Thesis
From 1.52 Be Aware of Multiple Sensory...
From 2.43 Call to Action
From 3.00 Take – away Message
From 3.34 Organization
From 4.07 Using a Hook
From 5.24 Transitions

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.13 Presentation Preparation	☐	☐	☐	☐	☐
From 0.45 Divide Your Talk into Sequenced...	☐	☐	☐	☐	☐
From 1.15 Examples of Presentation Formats	☐	☐	☐	☐	☐
From 1.31 Three – Minute Thesis	☐	☐	☐	☐	☐
From 1.52 Be Aware of Multiple Sensory...	☐	☐	☐	☐	☐
From 2.43 Call to Action	☐	☐	☐	☐	☐
From 3.00 Take – away Message	☐	☐	☐	☐	☐
From 3.34 Organization	☐	☐	☐	☐	☐
From 4.07 Using a Hook	☐	☐	☐	☐	☐
From 5.24 Transitions	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 4: Powerful Presentation Skills: Practice Your Delivery

Recommended segments to watch:

From 0.02 Why you need to practice your delivery
From 0.40 How to practice your presentation
From 0.48 Dress rehearsal – get familiar with ...
From 1.20 Dress rehearsal – practice bei...
From 2.28 Where do we get tripped up?
From 2.47 What is the best place to practice?
From 3.26 Dress rehearsal for a full hour?
From 3.59 Dress rehearsals for new content

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.02 Why you need to practice your delivery	☐	☐	☐	☐	☐
From 0.40 How to practice your presentation	☐	☐	☐	☐	☐
From 0.48 Dress rehearsal – get familiar with ...	☐	☐	☐	☐	☐
From 1.20 Dress rehearsal – practice bei...	☐	☐	☐	☐	☐
From 2.28 Where do we get tripped up?	☐	☐	☐	☐	☐
From 2.47 What is the best place to practice?	☐	☐	☐	☐	☐
From 3.26 Dress rehearsal for a full hour?	☐	☐	☐	☐	☐
From 3.59 Dress rehearsals for new content	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Back Next Page 5 of 12 Clear form

The questions below ask how you perceive the usefulness of recommended video-segments for learning about giving presentations.

*

The recommended video-segments with the short description enabled me to:

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

What do you find positive about the recommended video-segments with short description for learning?

Your answer

What do you find negative about the recommended video-segments with short description for learning?

Your answer

Back Next Page 6 of 12 Clear form

The following questions gather further feedback on the effect of recommended video-segments for learning

MENTAL DEMAND (1-low .... 20-high)

How mentally demanding was it to watch recommended video-segments to support your learning? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching? Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)

How hard did you have to work (mentally and physically) to watch recommended video-segments to support your learning? Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION (1-low .... 20-high)

How discouraged, irritated, stressed and annoyed did you feel while watching recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)

How successful do you think you were to identify new useful terms from watching the recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high)

Your answer

Please explain your score.

Your answer

Back Next Page 7 of 12 Clear form

In this Section you will watch another 4 videos about presentation skills. Please pay attention to the terms related to giving presentations - Structure, Delivery, Visual Aids and Presentation Characteristics.

You will also be provided with a list of interesting segments in the video which were identified by another computer algorithm.

For each segment, you will see the start and end, as well as a short description what concepts about presentation skills are covered. The segments and the short description are aimed to assist with your video watching experience by showing main points related to presentation skills.

Video 5: How To Make an Interview Presentation

Recommended segments to watch:

0.09 - 0.52 Focus on the topic Delivery by mentioning Audience
0.52 - 1.29 Focus on the topic Structure by mentioning Key Message (Conclusion)
1.29 - 2.08 Focus on the topic Structure by mentioning Section (Body Component)
2.08 - 2.36 Focus on the topic Structure by mentioning Opening (Structure Component)
2.36 - 2.52 Focus on the topic Delivery by mentioning Confidence,
Nervous (Speaker Emotion), Practice (Preparation)
2.52 - 3.25 Focus on the topic Visual Aid by mentioning PowerPoint (Slide)
3.25 - 3.42 Focus on the topic Visual Aid by mentioning Slide (Visual Aid Artefact) and
Focus on the topic Delivery by mentioning Pause (Paralanguage)
3.42 - 4.00 Focus on the topic Delivery by mentioning Voice (Paralanguage)
4.00 - 4.58 Focus on the topic Delivery by mentioning Audience

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.09 - 0.52 Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐
0.52 - 1.29 Focus on the topic Structure by mentioning Key Message (Conclusion)	☐	☐	☐	☐	☐
1.29 - 2.08 Focus on the topic Structure by mentioning Section (Body Component)	☐	☐	☐	☐	☐
2.08 - 2.36 Focus on the topic Structure by mentioning Opening (Structure Component)	☐	☐	☐	☐	☐
2.36 - 2.52 Focus on the topic Delivery by mentioning Confidence, Nervous (Speaker Emotion), Practice (Preparation)	☐	☐	☐	☐	☐

2.52 - 3.25 Focus on the topic Visual Aid by mentioning PowerPoint (Slide)	☐	☐	☐	☐	☐
3.25 - 3.42 Focus on the topic Visual Aid by mentioning Slide (Visual Aid Artefact) and Focus on the topic Delivery by mentioning Pause (Paralanguage)	☐	☐	☐	☐	☐
3.42 - 4.00 Focus on the topic Delivery by mentioning Voice (Paralanguage)	☐	☐	☐	☐	☐
4.00 - 4.58 Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 6: How to Use Humor in a Speech Opening

Recommended segments to watch:

0.0 - 0.17 Focus on the topic STRUCTURE by mentioning START (STRUCTURE COMPONENT) and Focus on the topic PRESENTATION CHARACTERISTICS by mentioning ATTENTION and Focus on the topic DELIVERY by mentioning STAND
0.17 - 0.50 Focus on the topic DELIVERY by mentioning HUMOR (RHETORICAL DEVICE)
0.50 - 1.46 Focus on the topic STRUCTURE by mentioning START (STRUCTURE COMPONENT)
1.46 - 2.56 Focus on the topic PRESENTATION CHARACTERISTICS by mentioning ATTENTION
3.07 - 3.47 Focus on the topic PRESENTATION CHARACTERISTICS by mentioning ATTENTION
3.47 - 4.27 Focus on the topic STRUCTURE by mentioning STORY and Focus on the topic DELIVERY by mentioning HUMOROUS (RHETORICAL DEVICE)
4.27 - 4.39 Focus on the topic DELIVERY by mentioning SMILE (FACIAL EXPRESSION), AUDIENCE
4.39 - 4.52 Focus on the topic VISUAL AIDS by mentioning PICTURE (FIGURE), SLIDE (VISUAL AID ARTEFACT), IMAGE (PICTURE)
4.52 - 5.54 Focus on the topic DELIVERY by mentioning HUMOR (RHETORICAL DEVICE)

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.17 Focus on the topic Structure by mentioning Start (Structure Component) and Focus on the topic Presentation Characteristics by mentioning Attention and Focus on the topic Delivery by mentioning Stand	☐	☐	☐	☐	☐
0.17 - 0.50 Focus on the topic Delivery by mentioning Humor (Rhetorical Device)	☐	☐	☐	☐	☐
0.50 - 1.46 Focus on the topic Structure by mentioning Start (Structure Component)	☐	☐	☐	☐	☐
1.46 - 2.56 Focus on the topic Presentation Characteristics by mentioning Attention	☐	☐	☐	☐	☐

3.07 - 3.47 Focus on the topic Presentation Characteristics by mentioning Attention	☐	☐	☐	☐	☐
3.47 - 4.27 Focus on the topic Structure by mentioning Story and Focus on the topic Delivery by mentioning Humorous (Rhetorical Device)	☐	☐	☐	☐	☐
4.27 - 4.39 Focus on the topic Delivery by mentioning Smile (Facial Expression), Audience	☐	☐	☐	☐	☐
4.39 - 4.52 Focus on the topic Visual Aids by mentioning Picture (Figure), Slide (Visual Aid Artefact), Image (Picture)	☐	☐	☐	☐	☐
4.52 - 5.54 Focus on the topic Delivery by mentioning Humor (Rhetorical Device)	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 7: Oral presentations | Must Dos and Don'ts | Speech delivery | Lisa Tran

Recommended segments to watch:

0.00 - 1.20 Focus on the topic STRUCTURE by mentioning START (STRUCTURE COMPONENT)
1.20 - 1.55 Focus on the topic DELIVERY by mentioning AUDIENCE
1.55 - 2.17 Focus on the topic STRUCTURE by mentioning TOPIC (BODY COMPONENT) and Focus on the topic DELIVERY by mentioning EXPRESSION (SPEAKER AURA)
2.17 - 2.27 Focus on the topic DELIVERY by mentioning EYE (EYE MOTION)
2.27 - 3.17 Focus on the topic DELIVERY by mentioning AUDIENCE
3.17 - 3.32 Focus on the topic DELIVERY by mentioning CONFIDENCE (SPEAKER EMOTION)
3.32 - 3.55 Focus on the topic STRUCTURE by mentioning REASON (CONTENT INTRODUCTION), START (STRUCTURE COMPONENT)
3.55 - 4.43 Focus on the topic STRUCTURE by mentioning TOPIC (BODY COMPONENT)
4.43 - 5.16 Focus on the topic DELIVERY by mentioning CONFIDENCE (SPEAKER EMOTION), TONE (PARALANGUAGE), EYE (EYE MOTION)

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 1.20 Focus on the topic Structure by mentioning Start (Structure Component)	☐	☐	☐	☐	☐
1.20 - 1.55 Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐
1.55 - 2.17 Focus on the topic Structure by mentioning Topic (Body Component) and Focus on the topic Delivery by mentioning Expression (Speaker Aura)	☐	☐	☐	☐	☐

2.17 - 2.27 Focus on the topic Delivery by mentioning Eye (Eye Motion)	☐	☐	☐	☐	☐
2.27 - 3.17 Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐
3.17 - 3.32 Focus on the topic Delivery by mentioning Confidence (Speaker Emotion)	☐	☐	☐	☐	☐
3.32 - 3.55 Focus on the topic Structure by mentioning Reason (Content Introduction), Start (Structure Component)	☐	☐	☐	☐	☐
3.55 - 4.43 Focus on the topic Structure by mentioning Topic (Body Component)	☐	☐	☐	☐	☐
4.43 - 5.16 Focus on the topic Delivery by mentioning Confidence (Speaker Emotion), Tone (Paralanguage), Eye (Eye Motion)	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 8: Beginning Graphic Design: Layout & Composition

Recommended segments to watch:

0.0 - 0.44 Focus on the topic PRESENTATION CHARACTERISTICS by mentioning LAYOUT (CLARITY) and Focus on the topic VISUAL AIDS by mentioning GRAPHICS (DIAGRAM), SOUND (AUDIO)
0.44 - 2.26 Focus on the topic VISUAL AIDS by mentioning TEXT (VISUAL AID ARTEFACT)
2.26 - 3.49 Focus on the topic DELIVERY by mentioning EYE (EYE MOTION)
3.49 - 4.55 Focus on the topic VISUAL AIDS by mentioning COLOR (EMPHASISED TEXT)

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.44 Focus on the topic Presentation Characteristics by mentioning Layout (Clarity)and Focus on the topic Visual Aids by mentioning Graphics (Diagram), Sound (Audio)	☐	☐	☐	☐	☐
0.44 - 2.26 Focus on the topic Visual Aids by mentioning Text (Visual Aid Artefact)	☐	☐	☐	☐	☐
2.26 - 3.49 Focus on the topic Delivery by mentioning Eye (Eye Motion)	☐	☐	☐	☐	☐
3.49 - 4.55 Focus on the topic Visual Aids by mentioning Color (Emphasised Text)	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Back Next Page 8 of 12 Clear form

The questions below ask how you perceive the usefulness of recommended video-segments for learning about giving presentations.

*

The recommended video-segments with the short description enabled me to:

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

What do you find positive about the recommended video-segments with short description for learning?

Your answer

What do you find negative about the recommended video-segments with short description for learning?

Your answer

Back Next Page 9 of 12 Clear form

The following questions gather further feedback on the effect of recommended video-segments for learning

MENTAL DEMAND (1-low .... 20-high)

How mentally demanding was it to watch recommended video-segments to support your learning? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching? Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)

How hard did you have to work (mentally and physically) to watch recommended video-segments to support your learning? Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

FRUSTRATION (1-low .... 20-high)

How discouraged, irritated, stressed and annoyed did you feel while watching recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)

How successful do you think you were to identify new useful terms from watching the recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

Back Next Page 10 of 12 Clear form

Thank you very much for completing the study.

Please provide your email address below if you want to enter a draw of Six £50 Amazon vouchers.

If you provide your email address, it will be used only to pay you the voucher and will be deleted afterwards. It will not be part of the data used in this study.

Your answer

Back Next Page 11 of 12 Clear form

Below is the second form, where we have included 4 videos characterised by VISC-L first. Then, we included other 4 videos characterised by Google. In this case, we will have evaluated VISC-L and Google on the same number of videos. The consent form and the user profile is the same as above. Here, we will include the videos, their characterisation, the Quality categories, the Perceived Usefulness scales and the Cognitive Work Load scales.

Section 5 of 12

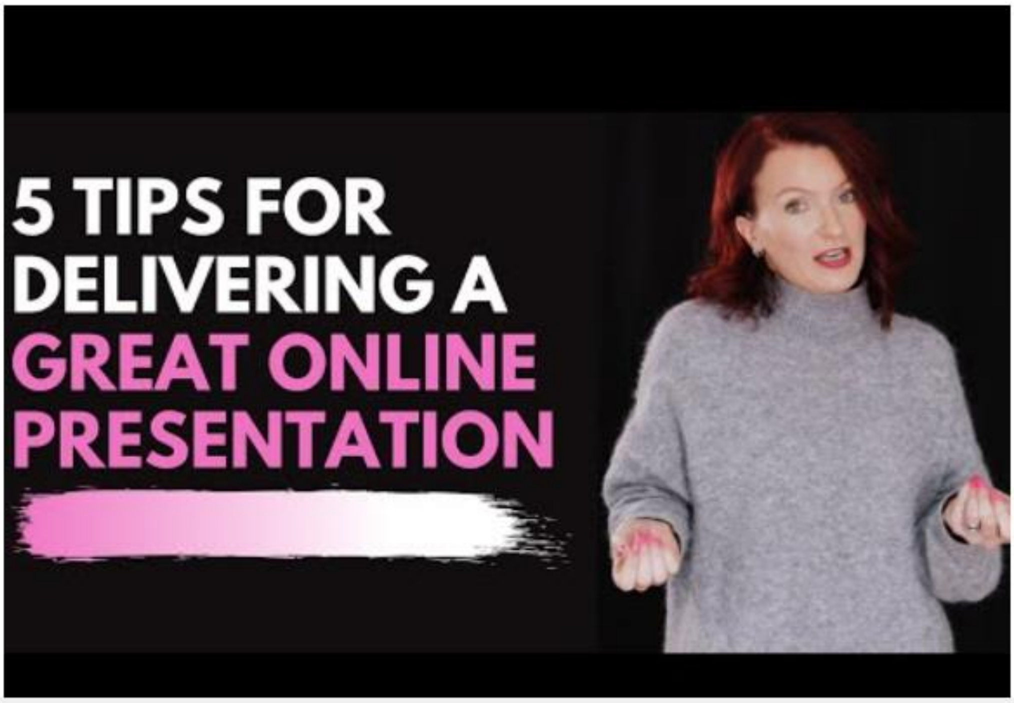
In this Section you will watch 4 videos about presentation skills. Please pay attention to the terms related to giving presentations - Structure, Delivery, Visual Aids and Presentation Characteristics.

Description (optional)

You will also be provided with a list of interesting segments in the video which were identified by a computer algorithm. For each segment, you will see the start and end, as well as a short description what concepts about presentation skills are covered. The segments and the short description are aimed to assist with your video watching experience by showing main points related to presentation skills.

Description (optional)

Video 1: 5 Tips for delivering a great online presentation



Recommended segments to watch:

0.00 - 0.30 Focus on the topic VISUAL AIDS by mentioning VIDEO (FILM), LAPTOP, PHONE (COMPUTER)
0.43 - 1.16 Focus on the topic DELIVERY by mentioning STAND (BODY POSITION)
1.43 - 3.06 Focus on the topic DELIVERY by mentioning STAND (BODY POSITION)
3.06 - 3.27 Focus on the topic DELIVERY by mentioning PRACTICE (PREPARATION)
3.27 - 3.58 Focus on the topic DELIVERY by mentioning DRESS (SPEAKER APPEARANCE)
4.23 - 5.14 Focus on the topic VISUAL AIDS by mentioning VIDEO (FILM)
5.14 - 5.48 Focus on the topic DELIVERY by mentioning AUDIENCE

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.30 Focus on the topic Visual aids by mentioning Video (Film), Laptop, Phone (Computer)	☐	☐	☐	☐	☐
0.43 - 1.16 Focus on the topic Delivery by mentioning Stand (Body position)	☐	☐	☐	☐	☐
1.43 - 3.06 Focus on the topic Delivery by mentioning Stand (Body position)	☐	☐	☐	☐	☐

3.06 - 3.27 Focus on the topic Delivery by mentioning Practice (Preparation)					
3.27 - 3.58 Focus on the topic Delivery by mentioning Dress (Speaker Appearance)					
4.23 - 5.14 Focus on the topic Visual Aids by mentioning Video (Film)					
5.14 - 5.48 Focus on the topic Delivery by mentioning Audience					

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 2: How to prepare Speaking Notes From Thinkwell's Public Speaking

Recommended segments to watch:

0.00 - 0.16 Focus on the topic DELIVERY by mentioning SPEECH (LANGUAGE ELEMENT)
0.16 - 1.33 Focus on the topic STRUCTURE by mentioning OUTLINE (CONTENT INTRODUCTION)
1:33 - 2.07 Focus on the topic STRUCTURE by mentioning QUOTATION (CONTENT INTRODUCTION)
2.07 - 2.18 Focus on the topic DELIVERY by mentioning AUDIENCE and Focus on the topic STRUCTURE by mentioning REFERENCE (CLOSING COMPONENT)
2.52 - 4.31 Focus on the topic VISUAL AID by mentioning NOTE (VISUAL AID ARTEFACT)
4.31 - 5.24 Focus on the topic DELIVERY by mentioning SPEECH (LANGUAGE ELEMENT)

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

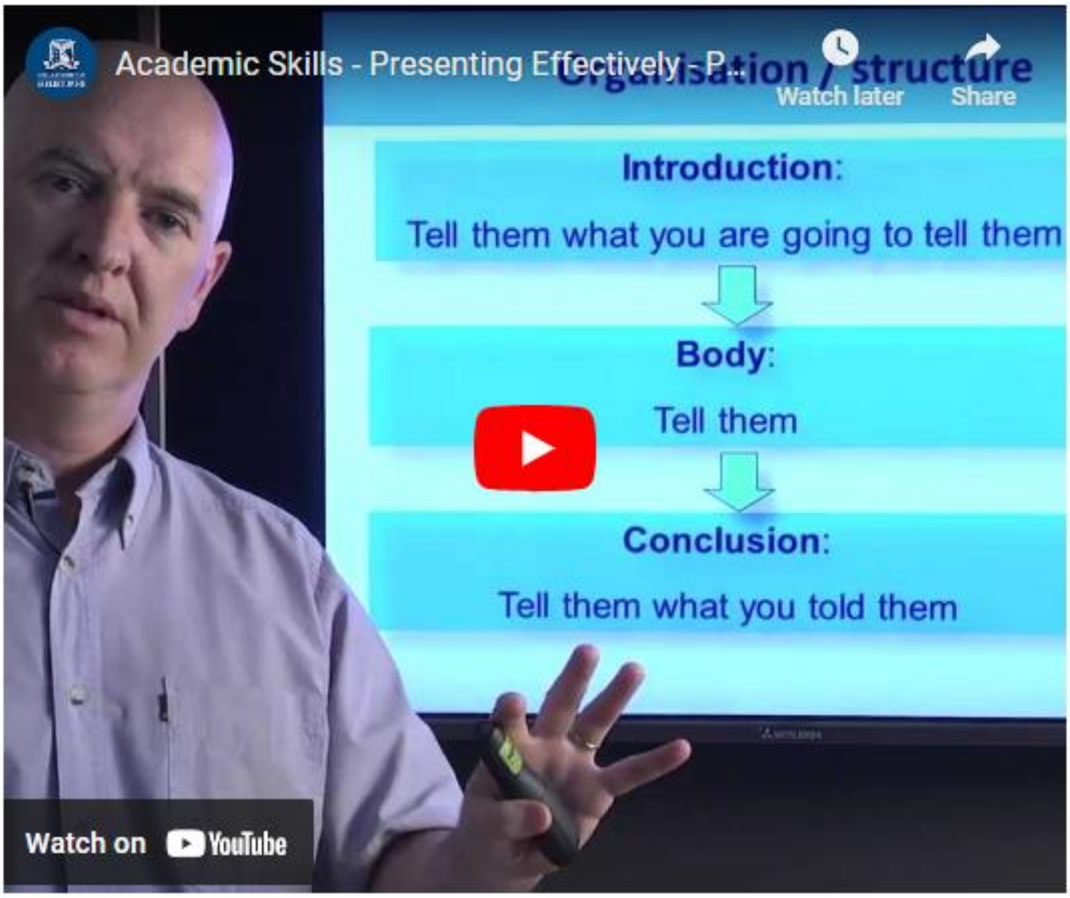
	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.16 Focus on the topic Delivery by mentioning Speech (Language Element)	☐	☐	☐	☐	☐
0.16 - 1.33 Focus on the topic Structure by mentioning Outline (Content Introduction)	☐	☐	☐	☐	☐
1:33 - 2.07 Focus on the topic Structure by mentioning Quotation (Content Introduction)	☐	☐	☐	☐	☐
2.07 - 2.18 Focus on the topic Delivery by mentioning Audience and Focus on the topic Structure by mentioning Reference (Closing Component)	☐	☐	☐	☐	☐

2.52 - 4.31 Focus on the topic Visual Aid by mentioning Note (Visual Aid Artefact)	☐	☐	☐	☐	☐
4.31 - 5.24 Focus on the topic Delivery by mentioning Speech (Language Element)	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 3: Academic Skills - Presenting Effectively - Part 1



Recommended segments to watch:

0.0 - 0.23 Focus on the topic STRUCTURE by mentioning STRATEGY (STRUCTURE COMPONENT) and
Focus on the topic VISUAL AIDS by mentioning POWERPOINT (SLIDE)
0.23 - 0.41 Focus on the topic STRUCTURE by mentioning START (STRUCTURE COMPONENT)
0.41 - 1.47 Focus on the topic STRUCTURE by mentioning INFORMATION (BODY COMPONENT)
1.47 - 2.27 Focus on the topic VISUAL AIDS by mentioning AUDIO (VISUAL AID ARTEFACT)
2.27 - 3.29 Focus on the topic DELIVERY by mentioning AUDIENCE
3.29 - 4.08 Focus on the topic STRUCTURE by mentioning INTRODUCTION (OPENING COMPONENT)
4.08 - 5.00 Focus on the topic STRUCTURE by mentioning STORY (STRUCTURE APPROACH)
5.00 - 5.49 Focus on the topic STRUCTURE by mentioning FUNCTIONAL LANGUAGE (STRUCTURE COMPONENT) and
Focus on the topic DELIVERY by mentioning AUDIENCE

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.23 Focus on the topic Structure by mentioning Strategy (Structure Component) and Focus on the topic Visual Aids by mentioning PowerPoint (Slide)	☐	☐	☐	☐	☐
0.23 - 0.41 Focus on the topic Structure by mentioning Start (Structure Component)	☐	☐	☐	☐	☐
0.41 - 1.47 Focus on the topic Structure by mentioning Information (Body Component)	☐	☐	☐	☐	☐
1.47 - 2.27 Focus on the topic Visual Aids by mentioning Audio (Visual Aid Artefact)	☐	☐	☐	☐	☐

2.27 - 3.29 Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐
3.29 - 4.08 Focus on the topic Structure by mentioning Introduction (Opening Component)	☐	☐	☐	☐	☐
4.08 - 5.00 Focus on the topic Structure by mentioning Story (Structure Approach)	☐	☐	☐	☐	☐
5.00 - 5.49 Focus on the topic Structure by mentioning Functional Language (Structure Component) and Focus on the topic Delivery by mentioning Audience	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 4: Powerful Presentation Skills: Practice Your Delivery

Recommended segments to watch:

0.00 - 0.29 Focus on the topic DELIVERY by mentioning PRACTICE (PREPARATION) and Focus on the topic STRUCTURE by mentioning MESSAGE (CONCLUSION)
0.29 - 0.49 Focus on the topic DELIVERY by mentioning DRESS (SPEAKER APPEARANCE), REHEARSAL (PREPARATION), AUDIENCE
0.49 - 1.28 Focus on the topic DELIVERY by mentioning WALK (BODY POSITION)
1.28 - 1.51 Focus on the topic DELIVERY by mentioning SUIT (SPEAKER APPEARANCE)
1.51 - 2.46 Focus on the topic VISUAL AIDS by mentioning COMPUTER (VISUAL AID DEVICE), SLIDE (VISUAL AID ARTEFACT)
2.46 - 3.25 Focus on the topic DELIVERY by mentioning PRACTICE (PREPARATION), STAND (BODY POSITION)
3.26 - 4.07 Focus on the topic DELIVERY by mentioning DRESS (SPEAKER APPEARANCE), REHEARSAL (PREPARATION)

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
0.00 - 0.29 Focus on the topic Delivery by mentioning Practice (Preparation) and Focus on the topic Structure by mentioning Message (Conclusion)	☐	☐	☐	☐	☐
0.29 - 0.49 Focus on the topic Delivery by mentioning Dress (Speaker Appearance), Rehearsal (Preparation), Audience	☐	☐	☐	☐	☐
0.49 - 1.28 Focus on the topic Delivery by mentioning Walk (Body Position)	☐	☐	☐	☐	☐
1.28 - 1.51 Focus on the topic Delivery by mentioning Suit (Speaker Appearance)	☐	☐	☐	☐	☐

1.51 - 2.46 Focus on the topic Visual Aids by mentioning Computer (Visual Aid Device), Slide (Visual Aid Artefact)	☐	☐	☐	☐	☐
2.46 - 3.25 Focus on the topic Delivery by mentioning Practice (Preparation), Stand (Body Position)	☐	☐	☐	☐	☐
3.26 - 4.07 Focus on the topic Delivery by mentioning Dress (Speaker Appearance), Rehearsal (Preparation)	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

The questions below ask how you perceive the usefulness of recommended video-segments for learning about giving presentations.

The recommended video-segments with the short description enabled me to: *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

What do you find positive about the recommended video-segments with short description for learning?

Your answer

What do you find negative about the recommended video-segments with short description for learning?

Your answer

Back Next Page 6 of 12 Clear form

The following questions gather further feedback on the effect of recommended video-segments for learning

MENTAL DEMAND (1-low .... 20-high)

How mentally demanding was it to watch recommended video-segments to support your learning? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching? Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)

How hard did you have to work (mentally and physically) to watch recommended video-segments to support your learning? Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION (1-low .... 20-high)

How discouraged, irritated, stressed and annoyed did you feel while watching recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

1

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)

How successful do you think you were to identify new useful terms from watching the recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high)

Your answer

Please explain your score.

Your answer

In this Section you will watch another 4 videos about presentation skills. Please pay attention to the terms related to giving presentations - Structure, Delivery, Visual Aids and Presentation Characteristics.

You will also be provided with a list of interesting segments in the video which were identified by another computer algorithm.

For each segment, you will see the start as well as a short description what information is covered. The segments and the short description are aimed to assist with your video watching experience by showing main points related to presentation skills.

Video 5: How To Make an Interview Presentation

Recommended segments to watch:

From 0.43 Create a profile on the interviewer ...
From 1.35 Restrict your presentation to three mai...
From 2.29 Set the tone for the rest of the ...
From 3.09 Address the interview panel at the ...
From 3.46 Gather your thoughts
From 4.34 Leave the audience with a final thought

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.43 Create a profile on the interviewer ...	☐	☐	☐	☐	☐
From 1.35 Restrict your presentation to three mai...	☐	☐	☐	☐	☐
From 2.29 Set the tone for the rest of the ...	☐	☐	☐	☐	☐
From 3.09 Address the interview panel at the ...	☐	☐	☐	☐	☐
From 3.46 Gather your thoughts	☐	☐	☐	☐	☐
From 4.34 Leave the audience with a final thought	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 6: How to Use Humor in a Speech Opening

Recommended segments to watch:

From 1.00 Attention Grabbers
From 2.07 Deliberately Quote Someone
From 3.35 Telling a Light-Hearted Story
From 4.39 Show Something Visual on th...
From 5.39 Question of the Day

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 1.00 Attention Grabbers	☐	☐	☐	☐	☐
From 2.07 Deliberately Quote Someone	☐	☐	☐	☐	☐
From 3.35 Telling a Light-Hearted Story	☐	☐	☐	☐	☐
From 4.39 Show Something Visual on th...	☐	☐	☐	☐	☐
From 5.39 Question of the Day	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 7: Oral presentations | Must Dos and Don'ts | Speech delivery | Lisa Tran

Recommended segments to watch:

From 0.35 Start off with a bang (rhetorical...

From 1.46 Body language (arms, facial...)

From 2.23 No awkward breaks (and how to deal ...

From 2.48 Practice your oral memorising ...

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.35 Start off with a bang (rhetorical...	☐	☐	☐	☐	☐
From 1.46 Body language (arms, facial...)	☐	☐	☐	☐	☐
From 2.23 No awkward breaks (and how to deal ...	☐	☐	☐	☐	☐
From 2.48 Practice your oral memorising ...	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Video 8: Beginning Graphic Design: Layout & Composition

Recommended segments to watch:

From 0.49 Proximity
From 1.20 Whitespace
From 1.55 Alignment
From 2.16 Be consistent
From 2.46 Contrast
From 3.48 Repetition

Please give your feedback on the recommended segments for learning about giving presentations (you can select several options).

	This video segment was USEFUL	This video segment was NOT USEFUL	The short DESCRIPTION of the video segment was HELPFUL	The short DESCRIPTION of the video segment was UNHELPFUL	I DID NOT WATCH this video segment
From 0.49 Proximity	☐	☐	☐	☐	☐
From 1.20 Whitespace	☐	☐	☐	☐	☐
From 1.55 Alignment	☐	☐	☐	☐	☐
From 2.16 Be consistent	☐	☐	☐	☐	☐
From 2.46 Contrast	☐	☐	☐	☐	☐
From 3.48 Repetition	☐	☐	☐	☐	☐

SUMMARY: List main points about giving presentations that you picked in this video, focus on: DELIVERY, STRUCTURE, VISUAL AIDS, PRESENTATION CHARACTERISTICS.

Your answer

Back Next Page 8 of 12 Clear form

The questions below ask how you perceive the usefulness of recommended video-segments for learning about giving presentations.

The recommended video-segments with the short description enabled me to: *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

What do you find positive about the recommended video-segments with short description for learning?

Your answer

What do you find negative about the recommended video-segments with short description for learning?

Your answer

Back Next Page 9 of 12 Clear form

The following questions gather further feedback on the effect of recommended video-segments for learning

MENTAL DEMAND (1-low .... 20-high)

How mentally demanding was it to watch recommended video-segments to support your learning? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching? Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)

How hard did you have to work (mentally and physically) to watch recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

FRUSTRATION (1-low .... 20-high)

How discouraged, irritated, stressed and annoyed did you feel while watching recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)

How successful do you think you were to identify new useful terms from watching the recommended video-segments to support your learning?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

Back Next Page 10 of 12 Clear form

Thank you very much for completing the study.

Please provide your email address below if you want to enter a draw of Six £50 Amazon vouchers.

If you provide your email address, it will be used only to pay you the voucher and will be deleted afterwards. It will not be part of the data used in this study.

Your answer

Back Next Page 11 of 12 Clear form

Appendix J

Google Form for VIN-L Evaluation (First Domain)

The Google Form designed and shared with the domain experts to evaluate VIN-L output in the first domain. Another four forms with the same structure but each form for a specific video narratives have been shared with Amazon Mechanical Turk workers.

Giving Pitch Presentation domain:The Video narratives evaluation form using Google Forms

Evaluation of video narratives to support presentation skills learning

Thank you for helping with evaluating the video narratives that have been generated from Abrar Mohammed's PhD project conducted at the University of Leeds, UK.

In this evaluation, you will assess **several video narratives** to help with learning presentation skills, including delivery, structure, visual aids, presentation attributes. A video narrative is a combination of video segments which have been automatically characterised and linked together by computer algorithms. You will be given a scoring sheet for each video narrative.

You will watch **19 video narratives**, and the evaluation takes **around 8-10 minutes per narrative**. You will have to log on with your Google account. When you fill out a Google Form in your Google account, **your progress is automatically saved**. This means if you can't complete the form or need to switch devices, your earlier responses will be saved, if you do not press SUBMIT. When you come back to the form, you will start from where you stopped last time. If you press SUBMIT and would like to come back to the form, you will start from the beginning, just be careful, please!

Your evaluation is essential to assess the potential benefits of the generated video narratives to support learning. Based on your evaluation, the best narratives will be selected for evaluation with learners.

The evaluation will take all together approximately 3 hours. You will be reimbursed for your time with £50 Amazon voucher.

Thank you very much for your help.

If you have any questions please contact:

- Abrar Mohammad <a.mohammed1@leeds.ac.uk>
- Vania Dimitrova <v.g.dimitrova@leeds.ac.uk>

a.mohammed1@leeds.ac.uk Switch account

Not shared

Next

Clear form

The evaluation will include the following steps:

1. Click on the video narrative link, which will open in a new tab. You can also copy the link and open it in a browser yourself.

2. Go through the video narrative page by following the descriptions and watch the suggested video segments (you will watch between 3 to 5 minutes of video footage for each video narrative).

3. Go back to the screen with the survey form (this form).

4. Complete the scoring form for each video narrative and give suggestions, if applicable, for improving the narrative.

5. Repeat steps 1-4 for each video narrative link included in the survey.

After each narrative type (Derivative, Super-ordinate, Correlative and Combinational), complete the:

6. Perceived usefulness section.

7. Further feedback section.

Back Next Clear form

Your profile:

Note that all your answers are kept in an anonymous way.

Your occupation: *

Your answer

Please indicate your experience in giving presentations: *

Your answer

Back Next Clear form

Derivative Narratives: learning a concept by linking it to a more generic concept

Video narrative: Learning SMILE by linking it to GESTURE (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning DISTRACTION by linking it to ATTENTION (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning CHART by linking it to FIGURE (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Back Next Clear form

The questions below ask how you perceive the usefulness of the Derivative Narratives (learning a concept by linking it to a more generic concept).

The video narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

Back Next Clear form

Further feedback on Derivative Narratives (learning a concept by linking it to a more generic concept).

What do you find **positive** about the generated Derivatives Narratives to support learning? *

Your answer

What do you find **negative** about the generated Derivatives Narratives to support learning? *

Your answer

Back Next Clear form

Super-ordinate Narratives: learning a concept by linking it to more specific concepts

Video narrative: Learning STRUCTURE by linking it to SUMMARY, STORY and INFORMATION (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning ATTENTION by linking it to DISTRACTION (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning CONCLUSION by linking it to MESSAGE (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Back Next Clear form

The questions below ask how you perceive the usefulness of the Super-ordinate Narratives (learning a concept by linking it to more specific concepts).

The video narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

Back Next Clear form

Further feedback on Super-ordinate Narratives (learning a concept by linking it to more specific concepts).

What do you find **positive** about the generated Super-ordinate Narratives to support learning? *

Your answer

What do you find **negative** about the generated Super-ordinate Narratives to support learning? *

Your answer

Back | Next | Clear form

Correlative Narratives: learning a concept by linking it to similar concepts from the same class

Video narrative: Learning IMPACT by linking it to ORGANIZATION and ATTENTION (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning MEMORABLE by linking it to INFLUENCE and PERSUASIVE (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning PAUSE by linking it to FOCUS, FORGETTING and TEMPO *

(Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning SLIDE by linking it to NOTE, TEXT and HANDOUT (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning INFORMATION by linking it to MAINTOPIC and TOPIC *
(Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning START by linking it to BEGINNING and OPENNING (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning COMMUNICATION by linking it to ENGAGEMENT (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning ATTENTION by linking it to ORGANIZATION and LENGTH (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning CONCLUSION by linking it to SUMMARY (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning STRESS by linking it to CONFIDENCE, NERVOUS and ENTHUSIASM (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Back Next Clear form

The questions below ask how you perceive the usefulness of the Correlative Narratives (learning a concept by linking it to similar concepts from the same class).

The video narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

Back Next Clear form

Further feedback on Correlative Narratives (learning a concept by linking it to similar concepts from the same class).

What do you find **positive** about the generated Correlative Narratives to support learning? *

Your answer

What do you find **negative** about the generated Correlative Narratives to support learning? *

Your answer

Back Next Clear form

Combinational Narratives: linking concepts from two presentation skills areas

Video narrative: Learning STRUCTURE by linking it to DELIVERY (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning PRESENTATION ATTRIBUTE by linking it to VISUAL AID *
(Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Video narrative: Learning DELIVERY by linking it to VISUAL AID (Click on the link, it will open in a new tab. You can also copy the link and open it in a new tab/window in your browser.) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	☐	☐	☐	☐	☐
All video segments clearly link to the presentation skills areas mentioned in the introduction.	☐	☐	☐	☐	☐
The descriptions which introduce each video segment provide a useful summary.	☐	☐	☐	☐	☐
All video segments provide relevant content for presentation skills learning.	☐	☐	☐	☐	☐

The concluding text at the end of the video narrative provides appropriate summary.	☐	☐	☐	☐	☐
This video narrative is useful for learning presentation skills.	☐	☐	☐	☐	☐

Can you give some feedback to explain your scores or suggest how the video narrative can be improved.

Your answer

Back

Next

Clear form

The questions below ask how you perceive the usefulness of the Combinational Narratives (linking concepts from two presentation skills areas).

The video narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to giving presentations	☐	☐	☐	☐	☐	☐	☐
Focus on key points at a time	☐	☐	☐	☐	☐	☐	☐
Identify key topics/concepts to learn	☐	☐	☐	☐	☐	☐	☐
Link main points mentioned in the video	☐	☐	☐	☐	☐	☐	☐

Further feedback on Combinational Narratives (linking concepts from two presentation skills areas).

What do you find **positive** about the generated Combinational Narratives to support learning? *

Your answer

What do you find **negative** about the generated Combinational Narratives to support learning? *

Your answer

Thank you very much for completing the evaluation of the video narratives.

Is there any thing else you would like to tell us about the generated video narratives?

Your answer

Please provide your email address below for the £50 Amazon voucher arrangements. *

Your answer

Back Submit Clear form

Appendix K

Amazon Mechanical Turk Study Design

The steps we followed to design our Amazon Mechanical Turk study to invite workers (learners) to evaluate the output of VIN-L in the first domain.

The process of using Amazon Mechanical Turk marketplace to invite learners to participate in the evaluation study (Study-2) of assess the video narratives generated for the presentation skill domain.

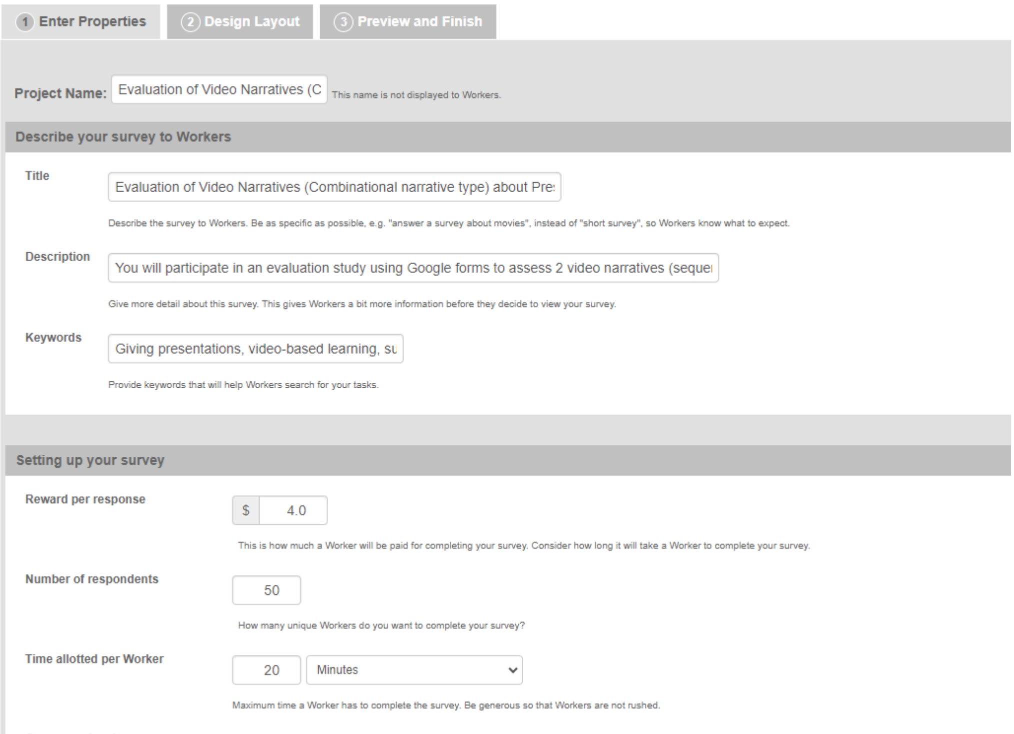
We have used Amazon Mechanical Turk marketplace to invite potential learners to assess the use of the video narratives to support learning. For that purpose, we have created an account with Amazon Mechanical Turk where we created a project and included four batches within it.

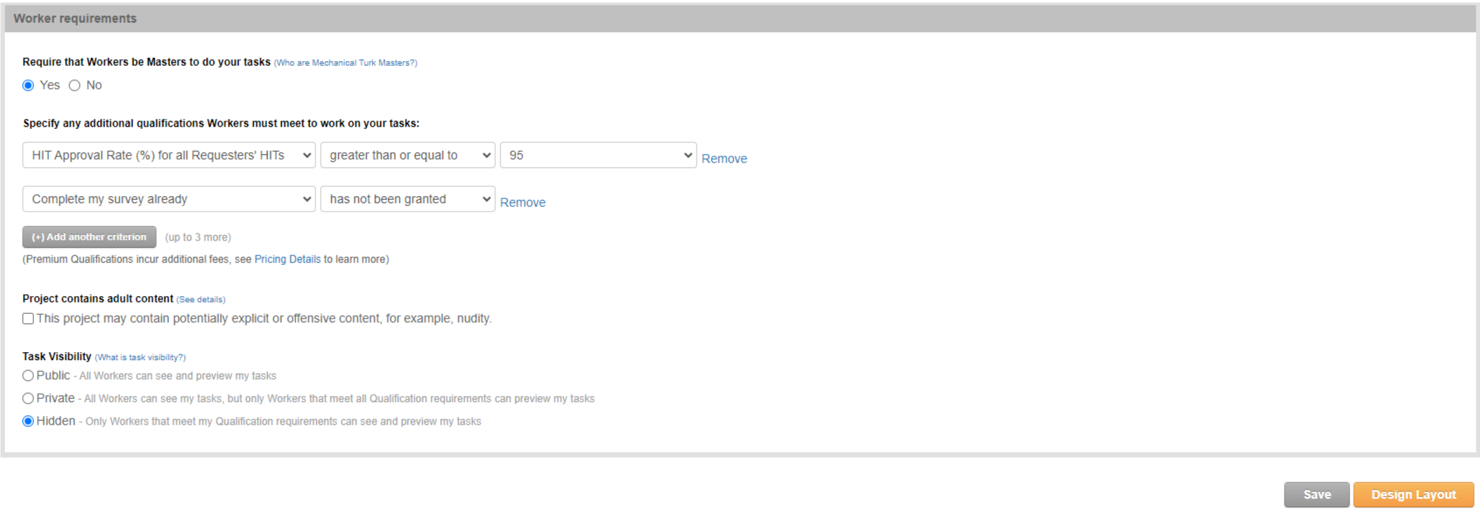
The design of each batch as presented in Appendix E includes three stages. First, is the 'Enter Properties' stage where we include the name of our project, the title, and the description, where we describe the aim of the evaluation study. Then, we include key words related to our study to help Amazon workers to search for the survey. After that, we set up the survey by specifying the following: how much we pay each participant (the rewards per response), number of responses we want, the time allotted per participant to complete the study, the maximum time for the survey to be available for the participants, and the amount of time for us to decide who to pay or reject from the participants' responses. Also, in this stage we designed our selection criteria to invite only the participants who are classified by Amazon Mechanical Turk as 'Master Workers who have hit approval rate >= 95.

The second stage includes the instructions we specify for the participants to follow to make sure they submit the study correctly. Also, we informed them that in our study we follow the General Data Protection Regulation and the study had been reviewed by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences at the University of Leeds, UK. The link of the study is also presented to the participants, and we included a space for them to add their Worker Id to enable us to proceed their payments as we showed in the first stage.

We have designed four batches in our Amazon project, one for each narrative type. Only the Amazon participant, who match the selection criteria we specified earlier, can access to the link of the surveys. Each participant will go through the following steps: (1.) Read and accept the consent form; (2.) Complete a short pre-study section to collect their profiles; (3.) Click on the video narrative link which will open in a new tab. They can also copy the link and open it in a browser themselves; (4.) Go through the video narrative page by following the descriptions and watch the suggested video narratives which have a duration of 3 to 6 minutes; (5.) Go back to the screen with the survey form and complete the Quality, Perceived Usefulness and Mental workload sections. After the worker submit the form, they need to enter their Worker ID on Amazon Mechanical Turk marketplace to be used to proceed their payment process.

Amazon Mechanical Turk project to evaluate the generated video narratives to support learning Giving Pitch Presentations with learners.




Worker requirements
Require that Workers be Masters to do your tasks (Who are Mechanical Turk Masters?)
Yes No
Specify any additional qualifications Workers must meet to work on your tasks:
HIT Approval Rate (%) for all Requesters' HITs
greater than or equal to
95
Remove
Complete my survey already
has not been granted
Remove
(+) Add another criterion
(up to 3 more)
(Premium Qualifications incur additional fees, see Pricing Details to learn more)
Project contains adult content (See details)
This project may contain potentially explicit or offensive content, for example, nudity.
Task Visibility (What is task visibility?)
Public - All Workers can see and preview my tasks
Private - All Workers can see my tasks, but only Workers that meet all Qualification requirements can preview my tasks
Hidden - Only Workers that meet my Qualification requirements can see and preview my tasks
Save
Design Layout

This is how your task will look to Mechanical Turk Workers.

1 Enter Properties | 2 Design Layout | 3 Preview and Finish

Evaluation of Video Narratives (Combinational narrative type) about Presentation Skills

Requester: Abrar Mohammed | **Reward:** $4.00 per task | **Tasks available:** 0 | **Duration:** 20 Minutes

Qualifications Required: HIT Approval Rate (%) for all Requesters' HITs greater than or equal to 95 , Complete my survey already has not been granted , Masters has been granted

Survey Link Instructions (Click to collapse)

Thank you for joining this survey.

Your evaluation is essential to assess the potential benefits of the generated video narratives to support learning.

In this evaluation, you will **spend up to 15 minutes** watching **videos about presentation skills**. You will assess 2 video narratives (totalling 8 minutes video content) to help with learning presentation skills, including some of the topics: delivery, structure, visual aids and presentation attributes. *A video narrative is a combination of video segments which have been automatically characterised and linked together by computer algorithms.* You will be given a scoring sheet for each video narrative and will be asked for your feedback on usability of the narratives.

You will have to log on with your **Google account**. When you fill out a Google Form in your Google account, **your progress is automatically saved**. This means if you can't complete the form or need to switch devices, your earlier responses will be saved, if you do not press SUBMIT. When you come back to the form, you will start from where you stopped last time. <u>If you press SUBMIT and would like to come back to the form, you will start from the beginning, just be careful, please!</u>

The study is **fully anonymous** - although you will logon with your Google account, the responses **do not save the email of the responders.**

The survey is fully complaint with General Data Protection Regulation (GDPR) and has been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences, University of Leeds, UK.

Thank you very much for your help.

The link of the survey is provided below.

Make sure to leave this window open as you complete the survey. When you are finished, you will return to this page to paste your survey confirmation code which is your worker ID into the box. Please, make sure you are writing your answers using your own words and DO NOT copy from the Internet

Template note for Requesters - To verify that Workers actually complete your survey, require each Worker to enter a survey confirmation code (Worker ID) to your HIT. Please, make sure you are writing your answers using your own words and DO NOT copy from the Internet

Survey link:	https://docs.google.com/forms/d/e/1FAIpQLSdnkG44vOdWXfXoPNQPWvoVhmedFugsY6ewFMPZ-UNKWsbE2g/viewform?usp=sf_link

Provide the survey confirmation code which is your Worker ID here:

e.g. 123456

Submit

The full batch details after publishing it:

Manage Batches > **Batch Details**

Evaluation of Video Narratives (Correlative type of video narratives) about Presentation Skills 1

View the latest status of this batch, make changes, or get results.

You will participate in an evaluation study using Google forms to assess 2 video narratives (sequences of video segments), The videos are about giving pitch presentations. You do not need to be experienced in Presentation Skills.

Status | Delete

Status: Pending Review

100% submitted | 100% published

Assignments Completed:	55 / 55	**Average Time per Assignment:**	11 minutes
Creation Time:	August 10, 2023 8:06 AM PDT	**Completion Time:**	August 12, 2023 6:45 AM PDT

Settings

Evaluation of Video Narratives (Correlative type of video narratives) about Presentation Skills

View Project

Note: If you have edited the Project after publishing this Batch, you will see the latest version.

Description:	You will participate in an evaluation study using Google forms to assess 2 video narratives (sequences of video segments), The videos are about giving pitch presentations. You do not need to be experienced in Presentation Skills.
Keywords:	Giving presentations, video-based learning, survey.
	HIT Approval Rate (%) for all Requesters' HITs greater than or equal to 95
Qualification Requirement(s):	Complete my survey already has not been granted
	Masters has been granted

Number of Assignments per task:	50
Reward per Assignment:	$4.00

Batch expired on: August 13, 2023 3:50 AM PDT

Results | Results

Assignments pending review:	0
Assignments approved:	50
Assignments rejected:	5

Cost Summary

Estimated Total Reward:	$200.00
Estimated Fees to Mechanical Turk:	$90.00 (fee details)
Estimated Total Cost:	$290.00

These costs are only an estimate until all of the assignments have been submitted and reviewed.

Example task from this Batch

Survey Link Instructions (Click to expand)

Survey link	https://docs.google.com/forms/d/e/1FAIpQLScdUn-xRVILIfIR34F-oVYST1X1GX--1A-LX5KLNUOmVuRLOA/viewform?usp=sf_link

Provide the survey confirmation code which is your Worker ID here:

e.g. 123456

You must ACCEPT the HIT before you can submit the results.

Appendix L

Evaluation Results of VIN-L (First Domain)

These are the evaluation results from experts and learners of VIN-L in the first domain which includes the: Quality and the Perceived Usefulness results.

Quality of the video narratives as evaluated by experts.

The numbers are the aggregation of the experts' responses where each expert had evaluated more than one video narrative:

Narrative type	Response type	Q1	Q2	Q3	Q4	Q5	Usefulness
CO	Strongly Agree	19	8	13	14	14	18
	Agree	8	13	9	11	7	10
	Neutral	6	5	8	2	7	2
	Disagree	0	6	3	6	5	3
	Strongly Disagree	0	1	0	0	0	0
CR	Strongly Agree	36	21	22	43	31	52
	Agree	45	31	32	31	31	30
	Neutral	14	28	29	18	18	19
	Disagree	15	31	29	18	18	11
	Strongly Disagree	2	1	0	2	2	0
D	Strongly Agree	12	11	6	22	18	25
	Agree	14	19	19	6	8	6
	Neutral	6	2	2	4	3	1
	Disagree	1	1	1	1	4	1
	Strongly Disagree	0	0	0	0	0	0
S	Strongly Agree	11	9	10	17	15	20
	Agree	11	11	9	5	4	5
	Neutral	5	5	6	5	7	3
	Disagree	4	4	6	3	4	3
	Strongly Disagree	0	0	0	1	1	0

Perceived usefulness of the video narratives as evaluated by experts.

The numbers are the aggregation of the experts' responses where each expert had evaluated more than one video narrative:

Narrative Type	Response type	PU1	PU2	PU3	PU4
CO	Extremely Likely	4	3	3	3
	Quiet Likely	4	4	5	4
	Slightly Likely	3	2	2	1
	Neutral	0	2	0	2
	Slightly Unlikely	0	0	1	0
	Quiet Unlikely	0	0	0	1
	Extremely Unlikely	0	0	0	0
CR	Extremely Likely	4	2	3	1
	Quiet Likely	5	6	2	5
	Slightly Likely	1	2	5	3
	Neutral	1	0	1	2
	Slightly Unlikely	0	1	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
D	Extremely Likely	5	5	6	4
	Quiet Likely	3	3	3	4
	Slightly Likely	2	2	2	2
	Neutral	1	1	0	1
	Slightly Unlikely	0	0	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
S	Extremely Likely	4	3	2	6
	Quiet Likely	3	4	7	1
	Slightly Likely	3	2	1	0
	Neutral	0	1	0	3
	Slightly Unlikely	1	1	1	1
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0

Quality of the video narratives as evaluated by learners.

The numbers are the aggregation of the learners' responses where each learner had evaluated more than one video narrative:

Narrative type	Response type	Q1	Q2	Q3	Q4	Q5	Usefulness
CO	Strongly Agree	14	27	24	27	27	35
	Agree	69	55	51	55	46	48
	Neutral	10	9	13	10	14	10
	Disagree	3	4	7	3	7	2
	Strongly Disagree	0	1	1	1	2	1
CR	Strongly Agree	35	46	36	51	40	45
	Agree	69	60	60	55	55	59
	Neutral	9	6	17	6	15	10
	Disagree	0	2	1	2	2	0
	Strongly Disagree	1	0	0	0	2	0
D	Strongly Agree	22	30	28	26	27	26
	Agree	60	51	52	46	53	54
	Neutral	33	24	26	28	29	25
	Disagree	9	16	14	17	12	12
	Strongly Disagree	2	5	6	9	5	9
S	Strongly Agree	23	42	32	47	31	45
	Agree	56	41	44	34	34	37
	Neutral	6	8	11	11	21	8
	Disagree	11	5	6	5	9	3
	Strongly Disagree	2	2	5	1	3	5

The perceived usefulness of the video narratives as ranked by the learners.

The numbers are the aggregation of the learners' responses where each learner had evaluated more than one video narrative:

Narrative type	Response type	PU1	PU2	PU3	PU4
CO	Extremely Likely	6	11	18	11
	Quiet Likely	28	22	23	25
	Slightly Likely	10	12	3	10
	Neutral	3	2	4	1
	Slightly Unlikely	0	1	0	1
	Quiet Unlikely	1	0	0	0
	Extremely Unlikely	0	0	0	0
CR	Extremely Likely	17	25	26	18
	Quiet Likely	31	22	22	29
	Slightly Likely	6	6	7	9
	Neutral	3	4	2	1
	Slightly Unlikely	0	0	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
D	Extremely Likely	10	15	7	7
	Quiet Likely	18	11	23	23
	Slightly Likely	11	14	8	8
	Neutral	6	6	10	8
	Slightly Unlikely	9	4	8	7
	Quiet Unlikely	6	9	3	9
	Extremely Unlikely	3	4	4	1
S	Extremely Likely	17	15	20	14
	Quiet Likely	17	24	17	25
	Slightly Likely	7	4	7	4
	Neutral	4	2	1	2
	Slightly Unlikely	3	2	1	1
	Quiet Unlikely	1	2	3	3
	Extremely Unlikely	0	0	0	0

Appendix M

Expert's Evaluation Results of the Semantic Tagging Algorithm (Second Domain)

The evaluation result of the Semantic Tagging Algorithm with an expert from the InAdvance European Project after implementing it in the second domain (Health Related Quality of Life Awareness).

Do nothing if you agree with the cocnept and the topic Or highlight the concept or the topic you find incorrect with red or highlight it with Orange if you are not sure

The main topic

Patients Stories

SegmentId	Start	End	Transcript	Concep1	Missed concept	Concept 2	Concept 3	Topic	Missed Topic	My note on the evaluation result
MxmrjLQvg7E1	0.13	0.27	cancer	Mum		PersonalRelationship		SocialRelationship		
			cancer	Mum		PersonalRelationship		SocialRelationship		
			and there's there's it's spread							
			everywhere and there's nothing we can do.							
			I remember I was holding on to my mum							
			screaming, don't let me die and she mum							
			was just going I won't you're, not							
			die and i was going. just don't let me							
rQutyErqBG02	0.39	0.56	and we had a tumor , I never had any	Tumor		RespritoryIllness		PhysicalHealth		
			symptoms and I was working in a private	LungCancer		RespritoryIllness		PhysicalHealth		
			school where you needed a physical every							
			year . Each year I 'd go in and I 'd say my							
			father died of lung cancer and 30 years							
			earlier I had smoked . Maybe I should have							
			a chest x-ray . She said okay and there it							
mWo-G3UQ-zU2	0.28	0.49	He was on the couch. He had the oxygen mask.	Dad		PersonalRelationship		SocialRelationship		
			He wasn't able to do those things.							
			It really was a shock to us.							
			My dad was going downhill very quickly, and we knew							
			He was in and out of local hospitals a couple of times.							
			Nobody was really able to accurately diagnose him.							
			I think that was probably the scariest thing is not							
hQQ5xQGZxdA4	3.01	3.14	a lot of us that get one kid's	Pneumonia		RespritoryIllness		PhysicalHealth		
			think about it so	LungCancer		RespritoryIllness		PhysicalHealth		
			time. went past about six months later i							
			got sick. again and i got pneumonia again							
			and so now you're like okay, i'm 34							
			old, i'm healthy, and							
			why? why? did i get into lung cancer, again							
xY3B9nLm1u83	2.23	2.38	So we we tried the injection.	Thinking		CognitiveFunction		PsychologicalHealth		
			um. I remember thinking	Pain		PhysicalSymptoms		PhysicalHealth		
			just before							
			um. They said you know the of pain							
			that you're in doesn't							
			to what we're seeing							
			ct, but well, go ahead. You							
yV893Fx41lE2	0.20	0.33	get better	Training		AcquiringInformation		Environment		
			You know. Marine corps is key to some of							
			the things that I do it's a							
			and once one challenge is done,							
			always looking for the next							
			So first, full marathon was the							
			Corps Marathon. While the training							
wwiwjZw7d6o2	0.30	0.46	favorite thing about being a mum, and	Mum		PersonalRelationship		SocialRelationship		
			I think just having her learning just	Learning		CognitiveFunction		PsychologicalHealth		
			watching her grow every day is,							
			is, just beautiful, i'm so i'm so lucky							
			that i get to be at home with her							
			and at the moment freya was							
			six months old. When i was diagnosed with							
uJoY4oMLXEY4	3.03	3.19	block, because you know you're,	Copd		RespritoryIllness		PhysicalHealth		
			hurting your heart. I think anybody							
			has COPD needs to have an oximeter you							
			are not limited as long as you know what							
			your saturation level is it helps							
			mind keeps my mind off of my troubles.							
			won't leave home without.							
l9k9q6FHeX44	1.54	2.09	what you we're dealing with so	ChestPain	cough	RespritoryIllness	iratoryillness symp	PhysicalHealth		To fix -Semantic Tagging Algorithm
			in 2006, in september i had							
			chest pain. like a cough went to							
			and i i remember because it was. It							
			day in september where we we're							
			a going away party. I have a in							
			the military in the navy and was.							
			And there's really no known treatment yet for it							
j3t5nFnTULQ4	1.23	1.46	except for lung transplantation.	Treatment				LevelOfIndependence		
			The lung is really the only organ in the body					Environment		
			that's exposed to the environment 24 hours a day					Environment		

			and a lot of what we see--the problems like Jen had--	Scared	NegativeFeeling		PsychologicalHealth
			are related the environment. Was I scared? Yeah.	Scared	NegativeFeeling		PsychologicalHealth
			I was definitely scared. You face the reality of death.				
			You get depressed. And as I got sicker and sicker and I wasn't able to do				
tfxB32Vb5hE3	1.43	1.57	scan for disease progression	Tumor	RespritoryIllness		PhysicalHealth
			and unfortunately my disease had				
			progressed, but it was also fortunate in				
			another way, because				
			with that progression a tumor grew				
			that could be accessed for molecular				
			testing.				
0fI_01yFmME1	0.51	1.11	breath. It was noticeable that something	PulmonaryFibrosis	RespritoryIllness		PhysicalHealth
			was radically the matter with me.				
			It quickly started to get worse where				
			the pulmonary fibrosis just started to				
			take over the lungs. A pulmonologist in				
			Williamsport said we can't do any more				
			for you here. All I knew is that I was				
llk-qgIr9Nk9	4.40	4.58	chemo	Mom	PersonalRelationship		SocialRelationship
			, my mom had breast cancer . I mean my	Scared	NegativeFeeling		PsychologicalHealth
			mother went through radiation	Scared	NegativeFeeling		PsychologicalHealth
			in the 90s . She went through chemo .				
			She had a mastectomy uh . He was scared				
			to die . I was scared				
			uh i did . I was afraid it was gon na hurt .				
bmvlK4qhAnU4	2.41	2.53	share um your story : ashley about	LungCancer	RespritoryIllness		PhysicalHealth
			lung cancer , getting diagnosed with it				
			and living life uh . What that means for				
			you , so thank you for joining us today .				
			Thank you				
			and thank you for being here				
			, yeah , i 'm . I know there 's so much to go				
wArV8Ho_C1A4	4.07	4.17	suppose yeah	Family	PersonalRelationship		SocialRelationship
			and just acknowledging what the patient				
			say is also a form of reassurance .				
			You know acknowledging what the patient				
			say and acknowledging how their family				
			or				
ehh89UrZtZU2	2.12	2.29	and there is difficulty breathing with	Copd	RespritoryIllness		PhysicalHealth
			some simple task by the 50 . People who				
			perform physical labor , for instance , find				
			it hard to continue this kind of work				
			and most COPD patient ca n't walk for				
			long distance and ca n't lift object by				
			the late 50 or early 60 . Quality of				
			diagnosed ha been to slow down . Life is no longer at				
VyGp12XbPzs2	0.59	1.38	100 and actually that 's	Exercise	Rehabilitation		Environment
			quite a nice thing . My health care practitioner have been very supportive in listening to				
			me listening to my suggestion listening to the way that I want to address the condition .				
			And they 've been very supportive in allowing me to develop my own exercise regime my own				
			nutritional plan . They 've been so supportive they are happy to allow me to climb Kilimanjaro				
			so that 's erm a bit of a big risk but they 're willing to help me do that . I use a device to				
			help strengthen my lung . It cause resistance when you breathe in and out . Basically it				
jZJTcp3d1q44	1.12	1.29	Copd can only plan daily .	Copd	RespritoryIllness		PhysicalHealth
			What this mean is you can wake up in the morning				
			and just feel awful .				
			You really know your not going to achieve				
			anything that day .				
			There are several thing that make				
			living my life rather simpler than it wa .				
Nl55TpSjWp44	3.53	4.09	that 's what we call it .	Pneumonia	RespritoryIllness		PhysicalHealth

			And I would say you know the report vary					
			but probably 5 % to 10 % of all bacterial pneumonia					
			are from Legionella .					
			Now I think higher percentage of that exists in the ICU					
			because there 's group of patient who tend to get very sick					
			when they get Legionella .					
6U7OpgFojaw4	2.16	2.36	responsive . It 'S the place to be dealing	RespiratoryIllnessSymptoms	PhysicalSymptoms		PhysicalHealth	Ignore-it was picked for the segment
			with dr. Culver , it 's a relationship he	respiratory illness				Ignore-it was picked for the segment
			make . You feel special , like you , are the					
			only patient that he had and that 's					
			wonderful .					
			I know I have a chronic respiratory					
			illness and I have to take care of it . So					
e0KVtXL-TjY4	2.11	2.23	, so that we could get her back into shape .	Strength	Energy		PhysicalHealth	
			Get her kidney functioning better					
			and allow her to maintain her transplant					
			candidacy until lung became available					
			after 19 day of being on ecmo , i built					
			up enough strength					
			to handle my transplant . My life now is					
im4bTtQ99SY3	2.2	2.33	17 % of eighth grader say that they 've	Friend	PersonalRelationship		SocialRelationship	
			done it to eighth grader . The good news					
			here at least that Tristan say that his					
			friend after seeing what he went					
			through immediately the illusion that					
			it 's safe right - yes and it wa dramatic					
			- to see that video . But it 's important , I					
GV3Rew061FA3	2.24	2.46	improved and felt better after the first	Exercise	Rehabilitation		Environment	
			set of exercise . And I continued for the					
			eight program and I found a very					
			strenuous to the first day or two and a					
			time went on . I got him . We became very					
			easy to do and I Breeden improved a lot					
			from them . Well , I 'd never really					
Nxrz6_e_gwo2	0.25	0.49	In the U.S. tobacco smoke is the most common exposure	Copd	ResprItoryIllness		PhysicalHealth	
			that cause COPD .	Copd	ResprItoryIllness		PhysicalHealth	
			About 15 percent of all COPD case can be attributed	Copd	ResprItoryIllness		PhysicalHealth	
			to workplace exposure such a dust gas and chemical fume .					
			This video illustrates some of the effect and the impact					
			that COPD potentially related to work ha had on the life					
			of several people living with the disease .					
q9xteXsPy3c2	0.36	1.09	came to me and said : I need to speak to you just a moment in private .	Guilt	NegativeFeeling		PsychologicalHealth	
			I ’ m a little bit in shock . But you know thing like this do n't happen to me .					
			So I did n't think anything of it . It 's probably just an infection . My primary care doctor					
			Dr. Blake Long scheduled me to see Dr. Chen in Pulmonary . I saw him he did the biopsy .					
			And he informed me : We were able to swab inside the lung and there are definitely cancer cell .					
			Immediately for me it ’ s guilt . I wa a smoker for 30 years you know what have I					
			done to myself ? So I met with the TOPS clinic to have the					
POskT8R_3t41	0.22	0.38	, and then throughout the body . There are	PulmonaryHypertension	ResprItoryIllness		PhysicalHealth	Ignore-it was picked for the segment
			five different category of pulmonary	PulmonaryHypertension	ResprItoryIllness		PhysicalHealth	Ignore-it was picked for the segment
			hypertension . The fourth group is labeled					
			, chronic , thromboembolic , pulmonary					
			hypertension , and that involves a group					
			of patient who have had a blood clot in					
			the lung circulation . What 'S typically					
3Fker8Nmd5Y5	2.2	2.36	Yeah .	Family	PersonalRelationship		SocialRelationship	
			I think it 's growing out straight .	Child	PersonalRelationship		SocialRelationship	
			Yeah that 's a new nail .					

			Emily : All we really ever wanted wa to have kid					
			and you know start a family .					
			And it 's so nice that he 's going to see our kid grow up .					
			Child : Daddy is my lunch ready ?					
OHeU3oj8nmc4	4.29	4.41	them play football and rugby , it just me	Grandchild	PersonalRelationship		SocialRelationship	
			world . Really i go down to see them . You					
			just make me smile all the time because					
			the grandchild love the bone off me .					
			They always					
			you know , write me little letter and					
			they would have been good . If anything					
OkHESl_I2O86	4.39	4.56	in ten year	Friend	PersonalRelationship		SocialRelationship	
			funny . I told my friend I wa like in a					
			dark tunnel for about two or three year					
			, Craig wa gone and since I started					
			feeling stronger and the spirit started					
			, coming back , I 'm back and and I 'll work					
			to stay . Where on that					
4AWZD3ClqW82	1.05	1.44	Then over time sort of even walking up the stair in your house or or at a railway station you know you ca n't do it without stopping two or three time on the way up the stair .	Exercise	Rehabilitation		Environment	
			Slowly it becomes difficult even to walk on the flat .	Friend	PersonalRelationship		SocialRelationship	
			Eventually you become dependent on supplementary oxygen on to for exercise initially and then 24/7 at home just to stay alive and you effectively become disabled in your own house .	end of life care	legalissue		levelofindependence	To fix -Semantic Tagging Algorithm
			You have need care .					
			You need to have somebody help you with simple task like washing and dressing .					
			It 's just it 's absolutely horrible .					
			And eventually those friend of mine I 've sadly seen passed away go through end of life care .					
r20Ak5ZxP_42	1.28	1.44	um the philosophy of teaching	Community	SocialActivity		SocialRelationship	
			everything about teaching is what i love .					
			So i did that for probably about 17					
			year professionally and even in other					
			aspect uh in the community , if there wa					
			a teacher needed for something or a					
			class to be taught . I talked so i 'm a					
MjEJaR3zLjg13	9.04	9.16	these scan um . How about the biopsy at	LungCancer	RespritoryIllness		PhysicalHealth	
			what point doe that					
			happen ? And can you describe that					
			procedure ?					
			You know , based on where you know where					
			the cancer is in your body					
			right : okay and mine . Wa is lung cancer					
KFBT8x3DPuM2	1.25	2.01	about 10 day . I got better but some people a lot of people die from it . My understanding is in	Child	PersonalRelationship		SocialRelationship	
			the U.S. about 17 000 adult die from RSV every season . One of the real concern I have is that I	Rest			PhysicalHealth	
			see these young child who are at high risk and they interact with the rest of their family	Family	PersonalRelationship		SocialRelationship	
			their parent their grandparent some of their great grandparent . So I 'm really concerned for	Child	PersonalRelationship		SocialRelationship	
			some of those child that the elderly who will have RSV and perhaps not be very sick	Grandchild	PersonalRelationship		SocialRelationship	
			can give it to their young grandchild or great and cause them to be very	Child	PersonalRelationship		SocialRelationship	
			sick . So if we can prevent the adult from having RSV we can also protect our youngest child . So					
HCgXqdpQGhc9	7.09	7.2	i have	Thinking	CognitiveFunction		PsychologicalHealth	
			you - know a kind of an arthritic knee i					
			mean .					
			Maybe this is you know people					
			get older and maybe this is going to be					
			your weak spot . So					
			i mean part of me wa thinking . How much					

			and what i mean by that is , after my college baseball					
FHXbDHakK1w3	3.32	4.12	playing career wa over and i	Rest			PhysicalHealth	
			got drafted um . I i i really transitioned in myself into					
			kind of a different level					
			of of sport . Working out fitness with whatever you					
			want to call it , and so					
			, when my plane career ended , which wa in around					
			2013					
			and i joined the rest of the real world in a normal job					
			uh . I just assumed					
			it wa normal to gain weight to to get out of breath and					
			just not be able to do some of the					
			thing that you maybe were used to being able to do .					
			And so i started to notice um my very first					
2utaepga5uk2	0.19	0.38	I went to see dr. pressburg . He knew	PulmonaryHypertension	RespritoryIllness		PhysicalHealth	Ignore-it was picked for the segment
			right away that I had something called					
			pulmonary , hypertension and a a nurse . I					
			knew what it wa , but I also knew it wa .					
			A really nasty evil disease and the					
			survival wa not good , and that began					
			this journey that I continue to be on .					
pmuUnQ5Zi4Q1	0.24	0.4	severe abdominal pain that wa diagnosed	Pain	PhysicalSymptoms		PhysicalHealth	
			a diverticulitis	Pain	PhysicalSymptoms		PhysicalHealth	
			during my Hospital stay for the					
			abdominal pain my scan showed a spot on					
			one lung . In retrospect I should not have					
			brushed this off , but I wa n't concerned					
			since I 'd never been a smoker . Almost a					
dyRmGVgG7_84	2.03	2.17	a PD score greater than 50 %	Drug	Behaviour		PhysicalHealth	
			what wa interesting about Oswald is that					
			he had a PD score of I think 80 %					
			he wa extremely sick when he had come .					
			I did n't think he would tolerate a platinum					
			chemotherapy					
			so having a first line immunotherapy drug					
			in our arsenal is tremendous .					
aREqsWoX-EY1	2.2	2.38	radiation therapy . I'Ve had a lung scan	Family	PersonalRelationship		SocialRelationship	
			since and it 's clear					
			it wa a pretty amazing process . I i have					
			been involved either myself or a family					
			member					
			in in care in different hospital					
			in the area and this wa . By far					
9nRhehMpODk3	2.45	2.59	good chance of being cured , and it really	Hope	PositiveFeeling		PsychologicalHealth	
			make a dramatic difference . Every single					
			person that I had anything to do with					
			what 's your hospital and in dr					
			Glassman 's office , wa so kind and so					
			caring and gave me hope to get up and					
			get out of that bed . I just ca n't say					
			So first there wa the shock of dealing with a second					
Tyo2YsA0Y02	0.43	1.19	cancer .	Hope	PositiveFeeling		PsychologicalHealth	
			And then just the shock when we ' re told it ' s such a					
			blow to be told that you have					
			to deal with a life disease .					
			Because of my previous experience and the fact that I					
			wa a cancer survivor that gave					
			me a lot of hope that this could be dealt with .					
			And once I got over that initial shock that kind of					
			numbness that come with that I wa					
			able to get to a place of okay—we have to deal with					
			this now .					
ZoEEgU6L-m81	0.35	1.02	ran a many test , a they needed until	LungCancer	RespritoryIllness		PhysicalHealth	
			they found that I had lung cancer and	Strength	Energy		PhysicalHealth	
			they had to tell me about it , which wa					
			pretty shocking to me . At the time you					
			know - and you had to find your own inner					
			strength to deal with it					
			when they told me I had cancer . Of course					
FH7aHDHnkjU1	0.03	0.15	Andy : There are a lot of thing that you give up	PulmonaryFibrosis	RespritoryIllness		PhysicalHealth	
			when you 're diagnosed with a disease					
			like pulmonary fibrosis .					

			I wa an avid motorcycle rider for almost 30 year .					
			I rode a Harley Sportster					
			and I had to give it up					
			because I would get sleepy while I wa driving .					
cfyb39S_CZw2	1.2	1.44	because I had lived through cancer	Hope	PositiveFeeling		PsychologicalHealth	
			but at the same time I wanted to give him hope just to live	Scared	NegativeFeeling		PsychologicalHealth	
			and let just play this out and see what happens .					
			So I wa really scared for Victor .					
			Some of the joy in my home is being able to get up					
			and be healthy enough to do certain thing .					
			Around the house I like to do laundry .					
mSYXddFVvHo1	0.03	0.18	Lung disease is an invisible disease per	LungDisease	RespritoryIllness		PhysicalHealth	
			se . You know , nobody know you have it	Exercise	Rehabilitation		Environment	
			unless they see you exercise , so really	LungDisease	RespritoryIllness		PhysicalHealth	
			nobody knew . I had lung disease except my	family	PersonalRelationship		Social Relationship	To Fix-Domain taxonomy (family)
			close family for a long time . First					
			symptom were I wa in the Martin Luther					
			King Poole downtown training for the . I					
323hkORG0OM3	2.19	2.31	actress smoker or previous smoker , you	LungCancer	RespritoryIllness		PhysicalHealth	
			should ask to get screened . Lung cancer	LungCancer	RespritoryIllness		PhysicalHealth	
			early detection can lead to more and					
			better treatment . Option . Ask your doctor					
			if you might be eligible for lung cancer					
			screening					
LYwQdM-2ok42	0.29	0.47	look like and erasing what some say is	Mom	PersonalRelationship		SocialRelationship	
			a stigma for the cancer meet Molly goal .	LungCancer	RespritoryIllness		PhysicalHealth	
			How 'S school					
			she 's like a lot of 39 year old married					
			working mom . Well , with one big exception					
			, I think when they told me it 's lung					
			cancer . I just thought there 's no way it					
O5DOre3MFlw4	0.59	1.15	You can ! Please do whatever .				Environment	
			Make yourself at home .	Fear	NegativeFeeling		PsychologicalHealth	
			What wa the environment	Scared	NegativeFeeling		PsychologicalHealth	
			around polio like back in the 1950s ?					
			Was everybody worried all the time .					
			Fear . Everybody wa so scared of polio .					
			It 's a horrible disease .					
bqkquNb5Z8A1	0.03	0.18	Tara You do what you have to do to stay alive .	Pain	PhysicalSymptoms		PhysicalHealth	
			car door slam engine rev					
			My pump wa popping outta my body every four day .					
			I wa on 24 hour pain killer .					
			To make this drive down here					
			to hopefully get transplanted					
			wa the only choice for me .					
qsAnlV8DUXo1	0.29	0.42	bronchial infection , type thing that he	PulmonaryFibrosis	RespritoryIllness		PhysicalHealth	
			needed to get over .					
			I wa coughing for 45 minute straight					
			and i could not catch my breath . Then i					
			decided to go to the doctor					
			and that 's when i discovered that i had					
			ipf idiopathical pulmonary fibrosis .					
2pzHkvmRSW82	3.19	3.33	2000 can make such a big	LungDisease	RespritoryIllness		PhysicalHealth	
			impact . I wish i had done it much earlier					
			than i did .					
			I think that if in your lung disease					
			you 're at a point					
			, everything even the simplest of					
			activity is is difficult .					
4ehrdRPEqE1	0.27	0.44	research nurse and I work in breast	LungCancer	RespritoryIllness		PhysicalHealth	
			oncology					
			so , prior to being a lung cancer survivor					
			you 'd order test for patient and you					
			did it because that 's standard of care					
			, that 's driven per protocol . That 'S just					
			what we do with your disease .					
MxmrjLQvg7E1	0.13	0.27	cancer	Mum	PersonalRelationship		SocialRelationship	
			cancer	Mum	PersonalRelationship		SocialRelationship	
			and there's there's it's spread					
			everywhere and there's nothing we can do.					

			I remember I was holding on to my mum					
			screaming, don't let me die and she mum					
			was just going I won't you're, not					
			die and i was going. just don't let me					
rQutyErqBG03	0.59	1.15	was . I just thought my life was over . It	Smoking	Behaviour		PhysicalHealth	
			happened to be an aggressive cancer .	Smoking	Behaviour		PhysicalHealth	
			Smoking small cell , which made you a					
			doctor , get it quickly enough .					
			I had no signs of symptoms . I know					
			nothing . I did n't feel anything .					
			Was I smoking ? Yes , but once she told me , I					
mWo-G3UQ-zU3	0.54	1.15	We didn't know what was going to happen.	Temple	Religion		PersonalValuesAndBeliefs	
			Was he going to be OK? Was he going to make it?	Temple	Religion		PersonalValuesAndBeliefs	
			We knew we needed a place that had more experience.					
			So they recommended the Temple Lung Center.					
			And that was the best decision we ever made.					
			Immediately you could feel a difference at Temple.					
			From the doctors to the testing that was done there.					
hQQ5xQGZxdA5	3.30	3.42	was	LungCancer	RespritoryIllness		PhysicalHealth	
			the first time because again i think a					
			lot of primary care docs. Don'T					
			think about screening, you know,					
			for lung cancer, right you just					
			so um. and that's when					
			i got the call. I remember the call.					
xY3B9nLm1u86	4.25	4.43	two weeks of starting to it	Pain	PhysicalSymptoms		PhysicalHealth	
			that					
			I started to					
			feel better. The pain. started to					
yV893Fx41lE3	1.31	1.45	uncommon for patients with lung cancer	LungCancer	RespritoryIllness		PhysicalHealth	
			to be diagnosed at a moment when	Thinking	CognitiveFunction		PsychologicalHealth	
			disease is already advanced at	Pain	PhysicalSymptoms		PhysicalHealth	
			four, when they have metastases, either					
			the Brain causing difficulties					
			thinking or confusion or in the					
			causing pain. So I actually didn't					
wwiwjZw7d6o3	0.49	0.58	how advanced my cancer was at the time i	Family	PersonalRelationship		SocialRelationship	
			mean we were all convinced, my family and	friend??				To Fix-Domain taxonomy(friend)
			friends that i wouldn't even see					
			christmas					
			and When you've just had a little girl					
			My eyes, you've got those new					
			hormones as well. It was a really tough					
uJoY4oMLXEY4	3.03	3.19	block, because you know you're,	Copd	RespritoryIllness		PhysicalHealth	
			hurting your heart. I think anybody					
			has COPD needs to have an oximeter you					
			are not limited as long as you know what					
			your saturation level is it helps					
			mind keeps my mind off of my troubles.					
			won't leave home without.					
l9k9q6FHeX45	2.35	2.46	went on about my business um. I	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth	
			developed. Actually i don't know if	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth	
			a cough at the time I if it was. It	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth	
			wasn't as bad,	ChestPain	RespritoryIllness		PhysicalHealth	
			developed a cough that wouldn't					
			A lingering cough					
			The chest pain. was. still, there went to a					
j3t5nFnTULQ5	2.41	3.05	then he said, "I'm gonna count to three and then you push	Treatment			LevelOfIndependence	
			as hard as you can so I can pull the tube out." And I'm going to myself,	Hope	PositiveFeeling		PsychologicalHealth	
			"I've got lives in tubes all in my body,					
			I hurt like hell, but I did it!"					
			It's important to have an accurate diagnosis					
			to help the patient and the physician					
			plan and develop the best treatment, but also to offer them some hope.					
tfxB32Vb5hE3	1.43	1.57	scan for disease progression	Tumor	RespritoryIllness		PhysicalHealth	
			and unfortunately my disease had					

			progressed, but it was also fortunate in						
			another way, because						
			with that progression a tumor grew						
			that could be accessed for molecular						
			testing.						
0fI_01yFmME1	0.51	1.11	breath. It was noticeable that something	PulmonaryFibrosis		RespritoryIllness		PhysicalHealth	
			was radically the matter with me.						
			It quickly started to get worse where						
			the pulmonary fibrosis just started to						
			take over the lungs. A pulmonologist in						
			Williamsport said we can't do any more						
			for you here. All I knew is that I was						
llk-qglr9Nk10	5.01	5.16	I was afraid what was gon na happen . I	Scared		NegativeFeeling		PsychologicalHealth	
			did n't want to lose my hair .	Scared		NegativeFeeling		PsychologicalHealth	
			I did n't want . I mean my youngest was						
			about to graduate						
			from college .						
			I was really scared .						
			I did n't need to be scared . I						
bmvlK4qhAnU15	13.45	14.03	if certain you know , if air got in there	Pain		PhysicalSymptoms		PhysicalHealth	
			, and so it was all the bad things they						
			told me that could happen and i 'm like .						
			Okay , i can do this						
			they 're , the experts , not me						
			, i wo n't know it whatever it is and so						
			waking up . I was in a lot of pain i felt						
wArV8Ho_C1A4	4.07	4.17	suppose yeah	Family		PersonalRelationship		SocialRelationship	
			and just acknowledging what the patient						
			say is also a form of reassurance .						
			You know acknowledging what the patient						
			say and acknowledging how their family						
			or						
ehh89UrZtZU2	2.12	2.29	and there is difficulty breathing with	Copd		RespritoryIllness		PhysicalHealth	
			some simple task by the 50 . People who						
			perform physical labor , for instance , find						
			it hard to continue this kind of work						
			and most COPD patient ca n't walk for						
			long distance and ca n't lift object by						
			the late 50 or early 60 . Quality of						
			make the lung work harder and improves the strength						
VyGp12XbPzs3	1.44	2.2	of them and improves their capacity	Strength		Energy		PhysicalHealth	
			a well . To health professional that want to provide						
			good support to their patient	Exercise		Rehabilitation		Environment	
			I would say try to think of them a individual not a a						
			case with a condition . Each individual	Treatment				LevelOfIndependence	
			is different . Things work differently for different						
			people particularly when it come						
			to managing your condition and exercise is always						
			different for every individual a						
			is nutrition . I think that patient should be involved in						
			their treatment plan . I think						
			that they should be able to make suggestion . I think						
			they should be able to ask question .						
jZJTcp3d1q45	1.49	2.06	, all of them and at the right time	Exercise		Rehabilitation		Environment	
			, because I take 12 or 15 .	Copd		RespritoryIllness		PhysicalHealth	
			One thing , that 's very clear is that exercise is						
			important .	Exercise		Rehabilitation		Environment	
			If you have COPD						
			, I make myself go to my exercise class once a week .						
			Some people do n't want to know anything						
			about what 's wrong with themwant .						
Nl55TpSjWp45	4.11	4.27	So those would be patient over 50	LungDisease		RespritoryIllness		PhysicalHealth	
			or with prior lung disease like COPD	COPD		RespritoryIllness		PhysicalHealth	To Fix-Domain taxonomy (COPD)
			or have some sort of immunocompromised state .						
			When I woke up and Aaron said to me you know						
			you have Legionnaires ' disease I wa like						
			`` what I thought that wa something back in the						
			seventy . ''						
			And he 's like `` no '' he go `` that 's what you got . ''						
6U7OpgFojaw4	2.16	2.36	responsive . It 'S the place to be dealing	RespiratoryIllness**Symptoms**	no symptoms	PhysicalSymptoms		PhysicalHealth	Ignore-it was picked for the segment

			with dr. Culver , it 's a relationship he					
			make . You feel special , like you , are the					
			only patient that he had and that 's					
			wonderful .					
			I know I have a chronic respiratory					
			illness and I have to take care of it . So					
e0KVtXL-TjY6	2.44	2.54	happy to know that michelle is doing so	Child	PersonalRelationship		SocialRelationship	
			well and					
			ha returned to all the different thing					
			that she love to do					
			especially taking care of her kid . I can					
			do everything now					
			play with my child . Go to my					
im4bTtQ99SY4	2.35	2.47	think , for parent and for kid to see	Vaping	Behaviour		PhysicalHealth	
			that video to see what can happen	parent????				To Fix-Domain taxonomy (Parent)
			exactly such dramatic video and reaction					
			to to vaping . It seems like we 're doing a					
			daily story . You know , because we actually					
			should be and more need to be learned					
			right like this . Thank You Linda hi .					
GV3Rew061FA5	4.06	4.27	even found a slight improvement in going	Glad	PositiveFeeling		PsychologicalHealth	
			up hill . So I 've very glad of that . I wa	Exercise	Rehabilitation		Environment	
			asked me six month . I still do quite a					
			lot of walking and exercising at home					
			, but we also have a support group that we					
			two exercise once a week and it 's					
			excellent . So there 's with there 's about					
			because they ca n't perform the essential duty of their					
Nxrz6_e_gwo3	1.26	1.44	job	Family	PersonalRelationship		SocialRelationship	
			because of shortness of breath .					
			This ha devastating socioeconomic consequence					
			for the patient and for the family .					
			I have stair in my house and by the time I start					
			at the bottom of the stair to get					
			to the top I 'm out of breath .					
			availability to go and to sit down with three doctors my cardiothoracic surgeon my oncologist					
q9xteXsPy3c3	1.13	1.44		LungCancer	RespritoryIllness		PhysicalHealth	
			and my radiation oncologist . And then the three got together and they spoke with each					
			other you know what 's the plan ? What should we do ? From three different aspect .					
			They told me I wa a Stage IIIB lung cancer . And I knew that that wa pretty serious being					
			in the medical field . So they scheduled my surgery for February 1 Dr. Lata sat me down					
			and explained to me that he needed to go into the mediastinal area and check those lymph					
			node because those would not pick up on an MRI and he needed to check those to make sure .					
POskT8R_3t41	0.22	0.38	, and then throughout the body . There are	PulmonaryHypertension	RespritoryIllness		PhysicalHealth	Ignore-it was picked for the segment
			five different category of pulmonary	PulmonaryHypertension	RespritoryIllness		PhysicalHealth	Ignore-it was picked for the segment
			hypertension . The fourth group is labeled					
			, chronic , thromboembolic , pulmonary					
			hypertension , and that involves a group					
			of patient who have had a blood clot in					
			the lung circulation . What 'S typically					
3Fker8Nmd5Y6	2.38	2.51	Just getting your milk .	Child	PersonalRelationship		SocialRelationship	
			Child : Okay .					
			I wa back here for maybe two day					
			before I started walking my daughter					
			to school in the morning .					
			Dropping her off at kindergarten					
			picking her up in the afternoon it 's just killer .					
OHeU3oj8nmc4	4.29	4.41	them play football and rugby , it just me	Grandchild	PersonalRelationship		SocialRelationship	
			world . Really i go down to see them . You					
			just make me smile all the time because					
			the grandchild love the bone off me .					
			They always					
			you know , write me little letter and					
			they would have been good . If anything					
Letemo_RoTk5	1.51	2.34	, colleagues at the School of Health and	Family	PersonalRelationship		SocialRelationship	

			Social Development , I 'd also like to pay					
			my respects to the traditional owners of					
			the land on which we are meeting and to					
			their elders , past and present , but					
			perhaps even more importantly , for this					
			this occasion , I 'd Like to pay my					
			respects to the family of the late Peter					
			quail , I did not have the privilege of					
			knowing Peter if I may take the liberty					
			of calling him by first name , and I know					
			that that is my loss from what I 've					
			excuse me from what I'Ve learned about					
			Peter he was passionate about social					
			justice and particularly about improving					
			for vulnerable people , their access to					
			quality services . I trust that what I					
ibyEHKnFTQ3	0.46	0.58	be very important in the next .	Hope	PositiveFeeling		PsychologicalHealth	
			I hope in the next years , but especially					
			in the next					
			months , with the new context we have um					
			when i was invited , they asked me to make					
			a					
			more an overview . This means that i 'm					
NWSPxXDj73Y3	0.55	1.10	speakers	Exercise	Rehabilitation		Environment	
			first , i 'd like to welcome valerie				Environment	
			gladwell good morning , valerie					
			valerie is the course director for the					
			sport and exercise science degree at the					
			university of essex .					
			Her main research interests include					
			physical activity					
			and the natural environment . The					
w2CmfIHNmV45	2.03	2.26	of crime and is it safe to walk outside	Parks	PhysicalEnvironment		Environment	
			in the day ? Does your neighborhood have	Income	EconomicStatus		Environment	
			access to green spaces and to parks and	accesstogreenspaces	PhysicalEnvironment		Environment	To fix -Semantic Tagging Algorithm
			to safe places to walk low income ?					
			Americans are three times more likely to					
			die before the age of 65 than					
			highincome Americans . My earliest work					
7HBp0OMc1TE11	4.59	5.39	: if the client is using an assistive	Mobility			LevelOfIndependence	
			device for walking , make sure it is					
			positioned properly the clients mobility					
			device . In this case , a walker should be					
			placed wherever it is most comfortable					
			for the client most commonly . The					
			placement would be in front of the					
			client , if necessary , help the client to					
			stand up stand slightly behind the					
			client on the client 's weaker side					
			, starting on the same foot as the client					
			walk on his or her weaker side and a					
			little behind grasp the gait Belt on the					
			backside of the clients waist with your					
			palms up remember when a gait belt is					
			not being used , the care assistant can					
			use the clients belt or hold onto the					
			clients arm on his weak side . If the					
cgc5uGqIgH82	0.20	0.34	Let 'S first look at what quality of life	Value	Spirituality		PersonalValuesAndBeliefs	
			means . People perceive many different					
			things when they think about the quality					
			of life . People will have different ideas					
			and value systems in helping them to					
			determine which factors they think are					
			important when looking at their quality					
			of life . This can also vary between					
8PH4JYfF4Ns3	0.40	1.00	expectancy of a child born in sierra	Child	PersonalRelationship		SocialRelationship	
			leone was 50 years , whereas in australia					
			it was 83 years a difference of 33 years					
			, but there are differences , even within					
			countries , for example in australia . The					
			life expectancy of indigenous people is					
			about 10 years lower than that of					
			nonindigenous people					
			within a population . Health is also					
we7CxqJQhhI3	0.49	1.03	pollutants would be respiratory	Asthma	RespritoryIllness		PhysicalHealth	

			disorders like bronchitis , asthma	LungCancer	RespritoryIllness		PhysicalHealth	
			, emphysema or lung cancer . Cardiovascular	Wheezing	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth	
			problems like artery , blockage					
			, heart attacks , and it can be linked to					
			allergies like wheezing , rashes					
			and allergy reactions . But what i found					
VGPwCN2p_Y42	0.20	0.35	where you looked at the professionals	SocialCare			Environment	
			and their roles responsibilities . This is					
			kind of a parallel to that , but it 's more					
			about the place rather than the					
			professional .					
			So when it comes to Health and Social					
			care in England and Northern Ireland					
			, Scotland was there are four key branches					
			of the NHS . So the NHS is kind of the					
89bvFq4XtW06	1.15	1.27	What are your strengths , your stressors	strength??			Environment	To fix -Semantic Tagging Algorithm
			, and what supports do you currently have					
			available to you ?					
			Are there any changes or adjustments					
			that need to be made in your life or					
			environment ?					
			We then work out with you and the					
			medical or multidisciplinary team					
			how we can support you . For example , do					
CZ0gliwjk_02	0.36	0.59	experience of about 20 or 25 years of	Pain	PhysicalSymptoms		PhysicalHealth	
			doing that , that i want to bring to you	Pain	PhysicalSymptoms		PhysicalHealth	
			the message this morning	Tumor	RespritoryIllness		PhysicalHealth	
			that pain is a disease .	Pain	PhysicalSymptoms		PhysicalHealth	
			Now , most of the time , you think of pain					
			is a symptom of a disease and that 's					
			true , most of the time it 's the symptom					
			of a tumor or an infection or an					
			inflammation or an operation					
			, but about 10 of the time					
			after the patient has recovered from One					
			of those events - pain persists . It					
kYK7utae7Cg2	0.19	0.37	So right at the top .	ChronicPain	Pain	PhysicalSymptoms	PhysicalHealth	
			You know what is chronic pain .	Pain	PhysicalSymptoms		PhysicalHealth	
			What do those two words mean yeah	Pain	PhysicalSymptoms		PhysicalHealth	
			, and how common is that yeah	Pain	PhysicalSymptoms		PhysicalHealth	
			, well , everyone 's experienced pain and we					
			need pain					
			is , is a protector					
			pain is something that it turns out . Our					
ZoZT8Hql646	2.19	2.53	You ask people to call up the memory	Memory	CognitiveFunction		PsychologicalHealth	
			of what you saw back then,					
			what you felt back then.					
			And then what you do					
			is that you ask people to follow your fingers					
			as you move your fingers from side to side.					
			And my first reaction was like,					
			"Man, stop this crazy nonsense, this is a crazy method."					
			And then I got to see some of the results,					
			I go like, "Wow, this is interesting."					
			Wiggling your fingers and full of people's eyes					
			as they think about the trauma made the trauma go away.					
1ZWtOD00Z1g4	1.46	2.03	have n't sort of prepared with them	Thinking	CognitiveFunction		PsychologicalHealth	
			beforehand , they may have a waiting list					
			or so on . The Department of Work and					
			Pensions does have its own visiting					
			service , so it 's always worth thinking of					
			contacting them as to whether there 's					
			any availability for that in your area					
			as to whether they can come and fill the					
			form out for you anyway . We'Ll just get					
DmteRv5sVcl9	4.14	4.56	responsible of judgment . You have to use	DailyLiving			LevelOfIndependence	
			your judgment , for example , if a client is					
			depending on you for so many activities					
			of daily living , you have to give them					
			the best choice . You have to follow their					
			own selection . There twice you have to					
			follow : it 's not we give them our choice					
			, but it is there twice we have to follow					

			and for that we still have to make the				
			judgment . What could be better for them ?				
skVpmoaGI2	0.24	0.37	do about it ?	Alcohol	Behaviour		PhysicalHealth
			Well , the who 's global strategy endorsed				
			by member states				
			, aims to reduce the harmful use of				
			alcohol . Unfortunately				
			, implementation of the strategy is uneven				
			, meet nina in her country . There are very				
KWQpV9_kUUM2	0.18	0.29	Is it better to day drink or drink at night?	Alcohol	Behaviour		PhysicalHealth
			When you drink a shot of vodka,				
			20% of the alcohol is absorbed by the stomach,				
			80% in the small intestine,				
			where it goes into your bloodstream,				
			then to your liver to be metabolized.				
			Ethanol gets into cells by passive diffusion.				
W0zFlbKiX02	0.17	0.34	The buzz , the slight headache and the	Alcohol	Behaviour		PhysicalHealth
			hangover the next day are all pretty				
			common .				
			However , regularly drinking alcohol can				
			also end up affecting your body . These				
			health effects show up quickly for those				
			who binge drink but can show up				
			gradually for people who drink regularly				
			, even if they do n't drink too much . Here 'S				
zSguDQRjZv02	0.25	0.50	For example , in 2016 the life expectancy	Child	PersonalRelationship		SocialRelationship
			of a child born in sierra leone was 53	Income	EconomicStatus		Environment
			years , while in australia it was 83 years	Education	EconomicStatus		Environment
			, but even within australia . The life	Occupation	EconomicStatus		Environment
			expectancy of indigenous people is about				
			10 years lower than that of				
			nonindigenous people				
			and even within a specific group of				
			people , health can change based on a				
			person 's income level of education or				
			occupation .				
4KbSRXP0wik4	0.43	0.57	The powers of both positivity and negativity are	Fear	NegativeFeeling		PsychologicalHealth
			stronger than you may know.	Anger	NegativeFeeling		PsychologicalHealth
			Lots of studies have shown that people with a positive				
			outlook on life tend to live longer, more fulfilling lives				
			than their mean and grumpy neighbors.				
			Fear, anger, and other more difficult emotions				
			and how we handle them are pretty closely				
			related to this thing called stress.				
7LD8iC4NqXM10	3.45	4.04	the stress I put a lot of stress on	Parents	PersonalRelationship		SocialRelationship
			myself . I think I 've always wanted to do	Parents	PersonalRelationship		SocialRelationship
			well for me , and I guess my parents , so				
			the stress of exams , and it was also kind				
			of hard because my parents were going				
			through a little bit . A troubled time				
			limit so okay , so this would be like last				
			March last April . Yeah take so around				
SJOjpprbfeE4	2.12	2.47	That means you often suffer quite a lot, but that's because the unpleasant emotions	Fear	NegativeFeeling		PsychologicalHealth
			help you survive.				
			Feelings also tend to be more unpleasant if you fight them. If you allow them to be there,				
			they become less unpleasant. You can experience and express many different feelings.				
			Like feeling hopeless, irritated, anxious, exited, lonely,				
			embarrassed, suspicious, content and so on.				
			These feelings all arise from your basic emotions. For instance, feeling suspicious springs from fear.				
Yh1y3TzSO44	1.11	1.29	They include	Fear	NegativeFeeling		PsychologicalHealth
			care , he capitalized these . So you see a				
			re care				
			, then something				
			he caused grief and panic				

			, then fear				
			lust				
			seeking				
			play				
			and rage .				
odAg6sIlZjg2	0.28	0.53	webinars are presented by the anxiety	Anxiety	NegativeFeeling		PsychologicalHealth
			and depression Association of America	Depression	NegativeFeeling		PsychologicalHealth
			, which is the leading nonprofit	Anxiety	NegativeFeeling		PsychologicalHealth
			organization in the field of anxiety and	Depression	NegativeFeeling		PsychologicalHealth
			depression . And you know our mission is	Treatment			LevelOfIndependence
			to improve diagnosis and promote the	Anxiety	NegativeFeeling		PsychologicalHealth
			prevention , treatment and cure of anxiety	Depression	NegativeFeeling		PsychologicalHealth
			, depression and stress related disorders .				
PxjxY9VilCs2	0.44	1.22	you don't just have to cope with anxiety; you can learn to process through anxiety to resolve it and	Anxiety	NegativeFeeling		PsychologicalHealth
			change your relationship to it. So let me show you how. In this video we're going to use three	Anxiety	NegativeFeeling		PsychologicalHealth
			examples to show you a stepbystep way to process anxiety. We're going to talk about Bob, who has	Anxiety	NegativeFeeling		PsychologicalHealth
			social anxiety. He feels uncomfortable around people, and he constantly worries about what he	Anxiety	NegativeFeeling		PsychologicalHealth
			says and what other people are thinking about him. We're going to talk about Jane, who experiences	Thinking	CognitiveFunction		PsychologicalHealth
			general anxiety. She just feels jittery and anxious much of the day for no apparent reason.	Anxiety	NegativeFeeling		PsychologicalHealth
			And we're going to talk about Fred, who has event anxiety. So Fred's really anxious about	Anxiety	NegativeFeeling		PsychologicalHealth
KYJdekjiAog3	1.58	2.34	He works as well a great deal with hypnosis,	Relaxation	Rest		PhysicalHealth
			with many different techniques to help				
			calm us down to help us get to a point of relaxation.				
			Using hypnosis, health hypnosis, biofeedback, body work,				
			but especially guided imagery.				
			He is a member of the advisory board				
			for the Osher Center for Integrative Medicine,,				
			and I was interested to discover he's also a member				
			of the advisory board for the Rosenthal Center				
			for Complementary Medicine				
			at Colombia University in New york.				
Zqx692vcQms2	0.38	1.11	really catastrophizing. I told my husband, "Oh, no. I'm sure that we're gonna get COVID from	Husband	PersonalRelationship		SocialRelationship
			that," even though there were only a handful of cases in Utah at the time. And I decided not to	Covid	RespritoryIllness		PhysicalHealth
			go see my parents that Easter weekend because I feared exposing them. Now, I think it's really	Parents	PersonalRelationship		SocialRelationship
			normal to worry about your health sometimes, and it's especially normal to worry about it during a	Anxiety	NegativeFeeling		PsychologicalHealth
			global pandemic. Everyone worries about their health sometimes. However, health anxiety can	Anxiety	NegativeFeeling		PsychologicalHealth
			be a quite serious problem when it gets more entrenched. Health anxiety is an obsessive and	Anxiety	NegativeFeeling		PsychologicalHealth
			irrational worry about having a serious medical condition. It's also called illness anxiety,				
5QSLQSl8lBA4	1.30	1.46	pretty horrible it disrupted . My sleep . I	Sleep	Rest		PhysicalHealth
			remember i woke up in the middle of				
			night and i would be drenched in sweat . I				
			had to lay a towel between my sheets				
			because my sheets were drenched and this				
			can actually be a positive symptom , a				
			sign that you are actually now eating				
			more . You have faster metabolism or also				
0XA7pNdbbG02	0.23	0.52	Depression is a mental health condition that affects millions of people worldwide.	Depression	NegativeFeeling		PsychologicalHealth

			It's a common, but serious illness that can interfere with daily life, work, and relationships.	Depression	NegativeFeeling		PsychologicalHealth
			Depression can be caused by a variety of psychological, biological, and environmental factors.	Depression	NegativeFeeling		PsychologicalHealth
			People with depression often experience feelings of sadness, hopelessness, and helplessness	Hopelessness	NegativeFeeling		PsychologicalHealth
			that persists for weeks or months.				
			They may lose interest in activities they once enjoyed, have trouble sleeping, experience				
			changes in appetite and weight, or have difficulty concentrating or making decisions.				
__Y_M3eIAw5	1.56	2.14	So , while this patient was spending a	Mom	PersonalRelationship		SocialRelationship
			month or more in the hospital , mom was	Mom	PersonalRelationship		SocialRelationship
			laying next to her . In a cot	Family	PersonalRelationship		SocialRelationship
			, when this patient was in the or mom , was	Community	SocialActivity		SocialRelationship
			waiting in the waiting room with baited				
			breath				
			, the family took our suggestion and they				
			started seeing a therapist				
			which is great				
			part of my job , as the social worker was				
			to liaise with community organizations .				
RxSsPSNGnkw2	0.27	1.04	, then you are jeopardizing your health	Anxiety	NegativeFeeling		PsychologicalHealth
			, and this is why you need	Anxiety	NegativeFeeling		PsychologicalHealth
			our stress and anxiety relief pack .	Anxiety	NegativeFeeling		PsychologicalHealth
			It relieves stress and anxiety , naturally				
			, because we use whole food herbs and				
			nutrients				
			, and you will feel results quickly				
			because our opti blend delivery system				
			ensures nutrients absorb fast and				
			deliver results				
			, and it contains 100 stress and anxiety				
			, relieving herbs , vitamins and minerals				
			, probiotics and enzymes				
			, and Our magnesium , as well as our calcium				
			and probiotics , are patented to deliver				
			results . You ca n't get anywhere else				
r0iMPxjRA2U7	1.54	2.09	talk a little bit about his experience	Depression	NegativeFeeling		PsychologicalHealth
			with depression	Depression	NegativeFeeling		PsychologicalHealth
			, the worst thing about depression				
			is that when you 're in it it 's hard to				
			recognize				
			and then take me , I 'm a fireman				
			and over time the normal day . Today				
lvQtjY3bcE2	0.40	0.57	Therefore , approach your loved one with				Environment
			respect , patience and in a gentle way .				
			Some things to remember are : go easy and				
			do n't rush . Anything				
			create a safe environment . Allow your				
			loved one as much independence as				
			possible . As you stand by gently talk				
XOxW_4kJqa89	2.43	3.02	As the assessment measures , high their	Pain	PhysicalSymptoms		PhysicalHealth
			health condition or disability affects				
			them on a daily basis and is n't about				
			the condition or disability itself .				
			Because of this people with the sium				
			condition . May get different outcomes , for				
			example , Mary scores Phil points when it				
			comes to moving around due to				
			significant hip pain , which increases				
			over time and short distances . Therefore				
B0KCzrUBUE3	0.40	0.54	Welcome marlena hi everyone um , it 's nice	Safety	PhysicalEnvironment		Environment
			to be here today				
			, i 'm just gon na so um as lori said				
			um , i 'm marlena and i 'm also presenting				
			today with jessica , volczynski				
			, we 're presenting on home safety				
			modifications . But we have a couple goals				
2qUcIQvnBC07	4.41	5.07	And given Emily's age and observations of her, we have to conclude that we can't allow	Family	PersonalRelationship		SocialRelationship
			to keep making tea for herself every morning	Husband	PersonalRelationship		SocialRelationship

			Well, I think there is another way. I rang Emily's niece this afternoon.				
			What?				
			Consulting family is standard procedure too, isn't it Frank?				
			Ok.				
			Her niece told me				
			that this tea thing has become a bit of a ritual apparently all started when her				
			husband Charlie was alive. She'd get up every morning, make a cup of tea then				
8KkKuTCFvzI3	1.06	1.33	Pictures of entire lives,	Memory	CognitiveFunction		PsychologicalHealth
			of the choices that people make and how those choices work out for them,				
			those pictures are almost impossible to get.				
			Most of what we know about human life				
			we know from asking people to remember the past,				
			and as we know, hindsight is anything but 20/20.				
			We forget vast amounts of what happens to us in life,				
			and sometimes memory is downright creative.				
5tDGBByc8tg2	0.23	0.37	I 'm nervous before an exam . You know , or	Anxiety	NegativeFeeling		PsychologicalHealth
			I 'm feeling nervous before , giving this				
			video , but anxiety is so much more than				
			just being in the head . It 'S also very				
			physical , it 's mental and physical				
			, because it 's focused on one thing , which				
			is survival now . What this means is				
yCSutY7LG382	0.15	0.30	that I 'm on the other side , so I can	Anxiety	NegativeFeeling		PsychologicalHealth
			share these with you and basically	Anxiety	NegativeFeeling		PsychologicalHealth
			relate with you guys . So , if you 're ready				
			to kick anxiety into butt , smash the like				
			button down below and leave me a comment .				
			Today 'S question of the day , what type of				
			music do you like to listen to when				
			you 're dealing with anxiety ? If you want				
4XqHVlZPYb82	0.30	1.02	you breathe faster to try to increase	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			the flow of oxygenrich air	Anxiety	NegativeFeeling		PsychologicalHealth
			into the lungs breathlessness , is n't just	Fear	NegativeFeeling		PsychologicalHealth
			a physical symptom . It 'S also a feeling				
			that affects the way we think				
			and act . If breathless , you can feel very				
			hot				
			panicky or overwhelmed , or that your				
			chest is tight or like you 're				
			suffocating				
			, and you need to take deep breaths , but				
			you ca n't or like breathing is just				
			such hard work and exhausting getting				
			out of breath can be				
			frightening and make You feel very				
			anxious that anxiety or fear can				
			increase how breathless you feel .				
Vs6DW1zSyso2	0.43	1.12	realize and when they take on some kind of physical activity , but they have n't	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			done for a little while they noticed breathlessness , and these are obviously	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			do n't signify a major problem at all . Then there are other causes of breathlessness	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			, predominantly the lungs that if you have a problem , your lungs and that certainly could				
			cause breathlessness and that 's more of a concern in people who are a heavy smokers or people				
			who have a history of ashma people . Who'Ve been exposed to asbestos				
			and I suppose , if you are getting breathless , then it is very important . You				
2auLobkUzSQ2	0.38	1.11	What amazes me about a lot of patients I meet with advanced lung disease is how accustomed	LungDisease	RespritoryIllness		PhysicalHealth
			many of them become to the limitations of their breathing.				

			Some of them become very used to walking ten feet and stopping and resting.					
			And it they at least tell me sometimes that it doesn't bother them and some people it					
			does bother.					
			So really it's taking a very personal, very patientfocused approach to how does it affect					
			them and how do we help make it better?					
bPNdAGBMph02	0.14	0.37	means you 're not able to breathe to a	Copd	RespritoryIllness		PhysicalHealth	
			certain degree .	Copd	RespritoryIllness		PhysicalHealth	
			Another name for copd is emphysema .	PulmonaryHypertension	RespritoryIllness		PhysicalHealth	
			Some of the symptoms - there 's quite a few .					
			The most common ones are shortness of					
			breath .					
			Coughing mucus the problem with copd is					
			it 's a progressive					
			condition that eventually leads to					
			pulmonary hypertension , so you 're getting					
			blood pressure ? That 'S going up in your					
FDS8oIbF6085	2.06	2.40	distressing of all chest pain	ChestPain	RespritoryIllness		PhysicalHealth	
			, respiratory symptoms are common and I	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth	
			think that 's one of the reasons we 've					
			decided to go down this respiratory					
			route , because kovat is putting a loss of					
			respiratory symptoms on our screens					
			, whether or not you 're reading about					
			somebody having A cough on Twitter or					
			someone who 's worried about wheezes that					
			they might be experiencing is this kovat					
			, so we want to make sure that everybody 's					
			understanding , the vocabulary and what we					
			need to ask with regard to the history					
			on those conditions or those symptoms . So					
			Even before this though, Buddhism has roots in a					
IjtWtakwsjw2	0.36	1.16	variety of belief sets that parallel	Belief	Spirituality		PersonalValuesAndBeliefs	
			what is now known as Jainism, which I may eventually cover in another video.	budism	religion		PersonalValuesAndBeliefs	Ignore-it was picked for the segment
			At the time, India put its main focus on tradition, based on texts called the Vedas, which were					
			ancient Sanskrit texts which informed their beliefs and made up a foundation for the Hinduism faith.					
			There was a bit of division, as a man named Siddhartha Gautama began to teach a shift					
			from this normal way of being, based on discipline and abstaining from indulgences.					
			See, he was a bit sheltered, and as he discovered more about the world, he began to teach on					
			the lessons he's learned.					
ITv53IhSwKk5	2.52	3.10	, illogical care , Huntingdon 's motor neuron	Training	AcquiringInformation		Environment	
			disease , multiple sclerosis . It puts a					
			huge amount of strain on the company					
			, both in terms of fainting again the rate					
			staff , but also in terms of training					
			, which has a huge cost involved in that					
			as well . Well , the girls do have a half an					
uZdWafHAX42	0.23	0.34	them into the Q & A box on the bottom	Education	EconomicStatus		Environment	
			right corner of your screen . If your					
			question is for Barbara , we 'll be					
			covering them at the end of the					
			presentation , so your speaker today will					
			be Barbara West with capital nursing					
			education .					
j11CQGyLoXo4	0.41	1.07	, as you can see over here	DailyLiving			LevelOfIndependence	
			, these okay , that 's not working good					
			there , the factors over here , so the five					
			factors are biological					
			, physiological , social , cultural . According					
			to this model					
			, those five worldly factors are factors					
			that influence everything within our					
			lives and by that					

			these impact on the middle activities of				
			daily living and there 's 12 of them				
			now to be healthy . We need to be able to				
m6dCxo7t_aE2	0.39	0.54	Hinduism means the religions of India.	Religion			PersonalValuesAndBeliefs
			It's not a single religion				
			but rather a variety of related beliefs				
			and spiritual practices.				
			It dates back five millennia				
			to the time of Krishna,				
			a man of such virtue				
			that he became known as an avatar of Vishnu,				
			an incarnation of the god in human form.				
lNqJhJy13M2	0.26	0.43	There has to be a few things that are	ChronicPain	Pain	PhysicalSymptoms	PhysicalHealth
			happening around you that we know will				
			lead to higher incidence of somebody				
			developing chronic pain . We do know that				
			one in four people who start having pain				
			that pain can just become chronic and				
			there does n't have to be any obvious				
			reason . A couple of things we know about				
SHoQoQobqgQ2	0.23	0.44	present to you . Our top five most popular	Training	AcquiringInformation		Environment
			videos about brand new training	Pain	PhysicalSymptoms		PhysicalHealth
			, specifically for pain , combined into a	ChronicPain	Pain	PhysicalSymptoms	PhysicalHealth
			single comprehensive series . These are				
			videos that resonated the most with our				
			audience and we believe they contain the				
			most valuable information for anybody				
			looking to overcome CFS and chronic pain				
			, so grab a pen and paper make yourself				
			comfortable and get ready to take some				
			notes and of all people . I know that				
J2boCpfjjhs2	0.33	0.54	Are you ready , then ? Let 'S begin now , let 's				Environment
			talk about the environment and				Environment
			environmental quality . Environmental				
			quality means to maintain a balance				
			between human activities and a healthy				
			condition of the environment . This				
			results in what is known as sustainable				
			development . Human activity at times has				
yMfgctSXgBo4	1.05	1.26	The subject of today 's panel discussion	Climate	PhysicalEnvironment		Environment
			is right at the center of those concerns .				
			As we know , climate change is likely to				
			impact				
			on a whole range of our activities				
			, but particularly ranging from everything				
			from where we live to what we eat				
			, as well as profound implications for our				
			health and wellbeing .				
			know they really trust you, and they're looking to you				
RijQpsWEdrE3	1.18	1.50	to help them through this difficult time.				PhysicalHealth
			Now, some social relationships can be bad, a person				
			that is constantly negative and has				
			a poor outlook, can bring you down and cause stress,				
			making that relationship toxic. Someone				
			that always talks about themselves and makes all of				
			your interactions about them, well, that's not				
			really a social connection. In that case you're just an				
			audience member in their one person				
			show on how wonderful their life is. Poor marital or				
			poor relationship quality, can also weaken				
			the immune system and erode physical health. Dealing				
			with stress from a poor relationship can lead to				
LVGQ23E9RVM2	0.25	1.00	Um	Rehabilitation			Environment
			go through the overview and aims for the	Rehabilitation			Environment
			presentation today , the the webinars seek	Rehabilitation			Environment
			to recover to cover the um	Rehabilitation			Environment
			rehabilitation needs being addressed in	Treatment			LevelOfIndependence
			the nhs				
			and , secondly , whether the				
			society , rehabilitation , medicine guides				
			, an interface of rehabilitation and				

			medical legal process				
			, we 'll be covering the rehabilitation				
			Code				
			and also the serious injury code				
			, and also the importance of interim				
			payments and access to early specialist				
			legal advice				
			and then dr julie harris will be				
			covering the areas in terms of access to				
			medical treatment and major trauma .				
v6n9snBQTic3	0.43	0.57	really depends where you start from it 's	Exercise	Rehabilitation		Environment
			not like . If you have no activity at all				
			that , you suddenly have to increase to				
			three times a week immediately , if you				
			get those effects or if you already have				
			a good exercise routine , you might have				
			to increase that even more to get the				
			maximum benefits . The other key question				
eIW5Ycgdjyo4	1.01	1.22	lowfat diet . The problem with that is	Diet	Behaviour		PhysicalHealth
			, sixty percent of the solid weight of	Depression	NegativeFeeling		PsychologicalHealth
			your brain is fat and low fat diets can				
			actually trigger depression , and so I				
			like healthy fat fish , although				
			um , clean fish				
			and so swordfish , is out and never would				
			have that . It 'S just loaded with Mercury				
xyQY8ang6g4	1.16	1.47	And while omegas are good fats for your brain,	Sleep	Rest		PhysicalHealth
			longterm consumption of other fats, like trans and saturated fats,				
			may compromise brain health.				
			Meanwhile, proteins and amino acids,				
			the building block nutrients of growth and development,				
			manipulate how we feel and behave.				
			Amino acids contain the precursors to neurotransmitters,				
			the chemical messengers that carry signals between neurons,				
			affecting things like mood,				
			sleep,				
			attentiveness,				
			and weight.				
ONpVDBXni2A7	1.45	2.03	In the context of taking a respiratory	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			history , you may find that patients	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			present with multiple respiratory	Dyspnea	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			symptoms , for example , they may have	Breathlessness	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			breathlessness and a cough .				
			So , let 's now look at some of the key				
			respiratory symptoms you may come across				
			top of the list is dyspnea or				
			breathlessness .				
uT4zDBknsE02	1.13	1.32	you 're watching me for the first time	Rehabilitation			Environment
			I 'm Miss Devi , Sundar specialized in	Copd	RespritoryIllness		PhysicalHealth
			Palmer Rehabilitation , Counseling	Asthma	RespritoryIllness		PhysicalHealth
			, Psychotherapy and health coaching .	LungDisease	RespritoryIllness		PhysicalHealth
			I have over 20 years of therapy				
			experience in dealing with people with				
			chronic respiratory disease majorly COPD				
			, asthma and Industrial lung disease				
			, and today I 'm going to talk about . Did we				
RQhfVbYaCws3	0.36	0.54	video episode and it was recorded before	Covid	RespritoryIllness		PhysicalHealth
			the pandemic , so it does not include	Covid	RespritoryIllness		PhysicalHealth
			covid considerations in that episode . But	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			if you want to think about the other	Cough	RespiratoryIllnessSymptoms	PhysicalSymptoms	PhysicalHealth
			considerations , aside from covid				
			, definitely check that episode out . I will				
			link to that below and talks about				
			specifically approach to when to use				
			antibiotics , and then this episode is				
			about chronic cough . So that 's a cough of				
HPz1va21l_M4	1.17	1.44	High culture , which is generally pursued	Education	EconomicStatus		Environment
			by the upper class , refers to classical				
			music theater , fine arts and other				
			sophisticated pursuits .				
			Members of the upper class can pursue				

			high art because they have cultural				
			capital , which means the professional				
			credentials , education , knowledge and				
			verbal and social skills necessary to				
			attain the property , power				
			and prestige to get ahead socially				
			low culture or popular culture . The one				
JYalx8bvEyg4	0.47	1.06	we stay stuck on negative thinking	Thinking	CognitiveFunction		PsychologicalHealth
			, negative thoughts and limited mindsets ?				
			So much yeah , that 's a big question . So				
			the simple answer is that the				
			um stories we 've been told about , what 's				
			going on in our skull				
			they 're just wrong				
			, interesting , okay . So the first thing is				
DESCcjSQSKY3	0.39	0.54	Bloodletting, purging, fasting	Treatment			LevelOfIndependence
			they were all wellregarded treatments.	Drug	Behaviour		PhysicalHealth
			Today, the wellness industry	Alcohol	Behaviour		PhysicalHealth
			has picked up on our desire to rid ourselves of things.				
			They've taken the word "detox,"				
			the medical treatment for people with drug and alcohol addictions,				
			and used it to apply to market cleanses.				
15R2pMqU2ok18	5.19	5.34	LMNT is formulated to help anyone	Diet	Behaviour		PhysicalHealth
			with their electrolyte needs				
			and is perfectly suited for people				
			who are following a ketogenic, low carbohydrate,				
			or paleo diet.				
			LMNT contains a sciencebacked electrolyte ratio				
			of 1000 milligrams of sodium,				
			200 milligrams of potassium,				
			and 60 milligrams of magnesium.				
ydyaBfY6aY5	2.29	2.48	experience on the running track	Diet	Behaviour		PhysicalHealth
			for over five years i ate only uncooked	Diet	Behaviour		PhysicalHealth
			fruits , vegetables , nuts seeds and sprouts				
			an experience that inspired my first				
			book . The price diet connector sells to				
			your soul				
			, but as time passed and life stresses				
			tested my resilience , i did n't feel as				
			good , physically or emotionally as when i				
			first began a vegan diet . The defining				
9jDsQU1UEAo20	6.12	6.39	Wow.	Tumor	RespritoryIllness		PhysicalHealth
			Separate from the gut microbiome,	Tumor	RespritoryIllness		PhysicalHealth
			they have their own microbiome and they took this further.	Tumor	RespritoryIllness		PhysicalHealth
			They were taking a look at pancreatic cancer,	Relative	PersonalRelationship		SocialRelationship
			which is one of our most deadly cancers.	Tumor	RespritoryIllness		PhysicalHealth
			And they analyzed the microbiome of the tumor,				
			not the person's gut microbiome, of the tumor,				
			and discovered that a person who has a low diversity				
			within the tumor microbiome has a worse prognosis				
			or a lower likelihood of survival				
			relative to the person whose tumor has a high diversity.				
V5PK_Qwejao2	0.35	0.53	study what happens to the health of				Environment
			people when they catch and eat those				Environment
			fish . Environmental health is not just				
			about the health of the environment ; it				
			always comes back to you and whether the				
			environment , you are part of is helping .				
			You stay healthy or making you sick . What				
			here the terms : physical , chemical , biological , social and psychosocial factors in the environment . These				Environment
NFHt_Zlb2xo2	0.54	1.40	specific terms are recurring and you will see them in various definitions that we 'll go over today	Climate	PhysicalEnvironment		Environment

			: clean air , stable climate , adequate water , sanitation and hygiene , safe use of chemicals				
			, protection from radiation , healthy and safe workplaces , sound agricultural practices				
			, health supporting cities and built environments are all Prerequisite for good health				
			, healthy environments could prevent almost one quarter of the global burden of disease according				
			to the whole cov19 pandemic is a further reminder of the delicate relationship between people and				
			our planet . Another very important agency in the united states is atsdr , which stands for agency for				
vmZVbXCv6wM3	0.49	1.08	out by capita . The assessment may take	Friend	PersonalRelationship		SocialRelationship
			around an hour , but you 'll get as much	Family	PersonalRelationship		SocialRelationship
			time as you need .				
			You need to bring photographic ID with				
			you , such as your passport or driving				
			license . You can bring someone such as a				
			carer support worker friend or family				
			member with you to support you and they				
			can take part in the discussion too . If				
AO66KltOLZA4	1.20	1.42	Contact your state's department of vocational or rehabilitation services	Rehabilitation			Environment
			To learn about the steps it takes to receive a driver's license.				
			Most states require you to go through an adaptive drivers lesson before you are able to get your license				
			But they also have programs				
			where the lessons and modifications are at little or no cost to you.				
			Once you have figured out what general accommodations you may need on your vehicle				
			You will need to do some research on the specifics of your modifications.				
eiRlm6BOzP42	0.23	0.37	at the time and it just got	Sleep	Rest		PhysicalHealth
			worse and worse as				
			the evening went on , and then				
			it was particularly bad				
			in bed and could n't get a wink of sleep				
			all night . Okay , can you tell me a bit				
			more about it ?				
qSYVWE_2Bnc2	0.45	1.15	anything that we we teach if you 're	PhysicalSymptoms			PhysicalHealth
			dealing with physical symptoms , if you 're	PhysicalSymptoms			PhysicalHealth
			dealing with something that you know	PhysicalSymptoms			PhysicalHealth
			, you 've got some serious physical				
			symptoms step . One is always going to be				
			consulting with a health professional .				
			Yes , what we 're going to be talking about				
			is things that you can be doing in				
			addition to seeing checking making sure				
			that what physical symptoms that you				
			have , you know you want to be checking in				
			with a doctor on right .				
MNp9bmNI602	0.27	0.48	And I also had this discomfort in my back.	Discomfort	Pain	PhysicalSymptoms	PhysicalHealth
			I just didn't feel like doing				
			the things I usually enjoy.				
			After several weeks of this,				
			I decided to make an appointment with my doctor.				
			Major depressive disorder, or MDD,				
			affects people's lives in many different ways.				
r8qsGPwgdAw2	0.17	0.27	everything is fine	Anxiety	NegativeFeeling		PsychologicalHealth
			and what they do is they label you with	Thinking	CognitiveFunction		PsychologicalHealth
			anxiety , now	Anxiety	NegativeFeeling		PsychologicalHealth
			you 've grown up thinking . Anxiety is all	Anxiety	NegativeFeeling		PsychologicalHealth
			in your head .	PhysicalSymptoms			PhysicalHealth
			So how can anxiety create such physical				
			symptoms ? In fact , you may not even be				
Cg_GW7yhq202	0.17	0.29	them	Sleep	Rest		PhysicalHealth

			: physical activity releases , feelgood				
			hormones called endorphins				
			which help us sleep and feel better . It				
			also improves our physical fitness				
			, which tends to make people feel better				
			in general . Even small amounts of regular				
b6Dte96WdqM2	0.26	0.47	substance in amounts or with methods	Alcohol	Behaviour		PhysicalHealth
			that are harmful to themselves or others .	drugs??			
			Some of the most commonly used drugs are				
			alcohol , cocaine , opioids , benzodiazepines				
			, cannabis , barbiturates , amphetamine				
			, hallucinogens , inhalants club drugs and				
			other substances .				
8qK0hxuXOC83	0.44	1.02	The slowest method is to take a drug orally	Drug	Behaviour		PhysicalHealth
			because it must be absorbed by our digestive system	Drug	Behaviour		PhysicalHealth
			before it takes effect.	Drug	Behaviour		PhysicalHealth
			Inhaling a drug gets it into the bloodstream faster.	Drug	Behaviour		PhysicalHealth
			And injecting a drug intravenously works quickly too				
			because it pumps the chemicals directly into the blood.				
			Once there, the drug quickly reaches the gates of its destination, the brain.				
Y18Vz51Nkos4	1.26	1.43	That's one of the reasons smoking can lead to oxygen deprivation	Smoking	Behaviour		PhysicalHealth
			and shortness of breath.	Smoking	Behaviour		PhysicalHealth
			Within about 10 seconds,				
			the bloodstream carries a stimulant called nicotine to the brain,				
			triggering the release of dopamine and other neurotransmitters				
			including endorphins				
			that create the pleasurable sensations which make smoking highly addictive.				
k8AuX2qQNa02	0.30	0.45	dipsnia can result from physical	Pneumonia	RespritoryIllness		PhysicalHealth
			illnesses , for example	Anxiety	NegativeFeeling		PsychologicalHealth
			, pneumonia , chronic obstructive pulmonary	Fear	NegativeFeeling		PsychologicalHealth
			disease	Depression	NegativeFeeling		PsychologicalHealth
			or organ failures . It can also be caused				
			by psychological issues				
			, for example , anxiety				
			, fear , depression .				
				294			

	New concepts suggested by Annotator
To fix - Domain taxonomy	4
To fix - Semantic Tagging Algorithm	4
Ignore - it was picked for the segment	9
Total	17

Appendix N

Google Form for VIN-L Evaluation (Second Domain)

The Google Form designed and shared with the domain experts to evaluate VIN-L output in the second domain.

First Form used with the experts from the InAdvance project

Health Related Quality of Life Needs of Patients With Chronic Illnesses (Respiratory Illness) - Expert Feedback

videonarrativesinadvance@gmail.com Switch accounts

Not shared

Next | Page 1 of 17 | Clear form

Introduction

Thank you for helping with evaluating the video narratives that have been generated from Abrar Mohammed's PhD project conducted at the University of Leeds, UK.

Your evaluation is essential to assess the potential benefits of the generated video narratives

to **help build awareness of health-related quality of life needs of patients living with chronic respiratory illnesses**.

In this evaluation, you will **spend approximately 90 min** watching **video narratives with patient stories about living with a chronic respiratory Illness**. Video narratives are *combinations of video segments which have been automatically characterised and linked together by computer algorithms*. You will be given a scoring sheet for each video narrative and will be asked for your feedback on the usability of the narratives.

You will assess 16 video narratives (totalling 64 minutes video content) which are aimed at building awareness of health-related quality of life needs of patients living with chronic respiratory Illness. This will include: Physical Health, Environment, Psychological Health, Level of Independence, Personal Values and Beliefs, and Social Relationships.

You will have to log on with your **Google account**. When you fill out a Google Form in your Google account, **your progress is automatically saved**. This means if you can't complete the form or need to switch devices, your earlier responses will be saved, if you do not press SUBMIT. When you come back to the form, you will start from where you stopped last time. <u>If you press SUBMIT and would like to come back to the form, you will start from the beginning, just be careful, please!</u>

The study is **fully anonymous** - although you will logon with your Google account, the responses **do not save the email of the responders.**

Thank you very much for your help.

If you have any questions please contact:

- Abrar Mohammad <a.mohammed1@leeds.ac.uk>
- Vania Dimitrova <v.g.dimitrova@leeds.ac.uk>

Back | Next | Page 2 of 17 | Clear form

Your involvement in this study will include the following steps:

1. Read and accept the consent form.

2. Complete a short pre-study section about your profile.

3. Watch several suggested video narratives.

4. Give your feedback on the video narratives you have watched and their description.

5. Give a short video summary.

6. Answer questions providing feedback on the usability and usefulness of the recommended video narratives for learning about Health Related Quality of Life-Respiratory Illness areas.

7. Repeat steps 3-6 with all four types video narratives.

CONSENT

I have read and understood the information about the evaluation of research on using video narratives for learning based on user interaction and video content, conducted at the School of Computing, University of Leeds, UK. On this basis I agree to participate in this online survey, and I consent to publication of the results of the evaluation with the understanding that confidentiality will be preserved. I also understand that I may at any time withdraw from the online survey, including withdrawal of any information I have provided. I note that the survey is fully complaint with General Data Protection Regulation (GDPR). Also, this survey has been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences , University of Leeds, UK.

☐ Agree

Back Next Page 3 of 17 Clear form

Your Profile

Please describe briefly what you do

Your answer

What is your awareness of health-related quality of life needs of patients living with a chronic illness?

	Not at all	General knowledge	Personal experience as patient	Some experience as carer	Some experience as health professional	Experience as researcher in patient quality of life	Other
Answer	☐	☐	☐	☐	☐	☐	☐

Back Next Page 4 of 17 Clear form

To help you understand the structure of the generated Video Narratives, in the Image below, you will see pointers to the main parts of the Video Narratives: Introduction, Video segment description, Video segment (part of a video to watch), Conclusion statement.

Video Narrative Structure

Back

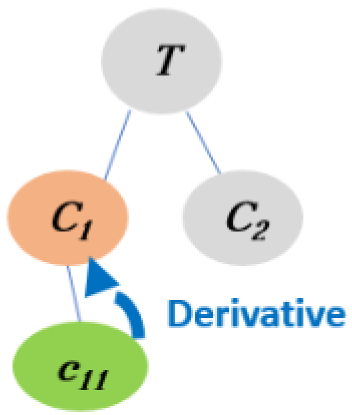
Next

Page 5 of 17

Clear form

In this section you will find the definition of the Derivative linking and 3 links to Derivative Video Narratives. Please, pay attention to the main areas of patient quality of life mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs, and Social Relationships.

Derivative linking: To become aware of a concept (Green oval) from a topic *T*, you will explore videos about its parent concept which is more generic (Orange oval).



Video Narrative: Exploring Strength by linking it to its parent concept Energy *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

[Video Narrative: Exploring Exercise by linking it to its parent concept Rehabilitation](#) *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: Exploring Sleep by linking it to its parent concept Rest *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

You watched 3 video narratives that were created using Derivative Linking (learning a concept by linking it to a more generic concept). The questions below ask how you perceive the usefulness of the these narratives.

The video narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Derivative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Derivative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

Back Next Page 7 of 17 Clear form

The following questions gather further feedback on the usability of the Derivative Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Derivative Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

EFFORT (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Derivative Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Derivative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Derivative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

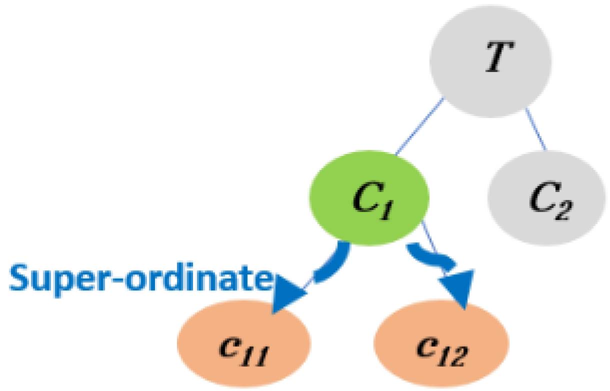
Please explain your score

Your answer

Back Next Page 8 of 17 Clear form

I In this section you will find the definition of the Super Ordinate linking, and watch 3   Super Ordinate Video Narratives. Please, pay attention to the main areas of patient quality of life mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs, and Social Relationships.

Super Ordinate linking: To learn a concept (Green oval) from a topic, we link to its children concepts (Orange ovals).



Video Narrative: Exploring Rehabilitation by linking it to its specific concept Exercise *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Exploring Rest by linking it to its specific concept Sleep *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Exploring Energy by linking it to its specific concept Strength *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

You watched 3 video narratives that were created using Super Ordinate Linking (learning a concept by linking it to a more specific concept). The questions below ask how you perceive the usefulness of the these narratives.

The Super Ordinate Video Narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Super Ordinate Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Super Ordinate Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

The following questions gather further feedback on the usability of the Super Ordinate Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Super Ordinate Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

EFFORT (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Super Ordinate Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Super Ordinate Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Super Ordinate Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

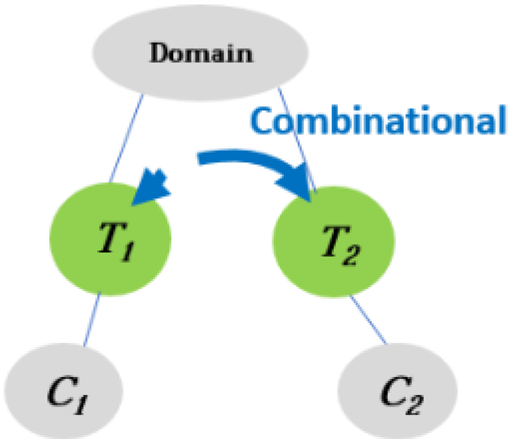
Please explain your score

Your answer

Back Next Page 11 of 17 Clear form

In this section you will find the definition of the Combinational linking, and watch 4 Combinational Video Narratives. Please, pay attention to the main areas of the patient quality of life mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs, and Social Relationships.

Combinational linking: Learn about two topics (Green ovals) by linking concepts from both topics mentioned in the same video segment.



Video Narrative: Linking Personal Values and Beliefs to Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Linking Level Of Independence to Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Linking Social Relationship to Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Linking Level Of Independence to Social Relationship *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.					
All video segments clearly link to the health related quality of life areas mentioned in the introduction.					
The descriptions which introduce each video segment provide a useful summary.					
All video segments provide relevant content for health related quality of life areas.					
The concluding text at the end of the video narrative provides appropriate summary.					
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.					

You watched 4 video narratives that were created using Combinational Linking (linking concepts from two topics mentioned in the same video segment). The questions below ask how you perceive the usefulness of the these narratives.

The Combinational Video Narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Combinational Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Combinational Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

Back Next Page 13 of 17 Clear form

The following questions gather further feedback on the usability of the Combinational Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Combinational Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

EFFORT   (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Combinational Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT   (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION   (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Combinational Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on   FRUSTRATION   (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Combinational Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

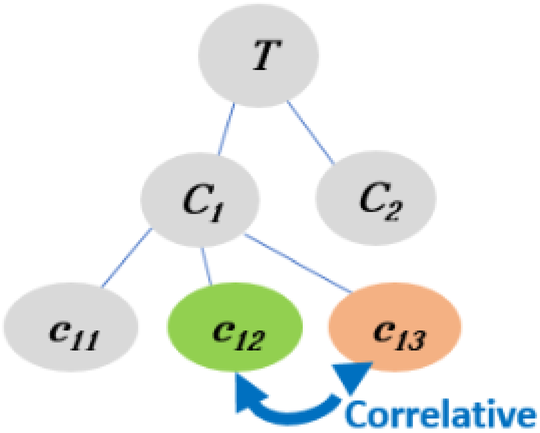
Please explain your score

Your answer

Back Next Page 14 of 17 Clear form

In this section you will find the definition of the Correlative linking, and watch 6 Correlative Video Narratives. Please, pay attention to the main areas of the Respiratory Illness mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs and Social Relationship and their concepts.

Correlative linking: To learn a concept (Green oval) from a topic, we link it to similar concepts (Orange ovals).



Video Narrative: become aware of Caregiver by linking it to similar concepts from the topic Social Relationship *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: become aware of the concept Fear by linking it to similar concepts from the topic Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: become aware of the concept Shortness Of Breath by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Exercise by linking it to similar concepts from the topic Environment *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Meditation by linking it to similar concepts from the topic Personal Values and Beliefs *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Drug by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

You watched 6 video narratives that were created using Correlative Linking (learning a concept by linking it to similar concepts). The questions below ask how you perceive the usefulness of the these narratives.

The Correlative Video Narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Correlative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Correlative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

Back Next Page 16 of 17 Clear form

The following questions gather further feedback on the usability of the Correlative Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Correlative Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Correlative Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

FRUSTRATION (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Correlative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Correlative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

Thank you very much for completing the study.

Please press SUBMIT to complete the study.

Back Submit Page 17 of 17 Clear form

Second Form used with the PhD researchers from the University of Leeds

Health Related Quality of Life Needs of Patients With Chronic Illnesses (Respiratory Illness) - Expert Feedback

videonarrativesinadvance@gmail.com Switch accounts

Not shared

Next Page 1 of 11 Clear form

Introduction

Thank you for helping with evaluating the video narratives that have been generated from Abrar Mohammed's PhD project conducted at the University of Leeds, UK.

Your evaluation is essential to assess the potential benefits of the generated video narratives

to **help build awareness of health-related quality of life needs of patients living with chronic respiratory illnesses**.

In this evaluation, you will **spend approximately 60 min** watching **video narratives with patient stories about living with a chronic respiratory Illness**. Video narratives are *combinations of video segments which have been automatically characterised and linked together by computer algorithms*. You will be given a scoring sheet for each video narrative and will be asked for your feedback on the usability of the narratives.

You will assess 12 video narratives (totalling 46 minutes video content) which are aimed at building awareness of health-related quality of life needs of patients living with chronic respiratory Illness. This will include: Physical Health, Environment, Psychological Health, Level of Independence, Personal Values and Beliefs, and Social Relationships.

You will have to log on with your **Google account**. When you fill out a Google Form in your Google account, **your progress is automatically saved**. This means if you can't complete the form or need to switch devices, your earlier responses will be saved, if you do not press SUBMIT. When you come back to the form, you will start from where you stopped last time. If you press SUBMIT and would like to come back to the form, you will start from the beginning, just be careful, please!

The study is **fully anonymous** - although you will logon with your Google account, the responses **do not save the email of the responders.**

Thank you very much for your help.

If you have any questions please contact:

- Abrar Mohammad <a.mohammed1@leeds.ac.uk>
- Vania Dimitrova <v.g.dimitrova@leeds.ac.uk>

Back   Next   Page 2 of 11   Clear form

Your involvement in this study will include the following steps:

1. Read and accept the consent form.

2. Complete a short pre-study section about your profile.

3. Watch several suggested video narratives.

4. Give your feedback on the video narratives you have watched and their description.

5. Give a short video summary.

6. Answer questions providing feedback on the usability and usefulness of the recommended video narratives for learning about Health Related Quality of Life-Respiratory Illness areas.

7. Repeat steps 3-6 with all four types video narratives.

CONSENT

I have read and understood the information about the evaluation of research on using video narratives for learning based on user interaction and video content, conducted at the School of Computing, University of Leeds, UK. On this basis I agree to participate in this online survey, and I consent to publication of the results of the evaluation with the understanding that confidentiality will be preserved. I also understand that I may at any time withdraw from the online survey, including withdrawal of any information I have provided. I note that the survey is fully complaint with General Data Protection Regulation (GDPR). Also, this survey has been reviewed and approved by the Research Ethics Committee of the Faculty of Engineering and Physical Sciences , University of Leeds, UK.

☐ Agree

Your Profile

Please describe briefly what you do

Your answer

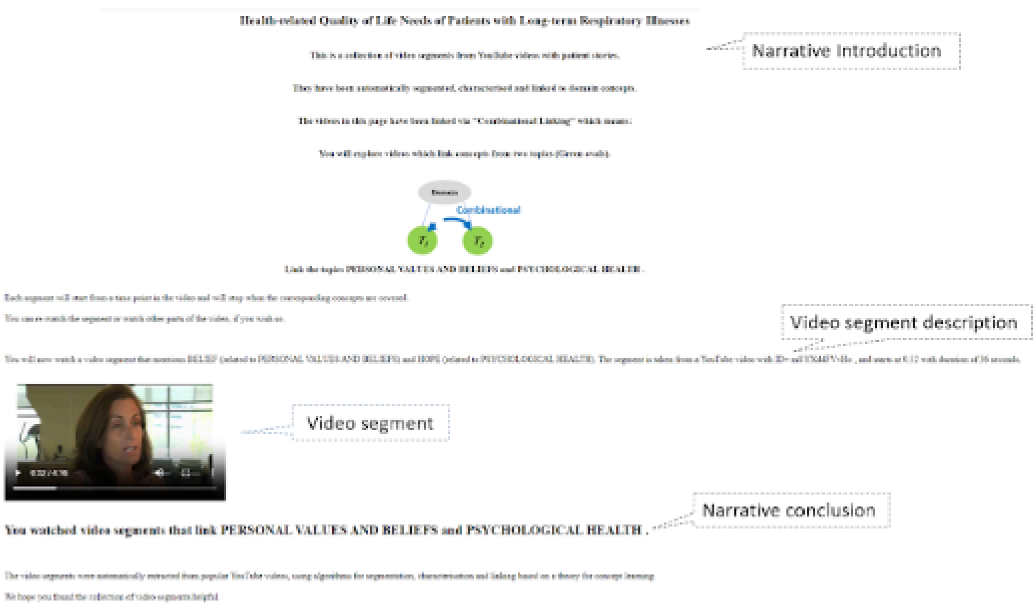
What is your awareness of health-related quality of life needs of patients living with a chronic illness?

	Not at all	General knowledge	Personal experience as patient	Some experience as carer	Some experience as health professional	Experience as researcher in patient quality of life	Other
Answer	☐	☐	☐	☐	☐	☐	☐

Back Next Page 4 of 11 Clear form

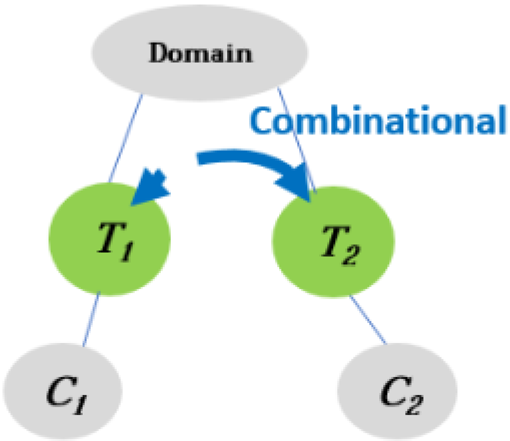
To help you understand the structure of the generated Video Narratives, in the Image below, you will see pointers to the main parts of the Video Narratives: Introduction, Video segment description, Video segment (part of a video to watch), Conclusion statement.

Video Narrative Structure



In this section you will find the definition of the Combinational linking, and watch 5 Combinational Video Narratives. Please, pay attention to the main areas of the patient quality of life mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs, and Social Relationships.

Combinational linking: Learn about two topics (Green ovals) by linking concepts from both topics mentioned in the same video segment.



Video Narrative: Physical Health to Environment *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: Linking Social Relationship to Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Linking Physical Health to Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: Linking Physical Health to Level of Independence *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: Linking Level of Independence to Environment *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

You watched 5 video narratives that were created using Combinational Linking (linking concepts from two topics mentioned in the same video segment). The questions below ask how you perceive the usefulness of the these narratives.

The Combinational Video Narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Combinational Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Combinational Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

Back Next Page 7 of 11 Clear form

The following questions gather further feedback on the usability of the Combinational Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Combinational Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

EFFORT (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Combinational Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

FRUSTRATION (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Combinational Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Combinational Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

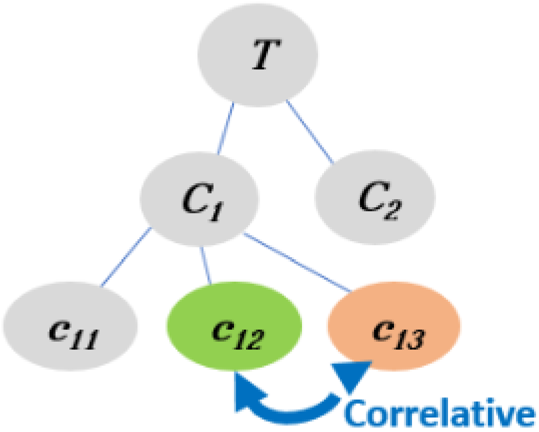
Please explain your score

Your answer

Back Next Page 8 of 11 Clear form

In this section you will find the definition of the Correlative linking, and watch 7 Correlative Video Narratives. Please, pay attention to the main areas of the Respiratory Illness mentioned in the videos: Physical Health, Environment, Psychological Health, Level Of Independence, Personal Values and Beliefs and Social Relationship and their concepts.

Correlative linking: To learn a concept (Green oval) from a topic, we link it to similar concepts (Orange ovals).



Video Narrative: become aware of Thinking by linking it to similar concepts from the topic Psychological Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	◯	◯	◯	◯	◯
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	◯	◯	◯	◯	◯
The descriptions which introduce each video segment provide a useful summary.	◯	◯	◯	◯	◯
All video segments provide relevant content for health related quality of life areas.	◯	◯	◯	◯	◯
The concluding text at the end of the video narrative provides appropriate summary.	◯	◯	◯	◯	◯
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	◯	◯	◯	◯	◯

Video Narrative: become aware of the concept Treatment by linking it to similar concepts from the topic Level of Independence *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Lung Cancer by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Energy by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Insurance by linking it to similar concepts from the topic Level of Independence *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Pneumonia by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

Video Narrative: become aware of the concept Cough by linking it to similar concepts from the topic Physical Health *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The introduction text in the video narrative gives a clear idea of the aim of the narrative.	○	○	○	○	○
All video segments clearly link to the health related quality of life areas mentioned in the introduction.	○	○	○	○	○
The descriptions which introduce each video segment provide a useful summary.	○	○	○	○	○
All video segments provide relevant content for health related quality of life areas.	○	○	○	○	○
The concluding text at the end of the video narrative provides appropriate summary.	○	○	○	○	○
This video narrative is useful for raising awareness of quality of life needs of patients living with chronic respiratory illnesses.	○	○	○	○	○

You watched 7 video narratives that were created using Correlative Linking (learning a concept by linking it to similar concepts). The questions below ask how you perceive the usefulness of the these narratives.

The Correlative Video Narratives with the short description are useful to *

	Extremely likely	Quite likely	Slightly likely	Neutral	Slightly unlikely	Quite unlikely	Extremely unlikely
Identify key points related to patient quality of life.	○	○	○	○	○	○	○
Focus on key points at a time	○	○	○	○	○	○	○
Identify key topics/concepts to be aware of	○	○	○	○	○	○	○
Link main points mentioned in the videos	○	○	○	○	○	○	○

What do you find **positive** about the generated Correlative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

What do you find **negative** about the generated Correlative Video Narratives with regard to raising awareness of quality of life needs of patients living with respiratory illnesses?

Your answer

Back Next Page 10 of 11 Clear form

The following questions gather further feedback on the usability of the Correlative Video Narratives you watched:

MENTAL DEMAND (1-low .... 20-high)
How mentally demanding was it to watch recommended Correlative Video Narratives and notice quality of life needs of patients living with respiratory illnesses? For example, how much mental and perceptual activity was required - thinking, deciding, remembering, looking, searching?

Your score should be within the range of low(1) to high(20).

Your score on MENTAL DEMAND (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

EFFORT (1-low .... 20-high)
How hard did you have to work (mentally and physically) to watch recommended Correlative Video Narratives and notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on EFFORT (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

FRUSTRATION (1-low .... 20-high)
How discouraged, irritated, stressed and annoyed did you feel while watching the recommended Correlative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on FRUSTRATION (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

PERFORMANCE (1-low .... 20-high)
How successful do you think you were to identify new useful terms from watching the recommended Correlative Video Narratives to notice quality of life needs of patients living with respiratory illnesses?

Your score should be within the range of low(1) to high(20).

Your score on PERFORMANCE (1-low .... 20-high) *

Your answer

Please explain your score.

Your answer

Thank you very much for completing the study.

Please press SUBMIT to complete the study.

Back Submit Page 11 of 11 Clear form

Appendix O

Evaluation Results of VIN-L (Second Domain)

These are the evaluation results, from experts, of VIN-L in the second domain which includes the: Quality and the Perceived Usefulness results.

Quality of the video narratives as evaluated by the experts.

The numbers are the aggregation of the responses from the experts where each expert had evaluated more than one video narrative:

Narrative type	Response type	Q1	Q2	Q3	Q4	Q5	Usefulness
CO	Strongly Agree	10	12	6	13	6	18
	Agree	11	6	10	6	13	3
	Neutral	3	7	8	2	5	4
	Disagree	3	2	3	6	3	1
	Strongly Disagree	0	0	0	0	0	1
CR	Strongly Agree	19	16	23	22	15	24
	Agree	13	14	9	11	17	14
	Neutral	5	5	7	4	5	1
	Disagree	2	4	0	2	2	0
	Strongly Disagree	0	0	0	0	0	0
D	Strongly Agree	3	3	0	5	0	7
	Agree	3	4	5	3	7	2
	Neutral	2	1	3	1	1	0
	Disagree	1	1	1	0	1	0
	Strongly Disagree	0	0	0	0	0	0
S	Strongly Agree	0	3	0	4	1	6
	Agree	6	6	7	5	6	3
	Neutral	2	0	1	0	2	0
	Disagree	1	0	1	0	0	0
	Strongly Disagree	0	0	0	0	0	0

Perceived usefulness of the video narratives as evaluated by experts.

The numbers are the aggregation of the responses from the experts where each expert had evaluated more than one video narrative:

Narrative Type	Response type	PU1	PU2	PU3	PU4
CO	Extremely Likely	2	1	2	3
	Quiet Likely	2	3	2	1
	Slightly Likely	1	2	2	1
	Neutral	1	0	0	1
	Slightly Unlikely	0	0	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
CR	Extremely Likely	3	0	3	2
	Quiet Likely	2	5	3	3
	Slightly Likely	1	1	0	0
	Neutral	0	0	0	0
	Slightly Unlikely	0	0	0	1
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
D	Extremely Likely	2	0	2	0
	Quiet Likely	1	2	1	2
	Slightly Likely	0	0	0	1
	Neutral	0	1	0	0
	Slightly Unlikely	0	0	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0
S	Extremely Likely	2	0	2	0
	Quiet Likely	1	3	1	2
	Slightly Likely	0	0	0	0
	Neutral	0	0	0	1
	Slightly Unlikely	0	0	0	0
	Quiet Unlikely	0	0	0	0
	Extremely Unlikely	0	0	0	0