



**Environmental Communication in the Digital
Deliberative Sphere: A Multimodal Analysis of the
Role of the Digital Publics in YouTube-Mediated
Taiwanese Environmental Discourse.**

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**Thesis submitted to the University of Sheffield for the degree
of Doctor of Philosophy.**

**Department of Sociological Studies,
The University of Sheffield**

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Submitted: 

For Eric, Annie and Natalie.

Abstract

Environmental communication plays a key role in representing scientific and political issues, such as climate change and environmental policy. Digital media platforms such as YouTube now play a central role in communicating environmental communication and engaging in the digital deliberative sphere. These platforms have a significant impact on shaping public opinion on political and environmental issues. For example, the 2018 Taiwanese referendum resulted in the abolition of coal and nuclear power plants and other environmental reforms being achieved, as all three proposals related to environmental issues were passed. Consequently, the Taiwanese context provides a useful case study for understanding the concrete power of the deliberative sphere in shaping environmental policy. While research in this area is growing, it often focuses on Western European and English-speaking countries, neglecting the different cultural and political contexts that contribute to global environmental problems. Moreover, there is little evidence on the digital deliberative sphere, making it difficult to identify its role and how the system works.

This thesis addresses these gaps by conducting a detailed multimodal analysis of environmental communication in Taiwanese current affairs programmes, including political talk shows, non-affiliated talk shows and in-depth reporting, mediated through YouTube. These programmes contribute to the digital deliberative system by providing non-serial forms of news media and extended discussions on platforms such as YouTube. The thesis utilises comment analysis and Up-next algorithm analysis to examine in depth the composition of publics and counterpublics, as well as the mobilisation of publics through YouTube's initial recommendation system. The results of the study show the communicative modes of the programmes in the digital deliberative system on environmental issues, the mediating role of the YouTube system (comments and Up-next algorithm) and the connections between the two. This study not only contributes to the understanding of the role of the deliberative system in media and platforms, but also provides robust evidence for policy makers and advocates working to promote environmental issues.

The thesis presents four key findings: (1) the results indicate a similarity to the siloed media logic of traditional one- or two-channel television media, with Taiwanese media remaining the dominant channels in the new media landscape, suggesting that the concept of 'totality of publics' is similar to traditional television media; (2) environmental issues exhibit varying degrees of politicisation in different programme genres, with political talk shows being the most affected, followed by non-affiliated talk shows and in-depth reporting. This politicisation of environmental issues underlines YouTube's role in mediating these issues and is associated with significant political polarisation, as a comparison of the agenda setting of the videos and the comments below them shows; (3) the practises of YouTube's recommendation system reveal a tendency to promote political radicalisation. A typical communicative practice associated with this is the use of numbers to support political arguments. For example, round numbers are often used to attract public attention, while precise numbers are used in data representation to complement and emphasise information sources or professional opinions; (4) the multimodal analysis identifies six communicative practices that aim to promote arguments by reducing content ambiguity and highlighting key points. This finding highlights the mediating role between raising public awareness and

taking environmental action within the digital deliberative sphere. The study identifies an emerging deliberative system on digital platforms that offers a new approach to communicating environmental issues and influencing environmental policy through the proposed methodology.

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Acronyms

CRTA: Cable Radio and Television Act

CCTV: China Central Television

CTV: China Television Company

CTS: Chinese Television System

DDP: Democratic Progressive Party

EA: Electricity Act

KMT: Kuomintang

LY: Legislative Yuan

NCC: National Communications Commission

NPPI: No.1 Nuclear Power Plant

NPPII: No.2 Nuclear Power Plant

NPPIV: No.4 Nuclear Power Plant

NPPs: nuclear power plants

PFPP: People First Party

TSP: Taiwan Statebuilding Party

TTV: Taiwan Television Enterprise

TPC: The Taiwan Power Company

Statement about Romanisation of Chinese terms

The Romanization of Chinese terms involves the conversion of Chinese characters into the Latin alphabet, allowing individuals unfamiliar with Chinese to better approximate their pronunciation. This procedure plays a pivotal role in enhancing cross-cultural communication, advancing academic exploration, and fostering international engagements. It accomplishes this by establishing a uniform means of depicting the auditory aspects of the Mandarin Chinese language, renowned for its intricate tonal and phonetic intricacies.

Within this thesis, each facet of the Chinese language undergoes meticulous translation under the author's discerning comprehension, subsequently receiving endorsement from supervisory authorities. Notably, the text of the thesis encompasses both Traditional and Simplified Chinese scripts.

Diverse Romanization frameworks, exemplified by systems like Tongyong Pinyin and Wade-Giles, have evolved progressively to bridge the divergence between the Chinese script and the phonetic attributes of foreign languages. These frameworks have been developed over time to bridge the gap between the Chinese writing system and the phonetic realities of other languages, contributing to a deeper understanding and appreciation of Taiwanese culture and language on a global scale.

I. Introduction

In 2018, Taiwan witnessed a significant referendum that included questions on a range of issues, notably the contentious debate over the future of nuclear power. This event catalysed discussions across both traditional and social media platforms, marking a critical juncture in the discourse of environmental communication in Taiwan. Despite the prominence of this discussion, the exploration of environmental communication on social media, especially YouTube, in the Taiwanese context remains scant. This thesis aims to address this gap, focusing on the 2018 referendum as a pivotal case study for understanding the dynamics of environmental communication on digital platforms.

YouTube, as argued by Leftwich (2004, p.2), plays an integral role in the complex interplay of power, decision-making, and governance within societies, especially in the context of environmental politics. The platform has evolved beyond a mere analytical channel, becoming a vital space for environmental discourse and active public engagement. Participation on YouTube encompasses various forms of engagement, from active involvement like posting and reading comments to passive interactions such as views, likes, and shares. This broader understanding of participation is crucial in appreciating the diverse ways in which the platform facilitates public discourse on environmental issues. Some commentators present compelling evidence that framing environmental concerns in a political context captures the public's attention through democratic contestation and deliberation (e.g., Lockwood 2018; Warner 2002). Notably, when environmental issues are portrayed as political matters rather than solely scientific, they tend to attract more attention, thereby benefiting the promotion of energy policy (e.g., Bridge et al. 2018; Cederlof 2021). Within this thesis, I critically review the literature on social media and climate change centred around the theme of participation. Three key themes are found in the literature that highlight the importance of public participation. Firstly, the transition

from television to YouTube exemplifies the ongoing debate on the digitisation of political communication, impacting the strategies employed in political campaigns and influencing public participation. Secondly, YouTube serves as a prominent platform where environmental issues are presented as political matters, both in talk shows and in-depth reporting. This phenomenon shapes the form of participation of digital publics, which is influenced by three factors: the news value associated with environmental topics, the political influence within the media, and the workings of the YouTube algorithm. Lastly, the YouTube algorithm itself plays a pivotal role in promoting specific topics, which ultimately affects the visibility and reach of environmental content on the platform. By recognising YouTube as a site for public participation, I gain valuable insights into how citizens actively engage in shaping environmental discourse in the digital era.

The literature suggests a strong relationship between the political orientation of channels and YouTube's unique video recommendation system, which distinguishes this study from previous research. This thesis focuses on the discussion of environmental issues in political talk shows on YouTube, using mixed methods including multimodal analysis (analysis of video performance), comment analysis and Up-next algorithm analysis (examination of YouTube's recommendation system). Through the use of these mixed methods, I aim to explore the emerging communicative practices around environmental issues, incorporating both producer and recipient perspectives. This comprehensive approach provides compelling evidence for policy makers and the public by highlighting the benefits of promoting a sustainable environment. Using mixed methods, I identify the communicative modes used in environmental communication in both political and non-political programmes, focusing particularly on talk shows and in-depth reporting. This analysis reveals clear differences in agenda setting and in the composition of mediated actions communicated. Furthermore, I examine the role of YouTube as a medium rather than a mere tool, highlighting its algorithm system, including personalised recommendations.

Furthermore, I discover a limitation of sentiment analysis when applied to Chinese comments, which I address through a systematic comparative test. This test shows that current online sentiment analysis software is unable to effectively analyse Chinese comments due to the complexity of sentence structure. Therefore, this study provides convincing evidence of the politicisation of environmental issues from both the producers' and recipients' perspectives. At the same time, it provides methodological insights into conducting research on environmental communication outside the European and English contexts.

The results of the political talk shows indicate that environmental issues are used as a tool to promote significant political polarisation, as the comparison between the agenda setting in the videos and the comments below them shows. Furthermore, the practices of the YouTube recommendation system show a tendency to promote political radicalisation. A typical communicative practice in this context is the use of numbers to support political arguments. For example, round numbers are often used to attract public attention, while precise numbers are used in data representation to complement and underline information sources or professional opinions. Compared to in-depth reporting and political talk shows, non-affiliated talk shows often use exaggerated visuals, images or titles accompanied by round numbers to grab public attention rather than relying on precise numbers to support environmental communication. This approach may get higher view counts, but it also increases the risk of spreading misleading information. In addition to conversation-based programmes, in-depth reporting proves important for both environmental and political communication. These programmes often use figures and scientific information to support their environmental communication, while stimulating political discussions in the comments section. The presence of in-depth reporting of disaster reporting on environmental issues is a double-edged communicative practice. While it raises awareness of severe environmental disasters, it also leaves people in the dark about how to respond. By applying a critical

methodological approach, this thesis provides a systematic guide for developing communication strategies for specific types of programmes related to environmental issues and policies. It also explores the implications of communicating environmental issues on digital platforms. In addition, this thesis provides a deconstructive analysis to examine the environment of both talk shows and programmes with in-depth reporting, as well as the role of the digital platform as a medium in political and environmental communication.

A. Research Purpose

The aim of this study is to use environmental issues discussed in talk shows and forum messages on YouTube as a corpus source. The study aims to examine how environmental communication is presented among different parties, the media, and the public in Taiwan. Environmental issues have become a global concern that is often framed as a political issue. According to Eriksen (2016, p.7), society is entering the postmodern era, and environmental crises, along with economic and identity crises, are the greatest challenges posed by globalisation. Environmental issues extend beyond the realm of energy and encompass a range of political issues and information overload. Discourses on environmental issues include transnational phenomena of media coverage, scientific uncertainty and changes in the political landscape (Olausson 2009; Stephen 2000).

Under the United Nations Sustainable Development Goals (SDGs), three of the seventeen goals relate to environmental issues, namely good health and well-being (Goal 3), affordable and clean energy (Goal 7) and climate action (Goal 13) (UN 2015). However, it is challenging to determine how these goals are addressed and debated in the public sphere, as environmental risk assessment involves multiple fields of knowledge and the convergence of science, media, public opinion and policy. A concept referred to by Varughese (2017) as the 'scientific public sphere'. Given the increasing prominence of environmental issues and the

accompanying politicisation, this study also looks at public understandings of science on YouTube, a legacy social media platform that encompasses various forms of public engagement. It is crucial to clarify the different forms of public engagement. Drawing on Bourdieu's (1993, p.155) categorization of three publics, I find:

"Mobilised opinion," primarily seen in environmental talk shows, advocates for the environment.

"Counterpublics," represented by comments that mobilise public opinion to counter the first form of public engagement.

"Official public," which includes guests or presenters who represent the government in political shows, such as ruling party academics.

Building upon the theoretical foundation laid by Chilvers et al. (2018), who defined the 'triangle' of participatory dynamics as "the subjects (including participating publics), objects (issues or material devices) and models (political ontologies or formats)", this thesis adapts this framework to the context of digital environmental communication on YouTube. In this adaptation, 'subjects' are reinterpreted as the digital publics that engage with content on YouTube, encompassing a wide range of stakeholders from individual content creators to organised media entities. 'Objects' are specifically framed as environmental issues that are discussed and debated within the content of YouTube videos, encompassing a broad spectrum from climate change narratives to sustainable living practices. 'Models' are conceptualised as the participatory mechanisms inherent in YouTube as a platform, including its recommendation algorithms, comment sections, channel subscriptions, video uploads, and view counts, which collectively facilitate and shape public discourse on environmental topics. This adaptation allows for a nuanced exploration of how digital platforms like YouTube serve as contemporary arenas for public engagement with

environmental issues, transforming traditional understandings of participation and discourse in the digital age.

This restructured approach will not only align the research purpose with the core theoretical premises but also lay a clear pathway for the ensuing research questions, structured around Chilvers et al.'s 'collective participatory practices' (2018, p.201). The delineation of YouTube as a participatory model will be substantiated by its functionalities: recommendations, comments, channels, uploads, and views, to illustrate how these features cultivate a democratic and interactive space, as argued by Gross (2015).

The media plays an important role in setting the agenda in this process, as it translates scientific findings into news reports. Media scholars have debated how science is represented in journalism, and common arguments about science news are related to newsworthiness and forms of news representation (e.g., Peters 2014; Vestergaard and Nielsen 2016). In terms of the approach to environmental news dissemination, previous research has largely focused on single issues in newspapers (e.g., Antilla 2005; Carvalho and Burgess 2005; Carvalho 2007; Shehata and Hopmann 2012; Boykoff 2008). An exception is Sampei and Aoyagi-Usui (2009), who studied both newspapers and television and emphasised that the newspaper and television are influential tools in broadening public awareness of environmental issues (Schoenfeld et al. 1979; Slovic 2000, cited in Sampei and Aoyagi-Usui 2009, p.204). As mentioned above, political talk shows on television play an important role in the mainstream media in many countries, but their role in the scientific public sphere is still little explored. Along with new media developments, it is necessary to observe how political talk shows on YouTube offer audiences a new approach to engage with environmental issues.

The 2018 referendum not only sparked widespread debate across traditional and social media platforms but also highlighted the dynamic nature of environmental communication

in Taiwan—a subject that, until now, has not been thoroughly explored in the context of social media. By focusing on this significant political event, this thesis aims to investigate the patterns and impact of environmental communication on social media in Taiwan.

Specifically, the research will examine how these discussions shape public opinion and influence policy decisions, addressing a gap in the current literature on environmental discourse in digital spaces.

Since the research objects of this thesis are taken from television programmes on YouTube, I first provide a historical discussion of Taiwan's media history, which clarifies the background.

The next chapter provides the background for this research in three sections: the first section illustrates the development of television in post-war Taiwan and highlights the shift of communication from one-way (Web 1.0) to two-way (Web 2.0). The second section focuses on illustrating the emergence of talk shows as an important form of political communication. The third section highlights the debates on environmental communication and post-truth politics.

B. Background

1. The Media History of Taiwan

The television industry in Taiwan has long been influenced by political manipulation, with TV programmes serving as a platform for government propaganda. The Kuomintang (KMT) was the first political force and played an important role in building Taiwan's television industry. As Lin (2006) notes, the KMT's control over the three major channels, known as the 'old three' still exists and is reflected in the current structural deficiencies of Taiwan's television industry. An example of this bias was the 2000 presidential election in Taiwan, where the 'old three' channels clearly favoured the KMT candidate streaming campaign events until midnight (Lin and Lo 2010, p. 77).

In the intricate tapestry of Taiwan's political landscape, two major parties have historically dominated: the Kuomintang (KMT) and the Democratic Progressive Party (DPP). The KMT, established in the early 20th century, has been a cornerstone of Taiwan's political scene, advocating for Chinese nationalism and, in the past, the eventual unification of China and Taiwan under its governance. In contrast, the DPP, founded in 1986 amidst a burgeoning democratic movement, champions Taiwanese identity and independence, positioning itself as a progressive alternative to the KMT. This dichotomy between the KMT and DPP has not only shaped Taiwan's political discourse but has also profoundly influenced its media landscape. The interplay between these parties and the media has been a dynamic one, with each party seeking to leverage media platforms to advance its agenda and narrative. As Taiwan's democracy matured, especially post the 1996 presidential election, the media's role in political communication became increasingly prominent, often reflecting the polarisation between these two dominant political forces. This backdrop sets the stage for understanding the evolution of political talk shows and their role in mediating the complex political communications in Taiwan, amid the shift of digital media platforms like YouTube.

In 1993, the government introduced a cable channel TV, and in 1997, the first private channel TV came into being, which meant the abolition of the above-mentioned laws and ended compulsory government propaganda on television. With the growth of political democracy in the 1990s and Taiwan's first presidential election in 1996, the media took on a new role as the fourth estate, acting as a watchdog, providing information necessary for rational debate and mediating between the people and the government. This development sparked debates about the purpose of the government-funded and regulated media: whether it served public service or acted as a mouthpiece for propaganda, and about the role of private media corporations that pursued their own commercial interests over those of the public (Dahlgrens 1995, cited in Pearson 2013, p.16).

Although it appears that the government no longer controls the media after the establishment of the National Communications Commission (NCC) in 2006, its influence continues in more subtle ways through the rise of political talk shows. These shows can be seen as a form of "mediatisation" of politics as defined by Mazzoleni and Schulz (1999, p.249). Political talk shows serve as a tool for mediating political communication and force political communicators to respond according to the rules, goals, production logics and constraints of the media.

The political opinions of Taiwanese media first underwent liberalisation and then polarisation after the transition from the 'old three' era. After that, political talk shows developed rapidly and occupied most of the prime time. As streaming platforms and social media gained prominence in Taiwan's media landscape, platforms like YouTube also became more influential. The shift to YouTube also changed viewing options and audience access by giving viewers more flexibility in when and how they could watch live streams, recorded/synchronous or asynchronous broadcasts, and contribute to debates via the comment function. It is important to focus on how the rise of new media affects the mediatisation of politics.

2. Talk Shows as Political Communication

The emergence of political talk shows was a notable example of the mediatisation of Taiwanese television. In the 1980s, change, particularly multiple communication technologies and 'neoliberalism', led to the structure of the news industry being 'marketised' and 'privatised'. These two changes affected the interaction between traditional media, meaning that the dominance of news tended to satisfy the preferences of the audience or business owners and weaken the control by the government or ruling party. Along with the development of new media, political talk shows began to change the form of communication from 'one-way' communication to 'two-way' communication, encouraged by

the five functions YouTube offers for online communication: Recommendation, Comments, Channels, Uploads and Views.

Political communication on talk shows is a specific example of TV media and has evolved into a 'hybrid format' that includes programme content, public comments on new media platforms such as YouTube, and the reaction of talk show participants to the comments or not. As Baum (2005) found, the more often viewers watch the talk show, the more likely they are to engage in political activity. The amount of media coverage of these issues was also positively related to the public's enthusiasm for them (Ader 1995).

The way the media handles news follows a certain pattern called the 'issue-attention cycle'. Downs (1972, p.39) has pointed out that the 'issue-attention cycle' describes the way the media interacts with the public with the following sequence: the pre-issue phase; alarmed discovery and euphoric enthusiasm; recognition of the costs of significant progress; gradual decline of intense public interest; the post-issue phase. Some authors have shown how this pattern influences public attention and timeliness (e.g., Nisbet and Huges 2006; Wien and Elmelund-Præstekær 2009; Vliegenthart and Walgrave 2008; Walgrave et al. 2008; Sormanen et al. 2016). Sormanen et al. (2016, p. 71) presented a novel computational technique for detecting and analysing topic attention cycles and news flows in public debate in Finland. The technique links flows on Facebook groups and pages, providing valuable information about what kind of news gains the public's attention and offering insights into online news consumption and news flows.

In addition, Djerf-Pierre (2012) has pointed out two factors: issue fatigue and issue competition. In particular, in issue competition, news coverage is typically conflict-rich, negative in tone and partisan as participants defend their own party and attack others. Increasing polarisation in the news media and in the broader political culture has led to fears that the scientific public sphere is being overtaken by 'post-truth politics'.

3. New Environmental Communication as an Activator to the Post-Truth Politics

Post-truth politics is a type of political culture that has gained increasing attention in recent years (Davies 2016). It has been popularly associated with an increasing disregard for facts in political discourse (Lockie 2017), meaning that post-truth politics has subverted the 'actions speak louder than words' approach and become 'eloquence speaks louder than actions'.

With the interactive features of platforms like YouTube blurring the line between news and social media, the problem of post-truth politics has become particularly pronounced.

One of the reasons for intensified post-truth politics arises from increasing professionals pursuing the ultimate authorities. As Davies (2016) mentioned, the problem of post-truth politics becoming more serious comes from the experts pursuing the ultimate authorities. For instance, the media emphasised an event-oriented approach to catastrophic modes of communication when covering environmental issues; politicians focused on hazards and benefits as a framework for describing risks; scientists relied on knowledge and data when disseminating environmental risk findings (Carvalho 2007; Takahashi and Tandoc 2016; Wilkins and Patterson 1990).

Post-truth politics have been pointed out probably accompanied by serious 'political polarisation'. As Jasanoff and Simmet (2017) mentioned, post-truth politics meant that the facts used in policy were usually for democratic contestation and deliberation. Runciman (2013) emphasised post-truth politics undermined the basic distinction of modern politics between reason and emotion, which means people start putting emotions and feelings in first and putting evidence, facts, and truth in secondary.

The attitude of right-wing populist parties in climate change policies is a typical positive case illustrating how post-truth politics affect environmental policy. Lockwood (2018, quoted in Fraune and Knodt 2018, p.2) argued that the opposition of right-wing populist parties

towards climate change policies was explained by ideology. However, in recent reports in Europe, Aronoff (2019) mentioned the attitude of right-wing parties on climate change issues have changed from former ideology (question climate science) to concern the climate change issues.

Post-truth politics in environment issues have attracted more attention in popular debates but have not been studied closely. The corpus analysis approach proposed in this project is intended as an appropriate step towards developing a comprehensive understanding of this issue.

4. 2018 Taiwanese referendum: public debates in digital deliberative forums

In Taiwan, a multi-question referendum was conducted on 24th November 2018, in conjunction with local elections. Among the proposals put forth during this referendum, three were directly related to climate actions (refer to Table 1.1). The initial two proposals addressed issues concerning air pollution, while the final one focused on matters pertaining to nuclear energy. These proposals ignited passionate public debates, with citizens actively voicing their opinions and concerns. Interestingly, these debates did not solely occur through traditional political channels; instead, an emerging platform for discussion was observed on digital media, particularly on YouTube talk shows. In several episodes of these talk shows, fervent arguments and the prevalence of like-minded viewpoints became apparent, reflecting the influence of media in setting certain parameters for the debate while inadvertently excluding specific areas of interest. This illuminating example underscores the significant role that YouTube talk shows played in shaping public discourse surrounding the referendum questions, shedding light on the complex interplay of politics and environmental concerns that gripped the nation during this pivotal period.

Figure 1.1 The three environmental proposals that appeared on the ballot and results.

Question	Result
Do you agree “To reduce by 1% year by year” the electricity production from thermal power plants?	Adopted
Do you agree with the establishment of an energy policy to “Stop construction and expansion of any coal-fired thermal power plants or generator units (including the Shen Ao Power Plant currently under construction)”?	Adopted
Do you agree to repeal Article 95 Paragraph 1 of the Electricity Act: “Should Nuclear-energy-based power generating facilities stop running by 2025”?	Adopted

In the first proposal, the Ministry of Economic Affairs set a target to achieve a 46 billion kWh reduction in thermal power generation over a two-year period, aiming to align with the 1% annual reduction during 2019 to 2020. However, the reduction in thermal power generation in 2021 did not reach the target, instead, it increased by 3%. On the other hand, the proposal to establish an energy policy halting the construction or expansion of coal-fired power plants has been implemented in line with the results of the referendum, with no new or expanded coal-fired power plants planned for the next two years. As for the proposal to repeal the provision requiring the complete shutdown of nuclear power facilities before 2025, the Ministry of Economy has indeed repealed the *Nuclear-free homeland by 2025* provision. However, it is worth noting that the substantive content of the *Nuclear-free homeland by 2025* policy remains unaffected, as the current nuclear plants have already surpassed the statutory deadline for extension applications.

Three years after the 2018 referendum, the energy policy landscape in Taiwan is witnessing significant developments with the approval of several referendum proposals addressing critical energy issues. These proposals encompass progressive reductions in electricity generation from thermal power plants, the establishment of policies to halt the construction or expansion of coal-fired power plants, and the repeal of provisions requiring the complete shutdown of nuclear power facilities before 2025. The effectiveness of these proposals and the implications of repealing the Electricity Act (EA) provisions have significant implications for Taiwan's energy future.

To examine the practices of public debates through collective deliberation on digital platforms, this research focuses on four political talk shows that cover three of the aforementioned proposals and represent two major political perspectives: pan-green (DPP, the ruling party) and pan-blue (KMT, the opposition party). Through this analysis, the study aims to compare the agenda-setting by media and the attributes of comments, including their relevance to the issues and their relationship to the agenda-setting process.

Table 1.2. The selecting videos for examining the role that talk shows on YouTube played in public debates about the referendum proposals.

Channel	Title	political perspectives
Situation Room	<i>Nuclear-free homeland</i> no longer set for 2025 deadline! The ruling party initiates a battle to defend her administration?	pan-blue
Situation Room	5.89 million votes pass the <i>Nuclear-free homeland</i> by 2025 referendum proposal. Can the ruling party stop the <i>Nuclear-free homeland</i> by 2025 policy?	pan-blue
Zheng JihdaoLiao	Ma Ying-jeou's (Former Taiwanese President) proposal for <i>Using nuclear to nourish renewables</i> referendum has surpassed 180,000 votes. Economic Minister: No need to worry about power shortages, but what about the disposal of nuclear waste?	pan-green
New Taiwan Refuelling	Misled? The real reasons behind the passing of the <i>Using nuclear to nourish renewables</i> referendum proposal were revealed. The latest poll shows that the percentage of people unaware of nuclear energy being only "10%" is surprisingly high...	pan-green

Agenda setting plays a crucial role in shaping the parameters of public debates, delineating the issues that will be emphasised and those that will be excluded from discussion. Through the examination of four agenda settings, it becomes evident how media logic becomes politicised, constructing a contextual backdrop before delving into the 2018 referendum proposals. Notably, the agenda setting in the media logic gives priority to political concerns over environmental concerns, and this discrepancy is evident between the pan-blue and pan-green perspectives. In the realm of political concerns (refer to Table 1.2), the pan-blue

agenda setting centres on scrutinising the ruling party's governance capabilities, suggesting that failure to implement the referendum results signifies government incompetence. Conversely, the pan-green agenda setting focuses on questioning the former Taiwanese President's one-sided understanding of the proposal *Using nuclear to nourish renewables* and contends that the proposal was inadequately explained before the referendum. Turning to environmental concerns (refer to Table 1.2), the pan-blue agenda setting revolves around whether the ruling party can continue to use nuclear power in compliance with the abolition of the *Nuclear-free homeland by 2025* policy. In contrast, the pan-green agenda setting concentrates on issues such as power shortages and nuclear waste disposal arising from the implementation of *Using nuclear to nourish renewables*.

YouTube comments provide a useful indication of the role of video content in agenda setting. For example, in a preliminary analysis carried out to inform this research, I found that comments are a valuable dimension for understanding how agenda setting shapes public debates. To gain a deeper understanding of how agenda setting shapes public debates, I conducted a comment analysis on smaller-scale talk shows, dividing them into two groups based on their political perspectives. Simple statistical analysis was then employed to identify comment characteristics pertaining to the issues and assess their relationship with the agenda setting. Comments are seen as reflections and outcomes of public debates. The results reveal that public debates in the comments generally align with the agenda presented in the video, forming a television media logic. In the pan-blue dataset, nearly one-third of the comments (28.92%, N=658) out of a total of 2,275 comments matched the agenda setting from both the political and environmental perspectives. Moreover, 90% (N=2044) of the comments solely addressed political content without covering any of the referendum proposals. Similarly, in the pan-green dataset, approximately 40% (N=79) out of 185 comments aligned with the agenda setting, while 90% (N=168) of the comments

concentrated solely on political content without addressing any of the referendum proposals.

These findings underscore the significant impact of media-driven agenda setting on public debates, as it tends to emphasise political viewpoints while excluding specific environmental concerns. Consequently, political parameters carry more influence in shaping the content of public debates compared to environmental parameters. The preceding case analysis highlights the significant influence of media-driven agenda setting on public debates, particularly involving the initial functions (comments) on YouTube and external collective parameters, which include media-driven agenda setting and the participation of various actors. This analysis forms the theoretical foundation of this paper, aiding in identifying the model of emerging digital deliberative forums through the deconstruction of collective participatory practices.

C. Structure and argument of the thesis

Chapter II-A. Exploring Digital Deliberative Forums: A Socio-Technical Change Perspective on Participation and environmental issues lays the foundation for the field of study by examining digital deliberative forums from a socio-technical change perspective. It explores the composition of these forums, including the subjects (the digital publics), models of participation (YouTube), and objects (environmental issues), focusing on Chilvers, Pallett and Hargreaves's (2018, p.201) socio-technical model. The chapter examines the mediatisation practices of YouTube in the context of environmental issues in digital society, considering technological advancements. Mediatisation not only influences public opinion but also impacts the structure and processes of political communication, decision-making, and democratic procedures. The analysis of mediatisation practices reveals how environmental issues have gained prominence on digital platforms and have become a significant part of the agenda-setting process. The chapter focuses particularly on developments since 2017,

during which several global environmental issues, such as 'power shortage,' 'anti-air pollution,' and 'energy transition,' have gained attention and have been extensively discussed in political talk shows and debates. It is evident that these issues, raised to the level of referendums, have increased public consciousness and mobilised climate actions. The thesis aims to deconstruct collective participatory practices on digital platforms, leading to a broader understanding of the role of media in environmental communication.

Chapter II-B. Power Change and the Political Effects of Television: From Post-war Era to New Media Era illustrates the interconnected relationship between politics and media development in Taiwan. It highlights how digital platforms have expanded beyond the traditional functions of television media and have become an extended field for media logic. This section specifically focuses on innovation at the material level and the resulting shift in political power within media development. The chapter outlines the historical background of the digital publics, which refers to the 'Subject' within the socio-technical system of the digital platform. It initially explores the significance of television in leading countries, establishing a foundation based on academic perspectives from existing media studies and its connections to other disciplines such as media, society, politics, science, and culture. Subsequently, it delves into the examination of the political effects within media development in Taiwan.

Chapter II-C. The application of YouTube as an approach to online political communication and *Chapter II-D. Recommendation System* explore the implementation of mediatization on YouTube and the functioning of the deliberative sphere in the digital media landscape. The discussion centres around how the five YouTube built-in functions (recommendation, comments, channels, uploads, and views) adhere to media logic or extend beyond the current media function. The focus of these two sections is primarily on the operational mechanism level and the resulting platform transition of content from Taiwanese current

affairs programs, including political talk shows, non-affiliated talk shows, and in-depth reporting. The particular emphasis lies in their role in forming a mature platform for online political communication within the socio-technical system of the digital platform.

Chapter II-C introduces the five YouTube built-in functions, providing a framework for the formation of a specific digital deliberative sphere that facilitates democratic processes. It examines how deliberative processes are enhanced and democratic processes take place on YouTube, building upon the political background of the digital publics from an agenda-setting perspective in *Chapter II-B*. This section focuses on the interactions and functionalities within YouTube, emphasising how these built-in functions contribute to participatory practices on the digital platform. The main argument is that these models of participation hold significant importance in shaping the digital deliberative sphere.

In *Chapter II-D*, the spotlight is on the YouTube recommendation system, which is isolated from the other built-in functions due to its involvement with massive and complex data. Ongoing debates on the digitalisation of political communication are centred around this system. The section presents research findings that highlight five key factors (user clicks, time spent watching videos, same political ideology, same channel, and the biggest channel) identified as significant influencers in making a video visible on YouTube. It argues that the recommendation algorithm plays a crucial role in shaping the deliberative sphere and constructing a common imaginary, extending beyond the reach of digital publics that may be reached through agenda-setting functions. The concern raised is that this algorithm could potentially lead to the immersion of users within an extremist ideological bubble, impacting digital deliberative processes on YouTube.

Chapter II-E. New Environmental Communication illustrates the controversy space that encompasses climate actions. It shows how this space forms an arena for exploring

innovative pathways for the future development of clean energy technologies.

Environmental issues have been a persistent concern within the deliberative sphere, exhibiting a sense of continuity. In recent years, they have witnessed a more frequent presence, particularly with the packaging of various emerging energy policies as referendum issues, such as the 2018 Taiwanese referendum. The preceding three sections (*Chapter II-B, C, and D*) have addressed the role of both offline and online media as powerful mobilisation mediums within the deliberative sphere. This section specifically focuses on how media on YouTube packages environmental issues. It begins with an exploration of practices within Taiwanese current affairs programs on YouTube with a focus on visual environmental communication. The section outlines the form of emerging environmental communication, referring to the 'Objects' within the socio-technical system of the digital platform. It first explores the reasons why YouTube contents are often influenced by authenticity and entertainment, providing the media logic that informs the production of current affairs programs on YouTube. Subsequently, it delves into an examination of visual practices in current affairs programs on YouTube, identifying various communicative modes. The thesis introduces the notion of mediated actions, complementing the lack of a systematic understanding of media practices in environmental communication. It clarifies the need for a more systematic understanding beyond conceptual understanding and impact on information spreading in the existing literature.

Chapter III. Methodology covers the research methods employed in this study, demonstrating how the theoretical approach discussed in *Chapter II-A* is put into practice in the subsequent chapters (*II-B, C, D, and E*). In particular, it explains the researcher's decision-making process in three areas: selecting the research subjects' setting, the methods for accessing information (YouTube Data Tools, YTD), and the methods for data analysis. The chapter describes the selection of video lists, comment lists, and video networks on YouTube as the research setting. It provides detailed information about the key distribution of

Taiwanese current affairs program videos available in the research data. Furthermore, the chosen research methods, such as multimodal analysis, visual analysis, corpus analysis, and up next algorithm analysis, are explained. The chapter reflects on the experiences of using these research methods in the field. Three key categories for analysis are identified: videos, comments, and the recommendation algorithm. The thesis then summarises the limitations and the data construction process resulting from the research design in the field. One significant contribution of this study has been to highlight the limitation of analysis boundaries in the comments data, particularly in the context of sentiment analysis for Chinese-based comments. Two possible reasons are proposed to explain this limitation: the form of the comments and the organisation of sentences and words. Overall, *Chapter III* provides a clear explanation of the research methods employed, ensuring a systematic and rigorous approach to data collection and analysis in the study.

Chapter IV. Analysis examines the interplay of components within the collective participatory practices discussed in *Chapter II*, while considering the entrenched influence of media mediatization on environmental communication in digital society. By considering these elements collectively, the chapter elucidates how the components of the socio-technical system in the digital platform contribute to the formation of digital deliberative forums, rather than solely focusing on individual system participants. In summary, the participatory actors within the socio-technical system collectively play a vital role in establishing digital deliberative forums that promote climate actions. The analysis deconstructs the collective practices of each participant, verifying the allocation of the weight of each component in participation practices on the digital platform (*Chapter II-A*): Models of participation (60%), Objects (25%), and Subjects (15%). This chapter thoroughly explains the reasons for the allocation of the weight, based on their capabilities in promoting climate actions in digital media. The YouTube built-in functions provide the most advanced ability in facilitating climate actions. Both videos and comments rely on the YouTube built-in

functions to operate effectively. Additionally, the recommendation algorithm enables information to reach a broader audience, transcending regional and issue boundaries. Secondly, agenda setting plays a central role in efficiently including and excluding specific areas of interest, thereby focusing public debates on climate action discussions. Finally, the role of digital publics is demonstrated in creating flows between mainstream opinions and alternative viewpoints. However, while the YouTube built-in functions and media-driven agenda setting are powerful drivers that adhere to media logic, digital publics often find themselves trapped within the cluster of mainstream opinions, unable to generate the expected flow as described by Warner (2002) in offline media.

Chapter IV-A. Video multimodal analysis is employed to process visual discourses. This offers valuable insights into reflecting micro-level social processes and serves as an on-the-ground analysis. The multimodal analysis of current affairs programs conducted here has expanded the knowledge of how to effectively utilise media mediatisation for mobilising climate actions in the digital deliberative sphere, with considerations for regional and cultural contexts. Typical mediated actions include verbal communicative modes (speeches, sounds, and code-switching) and nonverbal communicative modes (title bars, the use of symbols in footage, editing techniques and montage, the presentation of numbers and data, and gestures).

Chapter IV-B. Up next algorithm analysis conducts a systematic examination on the closed space between the seed videos (at crawl 0) to investigate four of the five aforementioned factors, including user clicks, the time a user spends watching videos, same channel, and the biggest channel. Subsequently, the analysis delves into the examination of the performance of these homogeneous video groups under the operation of the recommendation algorithm (same agenda setting and political preference, at crawl 1). This involves assessing the

strength and relation of the links between political videos and whether the videos in recommendation networks ultimately lead to homogeneous or heterogeneous ideologies.

Chapter IV-C. YouTube comments analysis uses corpus analysis in order to gain insights into YouTube comments that can be regarded as the assemblage of digital publics' debates, a field consisting of arguments and discussions. This section examines the role of user comments within the 'multimodal assemblage' of YouTube, encompassing arguments and discussions. YouTube comments are recognised to facilitate emerging communicative practices, promoting civic participation and diversity in the public sphere. However, existing studies predominantly focus on specific YouTube functions, overlooking a comprehensive analysis. Therefore, this thesis employs comment analysis as part of a mixed methods approach to understand how receivers perceive this communicative practice and provide evidence for environmental policymakers and public discourse on sustainability. The comment analysis addresses the second research question, exploring engagement patterns in environmental topics on YouTube across three genres of programs. Three methods are utilised, including Comment Term Frequency Comparison (CTFC), comparative analysis through YouTube API, and collocation analysis with Key Word in Context (KWIC). The findings reveal that KWIC analysis offers more conclusive insights, while CTFC analysis provides an overview of overall discourses. The section highlights the challenges in interpreting comments through KWIC analysis due to their multiple meanings, exemplified by the ambiguous use of '[the DDP]' in five-word clusters with both positive and negative connotations.

Chapter V. Discussion and Reflection provides an overview of the collective participatory practices involving YouTube, digital publics, and environmental issues, which have become increasingly interconnected in promoting climate actions and fostering links between media, government, and society. The section begins by identifying the engagement dynamics of

these collective participatory practices on the digital platform, drawing on socio-technical theories (RQ1). Subsequently, the chapter addresses the three research questions, focusing on the 'Subjects' (the digital publics) in the socio-technical system of the digital platform (RQ2), the 'Models of participation' (YouTube) in the socio-technical system of the digital platform (RQ3), and the 'Objects' (Environmental issues) in the socio-technical system of the digital platform (RQ4). Each research question is deconstructed to understand its capabilities in promoting climate actions, and the adjustable factors that may influence the operation of the system are thoroughly examined and discussed.

Chapter VI. Conclusion and Outlook offers a comprehensive summary of the research's contributions to knowledge, encompassing theoretical development, methodology, and empirical findings. It particularly provides novel and actionable insights into the socio-technical system. The chapter further makes two recommendations for future research. Firstly, it discusses the future direction of cross-national studies to identify collective needs and solutions to the climate crisis. Secondly, it assesses the implications of policy agenda setting on YouTube for policy implementation.

D. Research Questions

Against the backdrop of interdisciplinary collaboration between the digital communication field and environmental communication field, the research aims to summarise an overarching research question:

What role do the Taiwanese issues-based programmes (political talk shows and in-depth reporting) which on YouTube play in public deliberation about environmental issues?

This research question aims to investigate the emerging communicative forms of both platform-based perspective and issue-based perspective. These programs often include multiple sources of information, such as interviews, field reports, or investigative pieces, which provide more in-depth information on a particular subject.

The detailed literature review provides a brief overview of the relevant academic literature, identifying a controversy and a theoretical gap. Building upon this, I further address the more detailed research questions (detailed explain each question after the literature review (Chapter II-G)):

1. What factors influence the effectiveness of digital publics in engaging with environmental deliberations, and how can their participation quality be improved on environmental platforms?
2. How do agenda-setting practices impact public engagement with environmental topics via YouTube comments and popularity?
3. How are environmental issues communicated in various program types on YouTube?
4. What role do these programs play in influencing agenda setting and content reproduction within the digital deliberative forum?

II. Literature Review

This literature review chapter aims to examine digital deliberative forums from a socio-technical change perspective, focusing on their role in facilitating participation and addressing environmental issues. The chapter follows a structured approach and explores the three digital participatory roles of socio-technical systems in digital platforms (see Figure 2.2).

The chapter begins by discussing the concept of participation in digital platforms and its relationship to socio-technical change. It then delves into the notion of digital publics in deliberation, highlighting the unique characteristics and dynamics of these forums. Secondly, the section explores the development of television during the post-war era to illustrate the 'subjects (the digital publics)' in socio-technical systems. It points out the shift from one-way communication (Web 1.0) to two-way communication (Web 2.0), which signifies the emergence of a digital public with regional significance in the shift towards the digital platform. The subsequent section focuses on YouTube as a flourishing product of Web 2.0 and its role as an approach to online communication for political and environmental content. It examines the built-in functions of YouTube, such as recommendations, comments, channels, uploads, and views, to identify 'models of participation' within socio-technical systems. The concept in this section aims to explore the mediatisation practices of YouTube across environmental issues of digital society, contributing to a broader understanding of the role of media in modern society. Technological advancements, such as television and interactive social media, have shaped the process of mediatisation. Mediatisation influences not only public opinion but also the structure and processes of political communication, decision-making, and democratic procedures. The last section of this chapter discusses the role of 'objects' in socio-technical systems, specifically focusing on

the mobilising ability of YouTube in shaping the emergence of new environmental communication strategies. This section aims to explore how external sources, such as news media, utilise YouTube's initial functions to effectively communicate and amplify the impact of news media. One typical practice is agenda-setting, which refers to the process of determining the specific issues or topics that receive the most attention in digital publics' discourse. Agenda-setting reflects how the media attempts to influence the audience and establishes a hierarchy within news communication. In essence, it examines the confirmed role of YouTube algorithms in shaping online political communication, particularly in the context of political talk shows and visual communication. This provides an opportunity to implement and promote energy policies, addressing the existing challenges in the participatory system, specifically the stagnation in the democratisation of science.

Overall, this chapter aims to shed light on the potential of digital deliberative forums, like YouTube, to promote energy policies and address the existing challenges in the participatory system, ultimately advancing the democratisation of science.

A. Exploring Digital Deliberative Forums: A Socio-Technical Change Perspective on Participation and environmental issues

This section provides an analysis of participation in digital platforms from a socio-technical change perspective. *Section A1* introduces socio-technical theory, emphasising the interconnection between social and technical aspects. The subsequent section discusses the role of digital publics in deliberation, defining deliberation, highlighting the importance of opinion flow for deliberative quality, and addressing limitations in current approaches to public participation. The third part focuses on YouTube as a 'hybrid forum,' examining its role in socio-technical change, internal system changes, and the necessity of understanding the participatory practices of digital publics. Finally, the last part investigates the discussion

of climate change and environmental issues within a digital deliberative forum. It explores idealised practices of digital publics in deliberation, the gap between expected and actual deliberation effects in talk shows, and the transformation of talk shows from television to digital platforms.

1. Participation in digital platforms: socio-technical change perspective

The socio-technical approach is used to conceptualise interactions between social, technical, and environmental systems by deconstructing the dimensions of the given system. Previous literature focuses on the socio-technical system's dimensions, namely the social, technical, and environmental aspects (e.g., Mumford 2006; Pasmore et al. 1982, see Figure 2.1).

YouTube serves as a prime example of a content-intensive platform acting as an intermediary, enabling mediatisation to take place.

Social media represents an emerging digital public engagement system, and this research draws on socio-technical theory (*A-1, Chapter II. Literature Review*) to explore complex interactions between digital publics and technical changes. The core idea of socio-technical theory is to consider and integrate the 'social' and 'technical' aspects as interconnected components of a multifaceted system. Social media can be seen as a typical open system, facilitating an interactive flow within the socio-technical system. Mumford (2006) analysed socio-technical design's history (1960 to 1990) in working practices, providing insight into public-based practices and how they form a value system in the socio-technical system.

While Mumford's perspective includes multiple dimensions of socio-technical systems, Leavitt (1965) demonstrated a system with equal-weighted dimensions, including 'task' as a key component.

A range of social science research has found that public participation plays a core role in societal policymaking (Corner, Markowitz and Pidgeon 2014; Jakobsen and Fjørtoft 2018). However, the continuous existence of environmental issues and the slow development of energy policies have indicated that the current socio-technical system is unable to address the growing complexities of public governance with environmental issues.

Warner (2002) conducted an extensive research study to distinguish the composition of public and counterpublics. The study confirms that individual values, expertise, and socioeconomic status of the collective influence the mobilisation ability in social implementation and deliberation of socio-technical systems issues through the creation of flows. However, Warner's paper presents a single perspective on the relationship between individuals and collectives without fully considering the dimensions of the given values and structure. Moreover, the research primarily focuses on offline publics, providing only a vague definition of digital publics (Warner, 2002, p.55), making them challenging to identify due to a lack of consideration for the external tools and socio-technical systems that influence them.

Understanding publics and counterpublics is critical for comprehending socio-technical systems because they play a significant role in shaping collective mobilisation, implementation, and deliberation. They serve as the 'Subject' of the socio-technical system, stimulating discussions and influencing the dynamics of social implementation. Warner's research highlights how individual values, expertise, and socioeconomic status impact the mobilisation ability of publics and counterpublics, consequently affecting the flows of social implementation and deliberation. However, the primary focus of Warner's study remains on offline publics, and the identification of digital publics poses challenges due to a lack of external tools.

Furthermore, Mumford's and Leavitt's socio-technical system does not fully explain collective participatory practices in the digital platform. Their focus primarily centres on the context of working practices and the substance composition of the offline society system, with limited exploration of the dynamics of the digital society. In contrast, Chilvers, Pallett, and Hargreaves (2018, p.199) build upon the socio-technical system approach, providing further focus on the 'Subject' (see Figure 2.2), which explores the detailed role of public participation in energy systems. Similarly, Warner's study builds upon the socio-technical system and centres on the 'Subject' of the socio-technical system, aiming to identify the composition of public and counterpublics and evaluate their mobilisation ability in the social implementation and deliberation of socio-technical system issues.

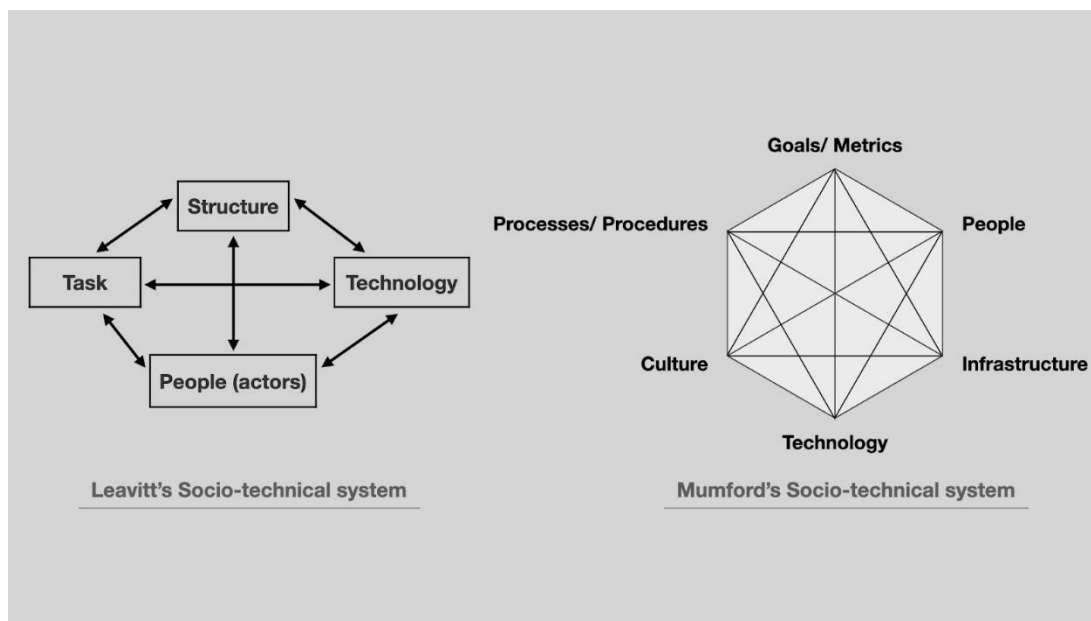


Figure 2. 1. The socio-technical systems form interdependent aspects (Leavitt 1965, p.1144; Mumford 2006)

In this study, I analyse the primary characteristics of digital media, placing 'technology' as the most influential dimension in the socio-technical system. The exclusion of 'collective task' as a core dimension is due to the divergent goals of digital collectives and the research objects, which involve environmental issues encompassing multiple disciplines. These divergences extend beyond the frames provided by agenda-setters in politics and the media.

To establish a systematic understanding of environmental participation in the digital platform, I refer to Chilvers, Pallett, and Hargreaves's (2018, p.201) relational and co-productionist framework, which includes the subjects (participating publics), objects (issues or material devices), and models (political ontologies or formats). This forms a foundation for comprehending the participation of heterogeneous groups and the interweaving of digital publics, deliberation, and material elements (YouTube as a 'hybrid forum'). Figure 2.2 illustrates the internal system of public participation in talk shows on YouTube deliberation, offering insights into the participatory socio-technical transformation from offline public to digital publics and the challenges faced by Taiwanese deliberation on YouTube.

Chilvers, Pallett, and Hargreaves (2018, p.199) argue that mainstream approaches to social engagement on energy issues usually adopt fixed, preordained means of participation, merely explaining discrete events or cases in broader socio-technical systems. This observation holds true for social engagement with environmental issues in Taiwan, as several studies (e.g., Fan 2023; Huang, Chen, and Park 2021) have utilised existing and broader means of participation to explain public participation in society. However, it is essential to address two key issues: firstly, participatory practices tend to concentrate in specific spaces, such as specific policies or ethnic groups; secondly, there exists an imbalance between expected participatory practices and actual political effectiveness. In Pearce et al. 's (2015) comparative analysis of traditional and new social media conduits in climate change communication, they underscored the tension between residual uncertainties in traditional modes of informing the public and the potential of participatory approaches, like the deliberative democracy model. This model encourages active engagement, knowledge acquisition, and task-oriented addressing, as opposed to passive message reception. It emphasises the interplay of communication technologies, social relationships, and

democratic decision-making, by recognising sources of dissensus and embracing lively debates that acknowledge differences.

Chilvers, Pallett, and Hargreaves (2018, p.200) further note that the digital revolution has challenged existing approaches to public participation in energy systems, implying that the socio-technical system is undergoing fundamental changes. The environmental issues examined in this thesis stem from human environmental activities, including climate change and air pollution. By dissecting the components of participatory practices, it becomes apparent that the participatory socio-technical transformation from offline public to digital publics poses challenges for Taiwanese deliberation on YouTube. The models of participation refer to specific methods, expertise, or technologies of participation, connecting similar participatory collectives across space, time, and cultures (e.g., YouTube built-in functions). Regarding the objects of participation, they can represent spaces of difference where multiple participatory collectives cohere within a controversy or issue space (Chilvers, Pallett, and Hargreaves 2018, p.202), such as climate change, air pollution, and energy shortage, or innovation pathways of development shaped by the participants, like energy transition and the development of clean energy technologies. The subjects of participation refer to the particular identities of the public and the imaginaries of the public (e.g., Asian-based participants, YouTube users). Figure 2.2 illustrates the various forms of participation in digital platforms (YouTube).

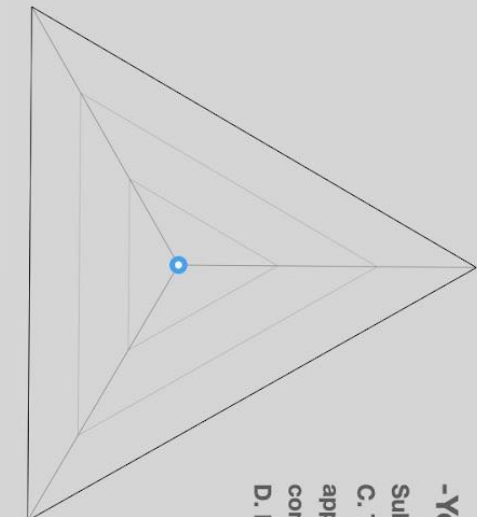
Collective Participatory Practices

Models of participation (YouTube)

-YouTube built-in functions

Sub-sections titles:

- C. The application of YouTube as an approach to online political communication
- D. Recommendation System



Objects (Environmental issues)

- Controversy or issue space: global warming, air pollution, energy shortage,
- An arena of innovation pathways: energy transition, the development of clean energy technologies

Sub-sections titles:

- E. New Environmental Communication

Subjects (the digital publics)

-Asian based participants

-YouTube users

Sub-sections titles:

- B. Power Change and the Political Effects of Television: From Post-war Era to New Media Era

Figure 2. 2. A relational co-productionist framework for understanding digital participatory in socio-technical system in digital platform.

Figure 2.2 reveals the specific composed model of the socio-technical system in YouTube. The system includes all the digital participants on YouTube, providing a preliminary perspective to understand the various forms of participation on digital platforms. However, in order to effectively utilise the socio-technical system in digital platforms for specific issues, it is necessary to clarify the proportion of each dimension in collective participatory practices. The layout of Figure 2.3 represents the weight of each component in participation practices on the digital platform. Its arrangement is based on the social effects they have brought about in the participatory socio-technical system, reflecting the essential practices provided by each dimension in the system.

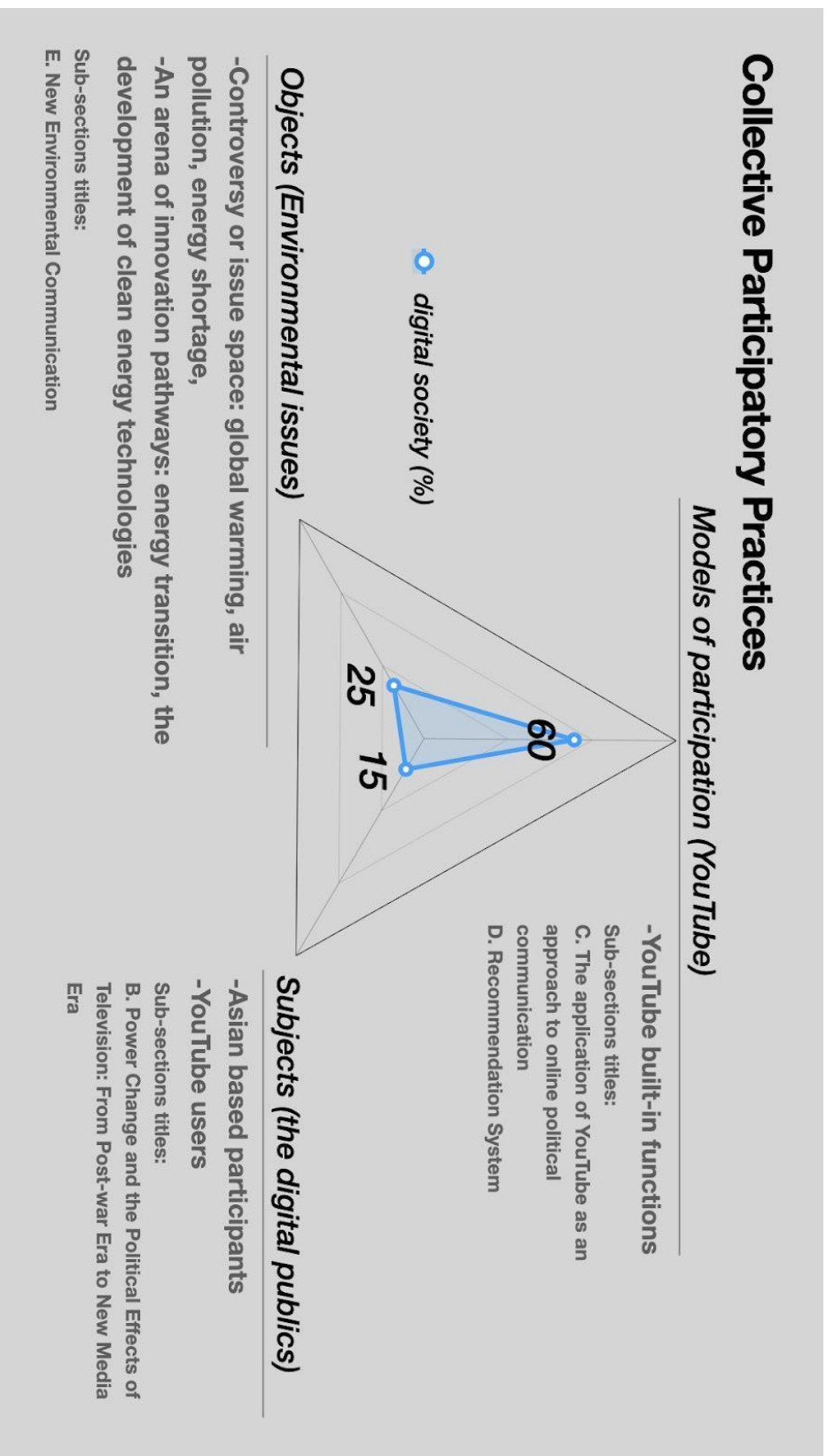


Figure 2. 3. A relational co-productionist framework for understanding digital participatory in socio-technical system in digital platform (with the relevant proportion)

The section focusing on the 'Models of participation' carries the most substantial weight (60%) in this study. This is because YouTube, as a 'hybrid forum,' offers various built-in functions, such as recommendations, comments, channels, uploads, and views, which facilitate dialogue and deliberation. The methodology arrangement of this study (see Figure 2.3) further justifies assigning the highest weight (60%) to the 'Models of participation' section. The shift from offline collective participatory practices to digital ones reveals that simply adjusting the subject and object is insufficient to address the stalled development of scientific democratisation. Chilvers and Kearnes (2016, p.4) argue that the existing residual realist imaginary in participation significantly underplays the ever-increasing multiplicity and multivalence of contemporary public engagements. For example, environmental news frames may not always align with collective imaginaries but instead adhere to the media's own imagination, limiting public deliberation and knowledge. I contend that the 'Models of participation' play the most crucial role in the socio-technical system on digital platforms, providing a sphere to construct knowledge, facilitate diverse discussions, and ultimately realise positive social effects through collective deliberation. This aspect also directly connects to transformations in scientific, democratic, and political orders. Notably, YouTube creates a space for public deliberation practices concerning the science and politics of environmental issues, with its affordances and algorithms contributing to the formation of issue publics.

The 'Objects' hold a weight of 25% in the socio-technical system on the digital platform. They refer to the specific deliberative spaces created by the media, influenced by political, scientific, and entertainment aims. In Taiwan, common controversy or issue spaces include climate change, air pollution, and energy shortage, while arenas of innovation pathways involve energy transition and the development of clean energy technologies. The media, through the YouTube recommendation system, comments, and subscribe functions, have a significant influence on shaping the deliberative spaces and restricting the digital publics

within them. I assign the weights of 'objects' as the second order in the socio-technical system on digital platforms, as the media exert high determination in restricting digital publics within preset deliberative spaces through the YouTube recommendation system, comments, and subscribe functions.

The 'Subjects' hold a weight of 15% in the socio-technical system in the digital platform. Evaluating and predicting the behaviour of digital publics is challenging, with substantial literature on their social effects often focused on experimental studies. From the perspective of the participatory socio-technical system, I argue that compared with the driving force of 'models of participation' and 'objects', the digital publics are relatively passive receivers of information. Besides, it is important to mention that the digital publics not only broadly define YouTube users but often have language boundaries whether YouTube offers the translation service, the comments mainly have the language boundary. For instance, the comments below the Taiwanese political talk shows, non-affiliated talk shows and in-depth reporting videos on YouTube are mainly composed by Asian based participants.

YouTube, as a cross-national digital platform, requires further discussion on the participation practices of Asian-based participants representing the 'subject' within a similar context, such as Japan, South Korea, and Singapore. This can be approached from two perspectives: public participation in the environment within these states and collective goals in climate actions. Numerous case studies exist on public participation in the environment in these states (e.g., Wi 2019; Huang, Chen, and Park 2021; Saito 2021). These case studies contribute to advancing scientific and technological research, examining the macro and micro parameters of policymaking, and understanding how the interaction between enduring national systems and specific political struggles shapes the design, implementation, and policy impact of public participation in specific locations, times, and policy areas. Furthermore, Wi (2019,

p.53) highlights that the interaction between the government and citizens is key to constructing the frame for climate actions. However, most cases of public participation focus on a single issue, such as the Fukushima Daiichi nuclear disaster in Japan (Saito 2021) or nuclear energy policies in South Korea (Huang, Chen, and Park 2021). Additionally, there is a lack of studies on digital publics and the integration of environmental issues. The Intergovernmental Panel on Climate Change (IPCC) explicitly states that extreme weather events have confirmed the increasing frequency and intensity of extreme climate as the new normal in the context of escalating climate change. The International Energy Agency (IEA) emphasises the difficulty of achieving the net-zero emissions target by 2050 based on the climate commitments made by governments worldwide, urging governments to take strong, credible policy actions (IEA, 2021). Japan, South Korea, and Singapore have served as reference benchmarks for Taiwan's energy policy formulation and climate pathways, including net-zero targets, timelines, types, and conditions. For example, the progress of carbon neutrality policies in Japan and South Korea has influenced Taiwan's Pathway to Net-Zero Emissions by 2050. In addition to promoting carbon neutrality targets at the national level, Japan encourages local governments to set carbon reduction goals and establishes alliances within the education system to promote local and educational research for greater impact. South Korea, on the other hand, has accelerated the pace of carbon neutrality policies and legislation, becoming the world's first country to enact a hydrogen energy law and the 14th country to legislate carbon neutrality, following the United Kingdom, Germany, and Japan. However, South Korea also faces challenges in implementing carbon neutrality policies, such as slow progress in renewable energy and inadequate awareness among small and medium-sized enterprises regarding decarbonization policies. These experiences provide insights for Taiwan in predicting public awareness of the climate crisis and carbon neutrality and serve as goals within the pathway to 2050 Net-Zero, enhancing the significant social driving force for the Taiwanese government in achieving carbon neutrality.

Overall, this analysis aims to emphasise the significance of the 'Models of participation' in shaping digital deliberation, the influence of 'Objects' in creating deliberative spaces, and the nuanced nature of digital publics within the participatory socio-technical system on the digital platform. According to Chilvers and Kearnes (2016, p.52), understanding a single participation collective requires knowledge of its interdependence with other participatory practices, technologies, negotiation spaces, and cultural and political contexts. The following sections discuss the digital publics' role in deliberation and the emerging role of YouTube as a 'hybrid forum'.

2. Subjects: The digital publics in deliberation

Deliberation is commonly defined as discussing shared issues among participants, who weigh relevant considerations to inform conclusions to reach decisions about actions (Bächtiger et al., 2007). The flow of opinions in discussions forms the fundamental notion of deliberative democracy, and this flow is often considered an indicator of deliberative quality. Positive discussions, as evidenced by view counts, like counts, or comments, play a significant role in determining deliberative quality and identifying the flow. Collins and Nerlich (2015, p. 204) conducted a corpus analysis on comments posted on The Guardian website. They found that comments which were more developed and considered the key themes of the discussion played a significant role in determining the quality of deliberation. This was evidenced by the degree of user interaction and the presence of such developed comments. Their analysis also revealed that the interaction between these key themes demonstrated a cohesive and interrelated nature, rather than simply appearing in close proximity. However, Sunstein (2022) pointed out that opinions sometimes are produced by non-deliberative mechanisms, such as 'elite opinion', which can result in group polarisation. It needs to mention that the following discussions of deliberation are based on heterogeneous groups and debates with few restrictive boundaries.

Seeliger and Sevignani (2022, p.6) extended the concept of the public sphere from Habermas and linked it to the consolidated democracy as a political system. In Habermas' view of the public sphere, the publics are composed of heterogeneous groups; specific examples are places and fields such as clubs, coffee shops, cultural salons, and literary journals outside the state and government (Finlayson 2005, p.44). In the public sphere, people can discuss issues of concern with each other on an equal footing, regardless of their social, political, and economic status (including gender and class), without considering interests. Habermas believes that in the public sphere, people have practised freedom, equality and solidarity. It defines the fundamental concepts of the contemporary public sphere. However, in "The Structural Transformation of the Public Sphere", Habermas went on to describe the process of the decline of the public sphere: the emergence of media such as newspapers and magazines opened up new public spheres, and the state, economic and political institutions became more and more easily communicated by the masses, way to win the trust and support of the public (Finlayson 2005, p.140). Habermas provided the initial concept of the imagined idealised public sphere. Although it is difficult to realise in society, it confirms that politics and media are crucial in deciding how the public sphere works.

The other scholars proposed a different perspective of deliberation, which was established by the process of the decline of the public domain, as Habermas mentioned. The existence of political talk shows is a mature sphere for deliberation, as it has brought out some specific social effects, especially in political issues, which will directly influence the voting result. According to Warner (2002. p.55), even though the public is imaginary, which is difficult to identify, it can be considered a collective common social goal to identify the public based on an external tool - such as voting. Before this study discusses the shifting of this social effect on the Internet and other new media, it is necessary to understand the composition of public and counterpublics of the research objects in this thesis, including political talk shows and in-depth reporting. The following paragraphs have been divided into three parts to

discuss the concept of publics and counterpublics, including identifying these two terms, how media interacts with the public through agenda-setting, and the importance of the counterpublics for society.

Warner (2002, p.50) mentioned that the public is flowing all the time and composed by the collaborative "visuality" and "action" to demonstrate the sense of totality. In the previous section, a clear example is the meaning of television: the television audience at that time could be seen as the public. Also, political talk shows and in-depth reporting have formed their public, and although the public is invisible, they are not imaginary. Through external tools, voting and TV ratings, it can be identified the composition of the public on each channel. The counterpublics can be regarded as having a subordinate role based on the public; it not only affirms the existence of the public but plays a crucial role in the deliberative sphere by providing debate materials. In understanding the dynamics of discourse within digital media and political talk shows, the concept of counterpublics is central. Counterpublics are defined as issue-specific discursive arenas that emerge through communicative acts, these groups form primarily to articulate and contest their real or perceived exclusion and/or marginalisation from dominant public spheres. (Figenschou and Thorbjørnsrud 2023, p.23) According to Warner's perspective (2002, p.86), which emphasises the role of counterpublics in contrasting with mainstream publics, often influencing the cultural horizon to a significant extent. The particular practice in the political talk shows is that the publics and counterpublics are distinct by the specific political ideology of the programmes. The discourses of counterpublics are often more meaningful than the public because the public exists for the opinion produced. The opinions are formed by debating with the discourses of counterpublics.

The effect of agenda-setting has produced many concrete political consequences, which identifies the role of political talk shows as a typical deliberative sphere at some level. The

specific behaviour of the media in the deliberative process is that the media determines the belonging of the public and systematically sets the extension of performance through agenda-setting. Scientific discourses as a specific issue need more background knowledge and extended information, which is easily observed in the flows between the public. These flows differ to distinguish the public gathering from political ideology, which already exists but is difficult to verify. The scientific discourses contribute to visualising the public and might lead to significant social effects. Besides, the discourses of counterpublics often play a crucial role in the debate, and the debate for the public aims to address the discourses of counterpublics.

Therefore, the public plays a critical role in shaping the social world through fundamental social changes, such as policy-making and political party alternation. The influence of mass media on society is particularly pertinent when considering how environmental issues are communicated, perceived, and understood through political talk shows. It is vital to examine these channels deeply, with a focus on political talk shows that can serve as potent platforms for public engagement and deliberation.

The application of multimodal analysis to political talk shows is crucial for a thorough understanding of how these programs are produced. This analytical approach examines the interplay of visual, textual, and auditory elements in shaping the content of TV programs. More importantly, it reveals how these elements collectively foster a deliberative space that engages the public and underscores the differences between the public and counterpublics. By doing so, the multimodal perspective not only deepens our understanding of the media's role in public deliberation but also clearly demonstrates how media influences social change. It elucidates the specific mechanisms through which public opinion and discourse are moulded, thereby justifying the significant, transformative power of media in shaping social realities.

Furthermore, integrating political science studies into this discussion clarifies the transformative potential of media in the political landscape. By engaging with theories of the public sphere and deliberation, scholars can better explain how televised political discourse contributes to public understanding and participation in democratic processes.

Many political science studies (e.g., Niemeyer, et al. 2023; Mercier and Sperber 2019) demonstrate that the public cannot deploy in the deliberative system due to a lack of a supportive environment providing the public with adequate information, which leads to incompetence in terms of solitary reasoning. Niemeyer, et al. (2023, p. 2) have identified critical parameters of deliberative reason, including values, beliefs, and preferences, which form a workable deliberative system. Davidson (2001, p.121) represented that deliberative reasoning is intersubjective, which is composed of personal knowledge with knowledge about others and objective information about the world. Personal knowledge includes values (such as the common concern and climate change), subjective dispositions (e.g., suspicion of governance or trust in scientists), and experiential understanding.

The public deliberative sphere realises argumentative deliberation, that individuals can recognise differences and adopt varying viewpoints, leading to shared group cognition, which means each person has a distinct voice. Public deliberation refers to informed and inclusive discussion and debate addressing complex social and political issues.

Combined with the concept of socio-technical theory, this study are provided with an intertwined relationship between society and technology, explaining the transition from the public sphere to digital publics and the mainstream approaches to participation, with emerging rationed and system perspectives. The discussion of rationality here starts from the concept of 'communicative rationality' proposed by Habermas to examine how the currently deliberative sphere achieves consensus, especially in the perspectives of

deliberative democracy and efforts of the common deliberative sphere (O'Mahony, P. 2021, p.492).

Through previous empirical studies, public participation has played a core role in environmental research, policy and practice. As Chilvers et al. (2018, p. 199) said, public participation plays a crucial role in the decision-making of energy research, policy and practice. There have been large empirical studies in Taiwan on local practices of energy governance (e.g., Chou and Lin 2019; Fan 2023), and they emphasised the importance of public participation in environmental policy implementation. However, as the medium of the public sphere changes with social media, there needs to be more studies examining the role of platforms. It has been pointed out that some known influences in the public sphere, including the 'deficit' of knowledge (Corner and Grovers 2014) and the public sphere, are positively transiting from the offline public sphere to the digital platform. Digital publics are considered the most decentralised heterogeneous groups, as Chilvers, Pallett and Hargreaves (2018, p.201) mentioned. They are composed of the original publics in the hybrid forum (YouTube) and have been suggested as an emerging route to solve the current concern of the public sphere- namely the standstills between energy policies and the poor performance of the socio-technical system to mobilise sustainable environmental development. Corner and Grovers (2014, p 743) represented that although the 'deficit' of knowledge has stood for explaining the gap between the social and scientific consensus on environmental issues in the representative Western countries, including the US, the UK and Australia, this deficit alone is insufficient to explain this gap. As Callon et al. (2011, p. 35) mentioned, "the examination of the functioning of hybrid forums leads us to see the controversies that develop within them as powerful and original apparatuses for exploration and learning". That is, through debate and learning, one will realise the alternating changes of knowledge between experts and laypersons.

In addition, in Corner, Markowitz and Pidgeon's empirical study (2014, p.418), they found that the determinants of public opinions about environmental issues are deeply held values about the organisation of society and political ideology. It pointed out that talk shows as the representative channel in the hybrid forum (YouTube), provide a typical example to examine the practices of digital publics in the emerging public sphere, including the ability to mobilise environmental actions and political and media practice of intervention. It needs to be mentioned that the intervention in media here includes the YouTube built-in functions.

3. Models of participation: YouTube as a 'hybrid forum'

Based on the previous discussion, current public participation practices are often perceived as limited in their capacity to comprehend and address public controversies related to environmental issues. These practices still have ample room for development in terms of approaching policy implementation and planning. The digital platform, as an emerging sphere of socio-technical change, not only means the change of the external tool (YouTube) that shapes a public, but represents the change of the internal system, including the participating practices of digital publics, the forms of deliberation and the ultimate purpose of the deliberation.

YouTube is identified as a 'hybrid' because of the diversity of specialist knowledge and participants. According to this concept, the deliberative practice is called a 'hybrid forum'; the primary function of the forum is as an open space where utilities for dialogue, discussion and disagreement. According to the case studies of the unsolved and unpredictable energy issues by Callon et al. (2011, p.18), hybrid forums can be seen as a procedure for transitioning those existing controversies or dangers. They believed the questions and problems are addressed at different levels in various domains through the hybrid forums. In addition, the hybrid forum can be regarded as the focal point in the socio-technical change, as it forms an emerging deliberative practice in both solving the long-term behaviour of the

discussion (precise and scientific principle) and creating a space for providing an appropriate response to the increasing uncertainties produced by environmental issues. Callon et al. (2011, p.18) called the hybrid forum “a response based on collective experimentation and learning”. The concept of the hybrid forum does not aim at finding improved methods of conveying the technical expertise of specialists to laypersons. However, it discusses unresolved issues and their derived unknown issues in an environment based on equality of identity and the right to speak. It demonstrates that the role of this hybrid forum (digital publics in YouTube) is to solve the proposed concern of mistrusting information by scientific organisations and solve the known dilemma of the gap between the mainstream approaches to societal engagement with environmental issues and bring out the specific policy implementation.

Along with the new media development, political talk shows have transitioned from 'one-way' communication to 'two-way' communication, as evidenced by media companies moving to social platforms like YouTube, which offer new ways to interact through features like the like/dislike ratio and comments. However, multiple communication types have also brought more debates in media studies; Pearson (2013, p.33) said, "Media technologies take many forms, ranging from the technological apparatus of ..., television to digital technologies associated with the Internet. In each case, the technologies used involve a complex network of elements, whose role in mediated communication has been a source of debate and contestation within media and cultural studies." The shift to the new media not only represents the transformation of the tool (from TV to online media) but has the broader changes in the practice of agenda-setting and the engagement of deliberative sphere works on digital media. The multimodal style of political communication and the mode of the deliberative sphere have formed a typical political public in Taiwan, which not only appears in TV media but in multiple spaces of discourse, such as news media, broadcasts or speeches delivered. It needs to be noted that heterogeneous groups organise this hybrid forum; the

groups involve the public, who come together to discuss issues involving the collective, which includes experts, politicians, technicians, and laypersons. The following discussions are based on the digital publics (heterogeneous collectives) in the hybrid forum to deconstruct how talk shows and YouTube challenge the Taiwanese desire for deliberation.

Before discussing the deliberative practices on YouTube, I first identify the role of the digital public. Chilvers, Pallett and Hargreaves's (2018, p.205) illustrative map of the collective participation in the UK energy system provides a clear view to identifying the role of digital publics and collective participatory practices based on other publics. I refer to this collective participation map to address the digital public and apply it to broader environmental issues, as energy issues are common agenda-setting in Taiwanese talk shows on YouTube. The most 'decentred' collective participatory practices, which means the public dialogues in digital platforms are often developing in a more distributed way. As Chilvers, Pallett and Hargreaves (2018, p.206) mentioned, digital publics is essential to understanding the dynamic of participation in socio-technical change, as its hybrid form can generate new categories different from the current focus, they called it 'overflows' which represents the continually animate and transform the assumed objects of socio-technical change. In their view, these overflows are not just expansions of the conversation but transformations that introduce entirely new dimensions to the discourse.

The theory posits that digital publics, through their inherent hybridity and fluidity, facilitate the generation of these overflows. This hybrid form allows for the intermingling of various discourses, thereby producing insights or focal points that may not be strictly aligned with the original topics of conversation. For example, a discussion on energy policy might spontaneously incorporate elements of economic theory, environmental ethics, or international politics, each adding layers of complexity and new perspectives to the initial discourse.

The practices of agenda-setting on digital media play a crucial role in drawing up the issue of the deliberative sphere to gain the attention of the specific public, such as a politically partisan issue setting or creating common problems people experience. Warner (2002, p.68) mentioned that "new media may be profoundly changing the public sphere, by the way, is through the change they imply in temporality", that is, the form in which the issue exists in the public sphere is no longer time-bound through the specific features of the digital platforms, such as YouTube up-next algorithm. It contributes to building a permanent and closely linked public.

Besides, the counterpublics also play an essential role in the online public sphere, which keeps the deliberative sphere operating by providing critical or non-mainstream discourses. Although the counterpublics lack the power to adjust themselves to adapt to the level of the public sphere, their opinions sometimes occupy a dominant position. For example, in the discussion of environmental issues, scientific knowledge does not circulate in modern society, compared with specific policies or norms. However, it provides the contextual construction and the discourse of debate in the democratic deliberative sphere.

As mentioned above, the political opinions of Taiwan's TV media moved towards liberalisation and then polarisation after they broke away from the 'old three' era, which was called hegemony. After this, political talk shows began vigorously developing and occupied most of the prime time. The shifting to YouTube also emphasises the timing of shows, which provides viewers flexibility over when and how they might watch the live stream, recorded/ synchronous, or asynchronous broadcasting. It is essential to focus on how the rise of new media affects the agenda-setting of politics.

YouTube public comments can serve as a means for constructing knowledge. The digital platform forms an emerging deliberative forum through its powerful interactive functions, including comments, view counts and like counts. Ozduzen (2020, p. 746) highlighted that

YouTube comments offer video-makers the opportunity to receive reflective feedback on their portrayals of everyday culture, politics, and social dynamics. The comment function is capable of emphasising the platform's role in public deliberation through the active engagement of digital audiences in the comment section.

I identify three differences compared with the offline deliberative forum:

1. YouTube is an ideal but risky environment for democratic deliberation, primarily due to its overwhelming structure and entertainment purpose. It also poses a risky alternative to more traditional forms of deliberation. Through analysing the discourse framework on YouTube, Hess (2009, p.412) argued that digital activism is limited in responses and replies, which often encounters an over-entertainment atmosphere on digital deliberative platforms.
2. The distribution of digital content enables reaching more people online and illustrates how public institutions are adapting to the rapidly changing nature of today's communications landscape. However, Hess (2009, p.413) also argued that the government usually has high expectations for the facilitator of the digital deliberative forum but violates the unwritten terms of user content, such as posting comments and rating videos.
3. In the digital deliberative forum, users believe that YouTube provides a space for free speech that should not be subject to government intervention, while in more traditional media such as television, radio, or print, they would accept that they cannot "talk back." (Hess 2009, p.426)

The current studies demonstrated that it is hard to examine the critical evaluation, refinement, or improvement of the comment on a digital platform (e.g., Hess 2009; Henderson, Selwyn and Aston 2017). Hess (2009, p.420) mentioned that the digital platform

allows people to engage in extensive discussions about political controversies and acts of resistance. However, inflammation of contradictory comments can also prevent policies from being implemented. Likewise, Shapiro and Park (2018) found that argumentative discussions occurred in the comments section of different videos on YouTube, even though there were no moderators to guide the exchange.

4. Objects: Climate change and other environmental issues in a digital deliberative forum

This section explores how talk shows have transitioned from traditional television formats to digital platforms, significantly impacting public deliberation on environmental issues.

Chilvers, Pallett and Hargreaves (2018, p.206) have mentioned an idealised practice of digital publics in deliberation. This section discusses the transformation of talk shows from television to the digital platform, and their potential role in public deliberation about environmental issues.

Environmental issues, as a genre of scientific concerns, redefine the conventional understanding of the roles of the public and counterpublics within the digital deliberative forum. In traditional views, the expertise, or the counterpublics, play a leading role in shaping the significant opinions within the deliberative forum. Previous studies have indicated that the public, often assuming a position of ideological hegemony (Hess 2009; Warner 2002, p.62), contributes to the ongoing flow of ideas and interactions with counterpublics. These exchanges are characterised by shared visibility and collective action.

The multiple functions of the digital deliberative increase the broader discussion on most of the issues that the powerful resource afford to cover almost all of the voices, including expert and lay citizens' opinion and the freedom of leaving active comments or passive clicking the like or dislike counts, to realise the irony and echo in the digital deliberative forum.

In the empirical study of the structure of the discussion network in YouTube videos from Shapiro and Park (2018, p.116), they found that at least half of the time, the discourse is driven by small groups of individuals running campaigns for or against climate change-related action. The discussions about climate change on YouTube are dominated by a small group of 'elites', which refers to people with a specific right to speak in the public sphere because of their identity or profession in the digital publics. This specific ideological hegemony brings two potential challenges to the digital deliberative forum: limiting deliberative opportunities for new discussants and ideas and the standstill of the hybrid forum. Consequently, discussions may be distorted and politicised, indicating that politically motivated commenters are steering the discourse. This case demonstrates that the post-video discussions on YouTube about climate change could be more practical for balanced deliberation since it cannot create a flow between the public and the counterpublics.

The previous paragraph echoes debates in political science that the discussion of environmental issues is dominated by experts rather than lay citizens, as scepticism and the ability to reason are regarded as entry requirements to participate in the discussion of scientific issues. The lack of a deliberative process cannot improve the interflow between different disciplines (environment science and politics) and the flow between the public and counterpublics. Exacerbating elitism and solidifying the deliberation system only has specific discussions, potentially leading to excessive catastrophic or idealised discussions on environmental science, and only stays in the echo chamber assembled by experts due to the lack of lay citizens' opinions that reflect social realities.

B. Power Change and the Political Effects of Television: From Post-war Era to New Media Era

1. The development of television in the leading countries during the post-war

This section examines the development of television in Taiwan from the perspective of political power shifts. The growth of television in the country is closely connected to political and media developments, both in its introduction and its role in politics. To fully grasp the thesis, one must understand the form of Taiwan's environmental media ecology throughout the history of television. The political power shift is divided into three time periods: (1) the post-war era (from 1945) saw government control and television being utilised as a tool for government propaganda and a symbol of material innovation, a trend seen in many leading countries at the time; (2) during the emergence of political democracy (from 1997), the media was regarded as the fourth estate, independent of the government, and the agenda-setting for political news focused mainly on public or commercial interests; (3) with the development of new media, the communication form shifted from 'one-way' to 'two-way' (from 2006), resulting in a weakening of both government power and the fourth estate, granting the public greater control over their media consumption. These three changes in media responsibility demonstrate the varying degrees of political involvement in the media, transitioning from strong to weak, and eventually to populism.

The development of television in Taiwan could be traced back to the leading countries during the post-war, including the UK and the USA. It represents both the innovation in material level and the meaning of the enhancement of relationship between media and other disciplines, such as political communication, family studies and nationalism studies. Within this context, the television industries undoubtedly worked for the government in that time, and political power existed everywhere, especially in discourses. As Pearson (2013, p.14) illustrated that each institution followed acceptable modes for maintaining the social operation, and continuously changing the relationships and roles within society. Through these power changes, it has shown the power of the specific institutions for keeping the dominant ideologies (Pearson 2013, p.14). This has reflected in the TV station which has a specific political view in Taiwan, for instance, the Ccity, one of the well-known pan-blue TV

stations, which reported substantially on raising exposure of the Kuomintang (abbreviated as KMT) presidential candidate and combated the other presidential candidates. During the Taiwan presidential election in 2020, the NCC published an investigation, which mentioned that almost 70 % of Ctitv news quantity and the length of time was reporting on KMT presidential candidate, which have led to serious news imbalance (NCC 2019). During the post-war period, the ideology took the form of a dominant social value: authoritarianism, which means the television was working for the government, and most of the appearing contents were controlled by the government as well (Schubert 2012, p.67). After the establishment of 'Yousian Guangbo Dianshihfa 有線廣播電視法 [Cable Radio and Television Act (CRTA)]' in 1993, the amount of TV programmes had a noticeable increase and has become diversified. Wang and Chen (2011, p.14) illustrated the amounts of TV programmes have reached to hundreds during the decade after the establishment of 'Yousian Guangbo Dianshihfa 有線廣播電視法 [CRTA]'. The increasing number of programmes have caused market competition in the television industry, and pursuing ratings is seen as the important target of programme content (p.14). Since the late 90s, there have been massive debates around market fragmentation intersected with (neo) liberalism and democratisation in Taiwan, which indicates the existence of the shifting trends in media consumption. Through the development of social media, which has led to extreme audience fragmentation, that media companies have moved from a situation where they had to serve the interests of a dictatorship, to one where they are subject to market forces not only within traditional televisual media but also hyper-metricised social media platforms. For example, the ideology of social value has transferred to differentiation, which means the TV rating is no longer the only index of the news value, as the parameter for media companies to satisfy publics, it also needs to refer to the like/dislike ratio and the comments. In addition, through a massive amount of emerging news genres and approaches for watching news, the publics' concepts

have become blurred. At the same time, the value of news has become multivariate, which means it no longer serves for the only publics in the concept, it tends to be biased toward minority preferences.

Silverstone (1994), a representative scholar who contributed to studying the relation between television and daily life, not only dealt with the sociological meaning of television but clarified the research concept of television programming, the television audience, and television's domesticity. From the perspective of the position of television, Silverstone considered that television was both historically and sociologically a suburban medium, which means television plays the role of mediator between private and public spheres. Origin from the characteristic of television as the metaphorically and ideologically 'suburban'.

Silverstone (1994, p.52) also mentioned the most important role of television- the centre of a whole range of relationships and identities, e.g., "public and private", "global and parochial", "domestic and non-domestic", which mark out the territory of the everyday (Silverstone 1994, p.52).

From the perspective of television's domesticity, Silverstone (1994, p. 50) mentioned four influences which brought from the appearance of television:

1. An emerging platform to increase news visibility through "bringing news of the world of affairs beyond the front door".
2. Form a multimodal platform by "providing narratives and images for identification, reassurance or frustration".
3. Create a sense of totality of public, that it can be seen an external tool and entity object, which "affecting or reinforcing the household's links with neighbourhood and community".

4. Shape a restricted sphere by the shared physical space (the position where television is located), which “locks the household ever more firmly into an increasingly privatised and commodified domestic world”.

The existence of television identifies an independent sphere of a ‘totality of publics’ . This form of concrete space extremely changes the new values, which tend to mostly satisfy the specific ‘publics (the audience of television)’. The concept of public organised by an entity object also happens in the shifting of online media, but the influence of media ecology has become more and more obvious by the peculiarity of Web 2.0, which has an in-depth discussion in next section.

The popularity of television increased at the end of the 1950s and was regarded as a communication tool to rebuild the social culture during the post-war period. At the same time, television was a tool used to propagate for the government, control the media framing and the society, which was observed by the history of television in Eastern and Western countries. The development of post-war West German television was an example of television as the main propaganda machine, as Schwoch’s (2001, p.110) illustration shows that America used controlling television to propagate anti-communism. Besides, in America, Britain and Japan, which led the development of the television industry, each of them had many representative essays, and they were focusing on the process of the popularity of television since the post-war period, e.g., Japan (Hagiwara 1998); Britain (Mundy 2008); America (Hilmes 1994). For instance, in the case of the development of early BBC Television Service, Mundy (2008) illustrated that “between 1947 and 1955 the BBC played a crucial role in the construction of popular television that placed it at the centre of national life and cultural identity for much of the second half of the twentieth century (Mundy 2008, p.53)”.

In the United States to shape the family concept in order to develop the suburbs, the American government encouraged suburban families to install television during the post-war

period. The studies of the American television industry were focusing on the discourse of family values and the experimental studies of multiple age groups (e.g., Douglas and Olson 1996; Fox 1993; Cantor 1991; Spigel 1992). The studies of the British television industry were focusing on the changes in the form of culture, the impact of television on the public sphere, and the relation between television and daily life (e.g., Silverstone 1994; Black 2005; Moy 2000).

Black's (2005) study was focusing on the popular debate about how the content of programmes impact on audiences and viewing behaviour. He also assessed television's impact on politics as a medium and how the main parties viewed it:

Labour was critical of Independent (commercial) Television (ITV) broadcasting and paternalist in traditional British Broadcasting Corporation (BBC, the public broadcaster) style towards audiences, but the Conservatives cannot be reduced to cheerleaders of ITV, pandering to audience tastes (Black 2005, p.549).

In addition, Black further mentioned the hidden worry of the politicisation of the media, for instance, Children over concerns about television for left critics in the 1950s. It was also criticised by T. S. Eliot, as he mentioned that this phenomenon probably produced negative social effects, especially for small children. (Black 2005, p.559).

Yoshimi Shunya, who worked in the field of techno-nationalism in post-war Japan, mentioned that the production and consumption of household appliances were inseparable with nationalism in post-war Japan. Techno-nationalism appeared in the 1950s as combining Japanese nationalism and American individualism, and Japan built the culture in post-war by comparison method (Yoshimi 1999). Yoshimi (1999, p.151) further mentioned that combining nationalism has influenced Japanese self-confidence in their technological capabilities since the 1960s.

In addition to production, Yoshimi (1999, p.155) also considered this phenomenon has been worked ideologically into their everyday consciousness in the post-war period, including the electrification of the family activities and nationalisation of television. Yoshimi (2003) further mentioned that the popularity of Japanese television not only reflected the national modernization but became an overarching medium linking the family with the state. For instance, open-air TV reflected a linkage between TV and the popular imagination in post-war Japan (Yoshimi 2003, p.464), and the form of family life characteristic in post-war Japan was created by television (p.477).

2. The development of television in Taiwan

The detailed timeline for the origin of television in Taiwan has two statements in general:

1. From the TV introduction, Cheng (2002, p. 310) believed that the development of Taiwan's television industry started in the 1950s, influenced by the development of television in the US: Television was introduced to Taiwan under the concept of "Great Americanism" dominated by the "Greater Americanism" in the 1950s, and the action of television preparation was greatly influenced by Chiang Kai-shek's eagerness to build a "free China" and confrontation with mainland China at that time. (author's translation)
2. From the perspective of TV production, it was generally believed that the development of Taiwan's television industry started on the date of the launch of the Taiwan Television Enterprise (abbreviated as TTV) on October 10, 1962 (Ko 2008). After that, the China Television Company (abbreviated as CTV) and the Chinese Television System (abbreviated as CTS) started broadcasting, which took Taiwan's television industry into the new era called 'the old three' era. 'The old three' was derived from the three wireless television stations (TTV, CTV and CTS) established by

Taiwan in the 1960s and 1970s, which were controlled by the only party 'KMT' in that time.

The status of television in Taiwan is as important as the countries mentioned above. However, in Taiwan, due to the situation of national development and a one-party state, the development of Taiwanese television was always confined by the government. Besides, differing from those leading countries which have a massive positive evaluation on the appearance of television, the sense of the emergence of television in Taiwan seemed like a double-edged invention: the appearance of television has enhanced cultural education, but also brought difficulties in the restriction of free speech. For easily controlled, government had already formulated the law of 'DianShih GuangBo JieShou Ji DengJi GueiZe 電視廣播接收機登記規則 [The Regulations for TV broadcasting receiver]' in 1959 and the law of 'DongYuanKanLuan ShihCi WuSianDianShouYinJi Ji DianShihJieShouJi GuanJih BanFa 動員戡亂時期無線電收音機及電視接收機管制辦法 [The Regulations for the Control of Radio, Radio and Television Receivers during the Period of Mobilisation]' (Ko, p.117) in 1955. Under this circumstance, the appearance of television represented a more inseparable relation between private and public spheres, which means government propaganda taking priority over the private facilities, such as for entertainment, improving family values, or enhancing nationalism. The appearance of television in Taiwan also intensified the four features raised by Sliverstone (1994, p.50) which was mentioned in the previous section.

The emergence of Taiwan's TV programmes was used for government propaganda, so TV programmes have been influenced by political wrestling for a long time. KMT was the earliest political force and founder of the television industry in Taiwan. Lin (2006) mentioned that the influence of the KMT controlling all the three channels (called as 'the old three') still exists and is reflected in the current structural ills of Taiwan's television industry. For

instance, in the 2000 Taiwan presidential election, the medium which was called 'the old three' were obviously partial to the KMT candidate, with a streaming campaign rally live till midnight (Lin and Lo 2010 p. 77). Lin and Lo (2010 p. 82) mentioned seven election news' manipulation strategy KMT, such as "screening and confirming the reporters which was responsible for political news standing by KMT"; "the department head directly ordered journalists and led the direction of news in election"; "shaming opponents' camp and making voters negative impression by controlled the news contents in election". The old three channels were the earliest television companies, including Taiwan Television Enterprise (abbreviated as TTV), China Television Company (abbreviated as CTV) and Chinese Television System (abbreviated as CTS). When martial law ended in 1987, the industry's role as government propaganda and entertainment tool apparently ended. At that time, it not only appeared in a large number of various types of media, but the reporting style of 'the old three' started to fail, so various controversial reports became mainstream. In 1993, the government opened a cable TV station, and the first privately-owned TV station existed in 1997, which meant the laws to be mentioned above had been abolished, and the television no longer for compulsory government propaganda.

Under this background, it can identify the audience of television as a 'totality of publics', which was the target audience the media served at that time (before 1987, when the government controlled the media). It forms the first public of politics in Taiwan, which provides an important background of political communication and an explanation of the continuous political wrestling, after the industry's role as government propaganda and entertainment tool apparently ended in 1987. Besides, although the political contents were restricted by the government at that time, the media ecology still realised a part of agenda-setting through providing the entertainment contents or the content improving family values. At the same time, the government propaganda priority has led to more specific

influences on the practice of agenda-setting afterwards, especially in political communication.

To generalise the related studies in Taiwan from previous years, there were many essays focusing on the policy analysis of the television industry and the political economy of the role of media. They supplied the detailed analysis and record for drawing up the internal policy, capital structure, and national policy after the period of building the television industry (e.g., Su 1993; Fang 1994; Cheng 2002; Chang 2005; Lin 2005). The historical studies of communication in Taiwan were also focusing on policy discussion of the process of institutionalisation, comparative study or institutional critique, and aimed to analyse the internal policy of television stations, the problem caused by the system of television stations, and the possible solution of it. According to the previous studies, the development of Taiwanese television has had an inseparable relation with politics. Ko (2008, p.118) illustrated how television played a role in political communication, he considered the initial role of television as a tool for strategic political communication and used to propagate national ideology. It means television was used as a culture machine at that time, which was completely obeying the national pedagogical and controlling and both for entertainment and political propaganda.

The opening of media has strongly realised the effect of agenda-setting, through creating a huge number of programmes and multiple genres of contents to satisfy the public (the audience). However, the political contents in this time demonstrated the different effect of agenda-setting than the non-politics contents, that the media companies tend to spread their political contents to the audience rather than satisfying the audience needs. Through the commercialization of the media, it changes the role of the media. Although nearly all the news channels still have their political ideology, the news channels start attempting to adapt their messages and communication style to make it attractive for the public.

In addition, with political democracy, the media had a new role: as a watchdog which was regarded as the fourth estate, not only played a role as a provider of information necessary for rational debate but as a mediator between people and government. The emergence of the fourth estate is also realised by programme diversity, as of May 2020, the quantity of programmes has already exceeded 150. This specific role of the media has brought out a debate of the establishment of a democratic sphere for deliberating. For example, the several debates also accompanied by this rising institution, e.g., the role of those government funded, and government regulated media institutions, is used for public service or propaganda mouthpieces; and the role of those private medias, is for own commercial interests or the public's. (Dahlgrens 1995, quoted in Pearson 2013, p.16)

Additionally, on the face of it, the government no longer controlled the media after the establishment of the NCC in 2006. At the same time, the turning point of the government control was that the official shares withdrew from the media market which means the parties no longer have any shares in the media, the rest of the media are fully privatised, except for the two public channels owned by the government. After this, in the 2008 Taiwan presidential election, the structure of the news industry has been affected by the news value and business mechanism instead of government control (Lin and Lo 2010 p.85). However, the invisible influence continued to the emergence of political talk shows, which has been described as the mediatization of politics, meaning the "long-term interrelation processes between media change and social and cultural change." (Hepp, Hjarvard, and Lundby 2010, p.223). Across the various ways to theorising mediatization, it can find mediatization was a complex concept (e.g., Schulz 2004; Krotz 2009), including difficult to define and reflected various influence of media, such as the specificity of different media and how they were used as the contents to affect culture and society. However, it was specifically applicable to illustrate the process of technological innovation and institutional change.

The emergence of political talk shows was a notable practice of mediatization in television ecology in Taiwan. In the 1980s, the transformation especially mentioned the multiple communication techniques and the 'neoliberalism' brought up the news industry structure to 'marketisation' and 'privatisation'. The two changes affected traditional media interaction, which means the dominance of news tends to satisfy preference to the audience or business owner and weakening the control from the government or the ruling party. In fact, the mediatization from political talk shows has formed the specific effects among television ecology in other countries. One of the specific effects is the audience and market shares changed, as Mattheiß, T. et al. (2013, p.171) mentioned, the German public broadcasting station (ARD) reformed the original programme schedule and increased the broadcasting shares of political talk shows, after observing the high TV ratings of political talk shows. The other common debate of the mediatization from political talk shows is the "categorise of political talk shows", is an entertainment or as respectable political programmes (Schicha, C. 2006, p.550). According to the experimental study of the motivations on watching political talk shows, Mattheiß, T. et al. (2013, p.176) indicated that entertainment contents and political information exist an interaction in the political talk shows, which is the crucial reason for influencing people watching the political talk show. Entertainment content is used for inducing the public's attention and the political information often followed by it, to provide the debating discourses on the deliberative sphere. In addition to German political talk shows, the multimodal style of political communication in the US has clear practices of agenda-setting, which is similar to Taiwan. Firstly, the composition of political talk shows is entertainment contents and political information, but it inclines to the entertainment effects, that the related studies classified the political talk shows as the entertainment programmes (Reijven, et al. 2020, p.1; Baym 2007, p.99). Besides, Reijven, et al. (2020, p. 2) represented that the multimodal style of political communication, including agenda-setting questions, guiding the issues towards the

goal of programmes in the debate, and extending the agenda according to the composition of the public and creating a sense of continuity of issues. However, the previous studies I mentioned above used the discourse-based methodologies (e.g., Reijven, et al. 2020; Baym 2007), and the research object were more focused on the audience's behaviour (e.g. Reijven, et al. 2020; Schicha, C. 2006). Since the ultimate goal of these practices is to create a long-lasting deliberative sphere, and environmental issues are majorly composed by visual elements, it is important to conduct an in-depth analysis on the mediatization from political talk shows, especially on the visual contents.

In the fields of political communication and political sociology, there has been ongoing discussion about the impact of television on politics, with various studies highlighting how media structures affect political processes (e.g., Holbert 2005; Bolin 2014; Jones and Soderlund 2017). Bolin (2014, p. 337) argues that one detrimental trend is the increasing influence of television's entertainment logic on political discourse. This trend risks degrading the relationship between journalists and politicians, as political discussions are increasingly framed in terms of entertainment rather than substantive deliberation. However, this study proposes a different perspective, suggesting that while entertainment elements in political talk shows do aim to capture and retain viewer attention, they ultimately serve to facilitate deeper engagement with the deliberative aspects of politics.

C. The application of YouTube as an approach to online political communication

YouTube is a typical online platform for mediatization and fostering deliberative engagement on digital media. Mediatization is a theory that describes how media shapes and frames the processes and discourse of political communication and social interaction, reflecting the media's increasing influence on cultural and societal norms. Unlike traditional

TV media, YouTube introduces features that enhance interactive and participatory communication, redefining the media landscape.

A vivid example of this phenomenon is YouTube’s role as a new form of mediatization, distinct from traditional media channels like television. According to Hruby and Burkhan (2018), YouTube not only hosts but actively shapes political discourse through its unique features and techniques. It provides various features that are either absent or beyond the capabilities of traditional TV media. It can in-depth understand the mediatization of politics on digital media through the interaction of the typical functions on YouTube and examine how the public builds a common imagination on a virtual platform. The following part illustrates how Web 2.0 changes the communication form on YouTube. And then further explains how the main five functions operate on YouTube. The final part indicates some findings for how political talk shows work on YouTube's algorithm.

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1										
2										
3										
4										
5										
6										
7										

Image 2. 1. The development of YouTube as the product of Web 2.0.

YouTube is by far the biggest online video sharing website, which provides users uploading, watching, sharing and commenting videos. YouTube was launched in 2005 and it was acquired by Google for \$1.65 billion in stock in 2006 (Jarrett 2008, p.132). At this time, with the rapid development, YouTube was creating several records. In July 2006, it was delivering an average 100 million video streams per day and served nearly 3 billion video streams worldwide (comScore 2006). According to the YouTube statistics page (YouTube n.d.), it has over two billion users, which means everyday people watch over a billion hours of video and

generate billions of views. Also, YouTube has launched local versions in more than 100 countries and can navigate YouTube in a total of 80 different languages.

YouTube exemplifies a typical product of Web 2.0, showcasing prominent features such as content sharing and interactive user engagement. These characteristics significantly enhance the process of mediatisation—a concept that extends the influence of media beyond traditional agenda-setting. Mediatisation explores how technological innovations in media, like those seen from television to social media platforms such as YouTube, reshape public opinion, political communication, decision-making, and democratic processes.

Discussing mediatisation is crucial because it transcends the traditional concept of agenda-setting by focusing on the broader impact of media technologies and practices. For instance, YouTube, as a hallmark of Web 2.0, dramatically alters how the public engages, communicates, and makes decisions, contrasting sharply with the one-way communication model of traditional television. This exploration of mediatisation thus broadens the scope of research, delving into the expansive effects of media technologies on societal structures.

The term "Web 2.0" was coined by Tim O'Reilly and Dale Dougherty during the O'Reilly Media Web 2.0 Conference in late 2004. O'Reilly (2007, p.17) subsequently described Web 2.0 as a framework characterized by greater information exchange and collaboration among users through web applications, marking a significant shift from static web pages to dynamic and shareable content (O'Reilly 2007, p.18). This paradigm shift underscores the transformative role of Web 2.0 technologies in fostering a more interactive and participatory media landscape. This concept was similar to the shift from one-way to two-way communication which was mentioned in the previous section. Schneider (2018, p.31) indicated that the 'digital bias' in terms of the Chinese nation has relation to the political economy, state intervention, technical, design choices of the companies and the psychology of the user. For instance, Schneider also provided an example to explain how the interaction

between digital political design choices influenced the volume of specific issues, he found that Web sites dealing with the Diaoyu Islands used little interactive affordances of the Web, and the reason was due to the interaction between digital technologies and political design choices (Schneider 2018, p.77). However, the psychologist Billig pointed out the defect of the 'digital bias', he thought the mechanisms ignored the underlying mechanisms that inform all group sentiments (Billig 2009, p.48). One thing has to be highlighted is that such means have never appeared in Taiwan since martial law ended in 1987. Besides, as Billig (2009, cited in Schneider 2018, p.75) mentioned "banal factors can play a crucial role in creating a sense of community", which means that the trivial elements often provide specific background knowledge as given. Therefore, 'Web 2.0' as a new term is necessary to be created since it not only symbolises a new era but the concept of social media platforms.

Since O'Reilly presented the conception of Web 2.0, it has brought high attention online, as O'Reilly (2007, p.18) illustrated, "the term "Web 2.0" has clearly taken hold, with more than 9.5 million citations in Google." But it still brings lots of controversies in the meaning of Web 2.0 which does not have a specific definition. Most of the related studies were following the conception of Web2.0 by O'Reilly and extending it according to the specific perspective. For instance, O'Reilly was standing on the producer perspective to list the common characteristics of Web 2.0. As Dougherty proposed in the initial brainstorming of MediaLive International that the Web is in a period of renaissance, with constantly changing rules and evolving business models (O'Reilly and Battelle 2009, quoted in Blank and Reisdorf 2012, p.538). Therefore, this study focuses on both producer and user's perspective on political communication, and only refers to the feature of 'public participatory' by O'Reilly.

YouTube has served a different range of users, which has always been a platform for amateur and professional production, creative consumption, curation, critique and public entertainment (Burgess and Green 2018, p.26). The powerful function is traced back to

YouTube's operating practices. Burgess and Green (2018) mentioned that YouTube not only increased the scale and complexity of its commercial practices but the controls of participation in the platform. The multiple functions of YouTube keep the independence of commercial development and ensure the reality and both mainstream culture and subculture have been published on the platform. More tensions between the mainstream culture and subculture have been produced, such as political struggle and conflict of interest, and demonstrates that YouTube is a popular platform for people engagement.

2. The five functions of YouTube operate for online political communication

The operation of participatory culture on YouTube is divided into five functions for both audiences and producers, including recommendation, comments, channels, uploads, and views. These functions of YouTube can be regarded as the tools to realise the practices of mediatisation through creating channel classification, issue-setting process and personalised recommendations. YouTube provides a commonly used framework of digital objects and affordances within which democratic processes take place, and it draws up a specific digital deliberative sphere. In addition, YouTube comments and views also provided external tools, such as voting, to concretise the virtual public. According to Gross (2015, p. 1), the emergence of YouTube changes the role of the media. He explained,

"The architecture of openness on YouTube has significantly reduced "gatekeeping" and "agenda-setting" from political elites and the mass media... increased amounts of civic participation and diversity within the public sphere."

The following paragraphs use YouTube's 'five functions' of channels, comments, recommendations, uploads and views as a structure to explain the difference between the old 'broadcast' style of media and the new 'dialogue' media of YouTube, which matches the mediator change from one-way broadcast to two-way communication.

a. Channels

The previous paragraphs have demonstrated much data of how the internet interacts with public engagement. For instance, May (2010) mentioned that the established TV channels were found to be more successful in building large, sustained audiences on YouTube, but major online political YouTube venues have witnessed a significant drop in the audience. However, the audience of online political YouTube venues was not decreasing as much as May represented. Although YouTube as an online political field does not have as many audiences as entertainment channels, this phenomenon is partly a result of lack of political channels instead of low attention to political issues. In recent years, the increasing amount of political content on YouTube has not only encouraged the growth of participatory culture but also raised attention at democratic spirit. Articles about politics and the internet have claimed some side effects, such as more polarisation, public ignorance, political apathy, and the rise and fall between the meritocracy, democracy and populism (e.g., Berrocal, Campos-Domínguez, and Redondo 2014; Tina and Julie 2011; Žuk and Žuk 2020, Walker 2019).

Nicoleta and Tănase (2014) used political communication on YouTube in Romania as an example to examine how the parliamentary parties in Romania use YouTube to promote the image and the political message of the certain political party as videos (p.81). However, there are some limitations of this study that not all of the parties have their own YouTube channels, so it might not represent complete online political communication on YouTube (Nicoleta and Tănase 2014, p.90). This study also illustrated the influence of online political communication on the development of political communication in Romania, especially in the parliamentary parties with the fewest parliamentary seats (Nicoleta and Tănase 2014, p.90). Compared with Romania, the development of online political communication in each party tends to balance and high dependence in Taiwan. In addition, this study lacked discussing how members of the public in Romania use YouTube to interact with political parties.

The phenomenon also appears in Taiwan, along with the new media development, the political talk shows have already had personal channels or playlists on YouTube, which demonstrated the full-fledged online political communication. It was observed by the change of communication ways of political talk shows, the political talk shows in Taiwan started to change the form of the communication from 'one-way' communication to 'two-way' communication, which was observed by the movement of media companies onto the social platforms such as YouTube and interact through likes/dislikes or the comments.

b. Comments

The existence of 'YouTube comments' is a noticeable function which plays a key role in facilitating two-way communication on YouTube and represents a change from the old 'broadcast' style to the new 'dialogue' media. Regarding the comments work on YouTube, Thelwall (2018) applied the Comment Term Frequency Comparison (CTFC), a social media analytics method to gather and analyse YouTube comments around a specific topic (p.305). According to the pros, cons and the suitability of the main topic of this study, it prefers to use CTFC to analyse the comments on YouTube, which are used to gain insights into the topic rather than to test hypotheses. For example, Thelwall used CTFC method to illustrate the dance types analysed and the context in which was discussed on YouTube. The results highlighted the difference between the dance types and gender, sentiment etc., which provides a starting point for deeper analyses of the topic (2018, p.314). As Thelwall mentioned, the CTFC method is most likely to be successful for topics that are narrowly focused on YouTube. However, the results illustrated that social media analytics methods were almost inevitably exploratory, which means it is difficult to assess traditional hypothesis testing (p.314). Therefore, the CTFC method is suitable for this study, because the environmental issues are seen as the specific issues which are widely discussed on YouTube.

c. Recommendation

YouTube's recommendation is the only one of five functions which is produced from an internal system. Since YouTube's recommendation is difficult to define the filtering rule, it has always been seen as a complex issue. The increasing number of related works has been studied on YouTube's recommendation system (the related video list). Davidson et al. (2010) introduced the formulation of YouTube's recommendation system which was based on the ranking of a variety of signals for relevance and diversity (p.294). They found that 207% of the recommendation pages executed according to the 'Most Viewed page' which was higher than 'Top Favorited' and 'Top Rated page' (p.296). It illustrates that the performance of recommendation pages follows the majority opinion, which also represents a positive effect on political communication- increasing exposure rate. For instance, the political party can expand the exposure rate through the well packed issue on YouTube. Zhou et al. (2016) have shown how to optimise the list of recommended videos and investigate if the related video list is used to improve the performance of YouTube's recommendation. This highlights that, after watching the initially selected video, most of the viewers choose to watch a video on 'Up next' list.

One of an ongoing surmises is about YouTube's recommendation becoming an approach to receive totalitarian ideology. O'Callaghan et al. (2015, p.474) illustrated that YouTube's recommendation has played an important role in the online strategy of the extreme right's ideological makeup. From O'Callaghan et al. 's (2015, p.474) case study for shaping the extreme right's ideology on YouTube's recommendation, they also drew attention in which this may already be influencing political thought and probably have potential lived effects. However, O'Callaghan et al. only found that YouTube's related video recommendation process was working correctly, which was a topic modelling with 'Non-negative Matrix Factorization (NMF)'. For instance, Tufekci (2018) mentioned that recommending videos on YouTube was more and more extreme by observing the videos of Donald Trump rallies on

YouTube during the 2016 presidential election campaign. She illustrated personal experience that after she watched the videos of Donald Trump rallies, YouTube started to recommend the “autoplay” videos to her which featured white supremacist rants and was the well-known speech from Trump. Tufekci (2018) further examined this phenomenon by creating another YouTube account, and started watching videos of Hillary Clinton and Bernie Sanders, then she was being directed to videos of a leftist conspiratorial cast, including arguments about the existence of secret government agencies and allegations that the United States government was behind the attacks of Sept. 11. The result was similar to Trump’s video but more and more extreme than the video she had started with. The phenomenon also happens in political talk shows in Taiwan, after observing the ‘Up next’ list from the single political talk show video, which Tufekci did, the ‘Up next’ list started leading to the more extreme videos, such as the long-term party’s controversy or political scandal. In addition, the content of the ‘Up next’ video always slowly departs from the initial issue.

This study tends to refer to O’Callaghan et al. ’s (2015, p.463) method to define the categorization of YouTube channels which uses text metadata associated with the particular channels—namely, their titles, descriptions, and keywords. First, using the singular value decomposition (SVD) rank aggregation method proposed by Greene and Cunningham (2013), to generate the ranking of related channels for specific topics. The consequences from the SVD rank aggregation method were then provided with the description for comparing with the previous related studies.

d. Uploads

It is necessary to explain the ‘genre-like categories’ on YouTube for understanding the brief description of ‘uploads’. YouTube currently has 18 genre-like categories, including: Autos & Vehicles, Comedy, Education, Entertainment, Film & Animation, Gaming, How To & Style, Movies, Music, News & Politics, Nonprofits & Activism, People & Blogs, Pets & Animals,

Science & Technology, Shows, Sports, Trailers, Travel & Events, which provides to be chosen the specific type of videos both from channel and individual. According to Bärtil et al. 's (2018, p.22) statistics data showed that the most channels fall into the Music category, reaching a peak in 2009, and occupying more than 20% of all created channels. However, in 2016, the majority of created channels were People & Blogs, coming close to 75%. It was worth that although less than 3% of all channels are News & Politics, this category has always been extremely active and accounts for 45% of all uploads overall (Bärtil et al. 2018, p.22).

e. Views

Due to YouTube's Publicly available data which keeps detailed records of the interaction and shares, the data enhances the amount of quantitative research. The related studies have focused on the description of interaction between videos and viewers, the prediction of video popularity, and external factors affecting how videos are shared (Bärtil et al. 2018, p.17). The majority of related studies were analysed by the surface data on YouTube, such as video length, comments, views etc. (e.g. Mukewar et al. 2013; Thelwall 2018; Bärtil et al. 2018). However, although the data analysis has reflected a high quality of human behaviour, it hardly illustrates the full information. As Bärtil et al. (2018, p.30) mentioned that it was worth finding the right level of aggregation instead of fine-tuning, which might be a good approach to use social media data to draw large-scale maps of society trends.

Thelwall (2018, p.304) mentioned some following problems of social media analytics methods:

1. They are lengthy to describe because they involve multiple methods.
2. Generic social media analytics method is complex since they involve a combination of automatic processing and human judgements.

3. Any method is difficult to effectively evaluate from a general perspective since it may work well for one topic but not another, it ... needs to be assessed separately, and possibly in different ways. (p.304)

3. YouTube algorithms

According to related studies, YouTube includes massive and complex data, it is difficult to illustrate overall characteristics of it (e.g., Wu et al. 2014; Montes-Vozmediano, García-Jiménez and Menor-Sendra 2018). As Wu et al. (2014) mentioned “retrieving and analysing data on all videos hosted on YouTube is currently impossible.” (p.19) Thus, the other studies focused on the case study which focused on the specific age group, type of channels, or issues, such as presidential election (e.g. Montes-Vozmediano, García-Jiménez and Menor-Sendra 2018; Al Nashmi et al. 2017; Gibson and Mcallister 2011).

There is currently an ongoing debate in the digitalisation of political communication that almost all of Taiwan’s political talk shows have their own YouTube channel and upload the videos promptly after the talk show plays out on television. The common debate was on the changes brought by the platform transition, such as reinforcing the existing campaign strategies, or this transition radically changed campaigning conditions. In Grusell and Nord’s (2016) observation from the digitalisation of election campaigns in Sweden, they mentioned that both professionalisation and digitalisation tendencies strongly have influenced online political communication, especially in bigger campaign parties. As Tufekci (2018) represented:” Given its billion or so users, YouTube may be one of the most powerful radicalising instruments of the 21st century.” It is necessary to understand which changes of political talk shows on YouTube will be brought by the extreme phenomenon on YouTube rather than on television. Due to the distribution of news viewers on each media has sufficient differentiation, political talk shows can be seen as an approach to promote the specific political view, by agenda setting in the political talk shows in Taiwan.

In this study, for evaluating the value of political talk shows on YouTube, the valuable approach is to understand how the YouTube algorithm works. Although below from Gielen and Rosen (2016) is not a peer-reviewed academic article, it is important because they used to work for YouTube. Gielen and Rosen (2016) called the multiple YouTube promotional algorithms (Recommended, Suggested, Related, Search, MetaScore, etc.) as “the YouTube algorithm”, and represented four significant impacts on the algorithm:

1. Watch Time, which influences each video and programmes’ value by extent and frequency, it consists of View Duration, Session Starts, Upload Frequency, Session Duration and Session Ends.
2. Views and View Velocity, through analysing Federator’s view velocity, Gielen and Rosen found that Views and View Velocity have positive correlation on the overall success of a video and a channel. In short, as Gielen and Rosen, mentioned that “...through the algorithm, YouTube actively promotes channels that appeal to that channel's core audience, while actively punishing channels that do not”.
3. View Duration, which means the length of time the viewer spent on watching an individual video. Gielen and Rosen also found that through observing the Channel Frederator, “videos with an average View Duration of over eight minutes brought in an average of over 350% more views in the first 30 days than those under five minutes”, which meant extending the length of videos can improve viewer’s performance.
4. Session Starts, which means the number of viewers starting their YouTube viewership performance with one of your videos. As Gielen and Rosen explained that the first 72 hours of viewership from your subscribers was directly influencing the ‘programme rating’.

Gielen and Rosen highlight the algorithm's dual objectives: to increase the frequency with which viewers return to the platform and to extend their viewing duration. This is particularly pertinent to this study as it underscores how the YouTube algorithm can be leveraged to enhance viewer engagement and audience building for political talk shows. This link between algorithmic influence and public engagement on digital platforms forms a key aspect of the analytical framework of this dissertation, illustrating how digital strategies can impact political communication.

'Ranking' is also one of the important metrics which usually directly influences the next video you will watch. The simple ranking on YouTube is 'search result ranking', as Rieder et al.'s (2018, p.63) finding, they mentioned three factors that influenced the search rankings on YouTube. Firstly, publication volume can be seen as the most important index to promote rankings, secondly, the search rankings on YouTube may be influenced by the site's recommendations and subscriptions, finally, the rankings were heavily influenced by platform languages. Rieder et al. (2018, p. 64) also provided a case of Syria, they gathered a set of manually selected queries: [gamergate], [islam australia], [islam], [trump], [sanderson], [refugees] and [syria], and found that by choosing contemporaries and controversial issues, people can argue that search results relate to political debates. This case demonstrated that 'search result ranking' can be used to understand the effects of platform politics.

To summarise, YouTube is a complex online platform which not only has abundant publicly available data to observe the development of online political communication but also is a beneficial platform to promote political ideology.

D. Recommendation System

The recommendation algorithms can be regarded as the most influential system, as YouTube Chief Product Officer Neal Mohan mentioned that more than 70 per cent of the time what users watch on YouTube is determined by the service's AI-driven recommendations (Joan

2018). Before discussing the historical development of the recommendation system, it is needed to mention the effects of the recommendation system, that it not only realises the practices of mediatisation through personalised recommendations but plays a crucial role in drawing up the issue of the deliberative sphere with the aim of building a common imaginary.

In recent years, the algorithm has continuously optimised and is valued under rigorous inspection, especially based on two main purposes: reinforcing scrutiny and increasing user engagement through optimising the algorithm. The scrutiny is implemented by the official YouTube platform, through filtering out the videos which mostly satisfy the optimisation, including removing the violent contents, reducing the spread of harmful misinformation and recommending the videos via personalised recommendations. Filtering out the violent content, reducing the spread of harmful misinformation and are the three typical optimised conditions of YouTube optimisation (YouTube n.d.) to strengthen the source credibility of the platform. In addition, according to Hao (2019), since the algorithm is optimised for getting people to engage with videos, the algorithm tends to recommend the videos via personalised recommendations, to create an addictive experience. YouTube emphasises the importance of scrutiny and realises the high-level access right for users at the same time, namely users allow to create a channel, live streaming, upload videos and access almost all the videos which satisfy the optimised conditions on the platform. To increase user engagement, YouTube is unceasingly attempting to leave users in the platform as long as possible through optimising the algorithm. Gielen and Rosen (2016) mentioned that 'watch time' as an important metric to promote videos on YouTube, which is a combination of the following items: views, view duration, session starts, upload frequency, session duration and session ends. Gielen and Rosen (2016) further demonstrated that 'watch time' has direct correlation to a video to be 'successful', the success is identified by reaching viewership

equal to or greater than 50% of the subscriber base in the first 30 days, and the calculation method is that taking the 'views' and multiply them by the 'average view duration.

A typical working behaviour of YouTube's recommendation system is personalised recommendations, which means YouTube recommendations aim to create the creation of ideologically like-minded information spaces and was almost always in the relevant studies (e.g. Rieder, Matamoros-Fernández and Coromina 2018; Röchert, Weitzel and Ross 2020; Hao, 2019). Almost all the important factors in video visibility on YouTube are derived from user behaviours that the primary filtering criteria of generating the recommended videos sidebar is through searching videos that user is watching or matching their search history. Hao (2019) study mentioned that the algorithm is believed that providing the videos that people already like or believe can create an addictive experience. Chen et al. (2022, p. 3) also pointed out that the extremist channel videos on YouTube are heavily concentrated among a group of people with high levels of gender and racial resentment, who usually subscribe to these channels and often follow the external links from these channels. These findings represent that YouTube's recommendation system is highly followed much more by subscriptions rather than recommendations.

The over-reinforced personalised recommendation is a potential problem in the process of algorithm optimisation at the same time, which is called 'Implicit bias' (Hao 2019). From the perspective of political videos, Hao (2019) indicated that this filtering criterion can quickly guide the videos with extreme content and lead to political polarisation. This mechanism will eventually exclude other viewpoints and leave the most extreme and controversial videos on recommendation lists. Political polarisation is a common phenomenon on social platforms, which is usually considered to be caused by recommender systems. Related studies have indicated that YouTube recommendation systems play a role as a catalyst in promoting and establishing specific political ideologies, especially on right-wing populist and neutral

political content (e.g., Röchert, Weitzel and Ross 2020). O’Callaghan et al. (2015, p.473) mentioned that the YouTube recommendation system can result in users being excluded from videos that are different from their existing perspective, potentially leading to immersion within an extremist ideological bubble. Therefore, it is necessary to examine the strength and relation of the link between political neutrality and extreme video, and whether the videos in recommendation networks ultimately lead to homogeneous or heterogeneous ideologies.

Since the user’s consumption behaviour of political news on YouTube is different from traditional news, balancing the presentation of different political viewpoints is not the goal of algorithm developers on YouTube. It is brought up in a dispute over the ethical issue of the over-reinforced personalised recommendation that the YouTube algorithm has a responsibility as a gatekeeper. It means that user behaviour should not be the only criterion for creating recommending videos but should be considered whether these recommended videos contribute to specific viewpoints at the same time, especially in politic-based videos. Jonas Kaiser, an affiliate at the Berkman Klein Centre for Internet & Society, said “YouTube should spend more energy in understanding which actors their algorithms favour and amplify than how to keep users on the platform,” (Hao 2019).

The relevant studies have demonstrated five important factors in video visibility on YouTube, including user clicks, the time a user spends watching videos, same political ideology, same channel, and the biggest channel (more subscribers).

1. User clicks

User clicks is a direct factor for YouTube recommendation system, which ensures that YouTube products can be immediately adjusted through user behaviour (Hao 2019; Markmann and Grimme 2021). Markmann and Grimme (2021, p.52) also mentioned that the dynamic and opaque nature of recommender systems makes it more difficult to conduct

further analysis and interpret the observation. The dynamic means that the recommendation is constantly changing through every single click, which means that it is difficult to interpret whether the meaning of the clicks on a recommended video is based on their favour or jumping out of the current video.

2. The time a user spends watching videos

The length of watching time can be regarded as a criterion for optimising recommended video content through observing the time users spend on video. Markmann and Grimme (2021, p.60) mentioned that the recommendation system will notice when a user leaves a video, regards this behaviour as negative feedback, and try to change the content or the channel that matches the user's interests originally. Besides, Stöcker (2020, p.144) indicated a potential risk in the process of updating recommended videos that the watch time as an optimised criterion can lead to the disproportionate presentation of radical or conspiracy-theory content because these videos usually have a higher click through rate (CTR). In addition to leaving users on YouTube by recommending the videos that match their behaviour, the other aim of the YouTube recommendation system is to discover videos that users might be interested in. As Zhou, et al. (2016, p.6055) mentioned, one of the purposes of the recommendation system is to encourage users to view new videos and discover new content. Röchert, Weitzel and Ross (2020) also said 'YouTube's recommendation system is designed to keep users watching more videos (p.245)'.

3. Same political ideology

Since political videos form a part of the research content, it is essential to understand how recommendation systems influence the distribution and consumption of these videos. Studies generally suggest that political videos lead viewers toward content with increasingly extreme ideologies. Röchert, Weitzel, and Ross (2020, p. 246) point out that users initially accessing extreme right-wing or populist videos are likely to be recommended further videos

that reinforce these ideologies. This cyclical reinforcement can deepen partisan divides and amplify extremist viewpoints. Additionally, Schmitt et al. (2018, p.781) discuss how the YouTube recommendation system promotes videos containing extremist content and counter-messages, indicating that such content benefits disproportionately from algorithmic promotion. They also note that social media platforms can facilitate the rapid spread of hate, making it a significant concern for digital community standards and content regulation (Röchert, Weitzel, and Ross 2020, p. 247).

4. Same channel

Recent research underscores the impact of recommendation systems in promoting content from the same channel a user is currently watching. This phenomenon, often resulting from algorithmic biases towards user retention and session duration, tends to narrow the diversity of content presented to the user. According to Ribeiro et al. (2019), about 50 percent of videos recommended by YouTube's algorithms are from the same channel that the user is already engaged with (p. 139). This creates a feedback loop where viewers are more likely to consume a homogeneous set of ideas and perspectives, potentially limiting their exposure to a broader range of content. Such practices can strengthen viewer loyalty to specific channels but also risk creating informational silos and echo chambers.

5. The biggest channel

Channel scale and genre are the criteria of the recommendation system, especially in the news channels. News channels usually have a large number of subscribers, which can be regarded as the biggest channel. In addition to the specific scale of the channel, the news channel plays an important position in this study, because the programmes which do not have independent channels usually exist as a playlist in news channels. According to Markmann and Grimme (2021), the platform seems to favour the largest channels and the recommendation system usually directs users to those channels which have a large number

of subscribers (p.60). Markmann and Grimme (2021) further conducted the recommendation network experiment and found that channels in which the videos were recommended by the system in-depth 10 have an average subscriber base of 32 million (p.61). This factor means that the programmes from the biggest channel have a higher proportion to appear in the recommended list, compared to the programmes that have independent channels.

According to the previous studies, YouTube's recommendation system focuses on fixing problems by rolling-type correction, and the ultimate target focuses on the balance between increasing users' engagement and the opinion polarisation on the platform. To reach these aims, the above pieces of literature have suggested some important factors in video visibility on YouTube, including user clicks, the time a user spends watching videos, the time a user spends watching recommended videos, same political ideology, same channel, and the biggest channel (more subscribers).

E. New Environmental Communication

Previous discussions have highlighted the significance of media as a medium within the deliberative sphere, both offline and online. These discussions emphasise how the media shapes concrete political actions (p.32). As environmental issues are a long-lasting issue in the public sphere, which has a sense of continuity, and match the agenda-setting criteria of the media. Besides, environmental issues have more frequently appeared in the deliberative sphere in recent years, with lots of the emerging energy policies being packaged as issues in the referendum. The results of the 2018 Taiwanese referendum have represented that the deliberative sphere has a concrete power in environmental policy making. At the same time, the media plays a crucial role as a medium in the deliberation of both offline and online media, to produce the intimacy flows between public and counterpublics, as the discussion in the literature review (II- A and II- B). This section directly pays attention to how

environmental communication works online and is divided into two parts: illustrates how environmental communication works on political talk shows on YouTube which is called new environmental communication; visual environmental communication.

1. The new environmental communication on political talk shows

The way that media deals with news has followed a specific pattern named 'issue-attention cycle', which reflects how news worked with traditional 'one-way' media. Downs (1972, p.39) indicated the 'issue-attention cycle' was the concept explaining how the media interact with the public, including the following sequence: the pre-problem stage; alarmed discovery and euphoric enthusiasm; realising the cost of significant progress; gradual decline of intense public interest; and the post-problem stage. Some of the literature has shown how this pattern influences the public attention and topicality (e.g., Nisbet and Huges 2006; Wien and Elmelund-Præstekær 2009; Vliegenthart and Walgrave 2008; Walgrave et al. 2008). Through the shift from one-way media to two-way media, this change produces an emerging question of how the cycle has been affected by YouTube and other new media. Although there was a lack of related studies, Wang and Guo (2020) still pointed out two framing differences throughout the issue-attention cycle between online coverage and Twitter. Firstly, Twitter applied the high attention but fewer varieties of benefit frames in Twitter discussions, which means the coverage probably was not as comprehensive as online coverage (p.11). Next, the coverage in Twitter frequently framed the tweets from a benefit perspective, which led to decline dramatically in Twitter coverage as the issue-attention cycle progressed (p.9). The issue-attention cycle not only shows the issue-attention cycle in two-way communication but also demonstrates that public engagement plays an important role in two-way communication.

Before discussing the public engagement in depth, it is necessary to narrow the concept of 'public and publics' to the aspects of science and technology. As Hess (2011, p.627) mentioned, the public is composed of individuals which form opinions about science and technology. It can be seen as a subordinate group of publics, like the government being defined as "official publics" by Bourdieu (1993, p.155). For instance, below is a Taiwanese case that explains how the public affected the political system to stimulate the political consciousness and spark a revolution. From Au (2020, p.8)'s study, he asserted that the literary public sphere produced a new critical generalisation of knowledge and created intelligentsia from the 1970s to the 1990s, which had a positive influence on the development of democracy in Taiwan.

As YouTube is a popular online video sharing site, the viewers' behaviour and public engagement is seen as the most important value on YouTube. Allgaier (2020, p.9) mentioned that "the popularity of YouTube content was determined both by the number of videos per see and by the actions and engagement of the YouTube users". Welbourne and Grant (2016, p.9) found that the professional channels (such as scientific channels) had posted more videos than the personal channels, but the personal channels had more subscriptions and flows than the professional ones. Muñoz Morcillo et al. 's (2016, p.10) study pointed out that professionalism among science communicators is always higher and independent of institutional or personal commitments. However, Geipel (2018, cited in Allgaier 2020, p.17) highlighted that "authenticity" was an important issue among YouTube content creators. For instance, as the entertaining online videos always had a high number of views on the television, online science videos sometimes imitated these formats on YouTube.

Talk shows on YouTube can be seen as a medium which plays an important role as a mediator for policy implementation. As Baum (2005) mentioned, the higher frequency of viewers watching the talk show, the higher the viewer's political effectiveness and

willingness to participate in political activities. The extent of media coverage on these issues was also positively related to the public's enthusiasm for such topics (Ader 1995). Due to political talk shows having both incredibly high exposure and reliable translation pipelines, this makes content tend to the general knowledge level.

The political communication on talk shows is seen as a specific example on TV media which shows several 'hybrid formats' between TV media and digital media, including the channels, talk show presenters and guests, algorithms and publics, such as YouTube. Marres (2017) called this 'hybrid format' as a kind of "hybrid assemblage", which includes different types of entities coming together within YouTube. For instance, the channels which are currently broadcasting via YouTube, the talk shows hosts and guests frame the issue in a particular way, YouTube's algorithm provides to confirm the relevance between the videos and particular topics, and YouTube's comments can be observed who assemble and organise around particular issues.

Besides, Hsieh (2018, p.7) mentioned that Taiwanese political talk shows reflect deliberative democracy in recent years, with explicit and implicit reconstruction of political deliberation beyond the normative formal decision-making process. Indeed, political talk shows provide a powerful platform for political communication, through hosts and guests play multiple roles in explaining, interpreting the topic, persuading and entertaining the public, it has successfully stimulated public engagement in recent years, and has caused an increasing number of cases of politicians forced to step down due to public opinion. Hsieh (2018, p.8) further pointed out a problem that almost all political shows have their own political status, the ideal version of deliberative democracy was never fully materialised in Taiwan. This obvious political wrestling reflected on corporate sponsors, for instance, the DPP government had long funnelled substantial budgetary resources into the pan-green SET

(Sanlih Entertainment TV) and FTV (Formosa TV). Sometimes, political talk shows use inflammatory titles or subtitles to create debatable implication and negative impressions.

2. Visual environmental communication

Several studies have already indicated the importance of the visual in propagating environmental issues and especially mentioned that visual environmental communication has widely spread in the daily visual environments. Hansen and Machin (2013, p.153) identified the role of 'seeing' as a result of cultures in the lives, that photography, television and films are part of the manner in which culture shapes the ways of seeing. Environmental issues are specific topics which have always existed as visual products, especially in the political environment. Ongoing environmental problems have been a global issue around the world, and have usually been packaged as political issues, such as energy policy or electricity problems. These synthetic products have frequently existed in the communicative environment, which solves the defect of timeliness of environmental communication.

Under this circumstance, it brings up the focus of attention on environmental visual communication studies, especially on digital media. Hansen and Machin (2013, p.155) have indicated that the particular difficulties for the visual representation in news are 'the invisibility and slow development of many environmental problems. Packaging environmental issues as political issues provides an emerging channel to improve the visibility in media that political news is posted more frequently than environmental news. For example, environmental news is often posted with limited timeliness, such as the UN Climate Change Conference or the United Nations Framework Convention on Climate Change. In comparison to environmental news, political news is more common in daily life. In addition to the visibility in media, politics package the environmental issues as policy and provide a channel to improve the public understanding of environmental issues. Hansen and Machin (2008, p.779) also indicated the importance of visual analysis that using 'symbolic'

and 'iconic' images to replace the content-based representations instead of the images of geographic/historical or social/cultural anchoring is easier than resonating with environmental issues and breaking the cultural framework, which is able to improve the environmental communication. Scharl et al. (2017, p.770) also indicated that transforming the contents into visual context information can support the decision of making a process between multiple disciplines, including environmental organisations, science agencies, non-government entities, enterprises, news media outlets, and policymakers, and can help to improve the environmental communication.

From the perspective of research material, research objects in visual environmental communication have been divided into static images and dynamic visualisations. Because the environmental issues are usually represented as dynamic production, number of previous studies were focused on dynamic materials, such as movies (e.g. Onyekuru et al. 2021; Leiserowitz 2004) and videos (Ettinger et al. 2021; Allgaier 2019), which much more than the studies of print materials, such as newspapers (e.g. O'Neill 2013) and advertisements (e.g. Garland, Huising and Struben 2013; Seufert 2016). However, it can be found that there is a lack of related studies on TV programmes, which is the main communicative channel receiving environmental issues. The shift between TV and digital platforms has influenced the ways of seeing, which make environmental communication not restricted by dial-out time. The character of the digital platform also realises public engagement in environmental communication. It demonstrates that it is important to analyse the visual environmental communication on the stripe programmes which plays a core role in constructing the visual environmental communication, such as news, talk shows and in-depth reporting.

I also find that plenty of research has focused on the content and context construction of environmental issues rather than visual representations of the environment. The common challenges included:

1. environmental problems are often slow development, which is difficult to do a comprehensive analysis over a wide time period (Hansen and Machin 2013).
2. compared to content, which is sequentially composed of words, visual content is usually composed of multiple visual elements interlaced, without sequential meaning. Bannister et al. (2021, p.2) argued that although interactive visualisations could be used to observe multiple uncertainties at the same time, the execution of interactive visualisations may require a greater level of skill or expertise to use compared to static or animated visualisations.

To solve these potential problems, I propose a possible solution to solve the visual difficulties of environmental communication, that is to code the visual elements as we do in the content analysis. The solution provides a systematic methodology that the environmental vocabulary is to a high degree a visual vocabulary, and most of the communicative spheres of environmental issues are constructed by contents and visual elements (Norris 2004, p.2).

F. Corpus Analysis Applicability

TV programmes as sources of corpus analysis differ from publications such as newspapers and magazines, because its narrative forms include video, text, and spoken language.

Wojcieszak (2009) revealed that television narration mainly focuses on oral media, which provides functions such as naming, describing, interpreting, and evaluating the issues to guide viewers to interpret the images. Most images publicised on talk shows were not direct reproductions of the events but rather provide viewers with simulations. Talk shows represent scientific knowledge according to their political ideology, to enhance both of the

positive and negative impressions of people. In terms of using talk shows as a source of the corpus, corresponding analytical angles include text, pictures, and sounds to construct a discussion field of multimedia information. Therefore, talk shows constitute a highly comprehensive corpus. Besides, through corpus analysis, it can easily observe political wrestling in three forms of public which have been mentioned above (p. 1). YouTube, which has the widest type of Counterpublics, reflects mostly public opinions on official publics.

G. Research Questions

The detailed literature review provides a brief overview of the relevant academic literature, identifying a controversy and a theoretical gap. Building upon this, I further address the more detailed research questions:

1. What factors influence the effectiveness of digital publics in engaging with environmental deliberations, and how can their participation quality be improved on environmental platforms?
2. How do agenda-setting practices impact public engagement with environmental topics via YouTube comments and popularity?
3. How are environmental issues communicated in various program types on YouTube?
4. What role do these programs play in influencing agenda setting and content reproduction within the digital deliberative forum?

The first research question aims to explore the factors that affect the effectiveness of digital publics in deliberating on environmental issues (objects), using socio-technical change theory as a theoretical lens. Previous literature has suggested that digital media provides unique features that can facilitate the creation of an emerging deliberative sphere for the digital publics, including the use of initial tools such as YouTube comments and other metrics to represent the deliberation and ultimately contributing to environmental education and policy implementation.

Moving forward, the second research question delves into the influence of agenda-setting practices on public engagement with environmental topics (subjects). This is assessed through YouTube comments and popularity metrics, such as Comment Term Frequency Comparison (CTFC) and subscriber counts. By examining these practices, the study aims to understand how they contribute to raising public awareness and motivating action towards environmental issues. Through the comment analysis, which represents public engagement, it is available to identify the practices of agenda-setting in the deliberative sphere between arousing public awareness and taking action on an environmental topic.

The third research question takes a platform-based perspective by examining YouTube as a 'hybrid forum (model).' It investigates how environmental issues are communicated through different programs, including political talk shows, non-affiliated talk shows, and in-depth reporting. The study specifically focuses on the role of the 'Up-Next algorithm' in shaping content exposure and user engagement, considering factors like view counts, subscribers, and publication time.

Lastly, the fourth research question explores the extent to which political talk shows, non-affiliated talk shows, and in-depth reporting contribute to the agenda setting and content reproduction of climate change and other environmental issues in a digital deliberative forum. It recognizes the importance of agenda setting and narrative structure in shaping public discourse surrounding environmental topics.

By addressing these research questions, the study aims to shed light on the dynamics of digital publics' engagement with environmental issues, the role of agenda-setting practices, platform algorithms, and the impact of specific program formats on the agenda setting and content reproduction in the digital deliberative sphere. However, there has been a lack of analysis of environmental communication through a multimodal methodology, particularly in visual-based issues. Therefore, this study will use multimodal methodologies to

systematically analyse the practices of agenda-setting in Taiwanese media on environmental communication, including verbal and nonverbal communicative modes, higher-level and lower-level actions, and levels of modal density. This analysis will contribute to identifying specific communicative modes that influence the deliberative sphere and the flow between public and counterpublics. Ultimately, the goal of this research is to enhance the understanding of the effectiveness of digital publics in environmental deliberation and to provide insights into how digital platforms can be improved to promote meaningful public participation.

III. Methodology

The methodology of this research involves an overarching strategy aimed at comprehensively examining emerging participatory forms from both a platform-based perspective (YouTube) and an issue-based viewpoint (environmental issues). To align the methodology with the underlying socio-technical theory, this project employs a mixed-method approach for digital media analysis. This approach integrates multimodal and visual analysis, corpus analysis, and innovative utilisation of digital tools. The objective is to enhance the understanding of the intricate relationship between content, networks, and platform recommendation systems.

The present study leverages YouTube Data Tools (YTDT) to analyse the contextual landscape of YouTube. This analytical endeavour seeks to uncover insights into the Models of participation within socio-technical systems on digital platforms. By harnessing data from YouTube's built-in functionalities, including videos, comments, and recommendation algorithms, the collaborative nature of this hybrid approach facilitates an in-depth analysis of the 'Objects' and 'Subjects' within the socio-technical framework of the digital platform. These terms denote specific deliberative spaces forged by media, influenced by a spectrum of motives encompassing political, scientific, and entertainment dimensions. The evaluation and prognostication of digital public behaviour present formidable challenges, with a substantial body of literature often centred around experimental studies addressing their social implications.

Section B. Multimodal analysis serves as a review of multimodal discourse analysis, providing a robust framework that mirrors the overall approach of the study. The utilisation of multimodal discourse analysis aligns with the research objectives, enabling us to combine various digital tools in novel ways. This approach allows us to delve into the complex

interactions and synergies inherent in digital media platforms, shedding light on the multifaceted nature of participatory dynamics.

By strategically placing Section B after Section A, this study establishes a logical progression that highlights the multimodal digital approach. Given that all data for this project originates from YTDT, the chapter commences by delineating the process of data selection from YouTube, thereby establishing the research context. Subsequently, a comprehensive introduction to the methodology is presented, encompassing multimodal analysis, visual analysis, and corpus analysis. This methodological triad serves as the foundation for an exhaustive exploration of the dynamic interplays inherent in digital media platforms. In doing so, it addresses the overarching research objectives and theoretical underpinnings of the study. This approach, synthesised through the integration of diverse analytical methods, underscores the commitment to unravelling the nuanced relationships within the socio-technical system of digital platforms. Through the lens of multimodal discourse analysis, the socio-technical landscape is explored, offering fresh insights into the Models of participation. This study is contextualised within the broader framework of digital communication and engagement.

A. YouTube Data Tools

1. YouTube video lists

This research obtained 24,715 video lists from Taiwanese political talk shows' YouTube channels and playlists, using Video List Modules of the YTDT. The first available data was published from 22 JUL 2014, as it was the time when environmental issues were rarely discussed in political talk shows. Thus, this study decided to use the available data after JAN 2017 until JAN 2021, as it was the time when environmental issues were frequently talked about in political talk shows and accompanied with more political debate. There were several remarkable global environmental issues that happened in 2017 that shaped

environmental debates in Taiwan. For instance, the concentration of global carbon dioxide reached 410 parts-per-million (ppm) ahead of schedule on April 18, 2017, which led to accelerated melting of the polar regions due to intensified warming. At the same time, the new Premier in Taiwan (Ching-te, Lai) was anxious to propose a solution to fears of a "power shortage" through an energy transition in Taiwan, however many of the proposed solutions relied on non-renewables that conflicted with civil organisations' appeals to be more "anti-air pollution". Instances and debates such as these were widely discussed on television shows that have since been circulated using formal YouTube channels. This process has shaped how I chose the YouTube channels or YouTube playlists as the available research data. In Figure 3.1 I outline the content I ended up including in this analysis. For data accuracy, I used information about the programmes from the Multimedia on Demand of Chunghwa Telecom (CHT 2020), selecting channels with the highest users in Taiwan, except for programmes which have been closed after January 2017.

I set out the following criteria and processes for how I selected materials for analysis. Firstly, I excluded the YouTube channels and playlists which have less than five videos discussing environmental issues. Next, I only included programmes that continued broadcasting after JAN 2017, and these programmes must have a complete YouTube channel or YouTube playlist. The filtering result showed that the amount of available YouTube channels and playlists reduced from 30 to 15.

In the fifth column of Figure 3.1, all of the political talk shows are divided into two genres, talk shows and in-depth reporting. The first type of programme broadcasting is 'talk show' which is composed of one or two hosts and a group of guests who have special experience with specific issues. Generally, the host in each episode has at least one member of the Legislative Yuan (LY), county and city councilmen or commentators (called "minzui" or famous mouth in Taiwan). This member arrangement for the political talk shows has two

meanings, the host usually plays a role in illustrating the public about the details and political debate of a topic, the guests play a role in engaging in discussion among themselves and attracting public attention, which have the similar observation to Lee (2011, cited in Hsieh 2018, p.7). The second type of programme broadcasting is ‘in-depth reporting’ which is composed by one host, the host is a news anchor or a minzui which often has obvious political status. Each episode has about 4 to 5 topics, the host not only to inform the issue but also to explain, interpret, persuade and entertain the issue, rather than simply broadcast news. Based on the broadcasting form, the ‘in-depth reporting’ is also a kind of political programme, which uses a mix of information and entertainment to attract public attention to some aspects of political issues.

programme	code	have available quantity of videos discuss environmental issues(≥5, Y/N)	continue broadcasting after JAN 2017(Y/N)	have a complete YouTube channel or YouTube playlist (Y/N)	the type of programme broadcasting
CTS News Magazine	A	Y	Y	Y	in-depth reporting
Channel 57 Breaking News (57 爆新聞)	B	Y	Y	Y	talk show
Sisy's World News	C	Y	Y	Y	in-depth reporting
News Take A Deep Breath (Sin Wun Shen Hu Si 新聞深呼吸)	D	Y	Y	Y	talk show
The Disappearing Borders	E	Y	Y	Y	in-depth reporting
Li Siduan's cloud world (Li Sihduan De Yunduan Shihjieh 李四端的雲端世界)	F	Y	Y	Y	in-depth reporting
For A New Taiwan	G	Y	Y	Y	talk show
Belle Show	H	Y	Y	Y	talk show
Situation Room	I	Y	Y	Y	talk show
Crucial Moment	J	Y	Y	Y	talk show
Hit the Headlines	K	Y	Y	Y	talk show
Facenews	L	Y	Y	Y	talk show
Fan Qi Fei's Global Tour/Adventure (Fan Ci Fei De Huan Yu Man You 范琪斐的寰宇漫遊)	M	Y	Y	Y	talk show
FTVNews Different Words Hall (Min Shih Yi Yan Tang 民視異言堂)	N	Y	Y	Y	in-depth reporting
New Taiwan Refueling	O	Y	Y	Y	talk show
Zheng JhihdaoLiao (『鄭』。知道了)		N	Y	Y	talk show
54 Viewpoint		N	Y	N	in-depth reporting
True Voice of Taiwan (政經關不了)		N	Y	Y	talk show
Deep Throat News (新聞深喉嚨)		N	Y	Y	talk show
Late-Night Punch (夜間打權)		N	Y	Y	talk show
Our Island		Y	Y	N	in-depth reporting
Shu Min Da Tou Jia(庶民大頭家)					talk show
In Depth Report		N	Y	Y	in-depth reporting
Yi Ci Kan Shih Jie(益起看世界)		N	Y	Y	in-depth reporting
You Ping You Jyu Kan Tai Wan(有評有據看台灣)		N	Y	Y	talk show
Sin Wun Shuo Liang Hua(新聞說亮話)		N	Y	Y	in-depth reporting
News Capture		N	Y	Y	talk show
Hua Shih Yu Di Ciou Duei Hua(華視與地球對話)		Y	Y	N	in-depth reporting
Da Kai Shih Jie Jihh Men(打開世界之門)		Y	Y	N	in-depth reporting
Taiwan Front Line		N	Y	Y	talk show

Figure 3. 1. The brief information of each political talk shows. 2020. (Print Screen)

After excluding the irrelevant YouTube channels and playlists, I generated a table which gave each available 15 YouTube playlists or YouTube channels code A to O (see Figure 3.2). It is important to explain the difference of the form shown on YouTube, which was shown in the third column. Each YouTube video is classified into one or both forms of collections, YouTube channels and YouTube playlists (see Figure 3.3 and 3.4). In Figure 3.3, I use YouTube channel Fan Qi Fei's Global Tour/Adventure ('Fan Ci Fei De Huan Yu Man You' 范琪斐的寰宇漫遊, code M) as an example, it has its own channel profile, subscribers, the latest video and several playlists which were composed of videos from the same programme but different themes. As Figure 3.4 shows YouTube channel The Disappearing Borders (code E) as an example of YouTube playlist (the red square), it is only one playlist of YouTube channel, and it does not have its own subscribers but has the views count (see Figure 3.5) which is a metric that may influence video prominence.

programme	code	the form shown on YouTube	the type of programme broadcasting	subscribers	video amounts	exclude irrelevant and nonexistant videos	the number of video views(exclude irrelevant and nonexistant videos)	the average number of views per video(exclude irrelevant and nonexistant videos)
CTS News Magazine	A	playlist	in-depth reporting	none	458	17	363827	21402
Channel 57 Breaking News (57 Bao Sin Wun 57 爆新聞)	B	channel	no affiliation talk show	537K	3295	28	2155025	76965
Sisy's World News	C	channel	in-depth reporting	480K	3435	186	3656188	19657
News Take A Deep Breath (Sin Wun Shen Hu Si 新聞深呼吸)	D	playlist	in-depth reporting	none	298	28	43401	1400
The Disappearing Borders	E	playlist	in-depth reporting	none	498	8	345181	43418
Li Siduan's cloud world (Li Sihduan De Yunduan 李四端的雲端世界)	F	channel	in-depth reporting	351K	1310	10	952287	105810
For A New Taiwan	G	channel	political talk show	79K	1059	6	94187	15698
Belle Show	H	channel	political talk show	364K	1200	8	393101	49138
Situation Room	I	channel	political talk show	1.06M	2822	75	12931352	170149
Crucial Moment	J	channel	no affiliation talk show	2.31M	1272	25	6553449	273060
Hit the Headlines	K	channel	political talk show	723K	5388	39	4715785	112281
Facenews	L	channel	no affiliation talk show	209K	659	5	237234	47447
Fan Qi Fei's Global Tour/Adv	M	channel	no affiliation talk show	76.9K	148	10	162573	16257
FTVNews Different Words Hall (Min Shih Yi Yan Tang 民視異言堂)	N	playlist	in-depth reporting	none	560	23	82816	3601
New Taiwan Refueling	O	channel	political talk show	192K	2317	13	209763	16136

Figure 3. 2. The code of each available YouTube playlist and YouTube channel. 2020. (Print Screen)

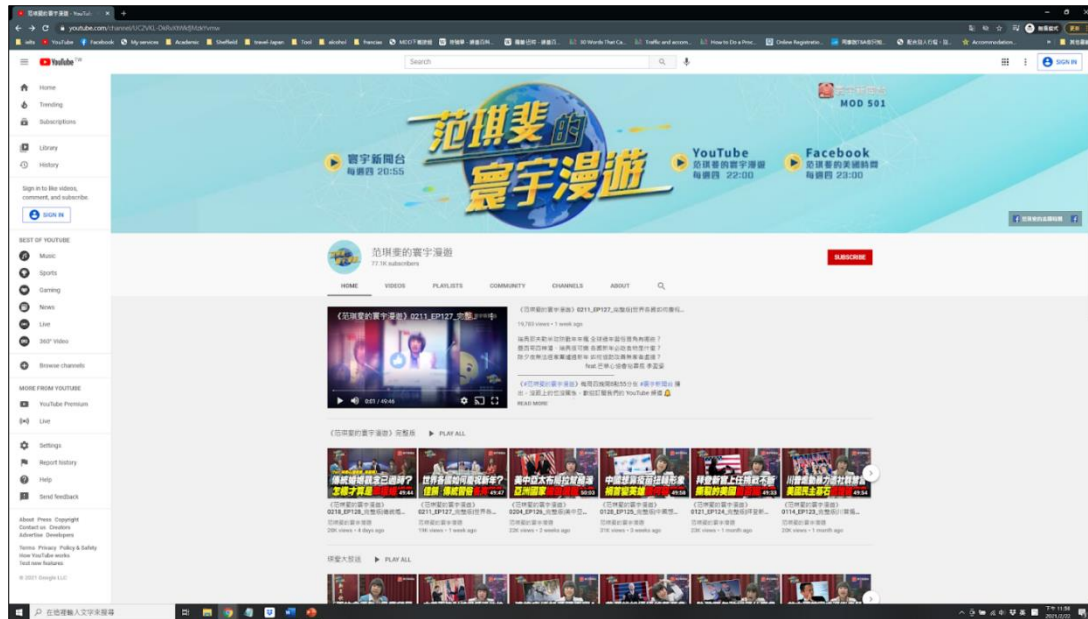


Figure 3. 3. The appearance of the YouTube channel. 2020. (Print Screen)

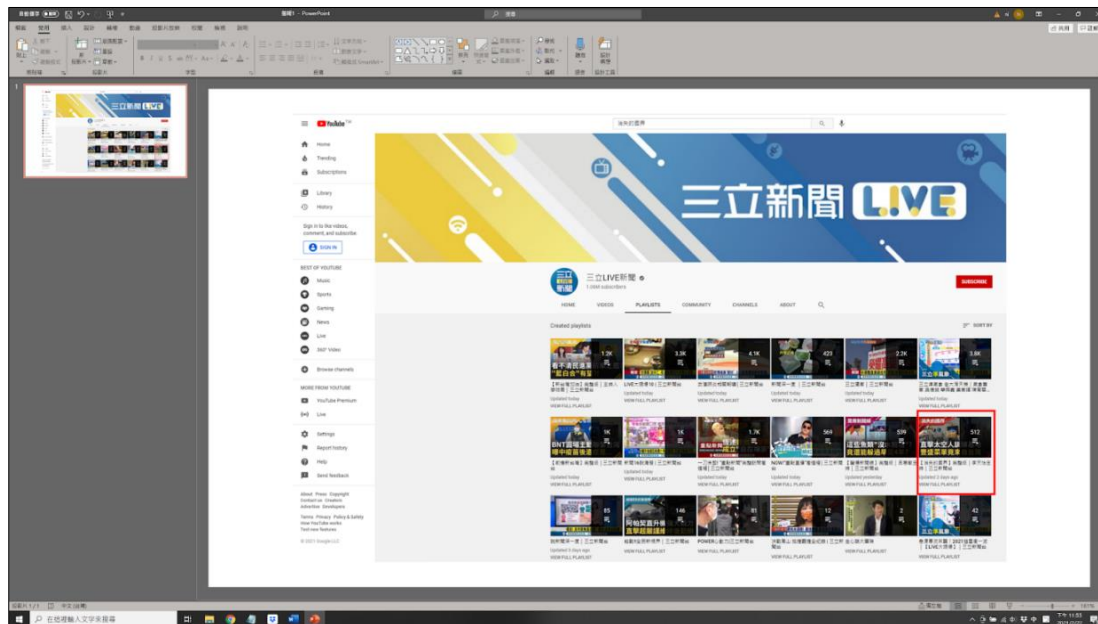


Figure 3. 4. The appearance of the YouTube playlist in the YouTube channel. 2020. (Print Screen)

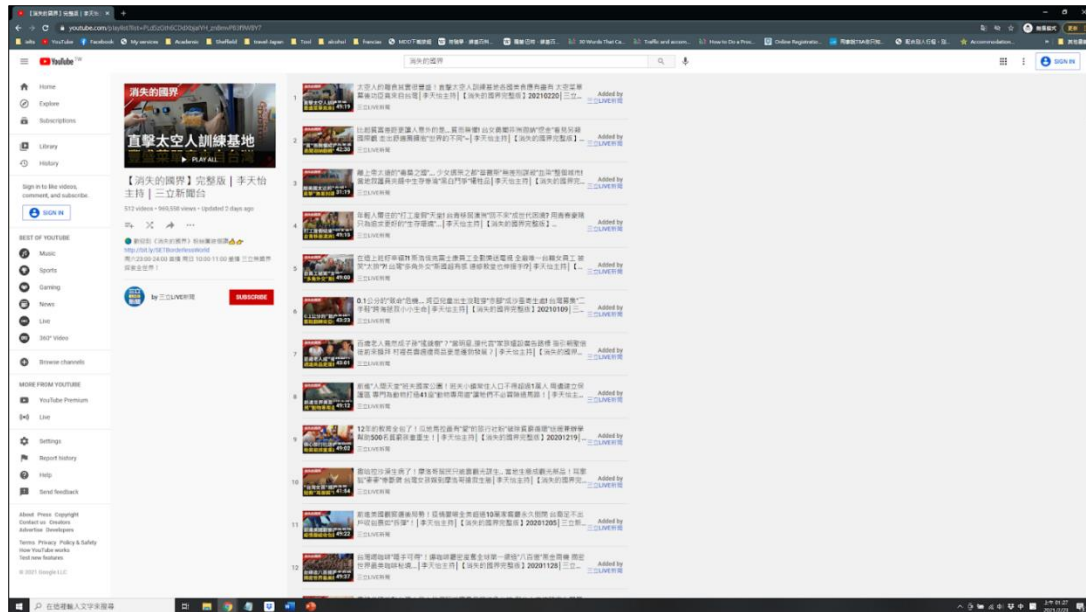


Figure 3. 5. The appearance of YouTube playlist. 2020. (Print Screen)

Below are the detailed steps to illustrate how I process the raw video lists generated by YTD. First, I typed in the channels' ids or playlist ids through the Video List Modules, As the first paragraph mentioned, TV talk shows are the main object of this research, but the presentation of these talk shows on YouTube varies, with some having their own YouTube channels, while others only appearing as YouTube playlists within YouTube channels. Using this approach generated the following video list below (see Figure 3.6), which has detailed information of each YouTube channel and playlist, such as video title, id, title, description, image, view count and comment count.

channelid	channelTitle_zh	videoid	publishedAt	publishedAtSQL	videoTitle_zh
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	9Xnd1WVP-hk	2020-12-02T10:39:24Z	12/2/20 10:39	自助洗衣店 成隱形地雷 百年士林夜市 肉搏與省思 吃力的力量 用美食改造家
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	fPleVGuUMfC	2020-12-01T06:59:38Z	12/1/20 6:59	【LIVE直播】公廣集團申請52台 說明記者會現場
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	sHcFz9FF_Y	2020-11-28T05:00:15Z	11/28/20 5:00	突破自我 金牌體技啦啦隊 單元1 20年的挑戰與堅持 華視新聞雜誌 EP224
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	pTEE3_TQo5s	2020-11-28T05:00:14Z	11/28/20 5:00	獲獎回歸 振興觀光然後呢 單元3 消費者權益報導 華視新聞雜誌 EP223
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	rPH3DKmkNks	2020-11-28T05:00:08Z	11/28/20 5:00	獲獎回歸 疫戰穿梭十七年 單元4 醫療報導獎優勝 華視新聞雜誌 EP2250
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	e5DrEj8Utl	2020-11-28T05:00:05Z	11/28/20 5:00	美體寶島 竟成他們的牢 6354天的等待 華視新聞雜誌完整版 EP2250 20
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	9PQP8ak7RuQ	2020-11-28T05:00:05Z	11/28/20 5:00	美體寶島 竟成他們的牢 單元2 6354天的等待 華視新聞雜誌 EP2250 20
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	VRM6lrgOGwl	2020-11-27T11:35:51Z	11/27/20 11:35	消費者權益報導頒獎禮 華視榮獲3獎 華視新聞 20201127
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	sRc6vNEoaa0	2020-11-24T04:24:37Z	11/24/20 4:24	重建笑顏 醫護送小傑的禮物 小兔子的奇幻旅程 華視新聞雜誌完整版 EP
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	1XzBU71m470	2020-11-14T05:00:00Z	11/14/20 5:00	醫體寶島 跨越百里求醫路 小兔子的奇幻旅程 華視新聞雜誌完整版 EP
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	V-OoYCHT5Y	2020-11-07T12:08:52Z	11/7/20 12:08	台灣醫療報導獎 華視新聞雜誌獲優獎 華視新聞 20201107
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	l4UsTQI2Py	2020-11-07T05:00:06Z	11/7/20 5:00	三昧堂 延續台灣特有文化 燃燒布袋戲魂 華視新聞雜誌完整版 EP2247
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	-GIWj3-MilK	2020-11-02T06:32:29Z	11/2/20 6:32	百家爭鳴 耳朵經濟崛起 他們都在聽什麼? 華視新聞雜誌完整版 EP2246
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	zmP_gP1-dId	2020-10-31T05:00:05Z	10/31/20 5:00	獲獎單元 別說我奇怪 單元4 公益新聞金輪獎特優 華視新聞雜誌 EP224
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	bEGqGL6lRbg	2020-10-24T05:00:03Z	10/24/20 5:00	異鄉 搶救生存危機 疫情下的貧童 華視新聞雜誌完整版 EP2245 2020.11
UCDCjYlPbfgeVE9IZIEam-Kg	中華電視公司	ME-m-ATY04	2020-10-17T05:00:03Z	10/17/20 5:00	零廢棄夫妻 生活新革命 我家沒垃圾 華視新聞雜誌完整版 EP2244 2020

Figure 3. 6. Video lists from the Taiwanese political talk shows channels on YouTube. 2020. (Print Screen)

Next step I gathered all the 15 YouTube channels and playlists' video lists into a google sheet, and I dealt with these data via the following four steps before keyword filtering, as the sheet shows below (see Figure 3.7).

1. I added a new column D [channelTitle_en] beside the column C [channelTitle_zh], for translating the channel title from Taiwanese Mandarin to English. (See red column)
2. Then I added the column [video URL] with the formula =CONCATENATE (), which transformed the videoId into the video URL. (See orange column)
3. In the processing of translation, I added two columns with the formula =GOOGLETRANSLATE (text, [source_language], [target_language]) beside the column I [videoTitle_zh] and column K [videoDescription_zh], which were named [videoTitle_en] and [videoDescription_en]. (See green column)
4. To provide the thumbnail preview as the image in the sheet, I added a column U [image] beside the column [thumbnail_maxres] with the formula =IMAGE (). (See blue column)

channelTitle_zh	channelTitle_en	videoid	videoUrl	publishedAt	videoTitle_zh	videoTitle_en	videoDescription_zh	videoDescription_en	thumbnail_maxres	Image
文茜的世界周報	Sisy's World	Ni BcmEf2Aae	https://www.youtube.com/watch?v=BcmEf2Aae	2017-04-03T03	《文茜世界周報》	Wen Qian Unive	《中天的夢想驛站》	"Transit dream inn" Mo	https://i.ytimg.com/vi/BcmEf2Aae/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni HXq4511Uz	https://www.youtube.com/watch?v=HXq4511Uz	2017-12-10T06	【文茜 Wen Qian Unive】	《中天的夢想驛站》	"Transit dream inn" Mo	"Transit dream inn" Mo	https://i.ytimg.com/vi/HXq4511Uz/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni 3pkgkZATh	https://www.youtube.com/watch?v=3pkgkZATh	2017-12-17T05	【文茜 Wen Qian Unive】	《中天的夢想驛站》	"Transit dream inn" Mo	"Transit dream inn" Mo	https://i.ytimg.com/vi/3pkgkZATh/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni zB8cCC0mi	https://www.youtube.com/watch?v=zB8cCC0mi	2017-12-31T07	【中天 2017.12.30 [tran	《中天的夢想驛站》	"Transit dream inn" Mo	"Transit dream inn" Mo	https://i.ytimg.com/vi/zB8cCC0mi/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni 02t5niN7ni	https://www.youtube.com/watch?v=02t5niN7ni	2018-01-07T08	【文茜 Wen Qian Unive】	《中天的夢想驛站》	"Transit dream inn" Mo	"Transit dream inn" Mo	https://i.ytimg.com/vi/02t5niN7ni/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni DoDQMmC	https://www.youtube.com/watch?v=DoDQMmC	2018-01-28T06	2018.01.27	【文茜 Wen Qian Unive】	更多【文茜世界周報 [More] Wen Qian Unive	更多【文茜世界周報 [More] Wen Qian Unive	https://i.ytimg.com/vi/DoDQMmC/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni 1EsCRD1Qs	https://www.youtube.com/watch?v=1EsCRD1Qs	2018-01-28T06	2018.01.27	【文茜 Wen Qian Unive】	更多【文茜世界周報 [More] Wen Qian Unive	更多【文茜世界周報 [More] Wen Qian Unive	https://i.ytimg.com/vi/1EsCRD1Qs/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni 5VaeX_xcm	https://www.youtube.com/watch?v=5VaeX_xcm	2018-01-28T06	2018.01.27	【文茜 Wen Qian Unive】	更多【文茜世界周報 [More] Wen Qian Unive	更多【文茜世界周報 [More] Wen Qian Unive	https://i.ytimg.com/vi/5VaeX_xcm/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni zKRtcVVEsv	https://www.youtube.com/watch?v=zKRtcVVEsv	2018-02-04T10	2018.02.03	【文茜 Wen Qian Unive】	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/zKRtcVVEsv/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni 9wRvYTD3k	https://www.youtube.com/watch?v=9wRvYTD3k	2018-02-04T10	2018.02.03	【文茜 Wen Qian Unive】	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/9wRvYTD3k/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni zyGR4wTr	https://www.youtube.com/watch?v=zyGR4wTr	2018-02-05T04	2018.02.04	【文茜 [2018.02.04] We	觀看《文茜世界財經 Watch "Wen Qian of the	觀看《文茜世界財經 Watch "Wen Qian of the	https://i.ytimg.com/vi/zyGR4wTr/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni HcpEuix7Xk	https://www.youtube.com/watch?v=HcpEuix7Xk	2018-02-11T08	2018.02.10	【文茜 Wen Qian Unive】	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/HcpEuix7Xk/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni ur2noVB5t	https://www.youtube.com/watch?v=ur2noVB5t	2018-02-11T08	2018.02.10	【文茜 2018.02.10 [201	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/ur2noVB5t/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni HxNjuYjCbz	https://www.youtube.com/watch?v=HxNjuYjCbz	2018-02-12T07	2018.02.11	【文茜 [2018.02.11] We	觀看《文茜世界財經 Watch "Wen Qian of the	觀看《文茜世界財經 Watch "Wen Qian of the	https://i.ytimg.com/vi/HxNjuYjCbz/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni NGIEMnRC	https://www.youtube.com/watch?v=NGIEMnRC	2018-02-18T07	2018.02.17	【文茜 Wen Qian Unive】	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/NGIEMnRC/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni B-pyOT176z	https://www.youtube.com/watch?v=B-pyOT176z	2018-03-05T03	2018.03.04	【文茜 [2018.03.04] We	觀看《文茜世界財經 Watch "Wen Qian of the	觀看《文茜世界財經 Watch "Wen Qian of the	https://i.ytimg.com/vi/B-pyOT176z/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni EUGRkRfz	https://www.youtube.com/watch?v=EUGRkRfz	2018-03-18T10	2018.03.17	【文茜 2018.03.17] [We	觀看《文茜世界周報 Watch "Wen Qian Unive	觀看《文茜世界周報 Watch "Wen Qian Unive	https://i.ytimg.com/vi/EUGRkRfz/maxresdefault.jpg	
文茜的世界周報	Sisy's World	Ni vsbJRp-hm	https://www.youtube.com/watch?v=vsbJRp-hm	2018-03-26T04	2018.03.25	【文茜 Wen Qian of the	觀看《文茜世界財經 Watch "Wen Qian of the	觀看《文茜世界財經 Watch "Wen Qian of the	https://i.ytimg.com/vi/vsbJRp-hm/maxresdefault.jpg	

Figure 3. 7. The Video list after improving the appearance of the dataset. 2020. (Print Screen)

While conducting research on digital platforms, it is essential to recognize and address common problems associated with digital bias. According to Marres (2017, p.101), these challenges include biased data and content, biases built into research instruments, and methodological bias. To specifically counteract methodological bias, a strategy known as 'critical extraction' (Driscoll and Walker, 2014) is employed. This approach ensures that the

empirical analysis remains independent of platform algorithms. It involves selecting equally sized clusters for comparative analysis across different political ideologies or various program genres discussing specific environmental issues. This strategy is crucial in maintaining the validity and reliability of the research findings by mitigating the influence of underlying biases that could skew the analysis.

Thirdly, I manually filtered out 481 videos from the available video lists by keywords divided into three parts: firstly, general environmental issues such as 'Kong Wu 空汙 [air pollution]', 'Cyuan Ciou Nuan Hua 全球暖化 [global warming]', 'Ci Hou Bian Cuan 氣候變遷 [climate change]', and 'He Fei Liao 核廢料 [nuclear waste]'; then climate actions including 'He Neng 核能 [nuclear energy]', 'Lyu Neng 綠能 [green energy]', 'Jie Neng 節能 [energy saving]', 'Tan Pai Fang 碳排放 [carbon emission]', 'Jian Tan 減碳 [carbon reduction]', 'Fong Li 風力 [wind power]', and 'Tan Jiao Yi 碳交易 [carbon trading]'; and finally, terms of environmental policy in Taiwan like '2025 Fei He Jia Yuan 2025 非核家園 [nuclear free by 2025]' and 'Yi He Yang Lyu 以核養綠 [using nuclear to nourish renewables]'. According to Rieder, Matamoros-Fernández, and Coromina (2018, p. 54), the search queries were designed to focus on controversial environmental issues that are easily related to political debates and the collective understanding of these issues.

Finally, to compare all the talk shows using a consistent metric, I added two columns at the end of this table which included the sum of views count of each YouTube playlist and YouTube channel and the average number of views per video. It is important to note the reason for creating the 'views per video' metric; only YouTube channels have subscribers, not YouTube playlists. Therefore, it is not possible to compare popularity across all the talk shows through subscriber numbers alone. I then sorted the video lists by published dates, from oldest to newest, and coded them in order 001, 002, 003, and so on (see Figure 3.8).

code	channelId	channelTitle_zh	channelTitle_en	videoid	videoURL	publishedAt	videoTitle_zh	videoTitle_en
A001	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	1R5K08fxw	https://www.youtube.com/watch?v=1R5K08fxw	2017-08-20T02:11:00Z	【風力發電從】	Wind power ge
A002	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	mnz00M9V	https://www.youtube.com/watch?v=mnz00M9V	2017-08-20T02:20:00Z	【供電危機深】	Power Supply C
A003	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	i9Uio0x5zE	https://www.youtube.com/watch?v=i9Uio0x5zE	2018-03-12T02:30:00Z	【無痕飲食 20】	No Trace Eating
A004	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	EwjwMS23f	https://www.youtube.com/watch?v=EwjwMS23f	2018-03-12T02:30:00Z	【裸賣商店友】	Naked Stores, f
A005	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	qBr2YoLU0f	https://www.youtube.com/watch?v=qBr2YoLU0f	2018-03-12T02:30:00Z	【綠色商機老】	Green Business
A006	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	snG9jz3uVn	https://www.youtube.com/watch?v=snG9jz3uVn	2018-08-20T02:00:00Z	【可燃冰 台灣】	Combustible ic
A007	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	iRRafay-R-0	https://www.youtube.com/watch?v=iRRafay-R-0	2018-08-20T02:11:00Z	【擴大展望 環】	Expansion of pl
A008	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	PqOHR6dt	https://www.youtube.com/watch?v=PqOHR6dt	2019-02-12T08:00:00Z	【看見空汙難】	Where to see t
A009	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	J9zcrN1dSg	https://www.youtube.com/watch?v=J9zcrN1dSg	2019-04-01T03:20:00Z	華視新聞雜誌	Huashi News M
A010	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	93oHLV05W	https://www.youtube.com/watch?v=93oHLV05W	2019-04-29T10:30:00Z	華視新聞雜誌	CTS News Maga
A011	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	EWsSjuPXm	https://www.youtube.com/watch?v=EWsSjuPXm	2019-06-25T06:20:00Z	【沒有未來 何】	There is no fut.
A012	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	ra_y84IYpp	https://www.youtube.com/watch?v=ra_y84IYpp	2019-07-30T02:30:00Z	華視新聞雜誌	Huashi News M
A013	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	4pIVCc-geb	https://www.youtube.com/watch?v=4pIVCc-geb	2019-08-13T05:10:00Z	全球華人永續	Global Chinese
A014	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	Nr3b5CKSM	https://www.youtube.com/watch?v=Nr3b5CKSM	2019-10-28T06:10:00Z	華視新聞雜誌	CTS News Maga
A015	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	Li_ts-oSDBU	https://www.youtube.com/watch?v=Li_ts-oSDBU	2020-07-24T13:00:00Z	都市造山 森林	Urban orogenic
A016	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	jTu20UDMr	https://www.youtube.com/watch?v=jTu20UDMr	2020-08-07T13:00:00Z	投入社福第一	Putting into the
A017	UCDCJyLpbfgVE9iZiEam-Kg	中華電視公司	Chinese Television	cBu4eNT_pl	https://www.youtube.com/watch?v=cBu4eNT_pl	2020-09-04T13:00:00Z	田間到餐桌 野	From the Field t

Figure 3. 8. The code of each video of each YouTube playlist or YouTube channel. 2020. (Print Screen)

2. The performance of the keywords on YouTube

To understand the influence of the media on environmental communication on YouTube, I used videos retrieved from a specific search query from YTDI and investigated how the queries of the environmental issues worked on YouTube. In this question, this study used the videos retrieved from a specific search query, which gave more data to analyse the general performance of each keyword on YouTube. Below, how the available data for analyse was generated (see Figure 3.9) is set out:

1. Click on ‘Search Query’, then enter a number of criteria:
 - a. The query was entered in the text box, for example (“Yi He Yang Lyu 以核養綠 [using nuclear to nourish renewables]”)
 - b. A language code ([“zh”]) and a regional code ([“TW”]) were entered, which enabled more focus on Taiwanese videos.
 - c. The number of iterations ([“1”]) were entered, which is enough to observe the top 50 videos.
 - d. As the time period of the study begins after JAN 2017, so click on ‘limit search to videos published in a specific timeframe (format: yyyy-mm-ddThh:mm:ssZ - timezone: UTC)’, and then entered [“2017-01-01T00:00:00Z”] in the text box.

- e. The 'relevance- Resources should be sorted based on their relevance to the search query' was clicked, which enabled us to observe the general performance of specific queries on YouTube. And the top 50 available videos were ranked by 'relevance- Resources should be sorted based on their relevance to the search query'.

Video List Module

This module creates a list of video infos and statistics from one of four sources: the videos uploaded to a specified channel, a playlist, the videos retrieved by a particular search query, or the videos specified by a list of ids.

The script then creates a tabular file where each row is a video. A number of infos and variables are added for each video.

Check the documentation for the [Video/list](#) (used to get the info for each video) and the [search/list](#) (used for the search function) API endpoint for additional information.

Parameters

Choose a way of making a list:

Channel id: (channel ids can be found in URLs, e.g. <https://www.youtube.com/channel/UCIDJjKMICpb9B1q7qjEOA>)

Playlist id: (playlist ids can be found in URLs, e.g. <https://www.youtube.com/playlist?list=PLJtitKU0CAehMmiSI9oCiv3WCJrzqMWZ0>)

Search query: (this is passed to the search endpoint)
 optional [ISO 639-1](#) relevance language:
 optional [ISO 3166-1 alpha-2](#) region code: (default = US)

Iterations: (max. 10, one iteration gets 50 items)

Published: limit search to videos published in a specific timeframe (format: yyyy-mm-ddThh:mm:ssZ - timezone: UTC):
 after:
 before:
 make a search for each day of the timeframe (can yield many more videos, use wisely)

Rank by:

Figure 3. 9. The schematic diagram of the Video List module of YTD. 2020. (Print Screen)

I did the below instructions on each keyword, put a number of video lists into an excel document, and improved the appearance of the dataset of these video lists (see Figure 3.10), which as I did in figure 3.8.

position	channelId	channelTitle_zh	channelTitle_en	videoid	videoURL	publishedAt	publishedAtSQL	videoTitle_zh	videoTitle_en	videoDescription_zh	
1	UC6YUPtf7UJebJ	台塑企業總管理	Formosa Plast	HHNzceEOD5ic	https://www.yi	2017-01-10T09	2017-10-01 09:	何謂空污 - 台	what is air p	何謂空污 - 台灣空污	
2	UCghPIQli_uvjf	台客劇場	TKstor	Visitors from	GKNe06IFFAQ	https://www.yi	2020-09-22T11	22/2020 11:00	夜店比工業區	Nightclubs mo	#Dyson #環島 #空氣品
3	UC4bokYuSrVG	The News Lens	The News Lens	UFcZd89FFO8	https://www.yi	2019-11-09T10	2019-09-11 10:	中國空污世界	china air pol	加入會員支持我們:	
4	UC6YUPtf7UJebJ	台塑企業總管理	Formosa Plast	dN8fhS8Y3-0	https://www.yi	2017-01-10T09	2017-10-01 09:	何謂空污 - PN	what is air p	何謂空污 - PM2.5 每	
✓		Kong Wu空汙	[air pollution]		https://www.yi	2017-03-25T09	25/2017 09:34	《霧哥來了》!	"Haze brother	《霧哥來了》 Smog M	
		Cyuan Ciou Nuan Hua	全球暖化	[global warming]	https://www.yi	2019-03-06T05	2019-06-03 05:	全球空污城市	Global air po	●TVBS新聞APP最即時	
		Ci Hou Bian Cian	氣候變遷	[climate change]	https://www.yi	2017-10-21T05	21/2017 05:05	空汙奪命!	台 Air pollution	空氣汙染看不到聞得	
		Lyu Neng	綠能	[green energy]	https://www.yi	2020-10-24T12	24/2020 12:48	秋冬空汙紫爆	Air pollution	秋冬 #空汙 嚴重 · 影	
		He Fei Liao	核廢料	[nuclear waste]	https://www.yi	2020-01-06T08	2020-06-01 08:	環境防衛隊-上	Environmental	「最近城市裡空汙	
		He Neng	核能	[nuclear energy]	https://www.yi	2019-07-11T06	2019-11-07 06:	101環境教室:	"National Geo	空氣汙染由大氣中的	
		Jie Neng	節能	[energy saving]	https://www.yi	2019-05-30T02	30/2019 02:06	擊敗空污怪	Beat air poll	擊敗空污怪 拯救空氣	
		Tan Pai Fang	碳排放	[carbon emission]	https://www.yi	2020-10-24T12	24/2020 12:51	空汙影響呼吸	Air pollution	本集完整內容: https://www.yi	
					https://www.yi	2018-06-12T07	2018-12-06 07:	我們的島 第95	Our island 95	新北市鶯歌區是聯合	
					https://www.yi	2018-10-22T10	22/2018 10:20	不可忽視的空	Indoer air po	空氣汙染日益嚴重	

Figure 3. 10. The Video list after improving the appearance of the dataset. 2020. (Print Screen)

First of all, the ranking of YouTube videos was found that could not easily link to the popularity metrics. According to Rieder, Matamoros-Fernández and Coromina (2018, p.63),

rankings might be highly influenced by a site's algorithm which would show in other sites' metrics, such as recommendations or subscriptions. Secondly, I found that the ranking data was heavily influenced by platform language and the accuracy of search query was an issue, which was similar to Rieder, Matamoros-Fernández and Coromina's findings (2018, p.64).

As table 3.1 shows, talk shows accounted for 4 percent of the query ranking of environmental issues on YouTube. It was important to note that 'global warming' and 'climate change' were the two most frequent environmental issues on talk shows, which means that talk shows are an important source of environmental communication among global environmental issues. Furthermore, in terms of the other environmental issues, the number of videos was similar to the individual ranking. Besides, except for talk shows, news videos were observed to have the highest percentage ranking, for instance, as a query of the top 50 video rankings in terms of the performance of 'global warming', news videos accounted for 42% of the total (see the Table 3.1). In Figure 3.1, in the top 20 rankings, the video sources from news channels accounted for 8 videos, which highlighted the fact that a large proportion of environmental communication in YouTube relies on news media which is also the producer of talk shows.

Table 3. 1. The distribution of talk shows in the top 50 video lists of each query.

query	quantity in top 50 video list
Kong Wu 空汙 [air pollution]	1
Cyuan Ciou Nuan Hua 全球暖化 [global warming]	7
Ci Hou Bian Cian 氣候變遷 [climate change]	4
Lyu Neng 綠能 [green energy]	2
He Fei Liao 核廢料 [nuclear waste]	2
He Neng 核能 [nuclear energy]	0

Jie Neng 節能 [energy saving]	0
Tan Pai Fang 碳排放 [carbon emission]	1
Jian Tan 減碳 [carbon reduction]	1
Fong Li 風力 [wind power]	3
Tan Jiao Yi 碳交易 [carbon trading]	2
2025 Fei He Jia Yuan 2025 非核家園 [nuclear free by 2025]	2
Yi He Yang Lyu 以核養綠 [using nuclear to nourish renewables]	1

position	channelId	channelTitle_zh	channelTitle_en	videoId	videoURL	publishedAt	publishedAtISO	videoTitle_zh	videoTitle_en
1	UC5nW4kD	TVBS NEWS	TVBS NEWS	lYu-8XW3NEA	https://www.y	2020-12-14T14:14/2020 14:29	2020-12-14T14:14/2020 14:29	地球暖化止不住! 專家:恐催生耐熱超級 Global warming could not stop experts	Earth orphans: polar bear extinction
2	UCR3asjvr	WA 奧森新聞	CHS: ETTV CH51	nwK5jEpZE	https://www.y	2020-10-01T07:20/2020-01-10 07	2020-10-01T07:20/2020-01-10 07	人類恐只剩7年! 紐約「氣候時機」未 Human fear only seven years! New York	Earth orphans: polar bear extinction
3	UCo5753iLrVE	天下雜誌	videoWealth Magazi	ROzr9ZD8Q4c	https://www.y	2020-06-21T13:21/2020 13:30	2020-06-21T13:21/2020 13:30	【與地球和好】第三集 暖化與傳染病 [Good] with the earth and the third e	Earth orphans: polar bear extinction
4	UCc2gAzWUk2i	喬喬 Joey	One Joey Joe	LazVCS9AC_8	https://www.y	2019-10-08T16:16/2019-08-10 16	2019-10-08T16:16/2019-08-10 16	全球暖化真的是世紀騙局? 環保女孩格 Global warming really is the century	Earth orphans: polar bear extinction
5	UCLROLAN8km	妈咪说Mommy	Mommy says	MxdJvjiYd_dc	https://www.y	2019-08-14T11:14/2019 12:41	2019-08-14T11:14/2019 12:41	全球变暖是骗局吗? 温室气体是主要因 Global warming is a hoax it? Greenhou	Earth orphans: polar bear extinction
6	UCwrt1aanVMi	文茜的世界周	Wen Qian's Un	grH6xPwSDmk	https://www.y	2019-07-14T05:14/2019 05:41	2019-07-14T05:14/2019 05:41	【完整版】2019.07.13《文茜世界週報》[Full version] 2019.07.13 "Wen Qian's	Earth orphans: polar bear extinction
7	UCLD_NxvKcX	TVBS新聞網	TVBS News	qV7BON-IBA	https://www.y	2020-12-14T14:14/2020 14:30	2020-12-14T14:14/2020 14:30	地球暖化止不住! 專家:恐催生耐熱超級 Global warming could not stop experts	Earth orphans: polar bear extinction
8	UCwrt1aanVMi	文茜的世界周	Wen Qian's Un	aANGMhGOvq	https://www.y	2019-02-18T06:18/2019 06:12	2019-02-18T06:18/2019 06:12	2019.02.17【文茜世界週報】全球暖化 Wen Qian Universal Sunday News [2019	Earth orphans: polar bear extinction
9	UC778cAegKGI	Tomonews 台	Tomonews	Taiw wJ0CuERsD8	https://www.y	2019-01-26T12:26/2019 12:04	2019-01-26T12:26/2019 12:04	全球暖化、氣候變遷到底怎么回事? Tomi Global warming, climate change in the	Earth orphans: polar bear extinction
10	UC2VmiWn8dA	民視新聞網	FcFTV News	Form X5s-wldO6-A	https://www.y	2020-08-21T06:21/2020 06:21	2020-08-21T06:21/2020 06:21	全球暖化加劇! 格陵蘭去年融冰量創紀錄! Exacerbate global warming melting i	Earth orphans: polar bear extinction
11	UCmgDmqjxbk	TVBS 優選頻道	Preferred cha	lljovj01A_U	https://www.y	2019-03-04T02:2019-04-03 02	2019-03-04T02:2019-04-03 02	全球暖化加劇 海溫升幅 超標40% T觀點 Exacerbate global warming sea surface	Earth orphans: polar bear extinction
12	UCCTIgzGzQSM	亮生活 / Bright	Bright living	YX2Yz_Uyev4	https://www.y	2020-04-17T14:17/2020 14:00	2020-04-17T14:17/2020 14:00	假如地球溫度上升了兩度的話, 結果如 If the Earth's temperature rise of tw	Earth orphans: polar bear extinction
13	UCm5HKlyFav	春霞環境學社	Jubilee Envir	Anvto0g6Ghw	https://www.y	2020-11-20T02:20/2020 02:32	2020-11-20T02:20/2020 02:32	全球暖化怎麼了? How the global warming?	Earth orphans: polar bear extinction
14	UCWKP3NW7	STARBAY GROU	STARBAY GROU	2vM7zH_cN6l	https://www.y	2019-12-26T07:26/2019 07:55	2019-12-26T07:26/2019 07:55	全球暖化危機 Global Warming Crisis	Earth orphans: polar bear extinction
15	UCR3asjvr	WA 奧森新聞	CHS: ETTV CH51	ARZLOR0xx-s	https://www.y	2019-06-17T06:17/2019 06:38	2019-06-17T06:17/2019 06:38	地球的孤兒~北極熊世紀末滅絕倒數 - Earth orphan polar bear extinction	Earth orphans: polar bear extinction
16	UC8ROUJHZEI	台視新聞	TTV Taiwan Televi	B4PXWj27yc	https://www.y	2020-02-16T13:16/2020 13:47	2020-02-16T13:16/2020 13:47	全球暖化加劇南極20.75度破60年高溫點 Exacerbate global warming Antarctic 2	Earth orphans: polar bear extinction
17	UCwrt1aanVMi	文茜的世界周	Wen Qian's Un	jMpXa0Go4ZU	https://www.y	2020-01-27T05:27/2020 05:42	2020-01-27T05:27/2020 05:42	2020.01.26【文茜世界週報】2019多地 Wen Qian Universal Sunday News [2020	Earth orphans: polar bear extinction
18	UCEhtBoqRgYc	安齊 ONCHINC	Ann Green ONC	PqrBU_yFO1l	https://www.y	2020-02-19T12:19/2020 12:15	2020-02-19T12:19/2020 12:15	近來天氣愈來愈冷 難道全球暖化是個假 Recently more and more cold weather i	Earth orphans: polar bear extinction
19	UCVWBL-Wfs	科普新視界	New Horizons	wZKkEjSv2XA	https://www.y	2020-03-24T08:24/2020 08:00	2020-03-24T08:24/2020 08:00	全球暖化、溫室效應 地球面臨這些危險 Global warming, the greenhouse effect	Earth orphans: polar bear extinction
20	UCIG_f_xZHGis	大陸科學 - Wh	Bold scientif H	huwGdgFU	https://www.y	2019-06-04T06:2019-04-06 06	2019-06-04T06:2019-04-06 06	城市的森林消失了, 全球暖化的問題 The city's forest is gone, the probl	Earth orphans: polar bear extinction

Figure 3. 11. The top 20 ranking of video performance in the query 'global warming'. (Print Screen)

3. YouTube video comment lists

The following paragraphs are the detailed steps to illustrate how I processed the raw comment lists generated by YTD. Firstly, I typed in every video id that appears on the filtering video lists (see Figure 3.8), then through the Video Info and Comments Module and generated the following sheet (see Figure 3.12). Figure 3.12 is the comment lists which have detailed information of comments of each filtering videos, such as video title, reply count, like count, author name, text and reply comment.

B. Multimodal analysis

Multimodal analysis is an approach that examines multiple modes of communication such as speeches, the use of footage via symbols, colour, and images. The multimodal analysis provides a good point of view on reflecting the micro-level social processes, which can be regarded as an on-the-ground analysis. Through the historic analysis of the public sphere in both politics and environment in Taiwan and the mode of agenda-setting on digital media, it contributes to filter the representative samples. As environmental communication is a typical visual topic, which realises the extreme effects of agenda-setting. In addition, almost all of the environmental communication in Taiwan exists in news media, political talk shows and in-depth reporting, which is why it is a good idea to look at political talk shows and in-depth reporting. The reason I have excluded the news media is that it does not have serial forms, nor does it extend the discussion through various forms of debate and commentary. This means it tends to have fewer effects on the digital deliberative sphere. The other two types of programmes have serial forms and space to extend the discussion by their public needs and interact with the counterpublics, which contributes to building the deliberative sphere. The long term and close flow between public and counterpublics will eventually realise thematized circulation, which means environmental issues will exist as a common fact of the public sphere and to organise a common imaginary. This long-standing issue in the political sphere usually has a substantial political impact, such as policy making and party alternation, as I mentioned in the literature review (p.30).

As noted in the discussion of the recommendation system in the literature review (p.24), it appears that the recommendation system has a strong influence on how environmental issues are being communicated/seen/understood. Since the recommendation system and the video contents have a mutual influence, it contributes to examining the systematic mode of agenda-setting on digital media through processing algorithm analysis and multimodal

analysis. To understand the political talk show requires a knowledge of the history of Taiwanese television, which has given rise to this format. It helps for understanding how the talk shows are being consumed now, through YouTube, (with its affordances of multimodal communication and the commenting facility), and the character of environmental communication.

Norris (2004, p.1) emphasised that all interactions inherently assume a multimodal character. Political talk shows and in-depth reportings, such as TV programs, serve as typical multimodal representations, constructed through the integration of verbal (language) and nonverbal communicative modes. This amalgamation forms a comprehensive communicative environment conducive to multimodal analysis. For instance, when examining a spontaneous conversation within talk shows, the interaction is orchestrated through the speaker's linguistic choices, encompassing diverse verbal elements such as content, prosody, tone, and code-switching. In this case, some scholars have exclusively focused on content-based analysis, treating language as the primary component of interaction while considering nonverbal channels to be secondary (e.g., Barker et al. 2022; Barker et al. 2021). Barker et al. 's (2021) study on tobacco and alcohol content in soap operas broadcast on UK television presents a notable instance of multimodal analysis. The researchers employed one-minute interval coding in reality TV programmes aired on UK television, encompassing both verbal communicative modes (content) and four nonverbal communicative modes, including actual use (tobacco or alcohol), implied use (smoking or drinking, tobacco paraphernalia), and brand appearance. While the research mainly focuses on specific concepts, such as the composition of reality TV programs, gestures, and expressions, their quantitative results (p. 597) revealed a significant finding. The data indicated a noteworthy correlation between the presence of alcohol content and the occurrence of those nonverbal communicative modes. This suggests that both verbal and

nonverbal communicative modes hold significant roles in constructing an interactive environment.

In addition to the verbal, nonverbal notion also involves the environmental elements including title bars, footages, gestures, facial expressions, and numbers of users, in the interaction. It demonstrates that the meaning of the conversation is constructed by multiple metrics in the environment. Norris (2004) noted that people often intuitively apply specific communicative channels or modes when interacting with others depending on the environment needed, and the environment inevitably influences the interaction simultaneously (p. 2). For example, in the representation of the same topics, speakers would intuitively adjust the communicative modes depending on different environments. Besides, Norris (2004, p.2) pointed out that personalised cognitive differences might lead to different interpretations with similar conditions or interactions in different ways and produce different communicative effects. Especially in the political-based programmes, different political orientations might interpret the same interactive process differently. It can be assumed that the opinions expressed by the interactors are usually biased, and these biases are likely formed before the interaction starts. It is also reasonable to assume that political programs are inherently biased, as they are created by people with specific political orientations.

According to the discussion of multimodal analysis previously, this study has identified the value of visual environmental communication in both political and non-political talk shows, and in-depth reporting is the modal density of social actors in the interaction. Modal density was proposed by Norris (2004, p.99), who depicted a concept of modal density of a social actor's levels of attention and awareness. It means that the interaction, which is composed of higher-level actions and high modal density, improves a person's attention and

awareness, and contributes to examining the media ecology of environmental communication.

However, there are two potential challenges in the conduction of multimodal analysis.

Firstly, in addition to the language, which is sequentially structured, other nonverbal communicative modes often come up randomly and are complex for coding (Norris 2004, p.99). Secondly, as previously discussed, multimodal interaction is composed of different communicative modes that possess distinct materialities (Norris 2004, p.99). This composition necessitates heightened caution in distinguishing and coding various materialities. Besides challenges to identifying form and meaning of communicative modes, the link between multimodal and human interaction needs to be identified during the analysis, too. Norris (2004, p.4) argued that the research object in multimodal analysis is the expression of perceptions, thoughts, and feelings, rather than experience. This argument provides a more reliable way to conduct the multimodal analysis, and the coding of analysis is the reflection expressed by a person. However, it is also necessary to be aware that some feelings may be hidden and not expressed in certain cases. To avoid these potential challenges, conducting a preliminary analysis on a small-sized dataset is recommended. This dataset should cover interactions across diverse backgrounds, such as different political orientations.

Multimodal analysis is a form of analysis beyond single content-based analysis, which is composed of three methodological approaches-multimodal social semiotics (MSS), multimodal discourse analysis (MDA) and multimodal interaction analysis (MIA). These approaches differ in their main focus on constructing the interaction and environment (Bernad-Mecho 2021, p. 181). Kress (2010, p. 34) mentioned that the purpose of MSS is to examine the representation of signs in social interaction through the process of making and remaking the meaning of the sign, which is used for understanding the social contexts of

both political and non-political talk shows, and in-depth reporting. The aim of MDA is to discourse 'in action', rather than 'as action' (Jones 2005, p.5). It means that MDA is used for observing the interaction between semiotic resources and conveying languages by social actors. Finally, MIA is grounded in Ron Scollon's theory of mediated discourse analysis (2001, cited in Bernad-Mecho 2021, p. 182), which is an approach of discourse analysis and is composed of mediated actions, or the performance of social actors. Following the concept of MIA, MIA is used for examining the actions performed by social actors in specific environments. Consequently, these three multimodal methodologies provide a systematic approach to conduct the multimodal analysis.

To deconstruct the organisation of communicative modes in the interaction of this thesis, it is necessary to distinguish the coding unit of the multimodal analysis, which is beneficial to analysis systematically. Norris (2004, p.11) proposed a concept to identify the unit of interactional meaning and concluded the meaningless communication modes, including lower-level and higher-level action. The lower-level action can be seen as the smallest interactive unit, and the higher-level action comprises multiple chained lower-level actions, which are more meaningful and obtain a comprehensive way to observe the interaction and environment of specific context. Here, this study identifies some notions of the mediated action in this thesis below:

1. speeches (verbal communicative mode).
2. title bars (nonverbal communicative mode).
3. the use of footage via symbols, editing techniques and montage (nonverbal communicative mode).
4. the use of numbers and data (nonverbal communicative mode).
5. gestures (nonverbal communicative mode).
6. sounds (verbal communicative mode).

- code-switching (verbal communicative mode).

C. Visual analysis

The following paragraphs are the detailed steps to illustrate how I create a multimodal frame and conduct multimodal analysis. I typed in the detailed information of each screenshot image (see blue column) and the communicative modes (see orange column) which are identified in the D-2 of literature chapter, including speeches, title bars, the use of footage via symbols, editing techniques and montage, the use of numbers and data, gestures, sounds and code-switching (see Figure 3.14). I then added a column at last, to record the higher-level actions (see green column).

Position	Time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other
1	0:24		An enhanced speech, 'Today's topic maybe was not just a program but a mournful event. It was because that the fire in amazon forest did not slow down and was not disappear either' 今天的主題可能不是一個電視節目，而是一個哀悼的節目，因為亞馬遜森林大火既沒有減緩，也沒有消失。 An enhanced title bar, 'The Amazon wildfire burned continuously, thus the Brazil government finally agreed to help' 亞馬遜森林大火持續燃燒，巴西政府最終同意幫助。	Using footage of Amazon rainforest wildfires with a wide shot and aerial shot.					The host said 'the Amazon wildfire did not slow down and didn't disappear either' with a husky voice.
2	0:40		A complementary speech, 'Under and climate, as long as these rainforests got fire, the fire would constantly spread out' 這些熱帶雨林在乾旱氣候下，一旦起火燃燒，就會不斷對外擴散。	Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.		An emphasised gesture which means 'diffusion'.			The host said 'constantly spread out' with a husky voice.
3	1:00		An enhanced speech, 'This time, the catastrophe was only caused by human factor. It levelled lands to act in concert with local cropping pattern, which resulted in a wide range of forest fire' 這次的浩劫並不是因為氣候乾旱，純粹就是當地的人為，為了整地配合當地種植方	Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.					The host said 'man-made' with a husky voice.

Figure 3. 14. The multimodal frame for multimodal analysis. 2022. (Print Screen)

Figure 3.15 is the diagram of code representation which means the engagement of the communicative modes. It needs to mention that the intersection of the communicative modes means the actions appear in the same screenshot image, which will be recorded in the column [Processes of knowledge selection] (see Figure 3.14).

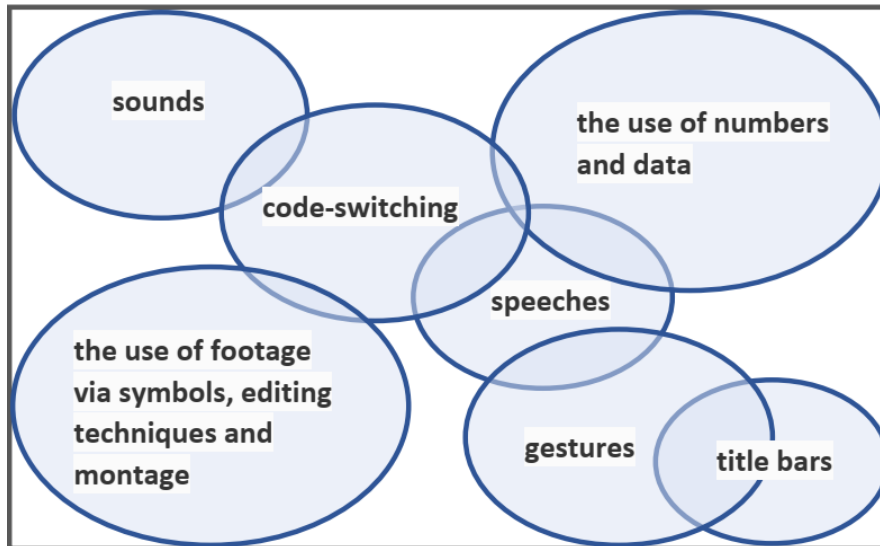


Figure 3. 15. A schematic diagram of the engagement of communicative modes in an interaction. 2022. (Print Screen)

More communicative modes compose to higher-level actions, which means they have a high modal density. In this case (see Figure 3.16), I chose three images from a political talk show (1035) as an example, showing the different camera angles and distances, which demonstrates the different interactive levels. The left side of the image depicts a person representing the arguments related to air pollution issues, encompassing the majority of communicative modes. In the middle image, the composition of the talk show participant is portrayed through a mid-shot, capturing the individual from the waist to the top of the head. On the right side, the image showcases a long shot of the scenery, featuring a large screen and the arrangement of seating. It can be noticed that the communicative modes progressively decrease from left side image to right. As Norris (2016, p.144) mentioned, it is difficult to establish a new connection without the lack of the communicative modes, this concept illustrates the practice of the 'modal density (Norris 2004, p.99)'. The relation between modal density and public attention is appropriate to explain how these TV programmes serve as the role of medium to communicate the environmental issues, that is, the image with a higher modal density can obtain a higher attention. For example, the type of TV program can only be discerned from the layout of the scenery in the right-side image. In contrast, the left-side image provides in-depth detail, enabling recognition that the

agenda setting of this episode concerns air pollution. Additionally, the argument of the person in the image may be inferred from their gesture and expression.

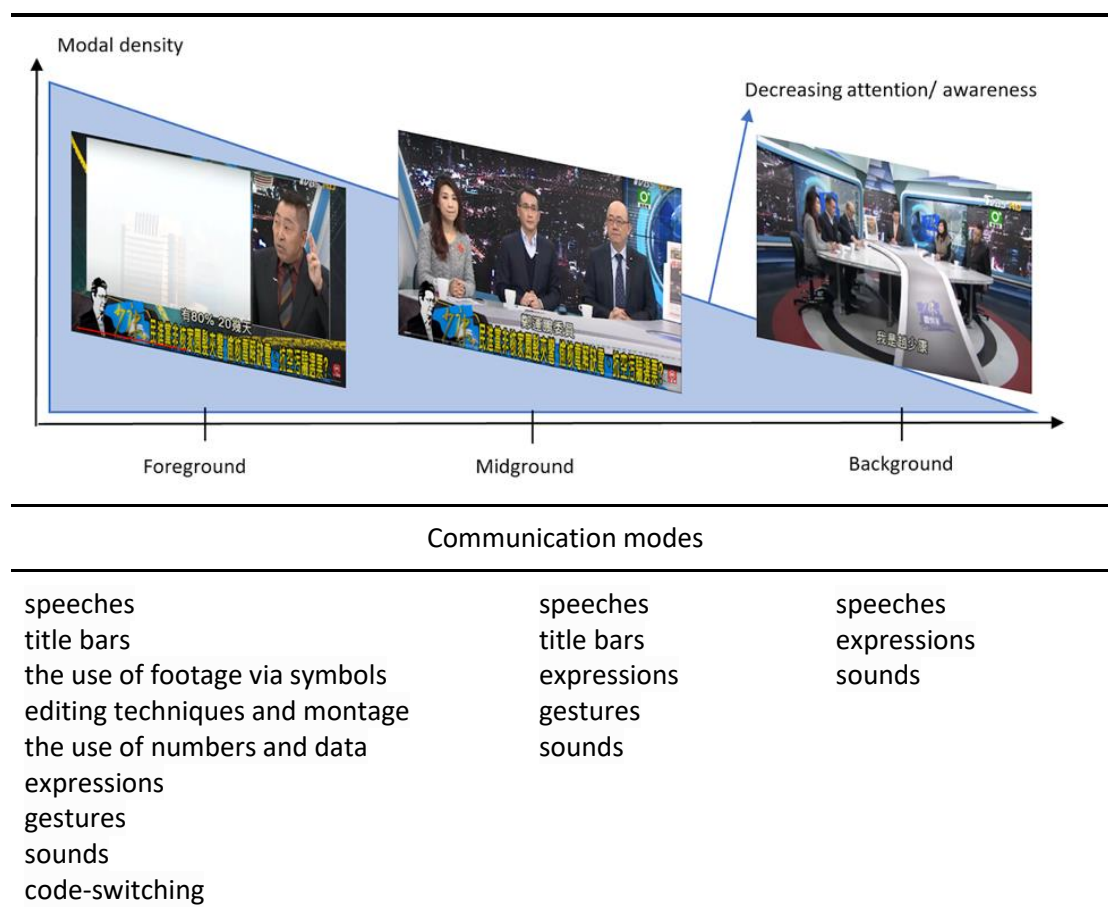


Figure 3. 16. The practice of modal density in the political talk show (Norris 2004, p.99)

D. Corpus analysis

Corpus analysis methods have been applied extensively in academic research abroad, most examples of which belong to the framework of corpus stylistics. This type of scholarship generally focuses on the distribution of words, such as by analysing keywords, lexical phrases, or collocations to examine text-specific characteristics. Many corpora have been generated, including learner corpora and computer-learner corpora. Researchers often summarise corpus analysis as follows:

1. The text is naturally produced and conveys the intuitive thinking of the study object.
2. The analysis includes interactive analysis between words and sentences.

3. The text includes quantitative analysis and the function of describing the meaning of language (Conrad 1996; McEnery and Wilson 2003).

Compared with other analytic approaches, corpus analysis exposes more metaphors beneath the surface of the text, making it a quantitative and qualitative research method. Granger (2002) stated that corpus analysis helps to promote discourse analysis; however, most corpus-based analyses focus on the lexical and grammatical patterns of text to the neglect of functional and rhetorical attributes. In response, some scholars have proposed multilevel corpus analysis, which includes a quantitative analysis of text (e.g., vocabulary and grammar) along with hand-tagged movement analysis (Biber 2011; Upton and Connor 2001).

The corpus analysis method proposed by Kuo (2017) is used as the main analytical framework in the present study to supplement work from the aforementioned scholars, which apply to this research. The corpus will be built by WordSmith Tools after segmented the caption by SegmentAnt. This study employed the following processes:

1. Frequency list: The frequency of lexical occurrences in statistical texts is used as evidence for corpus analysis to effectively observe intuitive or language-use methods in texts. Biber (1988) pointed out that 'frequency' can effectively reveal the applicability of the text to research problems and the linguistic application of the object's intuitiveness.
2. Collocation: A t-test analysis was conducted using 99.99% ($p < .001$) as the lexicon analysis standard, including statistics on how different vocabularies can be effectively distributed or collected in unique patterns.
3. Keywords: Based on the keyword analysis process, linguistic features can be observed in the context of the text while the subjective awareness of the topic can

also be taken into account. The resulting language model can be applied to one or more theoretical frameworks (Baker et al. 2008; Burns and Joyce 1997).

1. Create a dataset of YouTube comments

For conducting the Comment Term Frequency Comparison (CTFC) analysis which is referred to by Thelwall (2017), it is necessary to create a comments corpus within the filtered videos (see Figure 3.9), which can be divided into the following steps:

1. Put all the comment text into a notepad file, which downloaded from the Video Info and Comments Module of the YTDI (the 'encoding' of the file must be 'UTF-8').
2. Create a dictionary for the SegmentAnt, which contains all the phrases that should appear together, such as '2025 Fei He Jia Yuan 2025 非核家園 [nuclear free by 2025]' and 'Yi He Yang Lyu 以核養綠 [using nuclear to nourish renewables]', and each phrase is on its own line.
3. Enter a number of criteria (see Figure 3.17):
 - a. click and drag the 'notepad file' into the 'Input File' (see the red frame),
 - b. click and drag the 'dictionary of YouTube comments' into the column beside the 'Load' (see the green frame),
 - c. click on the 'Chinese (Jieba engine)' as language option, 'Full space' as segment character option, and 'use main+custom' as dictionary option.

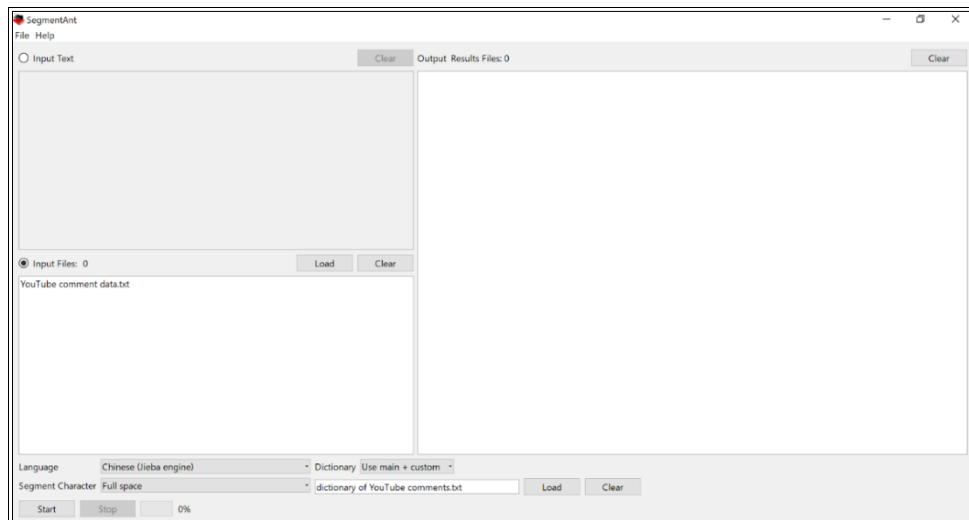


Figure 3. 17. The schematic diagram of the SegmentAnt, a Chinese segmenting tool. 2022. (Print Screen)

Next step I gathered all of the segmented comments from 15 YouTube channels and playlists' video lists into the WordSmith Tools, a software package for work in the field of corpus linguistics. And I divided these data into three packages, by each programme genre, as the output is shown below (see Figure 3.18). According to Figure 3.19, I then further conducted collocation analysis and Key Word in Context (KWIC) analysis for those words which have specific meanings in the comments discourse, figure 3.18 demonstrates how the word 'energy' plays as a centre word and engages in the comments discourse.

N	Word	Freq.	%	Texts	%	Dispersion	Lemmas	Set
42	看	1,323	0.23%	3	100.00%	0.96		
43	沒	1,288	0.22%	3	100.00%	0.90		
44	真的	1,277	0.22%	3	100.00%	0.94		
45	跟	1,274	0.22%	3	100.00%	0.91		
46	國民黨	1,274	0.22%	3	100.00%	0.73		
47	做	1,233	0.21%	3	100.00%	0.92		
48	大陸	1,177	0.20%	3	100.00%	0.77		
49	會	1,135	0.19%	3	100.00%	0.91		
50	用	1,116	0.19%	3	100.00%	0.95		
51	說	1,098	0.19%	3	100.00%	0.86		
52	能	1,085	0.19%	3	100.00%	0.94		
53	知道	1,074	0.18%	3	100.00%	0.95		
54	讓	1,058	0.18%	3	100.00%	0.88		
55	多	1,049	0.18%	3	100.00%	0.97		
56	才	1,042	0.18%	3	100.00%	0.96		
57	上	1,036	0.18%	3	100.00%	0.93		
58	那	1,028	0.18%	3	100.00%	0.96		
59	什麼	988	0.17%	3	100.00%	0.90		
60	你們	987	0.17%	3	100.00%	0.84		
61	再	982	0.17%	3	100.00%	0.94		
62	如果	966	0.17%	3	100.00%	0.95		
63	我們	948	0.16%	3	100.00%	0.85		
64	支持	945	0.16%	3	100.00%	0.82		
65	中國	944	0.16%	3	100.00%	0.80		
66	幕	923	0.16%	3	100.00%	0.91		
67	長	910	0.16%	3	100.00%	0.68		
68	一個	890	0.15%	3	100.00%	0.92		
69	後	888	0.15%	3	100.00%	0.92		
70	嗎	875	0.15%	3	100.00%	0.88		

Figure 3. 18. The output of the WordSmith Tools. 2022. (Print Screen)

N	Concordance	Set	Tag	Word	#Sent	Sent	Para	Para	Head	Sect	Sect	File	Date	%
					# Pos.	# Pos.	# Pos.	# Pos.	# Pos.	# Pos.	# Pos.			
1	短驗真心惡心。...美國消耗全球資源能源四分之一吧！新冠死亡人數就是	60,202	03..0	03..0	03..0	03..0	03..0	03..0	03..0	03..0	03..0	in-depth reporting.txt	2021/10/28	67.3%
2	環保更是可笑...人造鑽石所消耗的能源極大這這稱不上環保說是永續，	48,503	03..1	03..1	03..1	03..1	03..1	03..1	03..1	03..1	03..1	in-depth reporting.txt	2021/10/28	54.0%
3	...你不要自欺一下比較省世界的能源！啊~我都忘了，納粹政府不	70,455	03..3	03..3	03..3	03..3	03..3	03..3	03..3	03..3	03..3	in-depth reporting.txt	2021/10/28	78.3%
4	載電力產生氫氣儲存電動車太耗電能。這比較環保還要搞清楚，綠電和	79,400	03..8	03..8	03..8	03..8	03..8	03..8	03..8	03..8	03..8	in-depth reporting.txt	2021/10/28	88.5%
5	不要只會唱衰政府啦為啥不發錢。用備載電力產生氫氣儲存電動車	79,389	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	in-depth reporting.txt	2021/10/28	88.5%
6	也給臺灣最惠待遇，更不要說對臺灣供給了，多瞭解瞭解吧~別老	39,083	03..1	03..1	03..1	03..1	03..1	03..1	03..1	03..1	03..1	in-depth reporting.txt	2021/10/28	43.4%
7	葛英文已保證2025年時綠電可達到總能源的20%，多出來的綠電足夠	24,543	04..1	04..1	04..1	04..1	04..1	04..1	04..1	04..1	04..1	in-depth reporting.txt	2021/10/28	27.4%
8	萬託)。聯合再生能源將攜手華能建設200至300MW太陽能電廠	21,545	01..3	01..3	01..3	01..3	01..3	01..3	01..3	01..3	01..3	in-depth reporting.txt	2021/10/28	24.2%
9	可笑(電力統計資料來源：經濟部能源局)不是缺電啦，只是暫時	26,953	05..1	05..1	05..1	05..1	05..1	05..1	05..1	05..1	05..1	in-depth reporting.txt	2021/10/28	30.1%
10	所導致的。李四端不如年輕時候幹這局長--林全能到底是全能還是	30,249	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	in-depth reporting.txt	2021/10/28	33.8%
11	可笑(電力統計資料來源：經濟部能源局)不是缺電啦，只是暫時	27,883	07..1	07..1	07..1	07..1	07..1	07..1	07..1	07..1	07..1	in-depth reporting.txt	2021/10/28	31.2%
12	這比較環保還要搞清楚，綠電和傳統的裝置容量兩者不能同等看待，	79,409	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	in-depth reporting.txt	2021/10/28	88.5%
13	是島國跟日本一樣！政策跟日本一樣！卻老喜歡跟歐陸	81,430	01..8	01..8	01..8	01..8	01..8	01..8	01..8	01..8	01..8	in-depth reporting.txt	2021/10/28	90.8%
14	都比亞洲學生強得多。他們對政府的政策，有自己的想法，我們	81,404	01..2	01..2	01..2	01..2	01..2	01..2	01..2	01..2	01..2	in-depth reporting.txt	2021/10/28	90.8%
15	想的太天真了您好，以Gogoro為例，能源網絡中淘汰的電池，並非直接	82,000	01..8	01..8	01..8	01..8	01..8	01..8	01..8	01..8	01..8	in-depth reporting.txt	2021/10/28	91.5%
16	是以科學治理文明，不然的話就像是義和團「刀槍不入」一樣。你	86,154	05..2	05..2	05..2	05..2	05..2	05..2	05..2	05..2	05..2	in-depth reporting.txt	2021/10/28	96.3%
17	現有的技術條件下用再生能源當主要能源的可能性。創本无心中国风力	84,225	04..3	04..3	04..3	04..3	04..3	04..3	04..3	04..3	04..3	in-depth reporting.txt	2021/10/28	94.0%
18	之外)。所以，要用綠電取代20%的能源，所付出的代價恐怕不是我們	81,055	01..3	01..3	01..3	01..3	01..3	01..3	01..3	01..3	01..3	in-depth reporting.txt	2021/10/28	90.3%
19	容易充分利用。相對之下，傳統基載裝置容量和實際發電量其實可以	79,482	03..0	03..0	03..0	03..0	03..0	03..0	03..0	03..0	03..0	in-depth reporting.txt	2021/10/28	88.6%
20	能想像的。用政治意識形態來主導走向，即便最後失敗的話，如今	79,455	03..3	03..3	03..3	03..3	03..3	03..3	03..3	03..3	03..3	in-depth reporting.txt	2021/10/28	88.6%
21	大輿論轉移來穩定再生能源和其它的總產量。台灣屬於地震帶，	79,501	03..9	03..9	03..9	03..9	03..9	03..9	03..9	03..9	03..9	in-depth reporting.txt	2021/10/28	88.6%
22	停電好幾次，民眾只會更傾向傳統能源。建設200至300MW太陽能電廠	81,023	01..1	01..1	01..1	01..1	01..1	01..1	01..1	01..1	01..1	in-depth reporting.txt	2021/10/28	90.3%
23	萬託)。聯合再生能源將攜手華能建設200至300MW太陽能電廠	80,199	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	03..7	in-depth reporting.txt	2021/10/28	89.4%
24	景能源?急?即?揭出摺了解，?照能源早前因???金沙江?本??，与	17,200	07..8	07..8	07..8	07..8	07..8	07..8	07..8	07..8	07..8	in-depth reporting.txt	2021/10/28	19.5%
25	以及??人士引起??的??手法。?照能源?急?即?揭出摺了解，?照	2,135	02..3	02..3	02..3	02..3	02..3	02..3	02..3	02..3	02..3	in-depth reporting.txt	2021/10/28	2.3%
26	?力?池?AES的80%股?。?照能源?急?即?揭出摺了解，?照	2,122	02..0	02..0	02..0	02..0	02..0	02..0	02..0	02..0	02..0	in-depth reporting.txt	2021/10/28	2.3%
27	?的??手法。本月有媒體報道，邊境公佈向日產收購電池業務(2,182	02..0	02..0	02..0	02..0	02..0	02..0	02..0	02..0	02..0	in-depth reporting.txt	2021/10/28	2.4%
28	EV GP。有??倍??，媒体正与?照能源和金沙江?本?通。?界正密切?	2,264	02..2	02..2	02..2	02..2	02..2	02..2	02..2	02..2	02..2	in-depth reporting.txt	2021/10/28	2.5%
29	concordance collocates plot patterns clusters timeline filenames source text notes	2,221	02..9	02..9	02..9	02..9	02..9	02..9	02..9	02..9	02..9	in-depth reporting.txt	2021/10/28	2.4%

Figure 3. 19. The concordance list for conducting collocation analysis and KWIC analysis for the specific centre words. 2022. (Print Screen)

2. Comparative analysis of comments obtained through YouTube API and those prominently displayed on the video's web page

According to the previous discussion of the YouTube comments in the literature review chapter, a part of the discussion highlighted that it is important to observe whether YouTube API has a regular pattern to block specific comments, such as spam comments. From the perspective of data layout, YTDT is certainly a powerful tool to list all of the comments whether displayed on the video's web page or not, which provides the most useful basis for my research. Thus, I not only conduct word frequency analysis, collocation analysis and KWIC analysis of the whole comments discourse but examine whether the comments below these videos have the specific hidden pattern of the YouTube API through the comparative analysis.

The comparative analysis of comments obtained through YouTube API and those prominently displayed on the video's web page is useful for finding out which comments are hidden by YouTube API. The results demonstrated that most of the dependent variables do not reach the explanatory value, including 'reply count', 'like count' and 'language use' metrics; the other dependent variables only reach a less predictive value than 15%, including

'publish at', 'comment genres' and 'comment attitude' metrics. In comparison with the comparative analysis of comments appearance through YouTube API, the corpus analysis has higher accuracy to identify the comments genres, since it provides a comprehensive way to observe the comments distribution of the specific videos, including word frequency analysis, collocation analysis and KWIC analysis. These two different research methods demonstrate that the YouTube comments as data are very important but should be restricted to a specific methodology. The following paragraphs represented the detailed research process of the comparative analysis.

To observe the difference between the prominently displayed on a video's web page and the output from YTDT, I created a comparison spreadsheet (see Figure 3.20) for conducting further content analysis, the table including the ranking of comments, publish time, the language of comments, reply count and like count. Regarding the ranking of comments, it is necessary to mention that the ranking prominently displayed on a video's web page are sorted by 'top comments' and are ranked by 'relevance' from YTDT output, and the publish time prominently displayed on a video's web page only demonstrates the approximate time, such as '4 years ago. Since this study only examines the comments which directly display below the video, I ignore the reply comments which need to click to expand. It is necessary to mention that it is hard to examine the ranking of the comments since the ranking is influenced by multiple metrics, including ranking on both web page and YTDT output, published time, reply count, like count, the language of comments, content genre and content attitude. After manually observing the comment on the video's web page, it is difficult to observe the actual rank of these metrics which affect the ranking of the comments, for instance, it can be found that the top one or two comments do not have many like counts or the content are not related to the video or the comments which in the bottom have a high discussion (high like counts or reply counts). Thus, the aim of this part of comment analysis is to use content analysis for examining the distribution of the comments

		Encoding form
Is the comment prominently displayed on a video's web page?	Yes	1
	No	0
Language use of the comment?	Traditional Chinese	1
	Simplified Chinese	2
	English	3
	Others	4
Published at (from the video was published)	Within three days	1
	After three days to a week	2
	After a week	3
Is the comment have any reply count	Yes	1
	No	0
Is the comment have any like count	Yes	1
	No	0
The comment genres	Political: policy-related or economy-related	1
	Political: mention of specific politicians or organisation	2
	Environmental: local physical events (such as global warming, extreme weather or wildfires etc.)	3
	Environmental: man-made environmental issues (e.g., air pollution, pollution of rivers and seas or over development etc.) or actions (e.g., energy saving, carbon reduction or energy using etc.)	4
	Mention of programme-related (such as host, guests or media)	5
	Others or irrelevance	6
The comment attitude	Suggestions or criticisms (positive)	1
	Satirical speeches	2
	Hate speeches	3
	Unclear or irrelevance	4

Next, since all of the comments are downloaded by YTDI (including the hidden comments), I use the YTDI output as the coding subject. Regarding the sample selection, I used non-proportional quota sampling with a list of each of the three genres of videos, ensuring the samples include political talk shows, non-affiliated talk shows and in-depth reporting and maximise coverage of all topics. The non-proportional quota sampling can be used to select the sample with the specific characteristics within the total sample, even if the numbers are not proportionate to the total sample (Matthews, Anderson, and Nattinger 2005; Promtussananon and Peltzer 2005; Rogers et al. 2006; Young et al. 2005, cited in Morrow 2007, p.587). Thus, I selected ten video's comments, and I sorted comment lists by the relevance by Youtube output, from highest to lowest and coded them the video code with the ranking of the comment, such as C001001, the sample includes five political talk shows, two non-affiliated talk shows and three in-depth reporting.

Firstly, the comments which are hidden by YouTube can be filtered out by the first question of the semi-structured encoding table (table 3.2), as the table shows that the comment which is coded '0', means the comment does not exist on the video's web page. Table 3.3 demonstrates the comparison of the descriptive statistics of each metric between the comments which are hidden by YouTube and displayed on a video's web page. Overall, the total number of the comments are 1475, 52.7% (N=778) of comments are hidden by YouTube, which means the comments cannot be seen by users, even if they slide down to the button of the web page; and 47.3% (N=697) of comments are displayed on the web page. The distribution trend of both comments being hidden and being displayed on YouTube are similar within each metric.

I then use the Chi-Square Test of Independence to compare the comment metric variables. The null hypothesis (H0) and alternative hypothesis (H1) of the Chi-Square Test of Independence are shown below:

H0: YouTube will not use the metrics shown on the left side of table 3.3 as the criterion for selecting comments to be displayed on the web.

H1: YouTube will use the metrics shown on the left side of table 3.3 as the criterion for selecting comments to be displayed on the web.

Since the p-values illustrated in Table 3.4 show that the metrics 'language use of the comment', 'reply count', and 'like count' exceed the chosen significance level ($\alpha = 0.05$), the null hypothesis is not rejected. However, there is a potential reason that can explain why 'like count' and 'reply count' are not criteria for showing comments on the web, which is related to the official YouTube SEO. According to Bucher (2018), YouTube changed its algorithm after the "Reply Girls" issue, which added the watch time as the value overview count, like count and reply count (p. 131). "The Reply Girls" issue happened in 2012, which highlighted a typical ranking problem of the YouTube algorithm that although the users clicked "dislike", the YouTube algorithm recognises the video ranking highly, which means the three counts of metrics are regarded as the ranking criteria for the YouTube algorithm, and the YouTube algorithm cannot recognise the spam comments (p.128). After addressing the issue, YouTube's automated systems hide spam comments, which are classified as unwelcome and unsolicited information, such as advertisements or links to dating or pornography sites. According to Madden, Ruthven, and McMenemy (2013), 'hate speeches' can also be categorised as spam. As indicated in Table 3.5, it is found that over 60% of 'hate speech' instances (N=201, 64.2%) are hidden by YouTube. I then do the Pearson Chi-Square Test of like count with each option of the comment attitude in the 'hidden comment' for examining whether the specific comment attitude is recognised as spam by YouTube's automated systems. The null hypothesis (H0) and alternative hypothesis (H1) of the Chi-Square Test of Independence are shown below:

H0: In the range of the comments have like count, the specific comment attitude will not be the criterion which was hidden by YouTube.

H1: In the range of the comments have like count, the specific comment attitude will be the criterion which was hidden by YouTube.

According to table 3.6, the p-value of the comment attitude metrics 'suggestions or criticisms' and 'hate speeches' are the only two less than the chosen significance level ($\alpha = 0.05$, Table 4.5). This allows for the rejection of the null hypothesis, concluding that there is an association between the comments hidden by YouTube and suggestions or criticisms ($\chi^2(1) = 5.129$, $p = 0.024$) and hate speeches ($\chi^2(1) = 4.380$, $p = 0.036$). According to the Chi-Square Test, it can be found that the comments hidden by YouTube are affected by the specific comment attitude.

In contrast, the p-values of the metrics 'published time of the comment', 'the comment genres', and 'the comment attitude' are less than the chosen significance level ($\alpha = 0.05$, Table 3.4). This allows for the rejection of the null hypothesis, concluding that there is an association between the display of comments on a video's webpage and their published times ($\chi^2(4) = 8.000$, $p = 0.018$), the comment genres ($\chi^2(5) = 42.148$, $p < .001$) and the comment attitude ($\chi^2(2) = 39.429$, $p < .001$). According to the Chi-Square Test, it can be found that the comments appearing on the web are affected by multiple variables.

In brief, there is some significant data in table 3.3, firstly, the distribution of the language use of the comments, the comments discourse almost consisted of TC (N=886, 60.1%) and SC (N=603, 40.9%), which matches the result displayed by the frequency list that the wordlists of the three types of programmes consist of the keyword in TC and SC. The published time of the comments which are displayed on the web is concentrated on 3 days after the videos were released (N=1211, 82.1%). According to the comment genres, the most

frequent comment genre on the web is ‘political: mention of specific politicians or organisations (N=622, 42.2%)’, as the comment discourse represented, Trump, President Tsai and the DPP were the three politicians or organisations which appear frequently. And the second-most frequently commented genres are ‘environmental: man-made environmental issues or actions (N=251, 17%)’ and ‘mention of programme-related (N=300, 20.3%)’. The comment genre reflects that the content of the comments is mainly to evaluate the programme, such as agenda-setting or guest arrangement. The comment attitudes of the comments are focused on suggestions or criticisms (N=546, 37.0%) and hate speeches (N=681, 46.2%).

Table 3. 3. The comparison of the descriptive statistics of each metric between the comments which are hidden by YouTube and displayed on a video’s web page.

		The comments which are hidden by YouTube (count: ratio by row)	The comments which are displayed on a video’s web page (count: ratio by row)
Language use of the comment?	Traditional Chinese	445 (57.2%)	441 (59.0%)
	Simplified Chinese	327 (42.0%)	276 (39.6%)
	English	3 (0.4%)	6 (0.9%)
	Others	3 (0.4%)	4 (0.6%)
Published at (from the video was published)	Within three days	656 (84.3%)	555 (79.6%)
	After three days to a week	51 (6.6%)	46 (6.6%)
	After a week	71 (9.1%)	96 (13.8%)
Is the comment have any reply count	Yes	147 (18.9%)	124 (17.8%)
	No	631 (81.1%)	573 (82.2%)
Is the comment have any like count	Yes	348 (44.7%)	293 (42.0%)
	No	430 (55.3%)	404 (58.0%)
The comment genres	Political: policy-related or economy-related	63 (8.1%)	51 (7.3%)

	Political: mention of specific politicians or organisation	365 (46.9%)	257 (36.9%)
	Environmental: local physical events	88 (11.3%)	57 (8.2%)
	Environmental: man-made environmental issues or actions	131 (16.8%)	120 (17.2%)
	Mention of programme-related (such as host, guests or media)	116 (14.9%)	184 (26.4%)
	Others or irrelevance	15 (1.9%)	28 (4.0%)
The comment attitude	Suggestions or criticisms (positive)	245 (31.5%)	301 (43.2%)
	Satire speeches	99 (12.7%)	102 (14.6%)
	Hate speeches	417 (53.6%)	264 (37.9%)
	Unclear or irrelevance	17 (2.2%)	30 (4.3%)

Table 3. 4. The Pearson Chi-Square Test result of all of the metrics.

	Pearson Chi-Square		
	value	df	Asymptotic Significance (2-sided)
Language use of the comment	2.366 ^a	3	.500
Published at (from the video was published)	2.366 ^a	2	.018
Is the comment have any reply count	.299 ^a	1	.585
Is the comment have any like count	1.085 ^a	1	.298
The comment genres	42.148 ^a	4	.000
The comment attitude	39.429 ^a	3	.000

Table 3. 5. The comparison of the descriptive statistics of the comment attitudes which have like count between the comments which are hidden by YouTube and displayed on a video's web page.

	Suggestions or criticisms	Satire speeches	Hate speeches	Unclear or irrelevance

The comments which are hidden by YouTube	95 (42.8%)	43 (49.4%)	201 (64.2%)	9 (47.4%)
The comments which are displayed on a video's web page	127 (57.2%)	44 (50.6%)	112 (35.8%)	10 52.6%)

a. Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

Table 3. 6. The Pearson Chi-Square Test result of the like count and each option of the comment attitude.

	Pearson Chi-Square		
	value	df	Asymptotic Significance (2-sided)
Suggestions or criticisms (positive)	5.129 ^a	1	.024
Satire speeches	.077 ^a	1	.781
Hate speeches	4.380 ^a	1	.036
Unclear or irrelevance	.474 ^a	1	.491

a. Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

To answer the first question, there are some potential patterns of the comment which are hidden by YouTube count, the comment genre, 'Environmental: local physical events' and the comment attitude 'hate speeches'. Firstly, as Table 3.7 demonstrates, 268 comments of 'political: mention of specific politicians or organisations' with 'hate speeches' were hidden by Youtube, which means the comments which mention the specific politicians or organisations with hate speeches have high frequency will be hidden. Secondly, from an issue-based perspective, it can be assumed that the comments of 'environmental: local physical events (such as global warming, extreme weather or wildfires etc.)' should have a high ratio be displayed on the web. However, there were only 57 comments on the web, compared to 88 comments hidden by Youtube (see Table 3.3).

Table 3. 7. The crosstabs of the comment genres and the comment attitude which was hidden by YouTube.

	Suggestions or criticisms	Satire speeches	Hate speeches	Unclear or irrelevance
Political: policy-related or economy-related	13	19	31	0
Political: mention of specific politicians or organisation	44	52	268	1
Environmental: local physical events (such as global warming, extreme weather or wildfires etc.)	55	6	27	0
Environmental: man-made environmental issues or actions	66	14	50	1
Mention of programme-related (such as host, guests or media)	67	8	41	0
Others or irrelevance	0	0	0	15

- a. Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

According to the Chi-Square Test, it can be found that the metrics ‘published time of the comment’, ‘the comment genres’ and ‘the comment attitude’ have significantly influenced the comments displayed on the web, I then do the analysis of the directional measures to examine whether these three metrics have the predictive power to predict the comments display on the web or not, if so, how is the ratio of the predictive validity of these metrics.

Since the value illustrated in Table 3.8, it can be found that the predictive effect of ‘publish at’ to predict the comment which prominently displayed on a video’s web page (λ)=.036, $p > .05$), the p-value greater than the chosen significance level ($\alpha = 0.05$), which means the predicted result does not establish, the metric ‘publish at’ do not reach the explanatory value to explain the comment is prominently displayed on a video’s web page.

Table 3. 8. The directional measures of the ‘publish at’ and whether the comment is prominently displayed on a video’s web page.

Directional Measures

			Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Nominal by Nominal	Lambda	Symmetric	.026	.013	1.937	.053
		Is the comment prominently displayed on a video's web page?	.036	.018	1.937	.053
		Published at	.000	.000	.c	.c

- Not assuming the null hypothesis.
- Using the asymptotic standard error assuming the null hypothesis.
- Based on chi-square approximation
- Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

Since the value illustrated in Table 3.9, it can be found that the predictive effect of 'the comment genres' to predict the comment which prominently displayed on a video's web page (Lambda (λ)=.116, $p < .05$), the p-value less than the chosen significance level ($\alpha = 0.05$), which means the predicted result is established, through the metric 'the comment genres' is able to predict whether the comment is prominently displayed on a video's web page, and the predictive value is 11.6%.

Table 3. 9. The directional measures of the 'comment genres' and whether the comment is prominently displayed on a video's web page.

Directional Measures						
			Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Nominal by Nominal	Lambda	Symmetric	.052	.012	4.402	.000
		Is the comment prominently displayed on a video's web page?	.116	.025	4.402	.000
		The comment genres	.000	.000	.c	.c

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.
- c. Based on chi-square approximation.
- d. Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

Since the value illustrated in Table 3.10, it can be found that the predictive effect of ‘the comment attitude’ to predict the comment which prominently displayed on a video’s web page (Lambda (λ)=.103, $p < .05$), the p-value less than the chosen significance level ($\alpha = 0.05$), which means the predicted result is established, through the metric ‘the comment attitude’ is able to predict whether the comment is prominently displayed on a video’s web page, and the predictive value is 10.3%.

Table 3. 10. The directional measures of the ‘comment attitude’ and whether the comment is prominently displayed on a video’s web page.

Directional Measures						
			Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Nominal by Nominal	Lambda	Symmetric	.073	.029	2.467	.014
		Is the comment prominently displayed on a video’s web page?	.103	.038	2.561	.010
		The comment attitude	.047	.029	1.558	.119

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.
- c. Based on chi-square approximation
- d. Bold numbers are used to emphasise critical values in the results, which are crucial for understanding of the analysis.

The automated systems for YouTube comments are an important metric to examine how YouTube affects the distribution of the context of the comment. There were a large number of related studies focused on the criteria for showing comments on the web via the YouTube algorithm, which can be classified as two findings. Firstly, Bucher (2018, p. 131) mentioned

that YouTube algorithms are continually changing, and the watch time as the value overview count, like count and reply count are the three metrics that are already regarded as the ranking criteria for the YouTube algorithm. Secondly, the common debate is that the YouTube algorithm cannot recognise spam comments and that the YouTube algorithm sometimes leaves the spam comments displayed on the video's web page because of their high "dislike" counts (Bucher2018, p. 128). In addition, Madden, Ruthven and McMenemy (2013) also pointed out that YouTube's automated systems hide the spam comments which are classified as unwelcome and unsolicited information, such as advertisements or links to dating or pornography sites. To observe the difference between the prominently displayed on a video's web page and the output from YTDI, I created a comparison spreadsheet for conducting further content analysis, the table includes the ranking of comments, publish time, the language of comments, reply count and like count.

The result of the comparative analysis of comments demonstrates four potential patterns of the comment which are filtered out or hidden by YouTube. Firstly, the comment genre and the comment attitude, here mean that spam comments are the two comment genres which are hidden by the 'click to expand' feature on the YouTube web page.

Some potential patterns of comment metrics are frequently hidden by YouTube count, such as the comment genre, 'local physical environmental events and the comment attitude 'spam comments'. Firstly, as Table 3.7 demonstrates, 268 comments of 'mention of specific politicians or organisations' with 'spam comments' were hidden by YouTube, which means the comments which mention the specific politicians or organisations with spam comments have high frequency will be hidden. In addition, from an issue-based perspective, it can be assumed that the comments on 'environmental: local physical events (such as global warming, extreme weather or wildfires etc.)' should have a high ratio displayed on the web. According to the debate on hiding spam comments, the data distribution indicated that

YouTube is a double-edged platform for communicating environmental issues because the comment analysis demonstrates that only 53.6% of spam comments are deleted by YouTube algorithms.

Secondly, according to the Chi-Square Test, it can be found that the metrics 'published time of the comment', 'the comment genres' and 'the comment attitude' have significantly influenced the comments displayed on the web. In addition, although these three metrics reach the explanatory value, they still have less predictive value than 15%, which means the prediction effect of a single variable is not significant for determining whether the comment is prominently displayed on a video's web page. Thirdly, 52.7% (N=778) of comments are hidden by YouTube, which means the comments cannot be seen by users, even if they slide down to the bottom of the web page; and 47.3% (N=697) of comments are displayed on the web page. The distribution trend of both comments being hidden and being displayed on YouTube is similar within each metric.

Lastly, there is significant data on the distribution of the comments in the metrics of 'language use', 'published time' and 'comment genres'. The distribution of the language use of the comments, the comments discourse almost consisted of TC (N=886, 60.1%) and SC (N=603, 40.9%), which matches the result displayed by the frequency list that the wordlists of the three types of programmes consist of the keyword in TC and SC. The published time of the comments which are displayed on the web is concentrated on 3 days after the videos were released (N=1211, 82.1%). In addition, the most frequent comment genre on the web is 'mention of specific politicians or organisations (N=622, 42.2%)', as the comment discourse represented, Trump, President Tsai and the DPP were the three politicians or organisations which appear frequently. And the second-most frequently commented genres are 'man-made environmental issues or actions (N=251, 17%)' and 'mention of programme-related (N=300, 20.3%)'. The comment genre reflects that the content of the comments is

mainly to evaluate the programme, such as agenda-setting or guest arrangement. The comment attitudes of the comments are focused on suggestions or criticisms (N=546, 37.0%) and hate speeches (N=681, 46.2%).

Besides, I find a limitation of YouTube comment analysis, that it is difficult to observe the actual rank of these metrics which affect the ranking of the comments, that the ranking is usually influenced by multiple metrics. For example, it can be found that the top one or two comments do not have many like counts or the content is not related to the video or the comments in the bottom have a high discussion (high like counts or reply to counts).

E. Limitations

1. Sentiment analysis of the Chinese-based comments

According to the related studies, sentiment was often an important metric on the comment analysis, for examining the intensity of emotions or sentiments of online viewers (Livas, Delli and Pandis 2018) or recognising whether YouTube is a potential channel for learning about science or constructing knowledge (e.g., Dubovi and Tabak 2020). Therefore, I used sentiment analysis for seeking the environmental issues which elicit particularly strong positive or negative sentiment. On the one hand, the political talk shows, one of the major subjects of the study, it is important to observe that whether the comment below YouTube only have sentimental differences on certain environmental issues or show obvious positive or negative sentiments in politicised comments, which will lead to political polarisation. On the other hand, it can be observed that the comments of the in-depth reportings have a positive or pessimistic sentimental response to the environmental issues conveyed in the videos, such as stimulating environmental action or only increasing anxiety about environmental risks.

During conducting the sentiment analysis, I found that both the Sentistrength and BUTTER cannot generate the corresponding results, which are the two typical sentiment analysis

(opinion mining) programmes. According to the multimodal analysis, the expected results should have clear sentiment data, but both these two systems only recognise less than 10 comments have sentiment words among more than 100 comments on average. It is important to notice that after I manually view those comments that have not been identified with emotional words, most of these comments actually exist as emotional words. After comparing the relevant literature, I speculated two possible reasons for why the YouTube comments in this case cannot reach a reasonable result. One is the form of the comments that people use more emojis, question marks, exclamation marks or complete event descriptions instead of emotional words, for instance, in a comment condemning a politician, the comments in this case use the politician's name with exclamation marks instead of using a precise word. The other reason is the differences in the organisation of sentences and words in different languages, the comments in this case are mostly in Chinese. However, the composition of Chinese is not as easy to recognise as English because the comments usually use proverbs or dialect, which cannot be recognised by the software easily.

F. Ethics, and Data Management

The emerging development of the digital media extremely increases the public engagement on digital platforms, by creating a personal account and leaving the personalised opinion, which is distinctly increasing the importance of ethics. The current digital media ecology is a chaotic sharing sphere developing with a surprising scale and speed, which emphasises a double-edge situation that it improves the data accessibility and increases the risky problem of appropriate ethics governance. It needs to clarify that the data governance is continuously updated through the algorithm, and different digital media in different regions sometimes have different data regulations. Against this backdrop, it is important to ensure that the digital data is appropriately collected and used.

This study employed political talk shows, non-political talk shows and in-depth reporting as the research objects and YouTube as a corpus search database. Data collection is divided into three steps: filter out the relevant episodes, collect the video information and collect the caption. The first step will filter out the relevant episodes by using the YouTube search bar below the specific channel. Next step will use Bernhard Rieder's YouTube Data Tools (YTDT) to obtain the filtered video's information: click the modules of 'Video Info and Comments', type in the 'Video id' and click 'submit query'. And the final step will collect the caption in the filtered video. Depending on the output spreadsheet ('basicinfo. tab' file) from YTDT, it will easily have the basic video information (e.g., video title, published time, video description etc.) for description in the research, and observe the trend of public awareness on environmental issues by view count, like/dislike count and comment count. Further, the 'comments. tab' file from YTDT will provide the data for observing the intensity of the connection between the video contents and the comments.

To ensure the data integrity, I take two advance preparations before collecting the data, including: complete the full ethics training; guarantee the data impartiality and anonymity by using reliable online tool modules- YTDT which directly extracts data from API, to ensure the data sources are not bogus or biased.

The process of data collecting includes the YouTube comments which are involved in storing information related to identifiable individuals. I will ensure that: this data is stored securely on university servers; and make redact usernames or use pseudonyms. In dealing with the comments, I will quote a comment verbatim or paraphrase it. I will choose the comment if its content is directly related to my research. To protect the YouTube users in my study, I will paraphrase all comments except those made by certified users.

According to data storage and security, I will guarantee that only my supervisors and I can access the data generated at each stage of the research, with identifiable form. Also, I will

ensure the security of data processed during the project by ensuring that personal information is kept secure at all times. Even if the research has been published, I will ensure that personal information is kept secure and stored till the destruction time. The personal data will be destroyed 3 years after publication.

G. Data Construction and Research Process

1. Generating the video network data from YTD

To understand the video's genre link from the seeds video through YouTube's recommendation algorithms, the videos are selected from a specific seed video from YTD and investigated how the 'Up Next' network worked on YouTube. In this question, I used setting additional parameters from the Video Network Module. To generate a good size network, I set 'crawl depth' to 0 on YTD, which means the network will show us only how YouTube relates the seed videos to other seed videos with no additional recommendations. In the following example (see Figure 3.21), the political talk shows video has 136 seed videos in total. Below, how the available data for analysing was generated (see Figure 3.19) is set out:

1. Click on 'Seeds', then enter video id.
2. Set the number of crawl depths to ["0"]
3. Submit and download the related video network file.

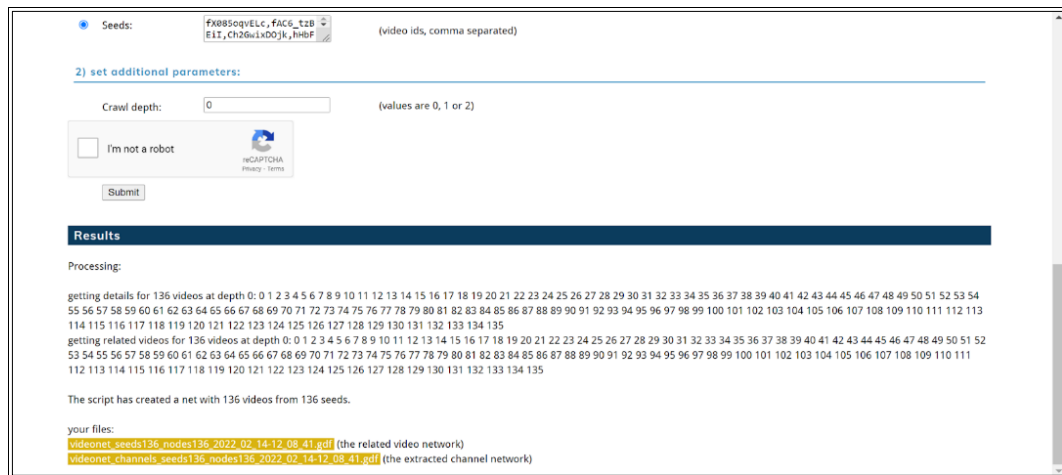


Figure 3. 21. The schematic diagram of the Video Network Module of YTD 2022. (Print Screen)

2. Exploring the video network data in Gephi

Through importing the output from YTD, the integrated video network can be explored by Gephi. To create a readable overall video network and an identifiable cluster network, I used the setting layout of nodes and edges in Gephi. Below are the steps of exploring and setting up the network file in Gephi as well as explaining some of the specific terms:

1. Drag the related video network file (.gdf) into Gephi (see Figure 3.22), there are two terms which are needed to identify: ‘# of Nodes’ and ‘# of Edges’. In this case, the nodes are videos, as Figure 4.2 demonstrates there are 46 videos related to the seed video through YTD. Edges are the links between the nodes, in this case, the edges illustrate which videos YouTube recognises as ‘related to’ each other.
2. There are two graph types: directed and undirected, in this case, I choose directed, which means that the edges between the nodes have a direction, and the recommendation system is irreversible as well.

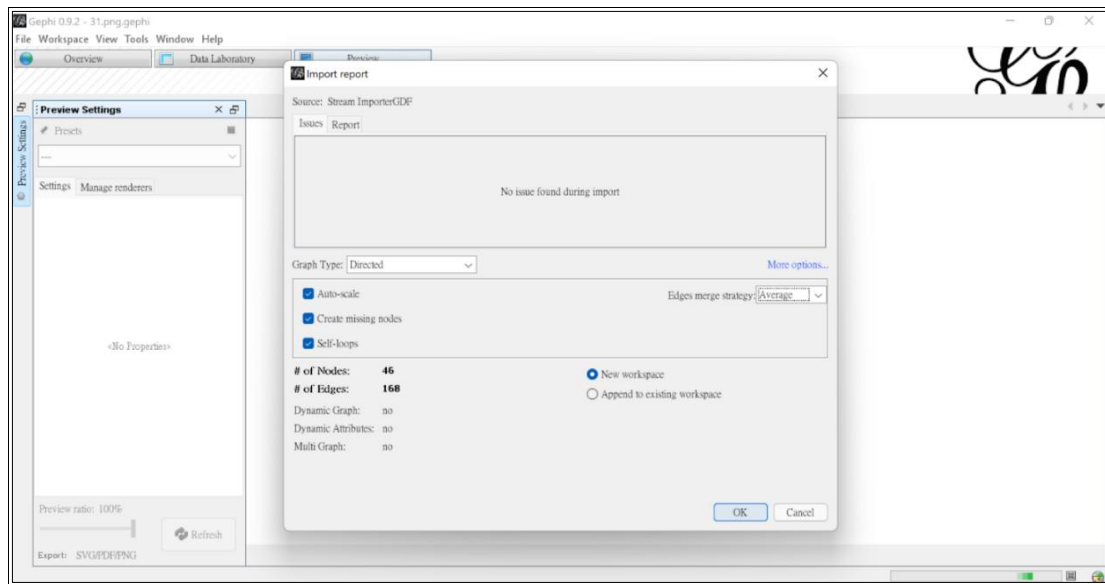


Figure 3. 22. The schematic diagram of the dialogue window of Gephi. 2022. (Print Screen)

3. Press ok and do some basic settings in the overview to adjust the network to make it readable.
4. Change the layout to 'ForceAtlas 2' which makes the appearance of the graph more meaningful and add some information. At the moment, the network looks crowded, I then adjust the scaling (to 20.0) which shows on the Layout pane. (See Figure 3.23)

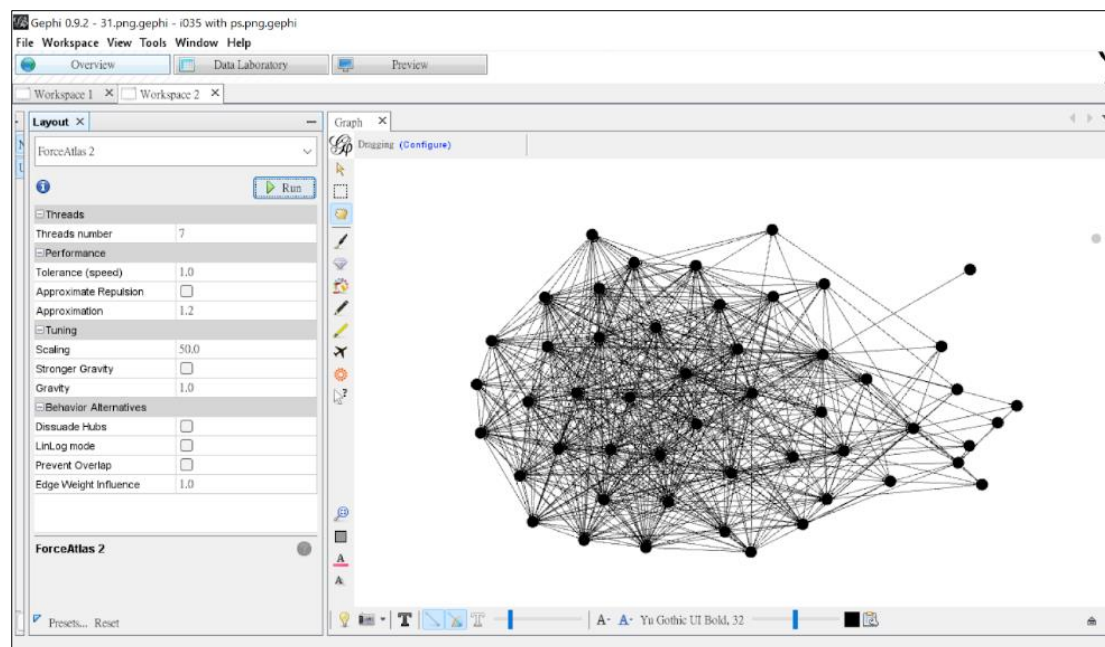


Figure 3. 23. The layout setting of the network in Gephi. 2022. (Print Screen)

5. Add labels and set the font through the bottom menu box, click 'show node labels' the font 'Yu Gothic UI'.

6. Adjust the appearance, Nodes ([In-Degree]), and adjust the minimum and maximum sizes to your own preferences, which means the number of links into a particular video by the 'Up Next' function. (See Figure 3.24)
7. Clustering layout by Modularity through applying the 'Modularity Class' of 'Partition' of 'Attributes' in the filter. (See Figure 3.23)

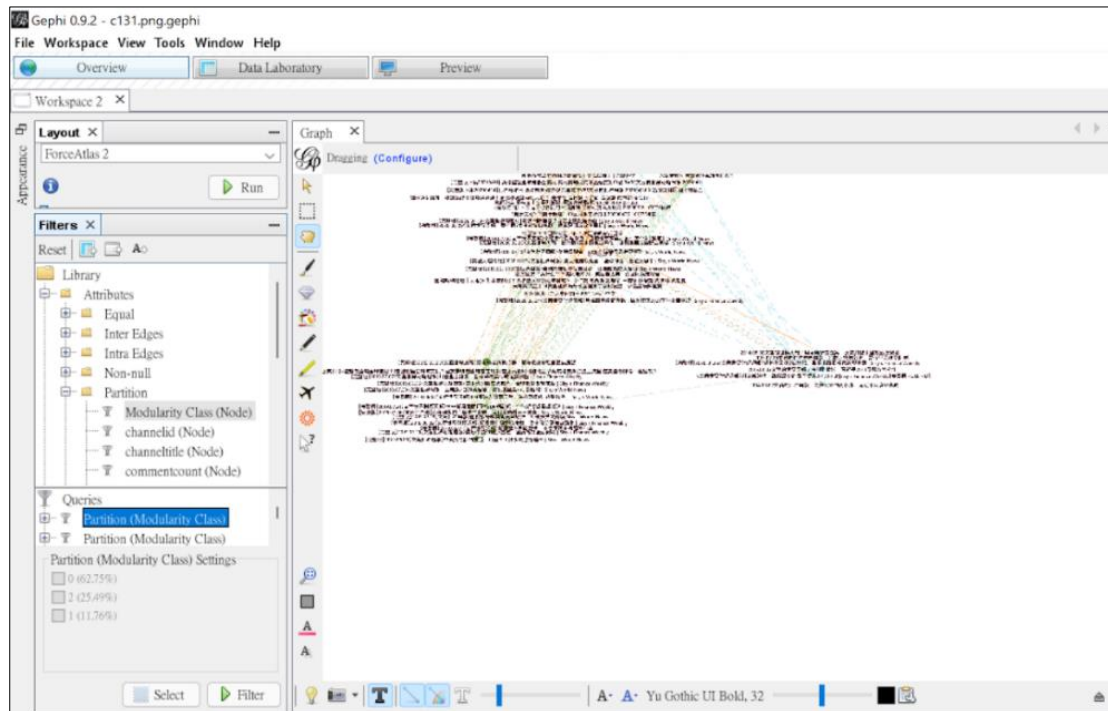


Figure 3. 24. The appearance of the cluster network in Gephi. 2022. (Print Screen)

IV. Analysis

A. Video multimodal analysis

The Taiwanese political talk shows, non-affiliated talk shows and in-depth reporting videos on YouTube are a powerful communication form for both political and environmental issues. Both of these programmes provide a complete platform for environmental communication through their narratives which include the background construction and influence of environmental issues, and YouTube has become an integrated online platform for environmental communication. However, none of the academic literature focused on the environmental communication of political-based programmes, as well as no relevant YouTube-based studies in these genres of programmes. As discussed in section A.2. of the literature review chapter, a large number of studies have focused on the spread effect of politics on television, the political discourse mostly spread through news, political talk shows and in-depth reporting, and was often packaged with the other issues, such as energy policy, air pollution or government effectiveness. The previous studies have also confirmed that politics and political discourse have been drawn into the entertainment logics of television, which means political discourse is becoming more focused on entertainment than deliberation.

I use multimodal analysis to examine how producers of different types of programmes promote environmental issues. Firstly, with regard to environmental issues, these programmes focus on two main aspects: local physical events, which include non-man-made natural disasters, such as extreme weather or wildfires, and the related issues of climate change, which are related to the man-made actions of energy saving and carbon reduction, such as energy transformation, plastic reduction actions, or air pollution.

In sum, the videos are important research materials for examining environmental communication in the political field as well as in the digital field. Through multimodal analysis, I find that both talk shows and in-depth reporting videos are the main channels for Taiwanese people to receive environmental information, which is not only an education platform but a platform for political communication. It can be identified that both talk shows and in-depth reporting channels and news channels are the two main channels for people receiving environmental information. In contrast to both talk shows and in-depth reporting videos, news videos are less important in environmental communication for two reasons, firstly, the agenda-setting of news videos is more focused on real-time issues, which have shorter issue fermentation time; secondly, news videos have the time limitation for a piece of news in approximately three to five minutes, which have less consonance effect than talk shows and in-depth reporting. As Scharrow (2019, p.206) mentioned that the agenda-setting and temporal stability is increasingly relevant, that the content stability over time is considered to be an important condition for media effects. It means that talk shows and in-depth reporting which have fixed and individual broadcasting time with specific agenda-setting, have brought up stronger media effects than news, especially on promoting specific policies or political arguments.

After analysing five videos within all types of the YouTube channels and YouTube playlists, I identify a potential line of comparison, that is the performance of speeches for different political perspectives and non-political perspectives, which includes all of the YouTube channels and YouTube playlists. Through the data classification analysis, I find that different channel genres have their preferences for issues. Firstly, the videos within particular political perspectives have focused much on short-term or policy-based environmental issues, such as air pollution and the energy policies operation. Table 4.1 demonstrates the distribution of the themes for each different political perspectives and non-political perspectives, that the videos within particular political perspectives have focused much on air pollution, climate

change and the current energy policies in Taiwan, including renewables and nuclear issues. The political perspectives mean the two of mainly political ideologies in Taiwan, that the Kuomintang (KMT) is the dominant party in the Pan-Blue Coalition and primarily competes with the rival Democratic Progressive Party (DPP). There are some typical discourses on particular topics between two main political positions in Taiwan (see table 4.2). For example, in the discourse involving air pollution and politics, both pan-blue and pan-green's presentations are condemning the political practices and elections. In the discourse of nuclear energy, the pan-blue's presentation denounces the nuclear free by 2025 policy, which is put forward by Taiwan's ruling party (DDP), and the pan-green's presentation is a passive explanation that the use of nuclear energy is to solve the problem of power shortage. Compared with the discourses of political videos, the non-political videos usually focused on the global extreme weather or the economic impacts of global warming (see table 4.3).

Secondly, the videos from non-political perspectives have focused much more on long-term or international environmental issues, such as global warming, climate change, green energy and ecological environment issues. Unlike the political talk shows, the sources of non-political perspectives videos use much more foreign media as information sources, such as Sky News, the ABC news, the CNN the BBC and the Guardian etc, which can be regarded as an important education platform.

Table 4. 1. The similarities and differences between the themes covered in the different video types.

Rank of issue	Pan-blue	Pan-green	Non-political
1	Renewables (35%)	Nuclear (26%)	climate change (26%)
2	Air pollution (25%)	Air pollution (21%)	global warming (20%)
3	Nuclear (15%)	Climate change (16%)	green energy (14%)
4			ecological environment (12%)

	The pan-blue political perspective	The pan-green political perspective
air pollution and everyday life	<p>PM2.5 is the number one carcinogen listed by the WHO... In Kaohsiung, people in Kaohsiung cannot go out 80% of the time in January 2018. (Siang-Long, Tang, 1035, position 22)</p> <p>The DPP fought air pollution to defraud voters. (1035, Title)</p>	<p>The fire disaster that happened in Kaohsiung may have caused air pollution to the worst degree. (G006, Title)</p> <p>Guo-yu, Han was afraid of being criticised for inaction that he not only self-recorded a video explaining that an air pollution warning had been issued but rushed to the scene. (Guei-Ya, Syu, G006, position 13)</p>
air pollution and politics	<p>Is the initiation of the second nuclear plant to slow down the air pollution problem caused by the Taichung thermal power plant so that the mayor of Taichung city can be re-elected? (Shao-Kang, Jhao, 1035, position 18)</p> <p>DPP stole nuclear power. (1035, Title)</p> <p>The Taiwan Power Company (TPC) wants to fight for parallel power generation on April 1, which is impossible. (Shao-Kang, Jhao, 1035, position 3)</p> <p>The DPP's attitude on nuclear power issues, which is like a U-turn. (1035, position 13)</p> <p>It is shameful for the ruling party (ODP) to restart the first nuclear power plant. (Shao-Kang, Jhao, 1035, position 16)</p> <p>The speeches by William Ching-te, Lai said that it was not 'restarting' but 'applying for re-operation of the nuclear power plant, which is a word game. (Shao-Kang, Jhao, 1035, position 21)</p>	<p>Even the district where the members of the Legislative Yuan Din-Lin, Chao is located smells very strong. "Is this problem not big enough? (Guei-Ya, Syu, G006, position 16)</p> <p>Operating the nuclear power plant is the last resort. (William Ching-te, Lai, 1035, position 11)</p> <p>If the power shortage problem can be solved, of course, I hope that the first nuclear power plant is able to operate again. (Chih-Chieh, Hsu, 1035, position 15)</p>
nuclear energy	<p>If you understand what natural gas is, you will know that it must be stored and ballasted before being shipped. (Wen-Chien, Chen, K007, position 5)</p> <p>DPP made a U-turn in the policy of Nuclear free by 2025! (1035, Title)</p> <p>The DPP needs to explain to everyone how to explain the drift of 'nuclear free by 2025'. (Siang-Long, Tang, 1035, position 17)</p> <p>The cost of nuclear power by 2025 is 'firing on all cylinders' which is a metaphor that means using thermal power extensively! (K006, Title)</p> <p>If the third storage is not built this year (2017), the natural gas will not reach the expected supply in 2022, and then the policy of nuclear free by 2025 will not be discussed anymore. (Wen-Chien, Chen, K007, position 8)</p>	<p>Natural gas is not stored but unloaded. (Wei-Cha, Huang, K007, position 6)</p>
natural gas		
nuclear free by 2025		

Table 4. 2. The similarities and differences between the themes covered in the different video types.

	The political talk shows (no party affiliation)	
	Global warming led to the Norilsk diesel oil spill, the 2019 Siberia wildfires and the plague of moths in China. (BO22, position 18)	
global warming	Because of the melting ice of the North Pole, many small islands that used to be covered under the ice slowly emerged. (Shih-Cong, Huang, BO22, position 22)	Korea has never been so dry in the past. (Wen-Chien, Chen, C131, position 11)
		India's daily rainfall today was equivalent to 60% of rainfall in June. (C131, position 23)
		We have lost 50% of the melting ice. (Jeff Berardelli, C131, position 25)
	The temperature of the North pole has reached up to 38° Centigrade. (BO22, Title)	The drought and heavy rains in India have affected more than 700 villages and up to 400,000 people. (Wen-Chien, Chen, C131, position 22)
	Taipei has the second hottest weather in June in history. (Yun-Siang, Syu, BO22, position 3)	The temperature in France was as high as 40 degrees a while ago. (Wen-Chien, Chen, C131, position 3)
	The weather is really weird this year. The high temperature did not appear in India, nor in Vietnam, where it should be hot. (Yun-Siang, Syu, BO22, position 4)	Severe hail has hit Mexico. (Wen-Chien, Chen, C131, position 4)
	The polar regions have not high temperatures unexpectedly, can you believe it appears in the North Pole? (Yun-Siang, Syu, BO22, position 5)	Heavy rains have hit both China and India. (Wen-Chien, Chen, C131, position 5)
	The North Pole has a high temperature of 38 degrees Celsius, which is like scorching heat. (Yun-Siang, Syu, BO22, position 7)	The recent tropical storm in the United States has increased the threat of flooding, including Louisiana and New Orleans, the severity similar to Hurricane Katrina. (Wen-Chien, Chen, C131, position 6)
extreme weather	This kind of high temperature seems like a curse. (Yun-Siang, Syu, BO22, position 8)	The daily rainfall of Washington, DC which caused the White House to be flooded and the subway station turned into the 'Shullian Dong' 'waterfall cave'. (Wen-Chien, Chen, C131, position 8)
	The high temperature has triggered hunting under the deep sea in China, the United States and Russia. (Yun-Siang, Syu, BO22, position 10)	Tornadoes hit the northern area of Greece. (Wen-Chien, Chen, C131, position 9)
	Can you imagine it? The current temperature in the North Pole is 38 degrees Celsius, which is the same as Taiwan. (Shih-Cong, Huang, BO22, position 12)	The temperature in Germany, Poland and the Czech Republic also rose to 40 degrees Celsius. (Wen-Chien, Chen, C131, position 21)
	Scientists originally estimated that such extreme temperature differences would only occur in 2100, but they did not expect it to happen 80 years in advance. (Shih-Cong, Huang, BO22, position 16)	As the changes of weather fundamentally change during patterns all over the world, the extreme weather will become ordinary, and it is extraordinary, such as the heat disaster in France or the flooding in the US. (Jeff Berardelli, C131, position 27)
	The Yangtze River, which spans 3,000 kilometres from east to west, is now caught in wind and thunder. (Yun-Siang, Syu, BO22, position 31)	
	The waters of the Yangtze River occupies nearly 20% of China that is unexpectedly threatened by extreme weather now. (Yun-Siang, Syu, BO22, position 33)	
	Even Chongqing has the biggest flood in 80 years. (Yun-Siang, Syu, BO22, position 36)	
	Shanghai suffers from heavy rain for five days. (Hong-Bo, Jiang, BO22, position 37)	Global warming hits the economy, causing it to lose 80 million full-time power in a decade. (Wen-Chien, Chen, C131, position 28)
global warming influence the economy	Because of the melting ice of the North Pole, many small islands that used to be covered under the ice slowly emerged. (Shih-Cong, Huang, BO22, position 22)	2.2% of global working hours will be lost... the total loss even reached US\$2.4 trillion. (Wen-Chien, Chen, research and development and enrichment. (BO22, position 27) C131, position 29)

Table 4. 3. The performance of speeches and titles in the specific topics within non-political perspective.

The following findings explain how the political talk shows, non-affiliated talk shows and the in-depth reporting reproduce environmental issues in terms of agenda setting, tone, visualisation and the narratives in politics, which match the first research question: How do political talk shows reproduce environmental issues in terms of agenda setting, content, and tone? In sum, the result of the communicative practices on multimodal analysis is that almost all of the videos have their own arguments, and they all use similar communicative practices to reduce the ambiguity of the contents, including the use of speeches and title bars, the use of data and numbers, the editing techniques of the footage, gestures, sounds and code-switching. However, they focus on different scales of environmental issues and draw on content from different sources. The following sections identify the aim and communicative practices of each of the three programmes in depth.

1. Political talk shows

As Rose argues, (2001, p.6) visuals are a contemporary form to construct social life and cultures. For instance, the 'video' on YouTube is a kind of technology that renders the world in visual terms. Visuality is similar to visual, but the vision constructed of visuality has several forms (Foster 1988a: ix, cited in Rose 2001, p.6), such as 'how we see' and 'how we are able, allowed, or made to see'. Political talk show videos on YouTube are a form of political ideology constructed by visuality. For example, the environmental issues are always presented through visual elements which have specific political viewpoints. As Rose (2001, p.7) mentioned, modern forms of knowledge are constructed by equating seeing with knowledge. Thus, I observe how visuality works with environmental news items and talk shows in the video to assess how this form of knowledge is produced, through the comparative analysis of the videos. For instance, as the following Print Screen shows (see Figure 4.1), the videos will be cut into many footages and recorded with the label of position and time, as the blue highlight colour shows, each image is then assessed through the six communicative practices, as the red highlight colour shows. There are six typical

communicative elements emerging in my analysis, as shown in the paragraphs below (see Figure 4.1), including speeches and title bars, the use of footage via symbols, editing techniques and montage, the use of numbers and data, gestures, sounds and code-switching, which are typical practices in the three video genres.

Po sition	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other
1	0:24		An enhanced speech, Today's topic maybe was not just a program but a mournful event. It was because that the fire in amazon forest did not slow down and was not disappear either (今天的主题可能不是一场电视节目，而是一个哀悼的节目。在亚马逊森林大火既没有减缓，也没有消失)。 An enhanced title bar, The Amazon wildfire burned continuously, thus the Brazil government finally agreed to help (亚马逊森林大火持续蔓延，巴西政府最终同意)。	Using footage of Amazon rainforest wildfires with a wide shot and aerial shot.			The host said 'the Amazon wildfire did not slow down and didn't disappear either' with a husky voice.		
2	0:40		A complementary speech, Under arid climate, as long as these rainforests got fire, the fire would constantly spread out (在热带雨林在乾燥的氣候下，一旦起火燃燒，就會不斷對外擴散)。	Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.		An emphasised gesture which means 'diffusion'.	The host said 'constantly spread out' with a husky voice.		
3	1:00		An enhanced speech, This time, the catastrophe was only caused by human factor instead of arid climate. It levelled lands to act in concert with local cropping pattern, which resulted in a wide range of forest fire (這次的浩劫並不是因為乾燥的氣候，而是當地的人為，為了配合當地耕種方	Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.			The host said 'man-made' with a husky voice.		

Figure 4. 1. The table of the comparative analysis of the videos within the six communicative practices. (Print Screen)

The communicative practices involved in these videos can be described using conventional cinematography term, I provide a list of the terms that appear in the comparative analysis and define them in Table 4.4.

Table 4. 4. The cinematography terms in the comparative analysis.

terms	explanation
close-up	A frame depicting the human head or an object of similar size.
fast-forward	A scene or sequence inserted into a scene set in the narrative present that images some events set in the future.
filter out	An editorial transition in video or photo screen conversion.
head and shoulders shot	A close up shot from above the shoulder.
look-down	A top-down bird's-eye view, used to present a large-area environment.
mixing up	A montage editing technique that presents similar clips from multiple sources in a short period of time.
rotate	An editorial transition in video or photo screen conversion.
short version	A condensed text for quick understanding of background knowledge.
sliding	An editorial transition in video or photo screen conversion.
split screen	A typical mode of in-depth reporting, which is a way of simultaneously presenting speech and screen.
time-lapse	Used to present time and space faster than real-time.
vibrating	Use vibrating footage to present a sense of history or use tight music to present devastating images.
warm filter	Used to present a sense of history.
wide shot	Also called a long shot or a full shot, is a shot that shows the subject within their surrounding environment.
zoom-in	Adjust a camera to make a person or thing being photographed appear larger or closer.
zoom-out	Adjust a camera to make a person or thing being photographed appear smaller or farther away.

a. Speeches and title bars

As Wojcieszak (2009) notes, 'polysemy reduction' is a common practice to reduce ambiguity through the combination of the iconic, linguistic, and audio messages. For instance, the voice-over narrative and on-screen text are the two main communicative practices for reducing ambiguity (p.462), which means leading the audience to read the specific arguments. In this study, the videos use lots of title bars, text boxes or speeches leading to specific views, which can be classified into three categories: enhancement content, compliment content and conflict content, and often accompanied by word game or political satire. For instance, the content in figure 4.2 shows an enhanced title bar with satirical words:

'New Taipei City advocates to clarify where to put nuclear waste first? The behaviour of the DDP seems like "no overall plan for a fundamental transformation"' (I035, position 7)

This quoted title bar below points out the specific argument discussed in the talk shows and uses 'no overall plan for a fundamental transformation' to satirise that the DDP does not solve the main problem, but only focuses on the surface. It also appears in pan-green talk shows and in-depth reporting, as figure 4.3 shows, 'The fire disaster that happened in Kaohsiung may have caused air pollution to the worst degree...and the solution from Guo-yu, Han is behind the times?!', which accuses the mayor of Kaohsiung, and satirises his crisis handling as 'behind the times'.



Figure 4. 2. An enhanced title bar with political satire in pan-blue talk shows. (I035, position 7)



Figure 4. 3. An enhanced title bar with political satire in pan-green talk shows. (G006, position 1)

The title bars often are used to complement the enhanced speeches, data or footage, according to figure 4.4, the complementary speech shows, ‘the colours which above yellow indicate that the air quality exceeds the standard’, which is used to supplement the data. Besides, the complementary speech sometimes is used to increase the severity of the topic, as the speech shows below, ‘according to the announcement of WHO, there are at least 7 million people who die of air pollution per year. Most of the population concentrates in Asia’ (C037, position 6), which goes along with the main argument of the video that air pollution is a priority issue in energy transition around the world.

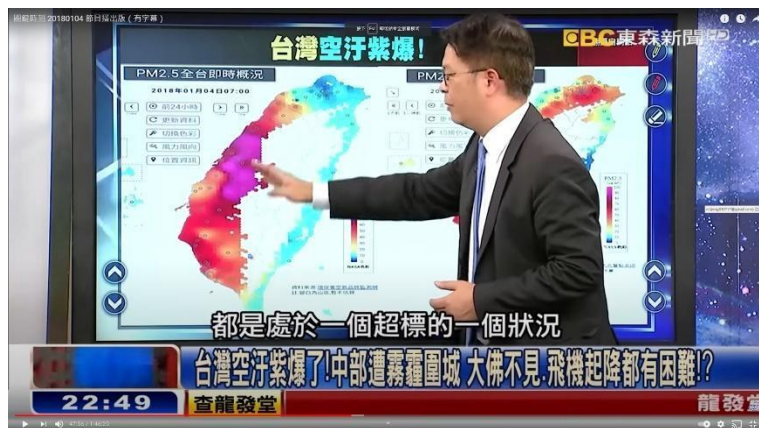


Figure 4. 4. A complementary speech in no party affiliation talk shows. (J007, position 9)

The conflicting title bars and contents mostly appear in the political talk shows rather than non-political videos, because they always have negative meanings. For instance, the following speech shows in pan-green talk shows:

‘Ying-jeou, Ma, the former president, had promoted wind power about four or five years ago, but the Bureau of Energy suddenly rejected it because of blocking tunnels. Thus, there were eight wind power plants being wasted’.

This speech criticises that the political governance of the KMT was worse than the DDP’s, the current government. It is needed to notice that the word game often accompanies the conflicting content, as figure 4.5 shows, ‘DPP made a U-turn in the policy of Nuclear free by 2025! They stole nuclear power and fought against air pollution to defraud votes?’ The title

bar not only represents the political opposition to the 'nuclear free by 2025', one of the current energy policies in Taiwan, but accuses the DDP playing a word game that reducing air pollution (reducing burning coal) is used as an excuse that the policy cannot be implemented.



Figure 4. 5. A conflicting title bar with a word game in pan-blue talk shows. (I035, position 1)

In addition to the above contents, the source of all of the analysed videos do not have obvious differences, news media are used most, and only few of the other sources, such as Facebook, movie, Twitter, interpellation video, documentary film, WHO etc. However, it only appears less than three times that some talk shows use news media with the same political status as their information sources, for instance, 'For A New Taiwan (a pan-green talk show)' uses 'SET News Channel (a pan-green news channel)' as the source (G006, position 6); 'Situation Room (a pan-blue talk show)' uses 'The China Times (a pan-blue news media)' as the source (I006, position 2).

b. The use of footage via symbols, editing techniques and montage

The performance of footage is an important metric for communication, especially in environmental issues. According to Smith and Joffe's (2009) study, they found three communication practices of visual angle via analysing the climate change images in the British press. Including: using wide shot and full shot to emphasise that global warming is getting worse (p.652); emphasising the climate change problem through visual contents

from specific political leaders (p.655); and using table to illustrate the climate change problem (p.656). The communication practices below are also found in environmental communication of talk shows and in-depth reporting in Taiwan, which has more multiple communication practices.

Firstly, the videos often use two kinds of images as symbols to represent the environment, one shows 'cause', the other shows 'effect'. As Lester and Cottle's (2009, p.929) quantitative analysis mentioned, using "spectacularization" and "symbols" to shape nature, environment, area and people can help to create a powerful sense of threat in television views. For instance, as the representation of air pollution issues in the political talk shows, the symbols which appear in footage frequently are 'smoke', 'factory', 'building', 'grey sky' and so on (see Figure 4.6), which emphasises the cause of air pollution problem.



Figure 4. 6. The common symbols for air pollution issues in pan-blue talk shows. (1035, position 22)

Secondly, the videos use numerous editing techniques with different camera angles for similar usage. For instance, 'close-up' shot is the common use in footage, which is always used for emphasising the argument, such as highlighting the number or data (see Figure 4.7), the source of the argument (see Figure 4.8). The 'head and shoulders' shot is often used for highlighting the opinion leaders (see Figure 4.9) or working with the symbols of political leaders (figure 4.10). The 'wide shot' is often used for emphasising that an issue is getting

worse, for example, in air pollution issues (see Figure 4.11). Nonetheless, other editing techniques, including short versions and split screens, currently appear only a few times.



Figure 4. 7. A 'close-up' shot of number or data for emphasising the argument. (I035, position 12)

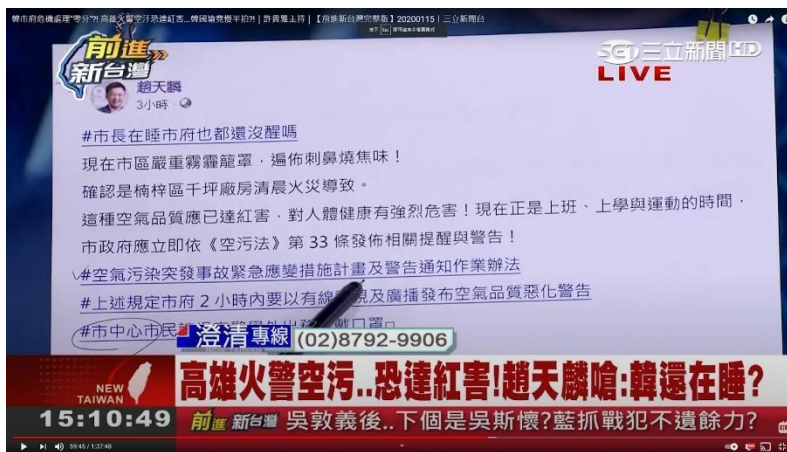


Figure 4. 8. A 'close-up' shot of source for emphasising the argument. (G006, position 17)



Figure 4. 9. A 'head and shoulders' shot of the opinion leader. (K006, position 14)

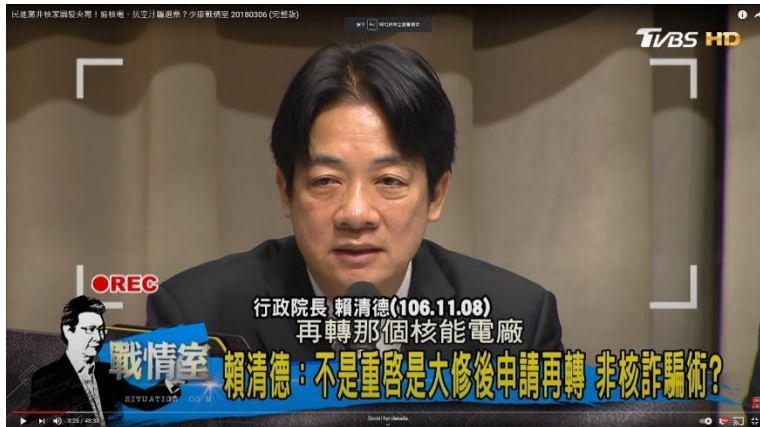


Figure 4. 10. A 'head and shoulders' shot of the political leaders. (I035, position 11)



Figure 4. 11. A 'wide shot' of air pollution issues. (J007, position 6)

Thirdly, the montage is also a common editing technique which includes multiple editing forms and is used for condensing space, time, and information. The representation form of montage is 'mixing up' a series of footage or images to emphasise the long-term interaction, such as the air pollution issue is not only a man-made environmental issue, but a negative effect of human life (see Figure 4.12). The 'zoom-in', 'zoom-out', 'look-down', 'rotate' and 'vibrating' are not often used alone but mix two or three editing forms to emphasise the severity of the environmental issue, as figure 4.13 shows that the footage uses 'zoom-in' editing technique to represent the severity of the extreme weather which appear in the North Pole. The montage is often used for illustrating the long-term changes in a short period of time, for instance, the footage (see Figure 4.14) uses 'time-lapse' to emphasise how the temperature changed in a week.



Figure 4. 12. A montage (mixing up) of air pollution issues. (Print Screen, J007, position 12)

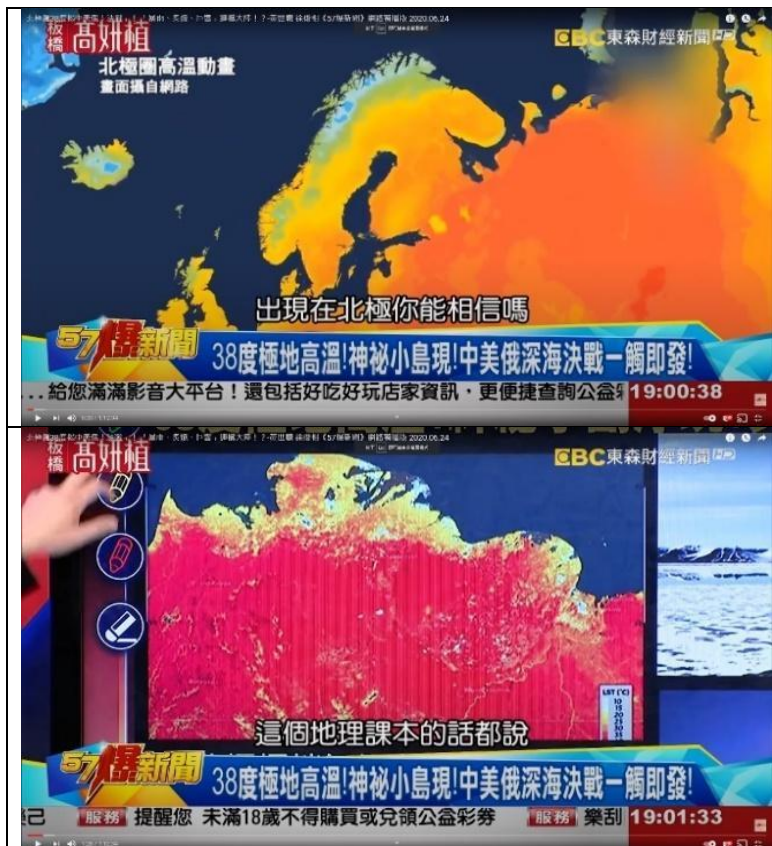


Figure 4. 13. A montage (zoom-in and look-down) of climate change issues. (Print Screen, B022, position 6 and 8)

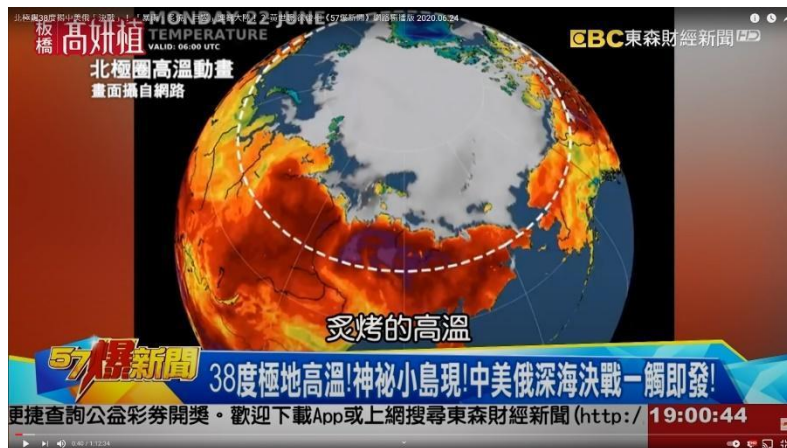


Figure 4. 14. A montage (time-lapse) of climate change issues. (B022, position 7)

c. The use of numbers and data

The videos have lots of numeric elements within title bars, speeches and data, which can be divided in two representative forms: round number and precise number. Porter (1995, p.4) pointed out that objectivity plays an important role in political communication and science communication, presenting reliable information reduces the need for intimate knowledge and personal trust. Under these circumstances, numbers are especially valued, because they are often generated by mechanical methods which are believed to provide solid evidence about the world (Porter 1995, p.4). However, not all areas can provide accurate information systematically, which leads to the precise global numbers being just too precise to be treated as literally accurate (Billig 2021, p.2). Comparing precise numbers with round numbers, Billig (2021, p.1) further mentioned that round numbers should be understood as an estimate which has extra rhetoric power by simultaneously conveying both quantity and quality. In these videos, both round numbers and precise numbers appear frequently and have their own communicative practices. The round numbers usually represent the percentage, fraction and the cost of money or energy, which are used to emphasise the severity of the environmental issues through the speeches or titles. For instance, ‘...we have lost 50% of the melting ice... (speech, I035, position 25)’, ‘One-third of kids in New Delhi had appeared lung problems and there were more than a million people died of air pollution per year (speech, C037, position 30)’ and ‘The volume of Taiwan offshore wind power device can

reach 290 billion watts, which can support 20 billion families a year (speech, H006, position61)'.
 position61)'.
 The precise numbers are used widely in data representation for complementing and emphasizing the information sources or profession, such as the area chart of the warning limit of power supply (see Figure 4.15) and the table records the PSI for the operation of the Shen'ao Power Plant (see Figure 4.16). It also appears in speeches, for instance, 'the PSI of Yilan increased from zero to 7.499 (speech, H006, position13)' and 'statistics displayed that the average concentration of PM2.5 was 153 $\mu\text{g}/\text{m}^3$ and PM10 was 286 μg in 2014 (speech, C037, position38)'.

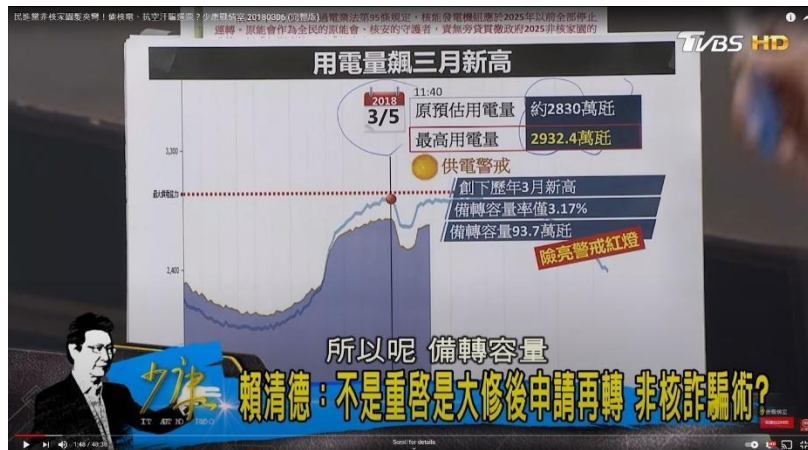


Figure 4.15. The representation of precise numbers in data. (I035, position6)

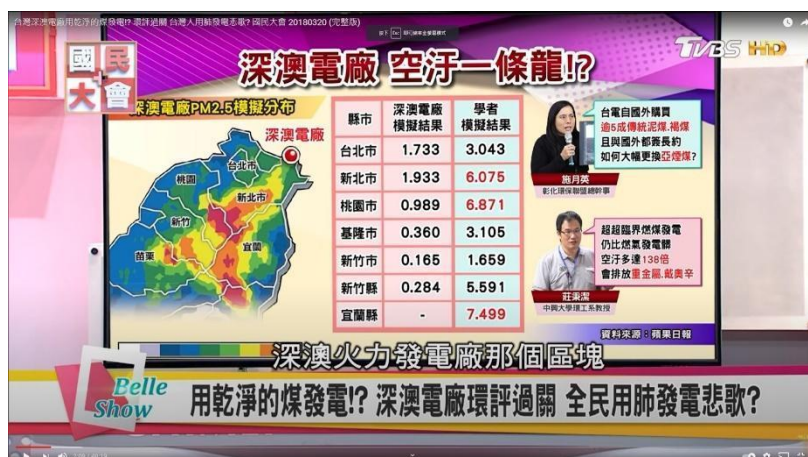


Figure 4.16. The representation of precise numbers in data. (H006, position6)

In addition, these videos often use the footage with numbers to support political arguments.

This rhetoric of quantification is common in the data-driven society nowadays. Kennedy and

Hill (2018, p.845) termed these numbers 'feeling numbers' that the data which is able to perceive and engage by ordinary people almost exists in visual elements. They further mentioned the other meaning between emotion and the rational that privileging the rational over the emotional meant a kind of group superiority (p.845) that certain groups, the groups here meaning the scientific experts which prefer using precise numbers to highlight the rational. For example, media, politics and scientists which have a computational background than others, and indirectly controls the 'knowledge' through determining how expertise is presented. For instance, the pie chart of '2016 fuel ratio of thermal power' shows with precise numbers (see Figure 4.17), which uses enlarging number to emphasise the proportion of coal-fired power generation in Taiwan in 2016, and number of electricity consumption (see Figure 4.18), the enlarging number is the total power generation, which means that the government is facing power shortage.

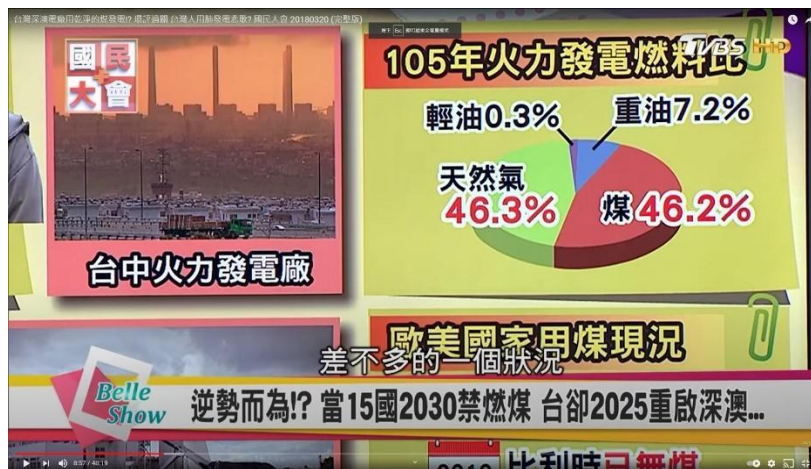


Figure 4. 17. The representation of feeling numbers with precise numbers in data. (H006, position 43)



Figure 4. 18. The representation of feeling numbers with precise numbers in data. (1035, position 12)

d. Gestures

The gestures are quite common to see in the videos, both in the political talk shows and no party affiliation talk shows, which have two main representative meanings, one is used for emphasising the speeches, arguments, and expression, and the other is used for indicating the main point. In the first representative meaning, the host and guests often use ‘number’, ‘height’, ‘length’ or ‘size’ gestures to emphasise the speeches or data (see Figure 4.19); using ‘exaggerate’ gesture means severity, ‘indignant’ gesture means opposition, ‘push’ gesture means active promotion or ‘wave’ gesture means disagreement to show the arguments and expression of the topics (see Figure 4.20). The other meaning of the gestures is ‘pointing with index finger’, which is commonly used on data or information sources (see Figure 4.21), sometimes used for accusing the other guests (see Figure 4.22).





Figure 4. 19. The representation of gestures for emphasising. (Print Screen)



Figure 4. 20. The representation of gestures for showing the argument and expression. (Print Screen)

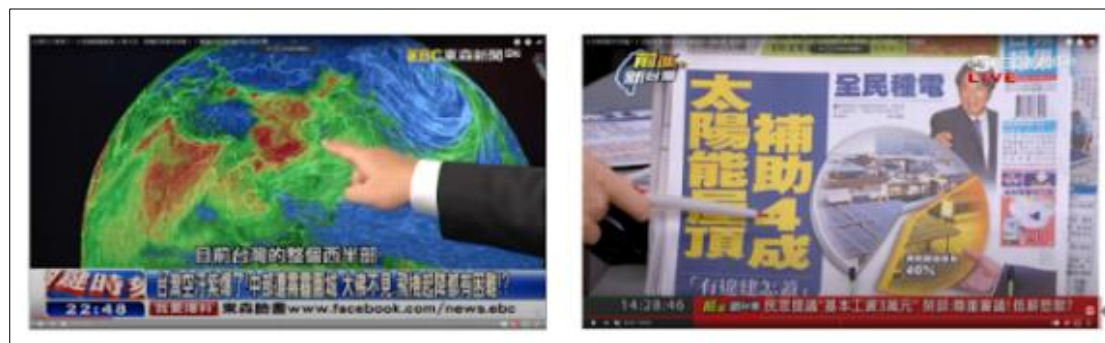


Figure 4. 21. The representation of gestures for highlighting data or information sources. (Print Screen)



Figure 4. 22. The gestures for accusing the other guests. (K006, position 11)

e. Sounds

The sounds have been divided into two forms, human voice, and music or natural voice. The human voice that appears frequently in the videos are ‘orotund’, ‘exaggerate’, ‘aggressive’, ‘husky’, ‘loud’, ‘contemptuous’, which are used to strengthen the tone or highlight the keywords of the speeches, and most of them are negative meanings. For instance, the host uses a husky voice for representing a conflicting and satirical speech, ‘That is my first time to know the coal without pollution (H006, position 24)’; the host uses an orotund voice for representing an enhanced speech, ‘You see that almost all of west section was over air polluted (J007, position 7)’; the guest said ‘Bu Yong Tan Liao 不用談了 [no need to talk] (K006, position 8)’ with a contemptuous voice in an enhanced speech, the sentence ‘no need to talk’ here means that if the natural gas will not reach the expected supply in 2022, and then the policy of nuclear free by 2025 will impossible to execute. Moreover, the music or natural voice are hardly used in the political talk shows.

f. Code-switching

Code-switching is commonly used for evoking a specific political consciousness, and ‘Taiyu’ is one of the typical Taiwanese dialects which is not only the most commonly used language in daily Taiwanese life but is also used in talk shows frequently. The practice of Taiyu also plays the role of a power relationship between language and political communication. Previous

research has indicated that the choice of language used in discourse can be used as a tool for expression of political meaning and identity, in addition to the ideology of the political status or the intentional expression presented by the host and the guest. For example, in Sheng's (2005) study, the talk show which used 'Taiyu' has increased gradually since 2003. One possible reason for this is that local 'Taiyu', which is the most intimate and familiar language in Taiwan, and the 'Pan-green' groups tend to attract target audiences who identify with local Taiwanese language and culture. For example, almost all of the hosts or guests not only have clear political status but have a clear correspondence between the language use (the proportion of use of 'Taiwan Mandarin' and 'Taiyu') and political status. Chang and Lo (2007) indicated that the ratio of the language used between the hosts and guests in 'Taiyu' in Pan-green channels is much higher than Pan-blue channels. After analysing ten videos within all types of the YouTube channels and YouTube playlists, I found that there is a huge difference in the dialect usage that the dialect appears in Pan-green's talk shows significantly higher than Pan-blue's. For example, For A New Taiwan, a pan-green channel, which uses a large number of dialects (Taiyu) in the speeches to highlight the keywords of them (eg. G006, position 2, 3, 4, 14, 16, 22). For example, the enhanced speech, 'The friends (residents) from Kaohsiung, let's take a look. The air this morning smelled very pungent' (G006, position 2), which uses Taiyu in the words of 'the friends from Kaohsiung' rather than 'the residents...' to emphasise the care of locals and using 'smelled very pungent' to emphasise the air quality index (AQI) was worse in Kaohsiung at that time.

In addition to the six typical communicative practices above, there are other metrics worthy of attention even though the number of appearances is few currently, including the use of metonymy, expression, and highlight colour. For instance, the footage shows a man putting water in his hat to dissipate heat as a metonym, which emphasises the extremely high temperature in summer (C131, position 21). The expression mostly appears with a close-up shot (see Figure 4.23) or a gesture (see Figure 4.24), but the number is not obvious in the

current analysis. Finally, the highlight colour is often used for enclosing the important part of the footage (see Figure 4.25).



Figure 4.23. The expression appears with a close-up shot. (I035, position 20)



Figure 4.24. The expression appears with a gesture. (H006, position 3)



Figure 4.25. An example of highlight colour is used in footage (H006, position 3)

g. Findings

The political talk shows are strongly geared toward promoting specific political arguments. From the perspective of an environmental-related issue setting, they focus more on the environmental or economic impacts caused by Taiwanese environmental issues and the responsibility of the government, that is, these videos always convey environmental issues by adding political views into the introduction of knowledge. In addition, they usually only have a single perspective. For example, the title bar of a pan-blue talk reads 'DPP made a U-turn in the policy of *Nuclear-free homeland by 2025!* They stole nuclear power and fought against air pollution to defraud votes? (1035)'. This is a typical case of discussing environmental issues from the perspective of energy policy, using strong words to promote a specific point of view, and this point of view appears almost frequently throughout the video.

However, the relevant studies focus on the news or specific political movements (e.g., Lin and Lo 2010; Hsieh, 2018), which usually have an issue-attention cycle, and it is hard to overwhelmingly observe how environmental issues engage in political talk shows. The issue-attention cycle means that most Taiwanese media often focuses on specific political events and does not study the 'everyday' environmental communications, and the role of the environmental issues is to supply or reinforce the political argument. In addition, the discussion of environmental issues is usually closed or refocused at fixed times, when the political events end or start completely. This thesis conducts a complete observation of environmental communication on political talk shows through multimodal analysis, which covered both regional and global environmental issues over a long period, 4 years, from JAN 2017 to JAN 2021.

The multimodal analysis reveals distinct approaches to the presentation of environmental issues in political talk shows and non-affiliated reporting. In political talk shows, there is a significant emphasis on specific energy policy issues and air pollution, reflecting a tendency

towards the politicisation of environmental topics. This is characterised by various communicative practices that either reduce or enhance content ambiguity, including the use of gestures, sounds, numbers, and code-switching. Such practices are often employed to underscore political arguments, with gestures and sounds frequently combined to highlight key speech keywords or reinforce the video's argumentative stance (see Figures 4.19 and 4.20).

Conversely, non-affiliated reporting tends to focus more on broader climate change issues along with air pollution, employing a different set of narrative techniques. These segments are less about politicisation and more about illustrating the catastrophic impacts of climate change, often using dramatic visualisations to convey the urgency and scale of environmental degradation.

Moreover, one of the common communicative practices is to use numbers to support political arguments, known as 'feeling numbers' (Kennedy and Hill 2018, p.843). This practice can be divided into two representative forms: round numbers and precise numbers. The choice between round numbers and precise numbers is important because it acts as two important purposes of environmental communication— providing scientific knowledge through precise numbers and arousing practical action through round numbers.

Broadcasters often follow specific guidelines when presenting numbers to ensure clarity and effectiveness in communication. Common advice includes "Round off numbers unless the exact number is significant" and "Numbers take time to say. Every syllable counts." Such guidelines are based on the understanding that listeners and viewers find it challenging to retain precise numerical details, especially during brief broadcast news segments. Excessive or overly precise numbers, such as stating "15.29%" instead of "15%", can overwhelm the audience, detracting from the message's impact and clarity.

Additionally, research supports the strategic use of numerical precision in broadcasting. Wadhwa and Zhang (2019) found that audiences are more likely to follow preventive advice when exposed to health messages that present numerical cues as round numbers rather than precise numbers. This finding suggests that round numbers are more effective in communicating health-related information, possibly due to easier cognitive processing and recall. Therefore, the choice between using round and precise numbers is not merely a stylistic or arbitrary decision; it is deeply influenced by practical considerations of audience engagement and information retention.

The practice of the use of numbers in the political talk shows demonstrates similar findings from Kennedy and Hill (2018), that the political talk shows use lots of round numbers for arousing public awareness, which represents the practice of 'feeling numbers' also exists in the political programmes. However, the great disparity in the use of round numbers and precise numbers also represents that the main media effect of the political talk shows is to arouse environmental awareness, rather than provide scientific knowledge.

Code-switching here means moving between two different languages: Taiyu and Mandarin, Taiyu is not only the most intimate and familiar language in Taiwan but also plays the role in a power relationship between language and political communication, which is used a lot in political talk shows to arouse people's awareness. The use of code-switching in political talk shows reflects the language community's power, which means that Taiwanese political talk shows are sometimes used to appeal to political demands or censor the hostile party, such as the enhanced speech from a political talk show, 'The friends (residents) from Kaohsiung, let's take a look (G006, position 2)', which uses Taiyu in the words of 'the friends from Kaohsiung' rather than 'the residents...' to emphasise solidarity with the local community and censor the solution of the city mayor from the hostile party. In addition, a large amount of scientific information is cited in Taiyu, which reflects that the main audience of the

political talk shows is the older generation. In addition, these videos usually lack scientific information and often play a role in brokering a specific policy or party. It not only works for attracting public attention but also results in serious political polarisation through their excessive incitement media framing.

Spectacularization and Catastrophization are the two common devices in political talk shows, to reach the aim of promoting specific political arguments by arousing people's awareness. However, these two performances usually have a negative meaning, such as using exaggerated speeches or title bars to promote specific energy policies. The result confirms Jasanoff's (2010, p. 248) finding that catastrophizing on environmental issues is a double-edged communicative practice that arouses people's awareness but may not give them any orientation as to how to take action after seeing the representation of massive severe environmental disasters. The multimodal analysis and the comment analysis (the next analysis section) have a similar finding from Jasanoff (2010), that the catastrophizing of environmental issues indeed arouses people's awareness but loses the focus on the substantial action, which is reflected in the comments. However, I also find that the catastrophizing of policy-based environmental issues often brings more political discussions than environmental discussions.

These representative practices can indeed promote environmental awareness since they make up for the problem that reality cannot compress the time to present long-term environmental changes. However, it also demonstrates that environmental issues can be seen as a tool for leading serious political polarisation through the issue setting of the video.

2. non-affiliated talk shows

In terms of broadcasting type, non-affiliated talk shows can be seen as an extension of news programmes, which focus on specific issue settings and provide a field for professionals to comment on the issues. From the perspective of composition of participants, non-affiliated

talk shows usually consist of one host and five to seven guests which are minzui or news broadcasters mostly, those who do not have a specific political stance. And the issue setting of the programmes is focused on two main issues, political based and curious or sensational environmental issues, such as a flood continually happening in somewhere or the polar region containing a lot of energy, etc., which emphasises the environmental orientation of the programme. Scientific information almost appears to sensationalise the speech through accessing the extreme numbers.

a. Speeches and title bars

Based on the communicative practices on multimodal analysis, almost all of the videos have their own arguments, and they all use similar communicative practices to reduce the ambiguity of the contents, including the use of speeches and title bars, the use of data and number, the editing techniques of the footage, gestures, sounds and code-switching. non-affiliated talk shows have similar communicative practices to the political talk shows, since they have similar composition of participants and the broadcasting type.

The obvious difference in the use of speeches and title bars with the political talk shows is that non-affiliated talk shows often use exaggerated content in the speeches and title bars, rather than specific political arguments. For example, an enhanced title bar from a non-affiliated talk show, 'The temperature of the North Pole has reached up to 38° Centigrade, and the underground resources have opened up a 'decisive battle' between China, the United States and Russia! (B022, position 2). This is a typical case of discussing environmental issues from the perspective of extreme weather, using exaggerated words to promote a specific point of view, and this point of view appears almost frequently throughout the video. Although non-affiliated talk shows and in-depth reportings have less overt political views than political talk shows, in the case of excluding personal political views, they create programmes from the viewpoint of promoting environmental awareness

and increased anxiety about environmental risks. For example, the speech from non-affiliated talk shows represents that 'The North Pole has a high temperature of 38 degrees Celsius, which is like a scorching heat (B022, position 7)', which uses the data to emphasise the severity of extreme weather.

In addition to the practice of contents, the source of all of the analysed videos do not have obvious differences, news media are used most, and only a few of the other sources, such as Facebook, movie, Twitter, interpellation video, documentary films, WHO etc.

b. The use of footage via symbols, editing techniques and montage

Spectacularization and Catastrophization are the two communicative practices that appear the most on non-affiliated talk shows, rather than the other two programme genres, which usually have a negative meaning, such as shows the range of wildfire burning with a wide shot or using catastrophizing footages to emphasise the negative impact of climate change on life. Spectacularization is a common practice in both non-affiliated talk shows and in-depth reporting, with different presentation practices that the non-affiliated talk shows often use specific shot angles to show the scope of environmental issues, aiming to stimulate environmental awareness. According to the multi-model analysis, these narratives were replaced by the footage with symbolic symbols most of the time, which portrays places or nature as threatened by environmental disasters. For example, figure 4.26 and 4.27 uses a barely visible city scene to emphasise the severity of the air pollution issue.

Catastrophization is often used to illustrate the consequences of environmental issues, such as the narrative of climate change which often uses catastrophizing images or news footage to emphasise the extreme climates around the world. According to Lowe et al. 's (2006) study of the people's perception of climate change after watching the film *The Day After Tomorrow*, which uses massive catastrophizing footage to depict climate change issue, he found that while the film increased anxiety about environmental risks, it aroused people's

strong motivation to act on climate change (p.451). However, this investigation also revealed that although the film motivated them to act, the public does not have enough knowledge and information about the action they can take to reduce climate change (p.453). It represents that catastrophizing on environmental issues is a double-edged communicative practice that not only arouses people's awareness but may cause people to not know how to take action after seeing the representation of massive severe environmental disasters. Besides, the time-lapse can be seen as a kind of bridging scale (Jasanoff 2010, p. 248), which increases the climate threat through problematizing of 'the present' in relation to both past and future. It is used a lot in the narrative of climate change issues such as using the time in seconds as the unit of time to present the melting ice changes in the unit of day, month or year, and compare these changes with the same time interval in the past or the future. These representative practices can indeed promote environmental awareness, since they make up for the problem that reality cannot compress the time to present long-term environmental changes.



Figure 4. 26. A montage of air pollution issues. (Print Screen, J007, position 12)



Figure 4. 27. A montage of air pollution issues. (Print Screen, J007, position 12)

c. The use of numbers and data

The use of numbers and data often appears in non-affiliated videos, that the videos have massive number elements within title bars, speeches and data, which can be divided into two representative forms: round number and precise numbers. Both round numbers and precise numbers appear frequently and have their own communicative practices.

The round numbers are designed to inspire action that the round numbers almost appear in the speeches, which are used as a kind of slogan for representing the urgency to call for action and the seriousness of the environmental issues. non-affiliated talk shows usually represent round numbers to emphasise the severity of the environmental issues, which provide more crisis than precise numbers. For example, a speech from the non-affiliated talk shows represents 'You see that almost all of the west section was over air polluted (J007, position 7)' which uses the fraction and a huge integer to inspire action on the air pollution issue; and a speech from the other non-affiliated talk shows represents 'The waters of the Yangtze River occupies nearly 20% of China that is unexpectedly threatened by extreme weather now (B022, position 33)' which represents the severity of extreme weather. To compare with the round numbers, non-affiliated talk shows use less precise numbers in both the content and the scene, the potential reason is that the main purpose of the non-affiliated talk shows is to attract public attention.

In addition, data visualisation appears in these videos frequently, which acts as media images as well as representations of data, and always have an emotional component to engaging with data, which is called the 'feeling numbers (Kennedy and Hill 2018, p.843)'. The feeling numbers usually play the role of emotional appeals, such as using to evoke shame emotion within that the energy policies cannot be implemented; empathy and pity emotion within the severe air pollution issues; or hopeless emotion within the climate change issues. Generally speaking, the feeling numbers will not appear in a single shot alone but will appear with the title bar or speech, which provides background knowledge of these numbers. According to Wagner and Davis (2010. p.5), the feeling numbers are as important as the understanding of knowledge that the appearance of numbers alone will only give the viewer the vague sense, and by transmitting background knowledge at the same time, it can effectively enhance the mass sense of the public. Therefore, the choice between the round numbers and the precise numbers is important because it acts as two important purposes of environmental communication: providing scientific knowledge through precise numbers and arousing practical action through round numbers.

d. Gestures

The use of gestures is quite common to see in the videos, both in the political talk shows and no party affiliation talk shows, which have similar representative meanings, including emphasising the speeches, arguments, and expression, and indicating the main point (see Figure 4.26).

e. Sounds

The sounds have been divided into two forms, human voice, and music or natural voice. The human voice that appears frequently in the videos are 'orotund', 'exaggerate', 'aggressive', 'husky', 'loud', 'contemptuous', which are used to strengthen the tone or highlight the keywords of the speeches, and most of them are negative meanings. For example, the host

uses a husky voice for a complementary speech, 'The weather is really weird this year. The high temperature did not appear in India, nor in Vietnam, where it should be hot (B022, position 4)'; the host uses an orotund voice for an enhanced speech, 'Do you feel so hot! When will it end? I'm afraid it will get hotter and hotter (B022, position 2)'. Moreover, the music or natural voice are hardly used in the non-affiliated talk shows.

f. Code-switching

Overall, code-switching seldom appears in non-affiliated talk shows and in-depth reportings. In the previous discussion of the role of Taiyu (A-1, Analysis chapter), Taiyu plays a role in representing a power relationship between language and political communication. Through multimodal analysis, I find that the practices of code-switching only exist in the political based context, that Taiyu is a specific communicative practice in the political talk shows, for evoking the political consciousness.

g. Findings

Non-affiliated talk shows are a double-edged channel for environmental communication. The issue setting of it focused on curious or sensational environmental issues, such as air pollution or energy shortage issues, which not only attract public attention but, as with much political discussion on social media, have a potential problem of misleading information. As the environmental issues usually include lots of scientific information, which is not well-known to the public. It means that the sensational environmental issues help to raise public concern, but it also has the relative risks when the programme misinterprets the risk of environmental issues. It is necessary to mention that although non-affiliated talk shows have less overt political views than political talk shows, they create programmes from the viewpoint of promoting environmental awareness and increased anxiety about environmental risks.

However, none of the relevant studies in Taiwan focuses on non-affiliated talk shows, as well as there are no relevant YouTube-based studies in this genre of talk shows. The lack of relevant studies makes it hard to examine the overwhelming performance of a specific issue. Thus, I use multimodal analysis to examine the performance of environmental communication in non-affiliated talk shows, to find out how environmental issues work on these channels and the role of them in environmental communication.

The result of the study demonstrates a specific purpose of the non-affiliated talk shows—to catch public attention, which has obvious evidence from using massive communicative practices, which represent spectacular and catastrophic meanings. For example, figure 4.27 uses spectacular and catastrophic footage to emphasise climate change issues by representing the severity of the extreme weather which appears at the North Pole. In addition, mixing two or three editing forms, including the ‘zoom-in’, ‘zoom-out’, ‘look-down’, ‘rotate’ and ‘vibrating’ are often used to emphasise the severity of the environmental issue. For example, figure 4.28 represents the footage that uses the ‘zoom-in’ editing technique to show how the air pollution got worse in a short time. Besides, in the perspective of code-switching, the use of Taiyu seldom appears in non-affiliated talk shows, which emphasises that the code-switching is specifically used in politic-based context, for evoking the political consciousness.

I also find that the non-affiliated talk shows often use exaggerated film, pictures or titles rather than scientific information as support in environmental communication, to attract public attention straightforwardly. Jasanoff’s (2010, p. 248) finding that using spectacular and catastrophic content promotes environmental awareness but may not give them any orientation as to how to take action after seeing the representation of massive severe environmental disasters. It also highlights that the practices can indeed attract higher view counts, but it is also riskier to grow misleading information at the same time.

3. In-depth reporting

In-depth reporting is a format familiar in other countries (e.g., Japan, China, Singapore), such as the 'Sian Chang 現場 [The Site]', a Chinese in-depth reporting, or '2030 Ying Siang Wei Lai De Cha Lu 2030 未来への分岐点 [2030 At a Crossroads to the Future]', a Japanese in-depth reporting. It not only selects the global environmental issue but interprets Taiwanese local environmental issues with a global perspective, which can be seen as a practice which translates into the Taiwanese media ecology. There are six typical communicative elements in the in-depth reporting videos, as shown in the paragraphs below.

a. Speeches and title bars

In the comparative analysis of the in-depth reporting, I found that the voice-over narrative and on-screen text are the two main communicative practices for reducing ambiguity, which play the role in leading the arguments. In this study, the in-depth reporting videos use lots of title bars, text boxes or speeches leading to specific views, which can be classified into two categories: enhancement content and compliment content, and sometimes accompanied by word game or political satire. The meaning of the enhancement content and compliment content in the in-depth reporting can be defined as the role of 'emphatic' content and titles and subtitles that the enhanced practices usually are the non-visual practices, such as tone or accent etc., and commonly adds emphasise on the title bar through the enhanced content. The compliment practices can be defined as another visualisation form of media content to the enhanced content, such as title bar or data visualisations. For instance, the content in figure 4.28 shows an enhanced title bar, 'Southern Europe, Greece, should have been dry and hot in summer, but a sudden ice storm caused 600 casualties' (C131, position 16). This quoted title bar below points out the specific argument in the following in-depth reporting, and uses 'Southern Europe, Greece, should have been dry and hot in summer' to emphasise that global warming is getting worse and brings out the extreme weather. The in-

depth reporting often uses lots of ‘provocative title bars’ and ‘complementary speeches’ as a way to segment the different aspects of the topic, which often bring some meaning of warning. For instance, as figure 4.29 shows, the title bar under the bottom of the screen said: ‘the wildfires occurred in the Amazon rainforest due to deforestation, and turning the Amazon rainforest into a forest cemetery’ (C144, position 7), which collocates a complementary speech: ‘the state of Hondonia occurs the wildfires due to deforestation, the prosperous land instantly turns into a forest cemetery and the atmosphere of death permeates everywhere’ (C144, position 8). This quoted title bar below points out an argument accusing the Brazilian government of the decision to develop rainforest.



Figure 4. 28. An enhanced title bar of global warming issues in in-depth reporting. (Print Screen, C131, position 16)



Figure 4. 29. An enhanced title bar of ecological environmental issues in in-depth reporting. (Print Screen, C144, position 7)

The title bars often are used to complement the enhanced speeches, data or footage, according to figure 4.30, the title bar shows, ‘An increasing number of fires around the

Amazon rainforest spread rapidly because of strong breeze and dry environment.’, which is used to supplement the data. In addition, the complementary speech sometimes is used to increase the severity of the topic, as the speech shows below, ‘according to the announcement of WHO, there are at least 7 million people who die of air pollution per year. Most of the population concentrates in Asia’ (C037, position 6), which goes along with the main argument of the video that air pollution is a priority issue in energy transition around the world. And the the complementary speech in global warming issue, as the speech shows below, ‘severe hail has hit Mexico’ (C131, position 4) and ‘heavy rains have hit in both China and India’ (C131, position 5), which lists global extreme weather disasters to emphasise how severe global warming is.



Figure 4. 30. A complementary speech in in-depth reporting. (Print Screen, C144, position 14)

In contrast to the political talk shows, only a few of the enhanced speeches with political satire are in the in-depth reporting, since its broadcasting style which reports by a single person, the conflicting speech is almost entirely absent from in-depth reporting.

b. The use of footage via symbols, editing techniques and montage

Firstly, in-depth reporting videos often use two kinds of images as symbols to represent the environment, one shows ‘cause’, the other shows ‘effect’. For instance, as the representation of air pollution issues, the symbols which appear in footage frequently are ‘smoke’, ‘factory’, ‘building’, ‘grey sky’ and so on (see Figure 4.31), which emphasises the cause of air pollution problem. The symbols which frequently appear in climate change

issues on Taiwanese programmes are 'heavy rain', 'floods', 'houses', 'melting ice' and so on (see Figure 4.32 and figure 4.33), which means global warming is getting worse. Moreover, the videos often use political leaders as the symbols that highlight that the air pollution problem has escalated to a global issue (figure 4.34).



Figure 4. 31. The common symbols for air pollution issues in in-depth reporting. (Print Screen, C037, position 21)



Figure 4. 32. The common symbols for global warming issues in in-depth reporting. (Print Screen, C131, position 6)



Figure 4. 33. The common symbols for global warming issues in in-depth reporting. (Print Screen, C131, position 32)



Figure 4. 34. The symbols of political leaders for air pollution issues in in-depth reporting. (Print Screen, C037, position 16)

Secondly, the in-depth reporting videos use numerous editing techniques with different camera angles for similar usage. For instance, ‘close-up’ shot is the common use in footage, which is always used for emphasising the argument, such as highlighting the number or data (see Figure 4.35), the source of the argument (see Figure 4.36). The ‘head and shoulders’ shot is often used for highlighting the opinion leaders (see Figure 4.37) or working with the symbols of political leaders (figure 4.34). The ‘wide shot’ is often used for emphasising that an issue is getting worse, for example, in climate change and air pollution (see Figure 4.38). Nonetheless the others editing techniques include short version and split screen appear a few times currently.



Figure 4. 35. A 'close-up' shot of number or data for emphasizing the argument. (Print Screen, E006, position 4)



Figure 4. 36. A 'close-up' shot of source for emphasizing the argument. (Print Screen, C144, position 24)



Figure 4. 37. A 'head and shoulders' shot of the opinion leader. (Print Screen, C144, position 40)



Figure 4. 38. A 'wide shot' of air pollution issues. (Print Screen, E006, position 9)

Thirdly, the montage is also a common editing technique which is used for condensing space, time, and information. The montage is often used for illustrating the long-term changes in a short period of time, for instance, the footage (see Figure 4.39) uses 'time-lapse' to emphasise the Iceberg is melting faster than before. The other representation form of montage is 'mixing up' a series of footage or images to emphasise the long-term interaction, such as the air pollution issue is not only produced by human life, but a negative effect of human life (see Figure 4.40). The 'zoom-in', 'zoom-out', 'look-down', 'rotate' and 'vibrating' are not often used alone, but mix two or three editing forms to emphasise the severity of the environmental issue, as figure 4.41 shows that the footage uses both 'zoom-in' and 'look-down' editing techniques to represent the severity of the '2018 Japan floods' which happened at the end of June, 2018.



Figure 4. 39. A montage (time-lapse) of global warming issues. (Print Screen, C131, position 34)



Figure 4. 40. A montage (mixing up) of air pollution issues. (Print Screen, C037, position 2)



Figure 4. 41. A montage (zoom-in and look-down) of global warming issues. (Print Screen, C131, position 35)

c. The use of numbers and data

The use of numbers in environmental communication within in-depth reporting videos can be categorised into two distinct forms: round numbers and precise numbers, each serving specific communicative functions. Round numbers are typically employed to inspire action and underscore the urgency of environmental issues. They often appear in speeches as slogans to emphasise the severity of these issues, for instance:

1. "The world produces about 8 million tons of marine debris every year, of which 50 to 60% are plastic products" (speech, E006, position 1).
2. "One-third of children in New Delhi have lung problems, with over a million people dying from air pollution annually" (speech, C037, position 30).
3. "Thousands of fires engulfed an area two-thirds the size of the U.S., stretching from Detroit to Los Angeles" (speech, C144, position 21).

These examples illustrate how round numbers are used to make the information more relatable and impactful, often representing percentages, fractions, or costs to highlight the

direness of environmental situations. This use of round numbers, especially in in-depth reporting, is a typical practice of what might be termed 'feeling numbers'—numbers designed to evoke an emotional response and drive home the scale of an issue, such as the extent of wildfires or marine waste.

On the other hand, precise numbers are predominantly utilised in data representations to augment and emphasise the credibility of the information sources or to underline professionalism. They are crucial in detailed data visualisations, such as:

1. A pie chart illustrating "sources of emissions of PM2.5 in Beijing in 2017" (see Figure 4.42).
2. A temperature distribution map showing the heat disaster in the polar regions (see Figure 4.43).

Precise numbers also appear in speeches, providing exact data to support claims and recommendations, for example:

1. "The government's biogas electricity development allowance for small pig farms accounted for 93.7% of farms in Taiwan in 2017" (speech, N010, position 10).
2. "Statistics showed that the average concentrations of PM2.5 and PM10 were $153\mu\text{g}/\text{m}^3$ and $286\mu\text{g}/\text{m}^3$ respectively in 2014" (speech, C037, position 38).

The choice between using round and precise numbers is crucial because each serves key purposes in environmental communication. Contrary to the previous mixed statements, it should be clarified that round numbers primarily provide accessibility and emotional engagement to mobilise public action, while precise numbers support these mobilizations with scientific accuracy and detailed evidence. This distinction ensures that communication is both emotionally resonant and factually grounded, catering to the needs for both urgent action and informed understanding in addressing environmental issues.

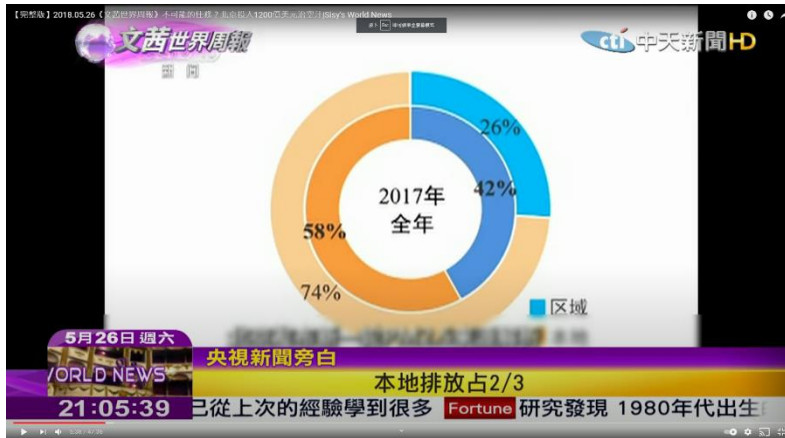


Figure 4. 42. The representation of precise numbers in data. (Print Screen, C037, position 18)



Figure 4. 43. The representation of precise numbers in data. (Print Screen, C131, position 24)

d. Gestures

The gestures are quite common to see in the in-depth reporting videos, but the gestures are more simplistic than the political talk shows that the broadcasting mode of in-depth reporting only has a single host which is a lack of interaction. The main representative meaning of the gestures in the in-depth reporting videos is always used for emphasising the speeches. The host often uses gestures to emphasise the keywords of the speeches, using 'rotate hands' gesture means the flooding happens round after round, 'spreading hands' gesture means the range of the area and the question, 'where did the remaining plastic go?' or 'hand' gesture means suspicion (see Figure 4.44).

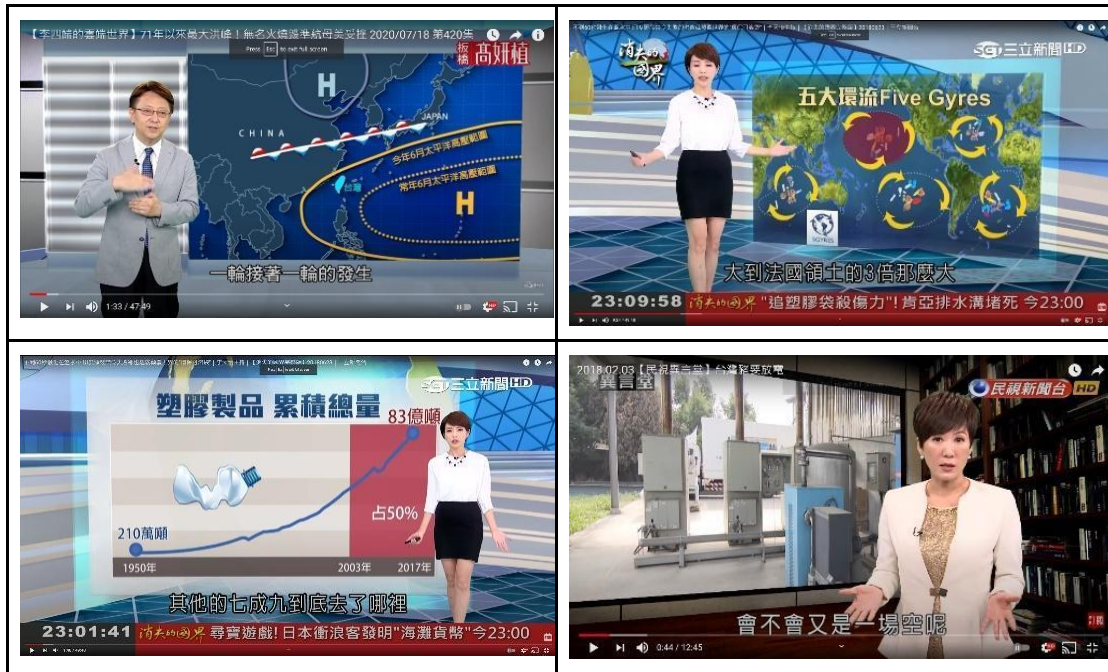


Figure 4. 44. The representation of gestures for emphasising the keywords of the speeches: rotating hands means the flooding happens round after round (upper left corner), spreading hands means the range of the area (upper right corner) and questioning the garbage disposals (bottom left) and the hand gesture means suspicion (bottom right). (Print Screen)

e. Sounds

The sounds have been divided into two forms, human voice, and music or natural voice. It is needed to notice that the in-depth reporting videos use more background music (BGM) for creating the specific atmosphere of the topic. The human voice which appears frequently in the in-depth reporting videos are 'orotund', 'exaggerate' and 'husky', 'loud' voices, which are used to strengthen the tone or highlight the keywords of the speeches. For example, the host uses a husky voice to highlight the specific keywords (C144, position 2), which emphasises the wildfire spreading quickly; or the host uses an orotund voice to censure the governance (C144, position 42). Moreover, the music or natural voice are often used for the background of the footage or speeches, which helps the audience to immerse the specific context which includes the specific arguments. For example, the footage uses a bright BGM to represent Beijing has made huge progress for the governance of air pollution (C037, position 19); the footage uses an allegro symphony as BGM which shapes the feeling of war, with an enhanced title bar, 'It was a long war to solve air pollution, which is needed energy

support from all industries (C037, position 24)'; using warning BGM to shape the tense and warning feeling, with an enhanced speech with satirical words, 'Taj Mahal used to witness an everlasting love and how the environmental destruction happened (C037, position 32)'. For instance, using tense music as the BGM to emphasise the severity of the plastic pollution (E006, position 3), using gloomy BGM to represent the helplessness feeling of the severe plastic pollution (E006, position 16), using tense music to construct the emergency of extreme weather and the climate action (C131, position 6, 14 and 16) or using allegro symphony to create tense feeling and the feeling of time going fast (C037, position 23).

f. Code-switching

Overall, code-switching seldom appears in in-depth reporting videos rather than the political talk shows. There are two possible reasons which exist in the use of Taiyu: the role of a power relationship between language and political communication and the broadcasting style between the talk shows and in-depth reporting. Firstly, the use of Taiyu illustrates that in Taiwanese political talk shows are sometimes used to appeal to political demands or censoring the hostile party, which does not exist in the narratives of in-depth reports. Secondly, code-switching occurs more in talk shows due to their broadcasting style that the talk shows place extra emphasise on dialogue, while in-depth reportings are almost no dialogue but a single-person report. In addition, as environmental issues are shaped as global issues, using Mandarin can arouse a wider range of concerns than using dialects.

In addition to the six typical communicative practices above, the source metric of all of the in-depth reporting videos use much more foreign media as the information sources rather than the political talk shows, such as the Sky news, the ABC news, the CNN the BBC and the Guardian etc. And only a few of the other sources from social media, such as Facebook and Twitter. The in-depth reporting videos also use lots of schematic footage to collocate with

the host's speeches and a large amount of devastating footage, which has the meaning of catastrophizing environmental issues (see Figure 4.45).



Figure 4. 45. The representation of devastating footage. (Print Screen)

g. Findings

In-depth reporting is representative of the channel of environmental communication in Taiwan, the issue setting is often implicit framing for specific environmental issues or political preferences. From the perspective of the producer, the in-depth reporting videos focus on global environmental issues, such as global warming and extreme weather, and they are relatively more focus on the perspective of science, not politics. It is necessary to mention that the in-depth reporting broadcast is a format familiar in other countries (e.g., Japan, China, Singapore). In the case of Taiwan, it not only selects the global environmental issue but interprets Taiwanese local environmental issues with a global perspective, which can be seen as a translation into the Taiwanese media ecology.

However, the relevant studies so far have focused on the spectacularization and catastrophization of the in-depth reporting videos, since the in-depth reporting videos do not have obvious politicisation of issue setting like political talk shows, which get less

discussion to the role of the in-depth reporting programmes in both environmental communication and the potential political influence. Thus, this thesis focuses on how the in-depth reporting programmes combine the environmental issues with specific political stance on YouTube through the multimodal analysis.

In sum, the result of the multimodal analysis demonstrates that the in-depth reporting videos follow a specific purpose—to catch public attention, which has obvious evidence by using massive communicative practices, which represent spectacular and catastrophic meanings. I also identify other potential narrative lines of environmental issues in the Taiwanese context, including discussing global warming and extreme weather from the perspective of science, not politics. The in-depth reporting programmes are not only an education platform for receiving environment-related information but an important communication platform which interprets Taiwanese local environmental issues from a global perspective. In addition, the source metric of all of the in-depth reporting videos often uses diverse sources, which confirms that it is a beneficial platform for learning about environmental issues. For example, a speech from an in-depth reporting video shows that ‘according to the announcement of WHO, there are at least 7 million people who die of air pollution per year (C037, position 6)’. In other words, it uses the data which is provided by WHO to emphasise the severity of air pollution issues and endangering human life.

Since each of the in-depth reporting videos has the issue setting to promote specific environmental issues, the in-depth reporting videos often use multiple communicative practices to reduce or enhance the ambiguity of the contents in both constructions of content and film.

From the perspective of the contents, the ‘feeling numbers’ is a common communicative practice in the videos, including round numbers and precise numbers. These two types of representation satisfy the two important purposes of environmental communication:

providing scientific knowledge through precise numbers and arousing practical action through round numbers. For example, the round numbers are represented as 'The world produces about 8 million tons of marine debris every year, of which 50 to 60% are plastic products (speech, E006, position 1)', 'One-third of kids in New Delhi had appeared lung problems and there were more than a million people died of air pollution per year (speech, C037, position 30)' and 'Thousands of fires engulfed about two-thirds of the size of the U.S., which is equal to the land from Detroit to Los Angeles (speech, C144, position 21)'. And the precise numbers appear in speeches such as 'the government provided allowance project for developing biogas electricity to small pig farms which occupied 93.7% in Taiwan farms in 2017 (speech, N010, position 10)' and 'statistics displayed that the average concentration of PM_{2.5} was 153µg/m³ and PM₁₀ was 286µg in 2014 (speech, C037, position 38)'. However, the regular distribution in the use of precise numbers and round numbers also represents that the media effects of the in-depth reporting are not only to arouse environmental awareness but provide relatively plenty of scientific knowledge, compared with both the political talk shows and non-affiliated talk shows.

In addition, the in-depth reporting videos also use lots of footage via symbols, editing techniques and montages, to highlight the specific environmental information. Firstly, in-depth reporting videos often use two kinds of images as symbols to represent the environment, one shows 'cause', and the other shows 'effect'. For example, as the representation of air pollution issues, the symbols which appear in footage frequently are 'smoke', 'factory', 'building', 'grey sky' and so on (see Figure 4.31), for emphasising the cause of air pollution problem; or appear in climate change issues with 'heavy rain', 'floods', 'houses', 'melting ice' and so on (see Figure 4.32 and figure 4.33), for emphasising global warming is getting worse; or use political leaders as the symbols that highlight that the air pollution problem has escalated to a global issue (figure 4.34).

Secondly, the in-depth reporting uses numerous editing techniques with different camera angles for similar usage. For example, a 'close-up' shot is common to use in the footage, which is always used for emphasising the argument, such as highlighting the number of data (see Figure 4.35). The 'head and shoulders' shot is often used for highlighting opinion leaders (see Figure 4.37). The 'wide shot' is often used for emphasising that an issue is getting worse, for example, climate change and air pollution (see Figure 4.38). Nonetheless, the other editing techniques include short versions and split screen appear a few times currently.

Thirdly, the montage is also a common editing technique which includes multiple editing forms and is used for condensing space, time, and information. The montage is often used for illustrating the long-term changes in a short period of time, for example, the footage (see Figure 4.39) uses 'time-lapse' to emphasise the Iceberg is melting faster than before. The other representation form of montage is 'mixing up' a series of footage or images to emphasise the long-term interaction, such as the air pollution issue is not only produced by human life but has a negative effect on human life (see Figure 4.40). The 'zoom-in', 'zoom-out', 'look-down', 'rotate' and 'vibrating' are not often used alone but mix two or three editing forms to emphasise the severity of the environmental issue, as figure 4.42 shows that the footage uses both 'zoom-in' and 'look-down' editing techniques to represent the severity of the '2018 Japan floods' which happened at the end of June 2018.

B. Up next algorithm analysis

The recommendation algorithms can be regarded as the most influential system on YouTube, as well as the only function that is produced from an internal system, which is also called 'Up Next'. The aims of the recommendation algorithms are reinforcing scrutiny and increasing user engagement. YouTube's recommendation system is the only function that is produced from an internal system, which is also called 'Up Next'. As discussed in the existing

research, the 'Up Next' videos on YouTube present a complex challenge due to the difficulty in identifying precise filtering rules. The ranking in the recommendation system is determined based on multiple criteria, making it challenging to pinpoint the specific factors at play. However, there are some potential tendencies to the performance of the 'Up Next' videos that 207% of the recommendation pages are executed through the 'Most Viewed page' (Davidson et al. 2010, p.296). However, Davidson et al. 's (2010) study are focused on observing personalised video recommendations, and mainly examines three of recommended metrics, including 'Most Viewed', 'Top Favorited' and 'Top Rated'. In this study, I conducted a more systematic observation by examining the huge number of specific channel categories and included the multiple recommended metrics, such as 'same channel' and 'same political ideology', which provide a comprehensive view to observe the media ecology between society and digital society.

According to the latest research, Matamoros et al. (2021) also indicate that the channel query is given a visibility boost by YouTube's recommendation algorithms (p.238). This means that some of the specific channels are consistently recommended repeatedly each day. The queries of view count and channel subscription are believed to be the two factors which influence the most on the performance of the 'Up Next' video. However, it needs to examine the different levels of influence between these two queries that the channel subscription numbers do boost video visibility in recommendation compared to video view count.

One of the typical surmises of the political communication on the recommendation system is that YouTube's recommendation is becoming an approach to receive totalitarian ideology (O'Callaghan et al. 2015; Tufekci 2018). According to Tufekci (2018), recommending videos on YouTube was more and more polarising by observing the videos of Donald Trump's rallies on YouTube during the 2016 presidential election campaign. The preliminary observation by

Tufekci pointed out that YouTube's recommendation has played an important role in the online strategy of the extreme right's ideological makeup. However, since Tufekci only conducts manual observation in a short period and only in a single issue, which is a lack of systematic observation, it is hard to understand how the recommendations work in depth. In this thesis, I conduct a systematic observation of the recommendation system, which covers a long period, 4 years, from JAN 2017 to JAN 202, and conducted both sizes of 'crawl depth' 0 and 1 on YTD, which is able to observe the initial connection between the seed videos to other seed videos with no additional recommendations, and further observe the precise recommended practices on the specific clusters.

In the context of using Gephi for network analysis, a cluster, often referred to as a community within network graphs, represents a group of nodes that are more densely connected to each other than to other nodes in the network. In Gephi, clusters help identify subgroups within the network, revealing patterns or communities based on shared attributes or stronger interactions, such as common topics in videos or closely linked user communities.

Since both of the three types of programmes in this study have delivered varying degrees of specific political ideology or environmental ideology. It needs to verify whether the 'Up next' list started leading to the more extreme videos. Through examining the 'Up next' network from the single video via the Gephi software, such as the long-term party's controversy or political scandal or slowly departs from the initial issue.

In terms of research steps of analysing the Up next algorithm on YouTube, I deal with each of the video network analyses through two stages of network analysis, including integrated analysis and cluster analysis. Firstly, the integrated analysis is able to illustrate the comprehensive 'Up Next' network on the YouTube page through the distribution of nodes, such as channel title and the view count, which demonstrate in the Data Laboratory mode of

Gephi software. It needs to notice the filtering criteria in this step, that the videos I selected for each type of programme have already been filtered out in-depth in previous analyses. Next, I then use the 'Modularity Class', a filtering tool of Gephi, to generate the clustering layout of the 'Up Next' network. Through the cluster analysis, it can be directly recognised where the seeds video will be linked to, and whether these seeds videos are directed to a specific ideology or issue. Since there is a lack of relevant research currently available, both the research subject (the political talk shows, non-affiliated talk shows and in-depth reporting) and the research field (YouTube 'Up Next' system) can be seen as a pilot study of algorithm analysis of both the political and environmental communication on YouTube.

There are a large number of studies on YouTube's recommendation system, which commonly focus on the filtering rules of the 'Up Next' videos, including the five important factors in video visibility on YouTube, including user clicks, the time a user spends watching videos, same political ideology, same channel, and the biggest channel (more subscribers). However, although there are already lots of relevant studies on YouTube's recommendation system, there are few YouTube-based studies in Taiwan. As the relevant studies (e.g., Rieder, Matamoros-Fernández and Coromina 2018; Röchert, Weitzel and Ross 2020; Hao, 2019) mentioned that almost all the important factors in video visibility on YouTube are derived from user behaviours that the primary filtering criteria of generating the recommended videos sidebar are through searching videos that user is watching or matching their search history. Besides user behaviours, I also find that the Up-Next algorithm is also influenced by multiple metrics, such as 'same channel', 'same political ideology', 'same environmental topic' and 'the latest video'.

The aim of YouTube's recommendation system further brings up a problem— implicit bias. From the perspective of political videos, this filtering criterion can quickly guide the videos with extreme content and lead to political polarisation. From the perspective of

environmental communication, the filtering algorithm can result in users being excluded from the videos that are different from their existing perspective, potentially leading to immersion within an extremist ideological bubble.

I use the next algorithm analysis to examine the political communication on the recommendation system through two stages of network analysis: integrated and cluster. In addition, since there is a lack of relevant research currently available, both the research subject (the political talk shows, non-affiliated talk shows and in-depth reporting) and the research field (YouTube 'Up Next' system) can be seen as a pilot study of algorithm analysis of both the political and environmental communication on YouTube.

In sum, the modularity report indicates that the videos of each genre of channels have high connections, that the higher modularity (Q) means the videos from clusters have higher similarity, such as have the same topics, arguments or programmes, which are suitable for thematic analysis. The modularity (Q) of the political talk show videos is 0.667 and the number of communities is 57, the modularity (Q) of the non-affiliated talk show videos is 0.687 and the number of communities is 44, and the modularity (Q) of the in-depth reporting 0.736 and the number of communities is 119. The modularity report also raises two issues worthy of further discussion: how the YouTube algorithm clusters the videos because they do not have a meaningful title; and the reasons for the huge number of scattered nodes. Firstly, through the manual observation of the same title forms and video descriptions, I find that these clusters are homogeneous, which indicates that the video description can be identified as the reason for the YouTube algorithm clustering the videos. Secondly, there are two potential reasons for the huge number of scattered nodes, including the multiple topics of a single video and the scattered release time of these videos.

The following sections explain the clustered performance of each of the three programmes, as well as examine the recommended behaviours on political issues and environmental

issues through the YouTube recommendation system, the up next algorithm analysis of crawl 1 will focus on three specific perspectives: the issue of political radicalisation; the issue of environmental spectacularisation and catastrophization; and the awareness construction of global warming.

1. Political talk shows

a. Up next algorithm analysis

As the Modularity Report indicates, the Modularity (Q) is 0.667, and the number of communities is 57, Modularity demonstrated that there are high dense connections between the nodes within the video network. The number of Modularity (Q) means each of the clusters has a high correlation. There are eight available clusters that have edges connected after excluding those nodes connected without edges, which indicates how YouTube gathers these videos together. Figure 4.46 demonstrated the overall political talks shows' videos network, which consisted of eight clusters (with different colours) and some scattered nodes which do not connect to others (the grey colour nodes). Besides, the network demonstrated a variety of political biases, which are not gathered by quantity metrics, such as programme or view count, but are clustered by the specific topics or issues. Therefore, I then conducted the further analysis for each cluster, and regarded the nodes which do not have edges as a single cluster.

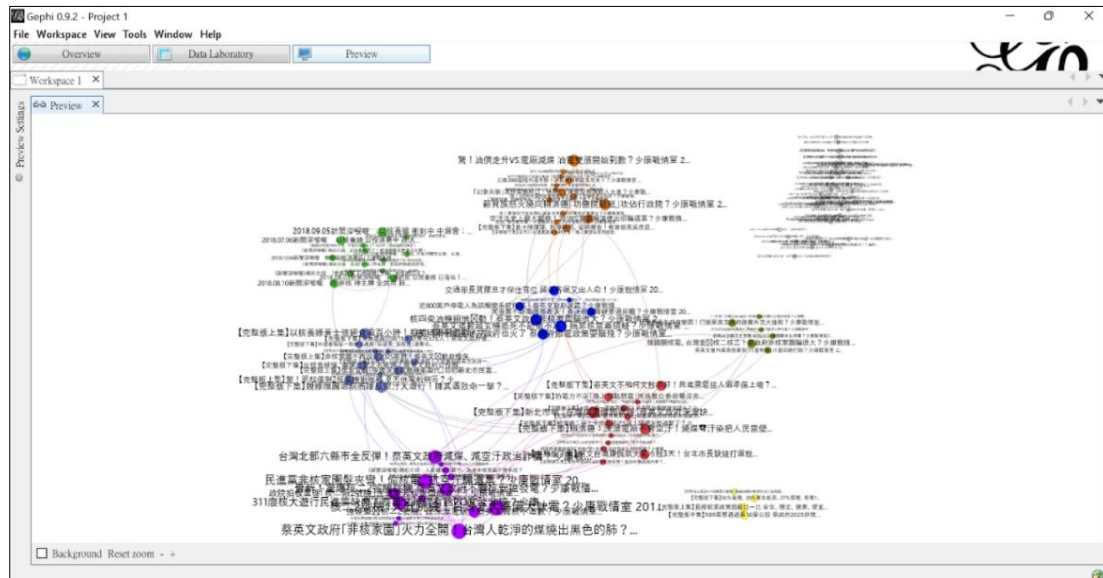


Figure 4. 46. The network of political talk shows' videos. 2022. (Print Screen)

Overall, YouTube clusters videos based on three primary factors: similar political bias, simultaneous occurrence of events, and commonality of program sources. It is crucial to recognize that the observed political biases reflect the content creators' political stance or inclination rather than a deviation from factual reporting. These biases serve to reinforce existing opinions, a process distinct from radicalisation, which involves adopting extreme views that could lead to drastic actions. In this study, the focus is on 'opinion reinforcement,' a term that aptly describes how YouTube's algorithm may amplify existing political beliefs by consistently presenting similar content, thereby deepening viewers' pre-existing biases without inciting extreme behaviours.

It is important to note, however, that only the first two clusters show potential signs of radicalisation, likely due to the specific selection of seed videos influenced by prevailing political conditions. The following contents are the detailed composition of the clusters:

Firstly, almost all of the clusters have a strong political bias, which focuses on the two main Taiwanese energy policies and the other two common environmental issues: *Using nuclear to nourish renewables, Nuclear-free homeland by 2025*, air pollution issues and power outage. Most of the bias is in condemning the ruling party or a typical speech of ascriptive

responsibility of the air pollution issue that 'the air pollution in Taiwan is caused by Mainland'. For example, as cluster 1 demonstrated '...PM2.5 damages the lungs and the liver! The government (DPP) insists on a nuclear-free policy, which leads to the Taiwanese seem to be in a gas chamber? ...' and '...Executive Yuan and the Environmental Protection Agency: Air pollution is coming from the Mainland! Is this a Chinese conspiracy? ...'.

Secondly, some of the nodes are clustered by the event which happened at the same period, such as cluster 8 (see Table 4.24). The nodes in it are discussing the energy policies between the KMT and the DPP, and the release time is within two weeks. Thirdly, some of the clusters are gathered by the same programme and often have the same political bias, which indicates that users might be directed towards more and more extreme videos through YouTube's recommendation algorithms when they watch these videos. For example, both of the nodes in clusters 3 and 6 are from the same programme, which has the same political bias that the energy policies (*Using nuclear to nourish renewables and Nuclear-free homeland by 2025*) proposed by the ruling party (DPP) is a lie.

The following points are the brief descriptions of the distribution of each cluster (see Table 4.5), which are divided into eight available clusters and some scattered nodes:

Air pollution issues: cluster 1 has two biases. Firstly, the ruling party cannot reach the goal of the energy proportion which means renewable energy cannot fully replace nuclear energy, and the alternative plan is continuous use of coal-fired power, which leads to air pollution. And air pollution in Taiwan is caused by the Mainland. Besides, the nodes of this cluster are all from the pan-blue programmes.

The referendum proposal of *Nuclear-free homeland by 2025*: the main argument of cluster 2 to 5 is anti-nuclear and energy use, which focuses on condemning the speech from the ruling party (the DPP) as a lie, for example, "all six cities in northern Taiwan rebounded! The commitment of reducing coal and air pollution which was proposed by President Tsai's

government is a political fraud?”. Besides, the nodes of these clusters are all from the pan-blue programmes, except for cluster 5, and almost from the same time period.

Power outage: cluster 6 has two political biases. Firstly, the explanation of the ruling party (the DPP) for the power outage is a lie; and the ascriptive responsibility of the power outage that the main cause of the power outage is the failure of the energy policies (*Using nuclear to nourish renewables* and *Nuclear-free homeland by 2025*) which are proposed by the DPP, the power outage. Besides, the nodes of these clusters are all from the pan-blue programmes, and almost from the same time period.

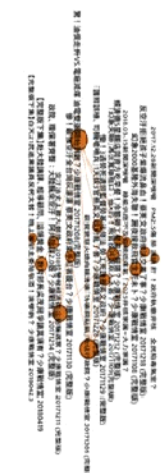

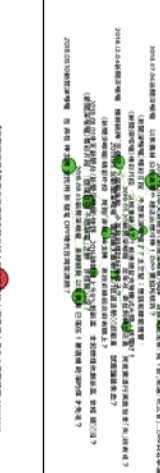
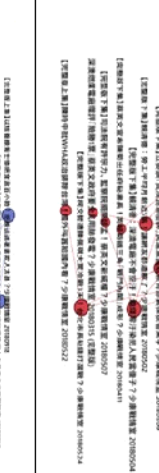
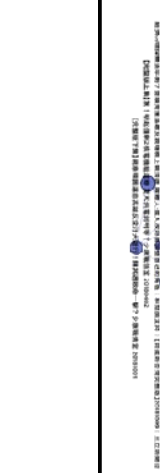
The ruling party's diplomatic issues: the nodes in cluster 7 are gathered by the diplomatic issues, especially the diplomatic situation between the DPP and the United States that the ideology of the ruling party is believed to be pro-American.

The plan of renewable energy: the nodes in cluster 8 discusses the energy policies between the KMT and the DPP, which does not have a strong political bias rather than the previous clusters. Besides, the nodes of these clusters are all from the pan-blue programmes, and almost from the same time period.

The scattered nodes usually contain multiple issues in a node, and although these scattered nodes are similar to the nodes in the above clusters (cluster 1 to 8), there is a lack of release time, and the strong political bias relates to the other nodes.

Besides, through further examining the different sizes of nodes, it can be found that these clusters sometimes focus on a certain event in the same period, such as clusters 4, 6 and 7. For example, cluster 2 indicated that all of the nodes which have the bigger size were focused on the same issue: the 311 anti-nuclear parades. The strong political biases of the 311 anti-nuclear parades are that they condemned the DPP for advocating non-nuclear but were absent from the 311 anti-nuclear parades, and questioned if the DPP does not

acknowledge that non-nuclear is impossible. The larger the size of the nodes, the stronger the connection with other nodes in the network, which means that these nodes play the role of core issues in the network.

code	Clusters
1	 <p>List of the nodes</p> <ul style="list-style-type: none"> ...PM2.5 dam ages the lungs and the liver! The government (DPP) insists on a nuclear-free policy, which leads to the Taiwanese, seem not to be in a safe chamber?Executive Yuan and the Environmental Protection Agency: Air pollution is coming from the Mainland! Is this a Chinese Premier, which ran from 2017 to 2019, tricked the ballot?The biggest overhaul in the history of the Air Pollution Control Act! 2018 Alert, William Ching-te, Lai (The former Premier, which ran from 2017 to 2019) tricked the ballot?Shock! Rising oil prices vs. Coal reduction in power plants: double increase in oil and electricity?The supply of green energy is not enough and depends on coal-fired power! Is Nuclear-free homeland by 2025 equal to coal-fired power by 2025? ...
2	 <ul style="list-style-type: none"> ...The DPP is absent from the Nuclear Abolition Parade! President Tsai is not ashamed of his absence but publishes a post on Facebook to discuss non-nuclear?All six cities in northern Taiwan have rebounded the energy policies proposed by the ruling party (the DPP)! The ruling party conducts political fraud through the slogans of reducing coal and reducing air pollution?The energy policy "Nuclear-free homeland by 2025", which was proposed by the DPP has resulted in an increase in the use of thermal power generation! Taiwanese's clean coal burns out black lungs?The Kuosheng Nuclear Power Plant broke down in just one day! Is Taiwan preparing for a power shortage in summer?The government decided to restart the "Kuosheng Nuclear Power Plant", does it mean the energy policy "Nuclear-free homeland by 2025", which was proposed by the DPP has failed? 1. ...
3	 <ul style="list-style-type: none"> ...The energy policy of "Using nuclear to renewable noursishes" is in the sprint. Election Conference. No guarantee for a case to be submitted in September... Is the DPP online to cheat?The energy policy of "Using nuclear to renewable noursishes" referendum, will the DPP strangle the Lungmen NuclearThe DPP insists on enforcing the energy policies: Using nuclear energy to noursish renewables and Nuclear-free homeland by 2025. This movement may restrict Taiwan's energy development?President Tsai criticised that "Using nuclear to noursish renewables" is outdated! Is burning clean coal a good idea? "10 pm power blackout" in case of power shortage: A DPP legislator revealed that there is no electricity without non-nuclear power? ...
4	 <ul style="list-style-type: none"> ...William Ching-te, Lai: Enabling the Shen'ao Power Plant will not cause air pollution! Burning coal with zero pollution treats people as fools?New Taipei City: "chooses between bad and bad". The ruling party (the DPP) uses the Sun's Power Plant to deal with power outages? ...
5	 <ul style="list-style-type: none"> ...The energy policy of "Using nuclear to renewable noursishes" supporters went on hunger strike for over 100 hours! Is it too deceiving to refuse to send the joint signature?The Shen'ao Power Plant has been in operation for 15 years, killing 576 people! The DPP chronic killing without blood?The energy policy of "Nuclear-free homeland by 2025" will no longer set a 2025 deadline! The ruling party starts aThe mayor of New Taipei city appeals to "the Shen'ao Power Plant and replace it with green energy" not to use the citizens of New Taipei as bargaining chips? ...

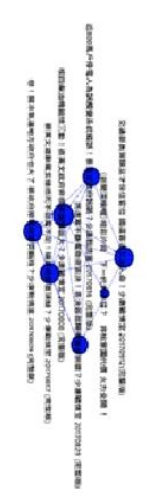


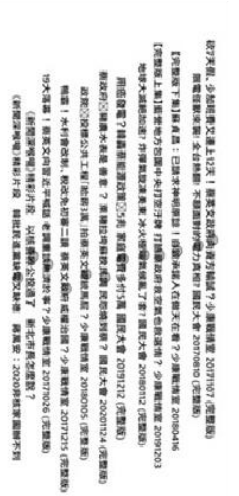
code	Clusters
6	 <p>List of the nodes</p> <ul style="list-style-type: none"> ... The Lungmen Nuclear Power Plant quietly started! the energy policy of 'Nuclear-free homeland by 2025' proposed by the ruling party, is it? ... President Tsai apologised but did not admit the lack of electricity! Propose the energy policy of 'Nuclear-free homeland by 2025' but don't want to face it? ... Angry! The measures to turn off the air conditioner are even popular with the local government. The power-saving policy proposed by the ruling party is stupid? ... The DPP kept telephoning all night long! If the voting machine fails, do you still have to force a vote? Nearly 8 million households were powered off by human error and triggered a system error! Is the ruling party lying? ... Trump hits is with the "mother of bombs"! The most powerful bomb on the surface prevented North Korea's nuclear test? President Tsai told foreign media that he wanted to contact the "Trump Hotline", but was rejected by Trump? A hundred years of Panama's changing tone! The pragmatic diplomacy proposed by the ruling party has been Energy policy comparison between the KMT and the DPP: safe, stable, healthy, cheap who can give? 5.89 million votes passed the 16th referendum, can the energy policy of 'Nuclear-free homeland by 2025' not be 50% gas, 20% renewable energy, 27% coal, 1% nuclear, 77% lungs? The blades of the wind turbines in Taichung are broken, and the foundations of the wind turbines in Taoyuan are collapsed. Is wind power generation a scam? The referendum on the energy policy of 'using nuclear to renewable nourishes' has passed, what did the mayor of The KMT attacked the ruling party with the issue of air pollution, not only to save the air but also the election Earth's mass extinction is accelerating! Bombs and cyclones freeze the eastern United States, and extreme weather is The power-limiting monster is coming! The whole of Taiwan is hot! The truth about electricity that you don't want to Use cancer to generate electricity? the energy policies proposed by the DPP consumes 5 trillion, and household electricity bills pay an extra 50,000 NTD. ...
7	
8	
9	

Table 4. 5. The cluster network of political talk shows' videos.

To understand the video's genre link from the seeds video through YouTube's recommendation algorithms, the videos are selected from a specific seed video from YTD and investigated how the 'Up Next' network worked on YouTube. The seed videos were composed of the videos which have been selected in multimodal analysis. In this question, I used setting additional parameters from the Video Network Module. To get a good size network, I set 'crawl depth' to 1 on YTD, which means the network will include all the videos that are 'related to' the seed videos, each video page approximately generates 90 Up Next videos.

1. The issue of political radicalisation

According to the overall video network analysis, clusters can be identified as smaller groups of seeds and two majority clustered factors of these seeds, the same channel and the same issue. This has a specific meaning for political talk shows, namely that videos from the same channel in a cluster will potentially reinforce political radicalisation, which means the videos with the same political bias are more likely to appear in the recommended list. To investigate the political radicalisation of YouTube regarding the content of Taiwanese political talk shows, I concentrated on two clusters, each with pan-blue (the KMT) populist content and pan-green (the DPP) populist content. This was used as the starting point for examining the recommendation behaviour. Through manually classifying the topic of the video of the political talk shows, Taiwanese energy policies (*Using nuclear to nourish renewables* and *Nuclear-free homeland by 2025*) are the most frequent topics discussed in these videos. Since the performance of cluster network analysis of the political talk shows does not cluster by pan-green, I manually filter out a cluster based on the conditions of pan-blues, including the similar seed size and traffic data, such as views count, likes count and comments count.

I selected cluster 3 of the cluster network of political talk shows' videos as the initial pan-blue populist videos seeds. Based on six pan-blue populist videos, 336 recommendations at crawl 1 were collected. The initial pan-green populist videos were manually selected by filtering out the videos which have the same topic as the six pan-blue populist videos. The ten pan-green populist videos were selected and 249 recommendations at crawl 1 were collected. The following table 4.6 shows the overall initial information on the videos, including both the seeds and the recommendations.

Table 4. 6. Indicators of the total dataset (including duplicates)

cluster	Programme genre	Total views	Total likes	Total dislikes	Total comments	Total videos
pan-blue populist	Political talk shows	75,434,464	105,109	0	309,147	342
pan-green populist	Political talk shows	24,263,555	7,059	0	74,659	249
extreme weather	non-affiliated talk shows	80,031,401	467,104	0	151,217	310
extreme weather	In-depth reporting	84,363,465	83,955	0	9,756	422
global warming	In-depth reporting	101,059,635	440,592	0	53,073	443

According to figure 4.47, the nodes in black frame are the seed videos, the nodes outside the black frame are the recommendations at crawl 1, which have a strong direction to other videos, as the dense grey edges between these nodes. The blue nodes are pan-blue populist videos, green is pan-green populist and red are neutral videos that do not have an obvious political ideology. Figure 4.48 illustrates the recommendation network of the energy policies cluster by channel metric, the nodes in the black frame are the seed videos, and the nodes outside the black frame are the recommendations at crawl 1. The green nodes and the orange nodes come from two channels, which are the channels with the first and second highest ratios in the recommendation results, and the grey nodes are the videos from other

channels. To get a good network visualisation, I export these videos into two forms, political populist and channel metrics. Through these construct steps, it will focus on the distribution of the videos in specific metrics.

Overall, the recommendation network of the energy policies on both pan-blue and pan-green political talk shows has similar communication effects, that is, the political videos possibly lead to political radicalisation through recommendation networks on YouTube. As figure 4.47 and figure 4.49 demonstrates, the seeds are eventually recommended to the videos which have the same political ideology. The phenomenon is more obvious in the pan-blue populist videos, compared to the pan-green populists. In addition, there are two potential findings from these two figures. Firstly, it can be found that these destination videos are often connected to each other, which means the spread effect of these videos is concentrated on YouTube. It demonstrated that the YouTube recommendation system is potentially leading to political polarisation. When users browse these destination videos via automatic recommendation, there will be a high frequency trapped in the videos from the same political ideology. Secondly, almost all of the video channels are from the programmes which I set as the research subject through further examining these destination videos, which means that the spread effect of this video genre is relatively closed on YouTube. For example, most of the recommended videos in figure 4.47 are from the same video category (news and politics) and focus on specific political talk shows. Through the in-depth analysis of figure 4.47, only a few pan-green destination videos. The video is related to condemning the performance of the pan-blue politician, and there has been no outstanding performance in the metrics of view count, like count and comment count. The only similarity with the other destination videos is the metric of the video category label, that is, the news and politics category label.

As figure 4.48 and figure 4.50 demonstrates, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic. As discussed in section A.2. In the literature review chapter, there are obvious differences between the new media and old media, including the shifting of communication from one-way (Web1.0) to two-way (Web 2.0) and the role of the new 'mediator' of two-way communication. The result is similar to the siloed media logic of one or two-channel television media, that Taiwanese media remain the same dominance of channels in the new media.

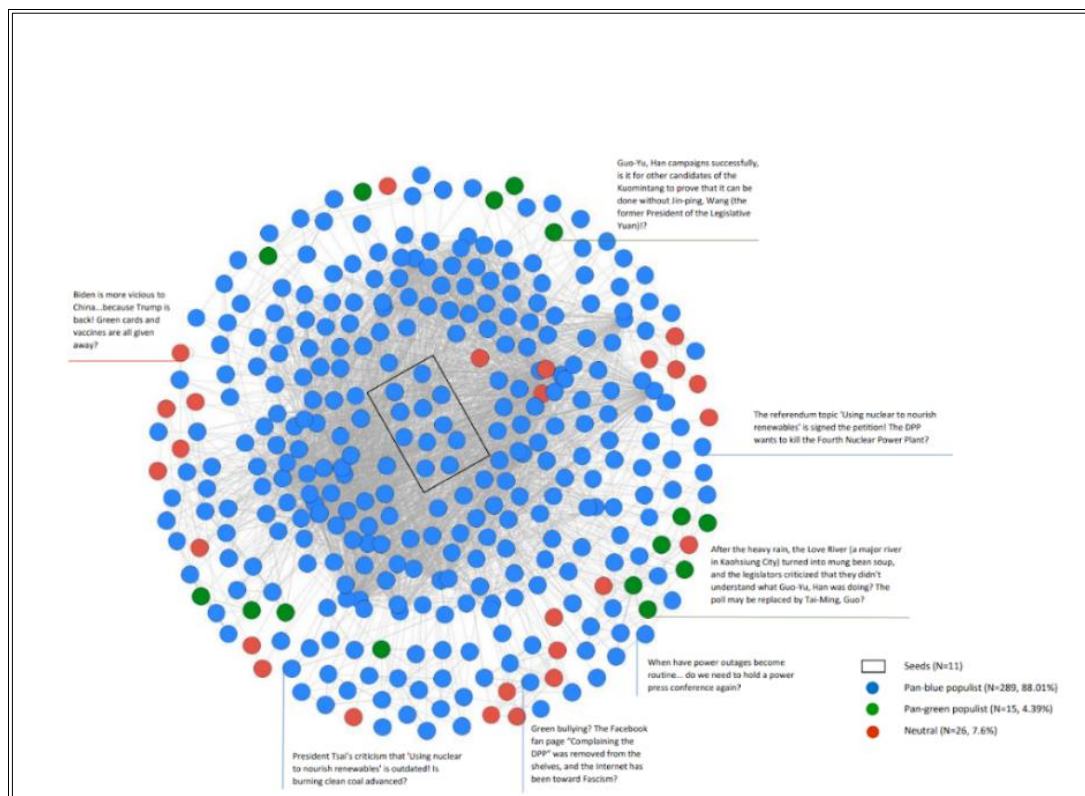


Figure 4. 47. Recommendation network of the energy policies cluster by political populist metric (pan-blue political talk shows)

* Since the huge amount of the output, the figure only lists some meaningful titles

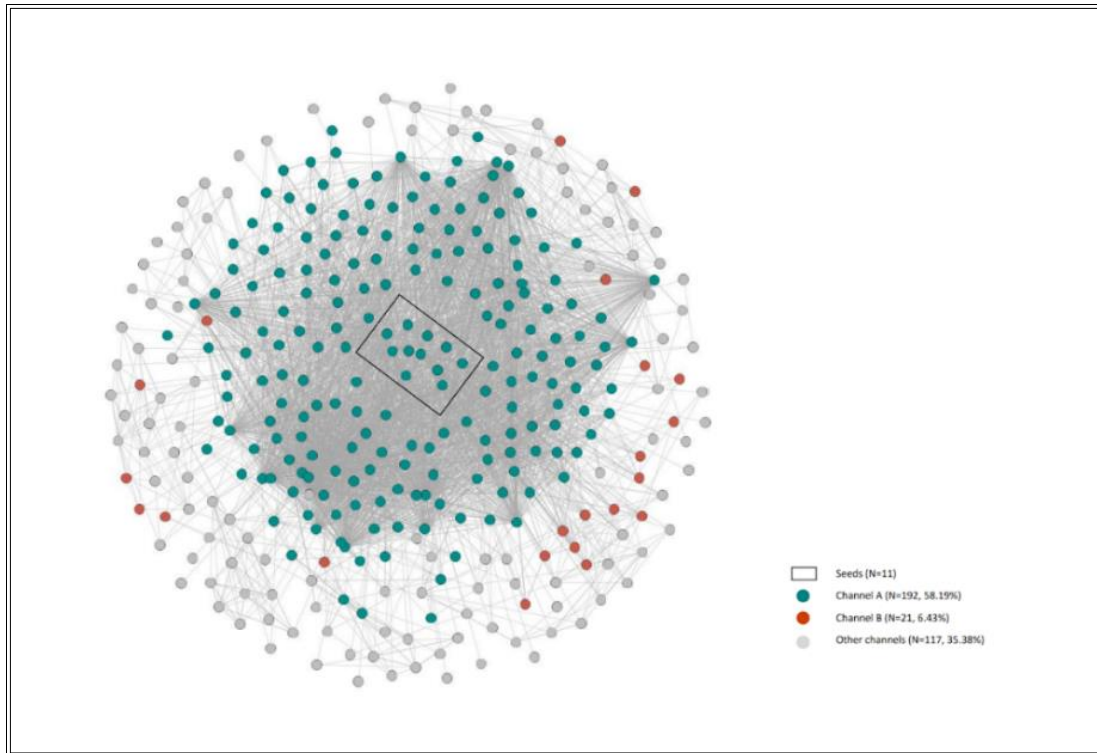


Figure 4. 48. Recommendation network of the energy policies cluster by channel metric (pan-blue political talk shows)

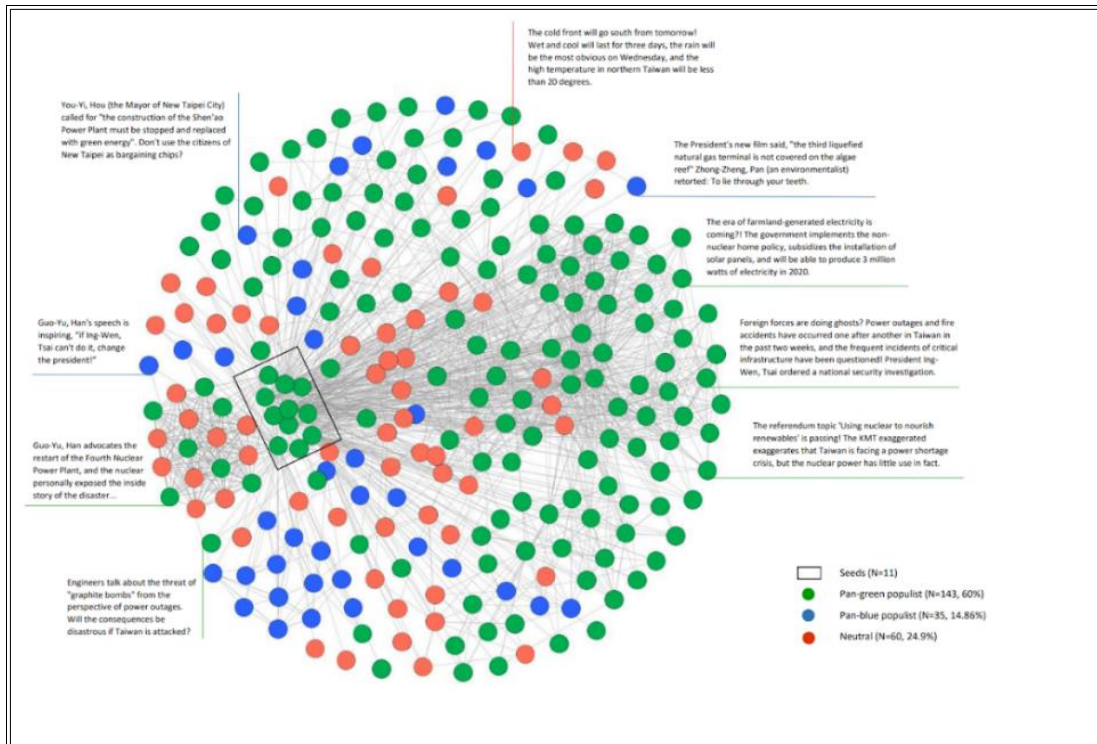


Figure 4. 49. Recommendation network of the energy policies cluster (pan-green political talk shows)

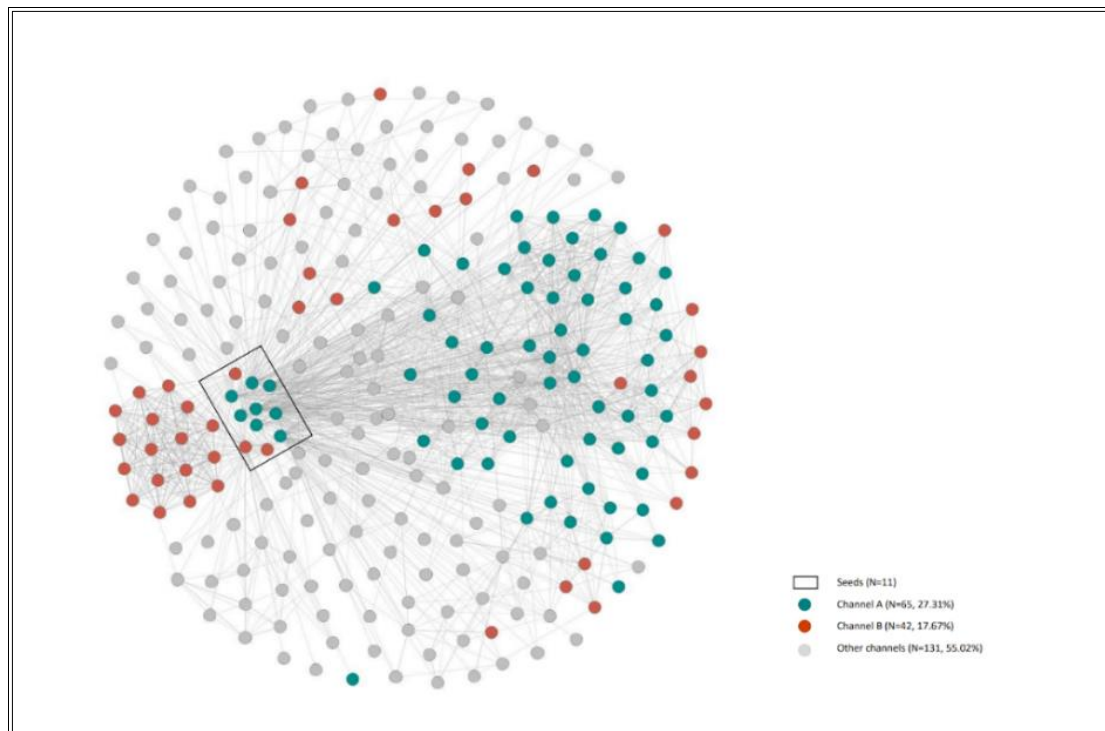


Figure 4. 50. Recommendation network of the energy policies cluster by channel metric (pan-green political talk shows)

b. Findings

The up next algorithm analysis of crawl 0 demonstrates the eight available clusters, which are divided by a variety of political biases. The observation of the connections between the nodes and the edges confirms that the videos are not gathered by quantity metrics, such as programme or view count, but are clustered by the specific topics or issues.

The in-depth analysis for each cluster indicates three potential reasons for how YouTube clusters different videos together, such as similar political bias, the event which happened during the same period and the nodes from the same programme. For example, the clusters have a strong political bias, which focuses on the two main Taiwanese energy policies and the other two common environmental issues— *Using nuclear to nourish renewables*, *Nuclear-free homeland by 2025*, air pollution issues and power outages. In addition, the possible reason for the scattered nodes is a lack of release time and the strong political bias related to the other nodes. Besides, the cluster analysis of the political talk shows also demonstrates that the larger the size of the nodes, the stronger the connection with other nodes in the network.

It means that these nodes play the role of core issues in the network, and the clusters with a similar political bias are easily formed as the filtering bubbles on YouTube, which result in promoting the specific political ideology. For example, a bigger-sized cluster demonstrates the strong political biases of the 311 anti-nuclear parades, that the main argument is condemned the ruling party (the DPP), that it advocates non-nuclear but was absent from the 311 anti-nuclear parades and questions the DPP do not acknowledge that non-nuclear is impossible.

To examine the political radicalisation of the Taiwanese political talk shows on YouTube, I then use the up next algorithm analysis of crawl 1 and concentrate on two clusters, each with pan-blue (the KMT) populist content and pan-green (the DPP) populist content. I find that the YouTube video recommendation system encourages political radicalisation, which means the videos with the same political bias are more likely to appear in the recommended list. It needs to be mentioned that the recommendation network of the energy policies on both pan-blue and pan-green political talk shows have similar communication effects. For example, figure 4.47 and 4.49 demonstrates that the seeds of both pan-blue populist and pan-green populist are eventually recommended to the videos which have the same political ideology. The result not only identifies the political radicalisation of the YouTube recommendation system but also that the spread effect of this video genre is relatively closed on YouTube, that most of the recommended videos in figure 4.47 are from the same video category (news and politics) and focus on the specific political talk shows. Besides, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic (Figure 4.48 and Figure 4.50), which represents the siloed media logic of one or two-channel television media, that Taiwanese media remain the same dominance of channels in the new media.

2. Non-affiliated talk shows

a. Up next algorithm analysis

As the Modularity Report indicates, the Modularity (Q) is 0.687, and the number of communities is 44, which means each of the clusters has a high correlation. There are seven available clusters that have edges connected after excluding those nodes connected without edges. Figure 4.51 demonstrated the overall non-affiliated talk shows' videos network, which consisted of eight clusters (with different colours) and some scattered nodes which do not connect to others (the grey colour nodes). Overall, the cluster analysis indicated how YouTube gathers these videos together. According to Figure 4.51, these clusters are classified by the specific topics or issues mostly, but some of the clusters are gathered by video title. Besides, it seldom has strong political bias as the political talk shows' network, instead of the referendum proposals 'Using nuclear to nourish renewables' and 'Nuclear-free homeland by 2025' but focuses more on the spectacularization and catastrophization of environmental issues, such as extreme weather. It corresponds to the finding of the multimodal analysis—spectacularization and catastrophization that the phenomenon is not only demonstrated on the video content but the video title. Therefore, I then conducted the further analysis for each cluster, and regarded the nodes which do not have edges as a single cluster.



Figure 4. 51. The network of the non-affiliated talk shows' videos. 2022. (Print Screen)

Overall, there are two potential reasons to explain how YouTube clusters different videos together: similar topics and the nodes from the same programme. It is important to mention

that the composition of the clusters is sometimes accompanied by two reasons above. Firstly, most of the clusters are gathered by spectacularization and catastrophization environmental issues as mentioned above, such as extreme weather (cluster 1, cluster 3 and cluster 5). For example, as cluster 1 demonstrated ‘... "Cliff-like cooling" appears in the northern hemisphere and it freezes for New Year's Eve! ?...’ and ‘...The polar vortex "divides into two" leads to the extremely low temperature in winter! ?...’. And the nodes in cluster 2 mention the two main Taiwanese energy policies: *Using nuclear to nourish renewables* and *Nuclear-free homeland by 2025*, which have a political bias that the policies are impossible to execute successfully. Secondly, some of the clusters are gathered by the same programme and often have the same genre of topics, for example, the nodes in cluster 5 are from the same programme, which discusses the same topic that extreme climate events are happening around the world. The following points are the brief descriptions of the distribution of each cluster (see Table 4.7), which are divided into seven available clusters and some scattered nodes:

Extreme weather events: the nodes in cluster 1, cluster 3 and cluster 5 are gathered by extreme weather events with exaggerated form, for example, ‘...La Nina phenomenon freezes East Asia! Winter "spectacles" appear in many places on the mainland...’ and ‘...The United States is facing the strongest cold current in 30 years ... causing Chicago to freeze overnight and the northern hemisphere to freeze!...’. Besides, the nodes of cluster 5 are all from the same programme.

The referendum proposes ‘*Using nuclear to nourish renewables*’ and ‘*Nuclear-free homeland by 2025*’: cluster 2 is the only cluster that has a political bias. The main political bias is that the policies are impossible to execute successfully. Besides, the nodes of this cluster are all from the same programme.

Renewable energy development and electricity consumption: the nodes in cluster 4 are gathered by the development of renewable energy and electricity consumption, for example,

‘...Google, an international company, expects to see "Taiwan becoming an island country dominated by renewable energy"! !...’ and ‘...An offshore wind turbine will cost 4 billion, the mystery of the development of renewable energy in Taiwan! ?...’.

Nuclear waste disposal and environmentally friendly issues: The content of the videos in cluster 6 mention the issues of nuclear waste disposal and environmentally friendly issues, such as plastic reduction and green energy development. Besides, the nodes of this cluster are all from the same programme.

Environmental issues Related to international relations: the nodes in cluster 7 are focused on the environmental issues Related to international relations, especially with the Mainland, for example, ‘...Xi Jinping and Putin join forces to check and balance the United States! The cold snap caused the "weather war" to explode! ?...’ and ‘...Is the power outages in Beijing, Shanghai, Guangzhou and Shenzhen an "electricity coup"? Is the Mainland using "power outage war" to attack Taiwan? ! ...’ Besides, the nodes of this cluster are all from the same programme.

The scattered nodes: cluster 8 demonstrates that the scattered nodes contain diverse topics, such as extreme weather events, water resources, air pollution and power supply. The possible reasons for lots of the scattered nodes are that these nodes hardly cluster at the same time period and do not have a specific bias as the political talk shows indicated.

Besides, through further examining the different sizes of nodes, the potential factor of the different sizes of nodes in the non-affiliated talk shows’ networks is that the nodes which have a larger size are from the same programme, which can be seen in cluster 2 and 6.

1. The issue of environmental spectacularization and catastrophization

According to the cluster network analysis, most of the videos in the clusters of the non-affiliated talk shows are gathered by extreme weather. According to Lowe's (2006) study of the people's perception of climate change after watching the film *The Day After Tomorrow*, it shows that catastrophizing on environmental issues may cause people to not know how to take action after seeing the representation of massive severe environmental disasters.

O'Neill and Nicholson-Cole (2009, p.368) also found a similar result from the investigation of the visual, and iconic, representations of climate change, that the representations have an obvious effect on attracting people's attention to climate change, but which could lead to a negative and bleak outlook for the future climate at the same time. This poses the question are brought out, whether the recommendation system encourages the spread of extreme climate videos or reinforces this ideology. In this thesis, I conduct a systematic observation over a long period, including multimodal analysis for videos, comment analysis and the Up-Next algorithm, which provides more predictable results for formulating the strategies of environmental communication in future.

I selected a cluster from the cluster network of non-affiliated talk shows videos, which discussed extreme weather as the initial video seeds. Based on seven non-affiliated talk shows videos, 310 recommendations at crawl 1 were collected. Table 4.7 shows the overall initial information on the videos, including both the seeds and the recommendations.

According to figure 4.52, the nodes in the black frame are the seed videos, and the nodes outside the black frame are the recommendations at crawl 1, which have a strong direction to other videos, as the dense edges between these nodes. The big-sized nodes are extreme weather videos, medium-sized nodes are other environmental issues and small-sized are videos that do not relate to environmental issues. In addition to the size of nodes, the different colours of nodes mean different channels.

Overall, only slight videos are eventually directed to extreme weather videos (N=17, 5.48%) and other environmental issues (N=4, 1.29%) through recommendation networks on YouTube (see Figure 4.52). Most of the seeds will eventually be recommended to videos that do not relate to environmental issues, the small-sized nodes in figure 4.52 demonstrate some of the non-environmental destinations, such as the 2022 United States elections, the conflict between Ukraine and Russia and Coronavirus disease (COVID-19). This phenomenon of environmental spectacularization and catastrophization is not obvious in all recommendation networks in this case. Furthermore, there are two potential findings from this figure, which are similar to the recommendation network of the energy policies cluster on both pan-blue and pan-green political talk shows. Firstly, it can be noticed that almost all of the videos are from the initial programmes, which means that the spread effect of this video genre is relatively closed on YouTube. Secondly, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic, which is similar to the siloed media logic of one or two-channel television media, that Taiwanese media remain the same dominance of channels in the new media.

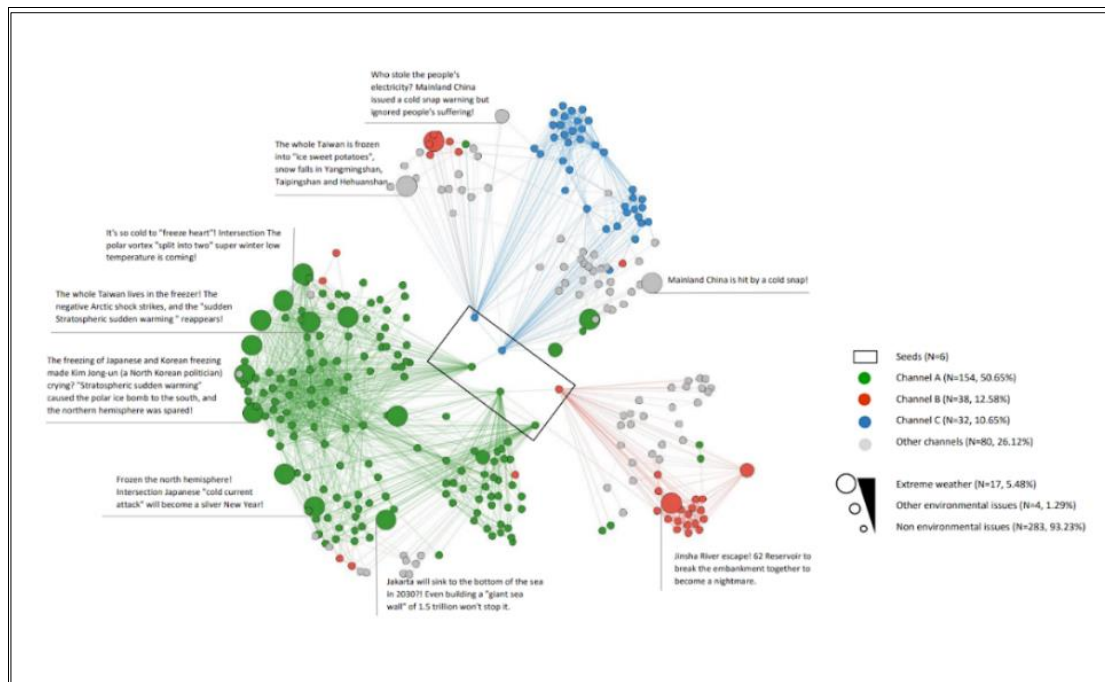


Figure 4.52. Recommendation network of the extreme weather cluster (non-affiliated talk shows).

b. Findings

The up next algorithm analysis of crawl 0 demonstrates the seven available clusters, which are divided by the specific topics or issues mostly, but some of the clusters are gathered by video title. Besides, the title of these videos seldom has a strong political bias as the political talk shows' network but focuses more on the spectacularization and catastrophization of environmental issues, such as extreme weather. It corresponds to the finding of the multimodal analysis—spectacularization and catastrophization appear in both the video content and the video title.

The in-depth analysis for each cluster indicates two potential reasons for how YouTube clusters different videos, including the similar issues and the same programme. The common issues of the clusters are extreme weather events, the referendum proposals '*Using nuclear to nourish renewables*' and '*Nuclear-free homeland by 2025*', renewable energy development and electricity consumption and nuclear waste disposal, environmentally friendly issues and environmental issues which are related to international relations. In addition, the possible reasons for lots of the scattered nodes are that these nodes rarely

cluster at the same time period and do not have a specific bias as the political talk shows indicated.

According to the cluster network analysis, most of the videos in the clusters of the non-affiliated talk shows are gathered by extreme weather, which brings up a potential problem of whether the recommendation system encourages the spread of extreme climate videos or reinforces this ideology. I then conduct the up next algorithm analysis of crawl 1, and concentrate on non-affiliated talk shows, which discuss extreme weather. Overall, there are only slight videos eventually directed to the extreme weather videos and other environmental issues through recommendation networks on YouTube (see Figure 4.52). This phenomenon of environmental spectacularization and catastrophization is not obvious in all of the recommendation networks in this case. In addition, I also find that the spread effect of these videos is concentrated on YouTube, that these destination videos are often connected to each other, and the spread effect of this video genre is relatively closed on YouTube, that almost all of the videos are from the initial programmes.

3. In-depth reporting

a. Up next algorithm analysis

As the Modularity Report indicates, the Modularity (Q) is 0.736, and the number of communities is 119, which means each of the clusters has a high correlation. There are eleven available clusters that have edges connected after excluding those nodes connected without edges. Figure 4.53 demonstrated the overall in-depth reportings' video network, which consisted of eleven clusters (with different colours) and some scattered nodes that do not connect to others (the grey colour nodes). Overall, the cluster analysis indicated how YouTube gathers these videos together. According to Figure 4.53, these clusters are classified by the specific topics or issues mostly, but some of the clusters are gathered by video titles. Besides, it does not have a strong political bias as the political talk shows'

network but focuses more on the global environmental issues which happened at the same time, such as the 2018 California wildfires and deforestation of the Amazon rainforest, or the introduction of green energy, which biased to provide knowledge of the emerging green energy. Therefore, I then conducted the further analysis for each cluster, and regarded the nodes which do not have edges as a single cluster.

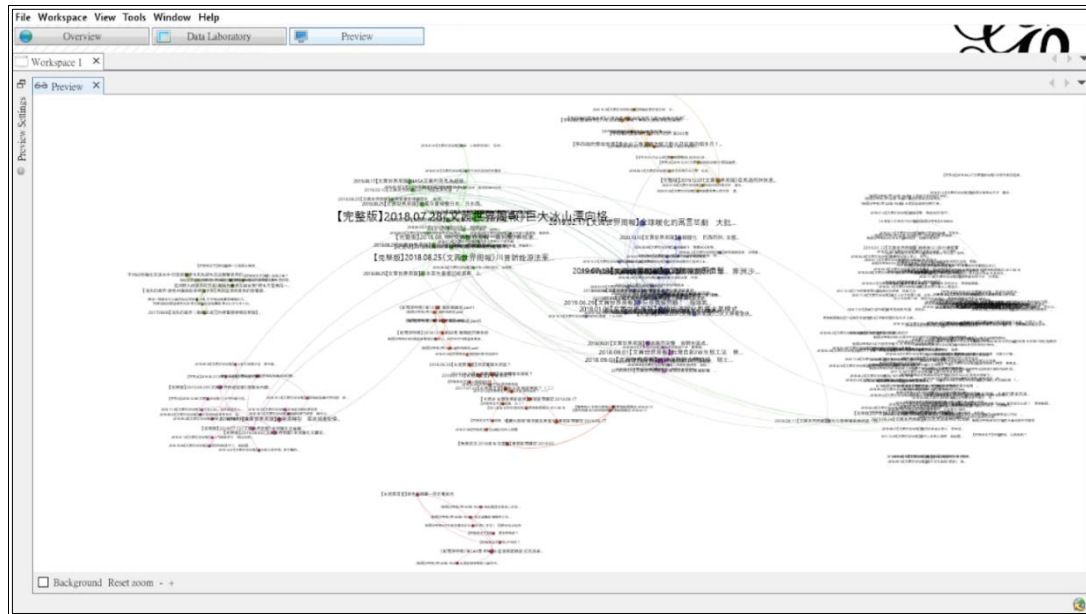


Figure 4. 53. The network of in-depth reporting's videos. 2022. (Print Screen)

Overall, there are three potential reasons to explain how YouTube clusters different videos together: similar topics, the event which happened at the same period and the nodes from the same programme. Firstly, almost all of the clusters have specific topics, which contain a variety of environment-related issues, including energy policies, global warming, environmentally friendly issues, climate change, environmental ecology and extreme weather events. For example, most of the clusters are gathered by extreme weather events (cluster1, 5, 10 and 11), which demonstrated ‘...the out-of-control summer heat in South Korea can be regarded as a disaster...’, ‘...Extreme torrential rain stormed the city of Seoul...’ and ‘.....The melting of glaciers causes mountain displacement, and the Swiss glacier village is in danger...’. Secondly, some of the nodes are clustered by the event which happened at the same period, such as clusters 10 and 11, the nodes in them are discussed about a series of

extreme events that happened at the same period. Thirdly, some of the clusters are gathered by the same programme and often discussed similar topics, which indicates that users might be directed towards the videos which discuss similar topics through YouTube's recommendation algorithms when they watch these videos. For example, the nodes in cluster 7 are from the same programme, which has the same bias that global warming is a disaster, and the resolution of the Conference of the Parties (COP) is regarded as an important solution. The following points are the brief descriptions of the distribution of each cluster (see Table 4.8), which are divided into eleven available clusters and some of scattered nodes:

The comparison of global energy policies: the main discussion of cluster 1 is the global energy policies. For example, '...Energy resource dependence on Malaysia, Singapore's energy policy in crisis...', '...Trump's new energy proposed law is criticised for 'initiating the war on the United States and all of humanity'...' and '...90% of Singapore's energy depends on imported natural gas...'. Besides, the nodes of this cluster are all from the same programme.

Global warming: clusters 2 and 7 have the same bias that global warming is a disaster, and the resolution of the COP is regarded as an important solution. For example, '...Record-high temperatures frequently happened everywhere in 2019, the global natural disasters verify serious global warming...', '...Establishing a carbon trading market, bolder climate goals, the resolution of COP25 is especially critical...', '...COP25 failed, global carbon trading market failed to take shape...' and '...Rare in the history of global warming disasters! The largest wildfire in 16 years in the Arctic Circle has burned for three weeks...'. Besides, the nodes of these clusters are all from the same programme.

Local environmental issues and climate change: the main bias of cluster 4 is that climate change causes ecological catastrophe in Taiwan, for example, '...Climate change threatens

alpine ecology in Taiwan...' and '...The ocean temperature is soaring because of climate change, which leads to coral death and ecological upheaval...'.

Extreme weather events: clusters 5, 10 and 11 are clustered by the same period and the same programme, which is focused on the consecutive events occurring at the same period and have a similar bias of extreme weather issues that extreme weather events are irreversible disasters beyond human control. For example, '...Extreme torrential rain stormed the city of Seoul...', '...The beauty that is about to melt, Greenland bears the brunt...' and '...Typhoon Yanzi devastated Kansai, and the destructive power of the storm surge is beyond imagination...'.

Human-caused environmental issues: clusters 3, 6 and 9 are gathered by the specific environmental events which are caused by humans, including the 2018 California wildfires and deforestation of the Amazon rainforest, and the bias is that human-caused environmental damage and contributing to global warming. For example, '...Deforestation meets wildfire, Amazon rainforest turns into forest cemetery...', '...Global warming is causing severe heat and causing wildfires around the world! ...' and '...the Amazon rainforest has rapidly disappeared 29% in the past year ...'.

Environmentally friendly issues: the main bias of cluster 8 is the development of energy transition (nuclear energy and green energy) and reducing plastic use with a positive perspective. For example, '...circular economy creates green energy...', '...wind power, the energy transition from land to sea...' and '...expand the plastic restriction, re-evolution of environmentally friendly tableware...'.

The scattered nodes: cluster 12 demonstrates that the scattered nodes contain diverse topics, such as extreme weather events, water resources, air pollution, global warming and climate change. The possible reasons for lots of the scattered nodes are that these nodes

hardly cluster at the same period and do not have a specific bias as the political talk shows indicated.

Besides, through further examining the different sizes of nodes, it can be found that these clusters sometimes focus on a certain event in the same period, such as clusters 5 and 7. For example, cluster 5 indicated that all of the nodes which have the bigger size were focused on the same issue: the global extreme weather events. The larger the size of the nodes, the stronger the connection with other nodes in the network, which means that these nodes play the role of core issues in the network.

According to the previous cluster analysis of each programme genre, it arises two issues which are worthy to conduct further discussion, including how YouTube algorithm clustered the videos together for not having a meaningful title, and the reasons for the huge number of scattered nodes. Firstly, the cluster 2 and 6 in Table 4.8 demonstrates that the title includes only the title of the programme and published date, without any additional description of the video content. Further research is required to ascertain whether the videos in these clusters are homogeneous or heterogeneous and how the YouTube algorithm clusters them together. Through the manual observation of each of the videos, I found that two factors influenced the cluster, that is, the same title forms and video description. All of these videos discuss similar topics and have a detailed outline which is represented in the description of the video, indicating that the video description can be identified as the reason for the YouTube algorithm clustering the videos.

In addition, there are two potential reasons for the huge number of scattered nodes. Firstly, since the videos usually include multiple topics, it can be surmised that it is difficult to identify which part of the content of the videos is the factor that is filtered out through the YouTube algorithm. Secondly, through manually examining the attributes of each of the scattered nodes, I find a common feature that the release time of these nodes often does not exist in the same time period of any other cluster. In addition, it can be found that the videos from some clusters are from the same channel, which is often a huge cluster. The possible reason for this is the difference in the number of video distributions in each programme. For example, programme L has only ten available videos and programme F has 186 available videos.

1. The issue of environmental spectacularization and catastrophization

According to the cluster network analysis, most of the videos in the clusters of the in-depth reportings are gathered by extreme weather. According to Lowe's (2006) study of the

people's perception of climate change after watching the film *The Day After Tomorrow*, it shows that catastrophizing on environmental issues may cause people to not know how to take action after seeing the representation of massive severe environmental disasters.

O'Neill and Nicholson-Cole (2009, p.368) also found a similar result from the investigation of the visual, and iconic, representations of climate change, that the representations have an obvious effect on attracting people's attention to climate change but could lead to a negative and bleak outlook for the future climate at the same time. This poses the question are brought out, whether the recommendation system encourages the spread of extreme climate videos or reinforces this ideology.

I selected a cluster from the cluster network of in-depth reportings videos, which discussed extreme weather as the initial video seeds. Based on fourteen in-depth reporting videos, 422 recommendations at crawl 1 were collected. Table 4.8 shows the overall initial information on the videos, including both the seeds and the recommendations. According to figure 4.54, the nodes in the black frame are the seed videos, and the nodes outside the black frame are the recommendations at crawl 1, which have a strong direction to other videos, as the dense edges between these nodes. The big-sized nodes are extreme weather videos, medium-sized nodes are other environmental issues and small-sized are videos that do not relate to environmental issues. In addition to the size of nodes, the different colours of nodes mean different channels.

Overall, only slight videos are eventually directed to the extreme weather videos (N=23, 5.69%) and other environmental issues (N=16, 4.03%) through recommendation networks on YouTube (see Figure 4.54). Most of the seeds will eventually be recommended to videos that do not relate to environmental issues, the small-sized nodes in figure 4.54 demonstrate some of the non-environmental destinations, such as the governance of the specific politicians and the conflict between Ukraine and Russia. This phenomenon of environmental

spectacularization and catastrophization is not obvious in all recommendation networks in this case. Furthermore, there are two potential findings from these two figures, which are similar to figure 4.52, the recommendation network of the extreme weather cluster on the non-affiliated talk shows. Firstly, it can be noticed that almost all of the videos are from the initial programmes, which means that the spread effect of this video genre is relatively closed on YouTube. Secondly, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic, which is similar to the siloed media logic of one or two-channel television media, that Taiwanese media remain the same dominance of channels in the new media.

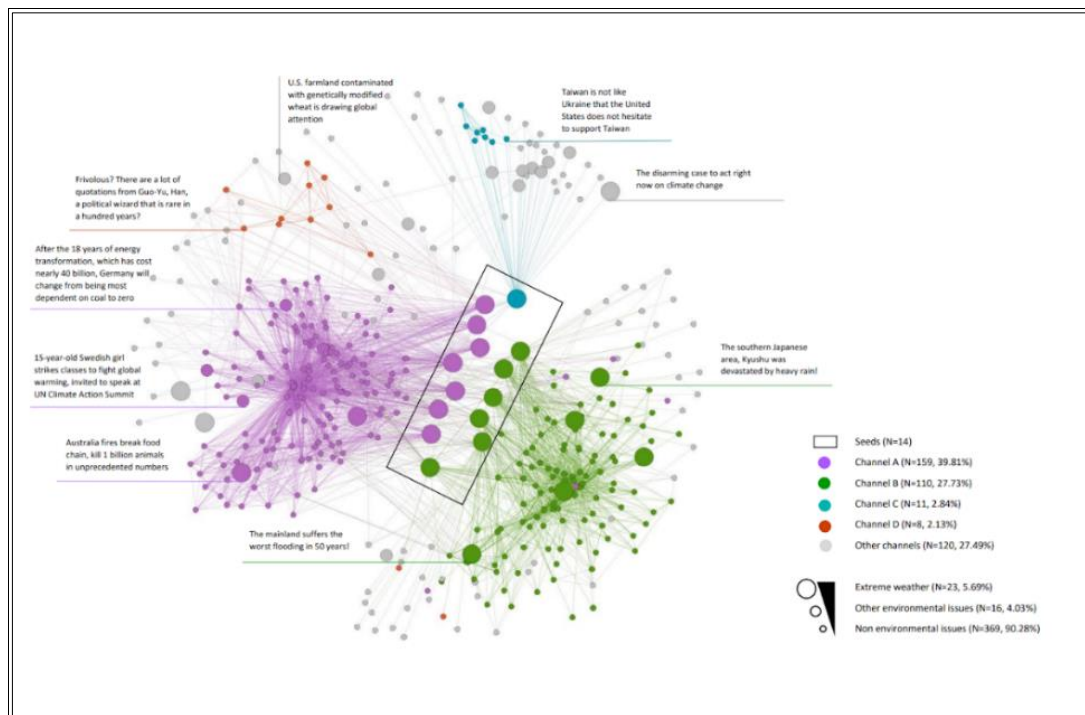


Figure 4. 54. Recommendation network of the extreme weather cluster (in-depth reporting).

* Since the huge amount of the output, the figure only lists some meaningful titles

2. The awareness construction of global warming on YouTube

In-depth reporting can be seen as an approach to environmental communication, compared to the other two genres of talk shows. The issue setting and the content of in-depth reporting not only selects global environmental issue but interprets Taiwanese local environmental issues with a global perspective, which can be seen as a practice that

translates into Taiwanese media ecology. Thus, it is worthwhile to find out what kind of communication effect videos showing in-depth reports bring through the recommendation system. I then selected a cluster video showing in-depth reports which discussed global warming, a common global environmental issue, to conduct the recommendation analysis at crawl 1. I selected cluster 2 of the cluster network of videos of the in-depth reporting as the initial videos' seeds. Based on thirteen videos, 443 recommendations at crawl 1 were collected. Table 4.8 shows the overall initial information on the videos, including both the seeds and the recommendations.

According to figure 4.55, the nodes in the black frame are the seed videos, and the nodes outside the black frame are the recommendations at crawl 1, which have a strong direction to other videos, as the dense edges between these nodes. The big-sized nodes are extreme weather videos, medium-sized nodes are other environmental issues and small-sized are videos that do not relate to environmental issues. In addition to the size of nodes, the different colours of nodes mean different channels.

Overall, the recommendation network of the global warming issues on in-depth reportings has positive communication effects, the difference can be found in the number of videos between extreme weather videos (N=8, 1.81%) and global warming videos (N=39, 9.03%), which are eventually directed through recommendation networks on YouTube (see Figure 4.55). The number of global warming videos is far greater than extreme weather videos, which means the videos through the YouTube recommendation system will not exacerbate the catastrophizing of environmental issues. Most of the seeds are eventually recommended to videos that do not relate to environmental issues. Through the in-depth analysis of figure 4.55, it can be seen that only a few destination videos are extreme weather, and the global warming videos are often related to energy policy, the COP26 or the reuse of agricultural waste. In addition, most of the seeds will eventually be recommended to non-environmental

destinations, the small-sized nodes in figure 4.55 demonstrate a common destination, the conflict between Ukraine and Russia. The promotion of global warming issues is less obvious in the recommender system compared to breaking news.

Furthermore, there are two potential findings from these two figures, which are similar to the previous figures 4.52 and 4.54. Firstly, it can be noticed that almost all of the videos are from the initial programmes, which means that the spread effect of this video genre is relatively closed on YouTube. Secondly, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic, which is similar to the siloed media logic of one or two-channel television media, that Taiwanese media remain the same dominance of channels in the new media.

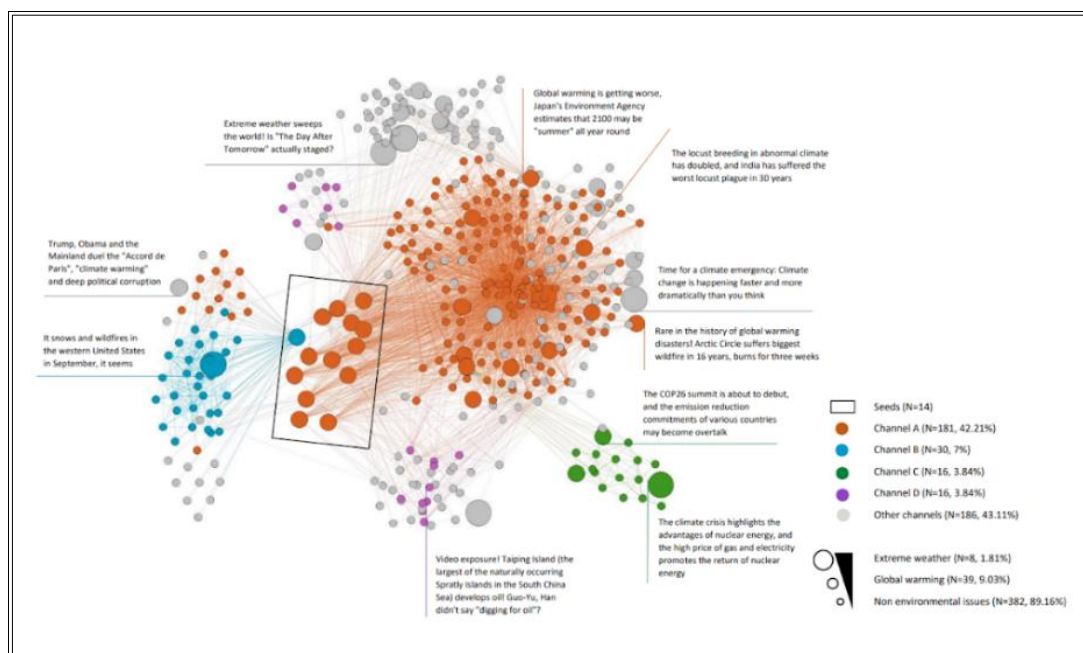


Figure 4.55. Recommendation network of the global warming cluster (in-depth reporting).
 * Since the huge amount of the output, the figure only lists some meaningful titles

b. Findings

This thesis exemplifies digital social research on YouTube, highlighting the need to clearly define the subject of research and address potential problems of digital bias. YouTube operates with an independent algorithm system, evidenced by its recommendation patterns, making it impossible to control the recommendation trail for videos with similar

topics or metrics such as view counts or channel subscribers. Findings from the 'Up Next' analysis reveal that different seed videos produce varied results. This suggests that digital platforms should not be viewed solely as tools or communication spaces; instead, any results from digital methods represent an interplay between the medium (YouTube) and specific topics (e.g., environmental issues on Taiwan's political talk shows). The results from digital platforms are identified as 'hybridity' of online practices, a concept proposed by Hine (2000, p.71). This refers to the integrated production by technology and human activities that contribute to the content and interactions encountered online. The research objectives of my thesis include analysing patterns within Web materials from a single platform (YouTube), and specific issue settings are useful for documenting platform-based phenomena (Schneider and Foot 2005, p. 157). Secondly, there are three common problems of digital bias while conducting the analysis in the digital platform, including biased data and content, biases built into research instruments, and methodological bias (Marres 2017, p.101). To treat the methodological problem of bias, I use the methodological strategy which was called 'critical extraction' (Driscoll and Walker, 2014), to secure the independence of the empirical analysis from the other platform algorithm, that I select the same size of clusters when I conduct the comparative analysis of the different political ideology or comparing the specific environmental issues on different programme genres.

The up next algorithm analysis of crawl 0 demonstrates the eleven available clusters, which are divided by the specific topics or issues mostly, but some of the clusters are gathered by video title. Besides, the title of these videos does not have a strong political bias as the political talk shows' network but focuses more on the global environmental issues which happened at the same time. For example, the 2018 California wildfires and deforestation of the Amazon rainforest, or the introduction of green energy, which biased to provide knowledge of emerging green energy.

The in-depth analysis for each cluster indicates three potential reasons for how YouTube clusters different videos together, including similar topics, the event which happened during the same period and the nodes from the same programme, which identifies that these clusters are homogeneous. The common topics in these clusters are energy policies, global warming, environmentally friendly issues, climate change, environmental ecology and extreme weather events. According to the cluster network analysis, both extreme weather and global warming have the largest clusters.

To further examine the environmental ideology promoted in the in-depth reporting through the YouTube recommendation system, I use the up next algorithm analysis of crawl 1, and concentrate on two clusters, each with extreme weather content and global warming content. Firstly, the extreme weather clusters do not grow the environmental spectacularization and catastrophization or promote the specific environmental ideology. Most of the seeds will eventually be recommended to videos that do not relate to environmental issues, the small-sized nodes in figure 4.55 demonstrates some of the non-environmental destinations, such as the 2022 United States elections, the conflict between Ukraine and Russia and Coronavirus disease (COVID-19). Besides, the spread effect of these videos is similar to the previous cluster analysis (see Figures 4.52 and 4.54), that the spread effect of the in-depth reporting is relatively closed on YouTube, as almost all of the videos are from the initial programmes. Secondly, the issue setting, and the content of the in-depth reporting are concentrated on environmental communication, compared to the other two genres of talk shows, which can be regarded as a practice that translates into Taiwanese media ecology.

I then select the cluster of global warming to conduct the recommendation analysis at crawl 1. Overall, the recommendation network of the global warming issues on in-depth reportings has positive communication effects, that the number of videos is eventually

directly related to the positive environmental movements (see Figure 4.55), such as energy policy, the COP26 or reuse of agricultural waste. In addition, most of the seeds will eventually be recommended to non-environmental destinations, the small-sized nodes in figure 4.55 demonstrate a common destination, the conflict between Ukraine and Russia. The promotion of global warming issues is less obvious in the recommender system compared to breaking news.

C. YouTube comments analysis

User's comments are a part of 'multimodal assemblage', which can be seen as a field consisting of arguments and discussions on YouTube. According to Ricke (2014, p. 55), YouTube comments play an important role in the emerging communicative practice which increases amounts of civic participation and diversity within the public sphere. As well as identifies the difference between the old 'broadcast' style of media and the new 'dialogue' media of YouTube, which provides evidence of the mediator change from a one-way broadcast to two-way communication. However, almost all of the relevant studies are focused on the platform or single function of YouTube, such as the recommendation system or comments in common. A part of the previous studies mentioned an increasing polarisation in the news media and wider political culture has given rise to concerns that the scientific public sphere is being overtaken by 'post-truth politics', and the personal effect of the hosts was more effective than public discourse (Parham 2017). This thesis uses comments analysis as a part of the mixed methods, to demonstrate how the receivers feel about this emerging communicative practice, as well as provide overwhelming evidence for environmental policymakers and public arguments for the benefits of a sustainable environment.

In sum, the comment analysis responds to the second question of this study, that I find the specific engagement performances in the environmental topics on YouTube. The comment

analysis also provides evidence for examining whether the environmental communication in the three genres of programmes encourages political polarisation or not, and which discussion of environmental issues they arouse a lot. The comment analysis is processed by three methods, including the findings of each comment the Comment Term Frequency Comparison (CTFC), the comparative analysis of comments obtained through YouTube API and those prominently displayed on the video's web page and the collocation analysis and Key Word in Context (KWIC) analysis.

I also find that the KWIC analysis feels more conclusive than the CTFC analysis and that the CTFC analysis provides a way to quickly glance at the overall discourses. In these comments, it is hard to identify the meaning of comments from just one word through the KWIC analysis, because the words of the comments often have multiple meanings. For example, [the DDP] almost appears in the five-word clusters, and often with both positive and negative meanings. The following findings explain the depth of the public engagement in an environmental topic expressed by YouTube comments on each of the three programmes.

1. Word frequency analysis of YouTube video comments

Triangulated analysis provides a systematic comparison between the top 100 wordlists of the comments of these three types of programmes. Table 4.9 shows an overview of all programmes, while Table 4.10 shows the specific view of each type of programme. I combine words that have the same meanings, such as 'Tsai' and 'Yin-Wen', and the prepositions and adverbs which do not have specific meanings, such as in, of or too, etc. According to the output from Triangulate (Table 4.9) and the tag cloud (Figure 4.56), the comments discourse is reflected in some comment topics through the clusters of common words. The tag cloud demonstrates the words common for the three top 100 wordlists with frequency through the visualisation perspective, which clearly presents the main topic and attitude of the comments discourse, the main discussion surrounded by the comparison

between Taiwan and Mainland in politics and the energy policy launches by the ruling party (the DPP); and through the verbs which is presented on the tag cloud (Figure 4.57) with the highest frequency, such as 'have', 'intentionally' 'say' and 'do not', they represent two main attitude of the comments discourse: the comments are usually around a specific statement from the programmes or the key politicians, such as 'say'; and often express opinions with polarised verbs, such as 'have' and 'do not'. Besides, I excluded 'hashtag' which had the highest frequency of the whole wordlists to make a clear tag cloud by two reasons: since the hashtag is the automatic setting of the WordSmith tools means number in the comments, there was a lack of meaning compared to other words here, and its huge amount of frequency cause the tag cloud out of focus.

The following paragraphs have been divided into three topic clusters to understand how environmental issues are discussed in the comments, from political, economic, and policy perspectives.

Table 4. 9. The words common for the three top 100 wordlists.

Common for political talk shows, non-affiliated talk shows, in-depth reportings:		
hashtag (7668)	have (4637)	can (1736)
intentionally (4545)	do not (3999)	Mainland (1657)
Taiwan (3749)	say (2321)	money (672)
Taiwan (SC, 2229)	the Taiwanese president (1683)	only (930)
power generation (705)	government (951)	United States (611)
cannot (627)	compare (623)	them (616)
do (negative meaning, 604)	politics (727)	no (756)
now (674)		

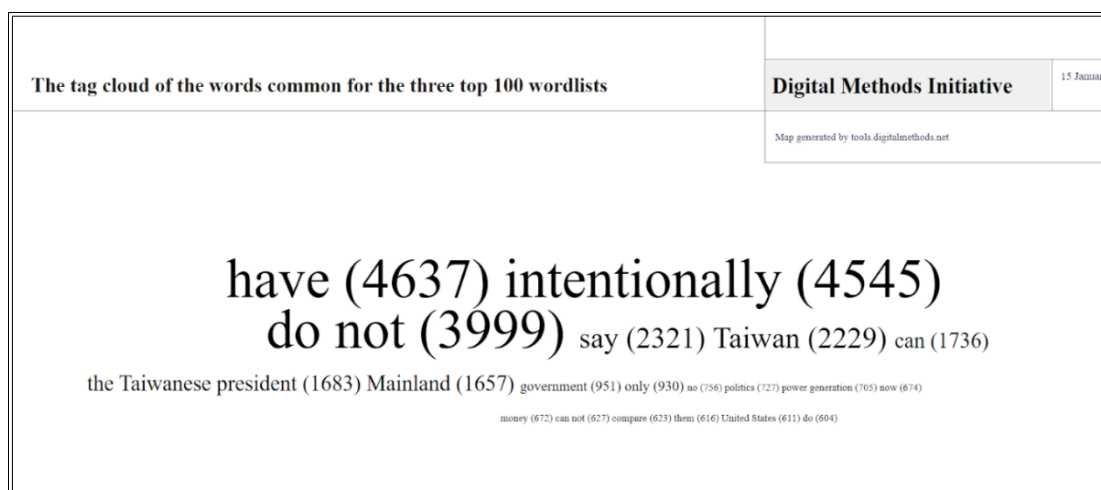


Figure 4. 56. The tag cloud of the words is common for the three top 100 wordlists. 2022. (Print Screen).

The politic-related comparison the nations frequently discussed in the comments are Taiwan, Mainland and the United States, the related words are [Taiwan], [Mainland], [United States], [politics] and [the Taiwanese president], which reflects the discourse surrounding the issue of the cross-strait relation and the wrestling between the US and Mainland, and the forms of the comments often tie-up by political ideology or use Mainland and the U.S. as comparative targets, such as the comparison of air quality between Taiwan and Mainland, the comparison of green energy using between Taiwan and Mainland or the ascriptive responsibility of energy consumption, for example,

'It's a simple solution. The UK, the US, Europe, Japan, China, and India should reduce their energy consumption first. There is no reason for asking others to consume less energy but enjoy high energy consumption by themselves.' (SC, C156).

'In past, Taiwan Province mocked the mainland's air pollution, but now there is basically no air pollution in the mainland. PM2.5 will not be a medium dust, plus the Russian natural gas pipeline is coming, there will be no more coal power in the future. On the other hand, Taiwan Province has turned its good nuclear power into coal power for the sake of votes and fake democracy.'

Look at the fact that every family in India builds power plants to turn on electricity, and the result is that the air pollution in India is 999 times more serious than the mainland. Taiwan Province is following the Indian step.' (SC, I074).

The related words of economy-related environmental issues are [money] and [power generation], which reflects that the feedback of people on environmental issues is related to life behaviours, such as prices or energy use. The common discourses are using nuclear energy to replace the thermal energy, the green energy is cost higher and abolishing nuclear will lead to power shortage, for example,

'The wind won't work in Taiwan, Taiwan has a few windy days in summer, and solar energy will meet typhoons. Be more sober! The price of natural gas will increase in future. Just wait for electricity prices to rise!' (H002).

'That's right, 50% natural gas. What the government didn't tell you is how much electricity bills will rise by then? How much does thermal power account for? The harm of nuclear energy has not been encountered yet.

Everyone absorbs air pollution first, the 23 million people air purifier.' (J016).

The related words of policy-related environmental issues are [power generation], [government], [the Taiwanese president], [Taiwan] and [the Taiwanese president], since the emerging energy policies 'Using nuclear to nourish renewables' and 'Nuclear-free homeland by 2025' were proposed by the ruling party (the DPP), as the main political view in the 2016 and 2020 Taiwanese presidential election. Therefore, the power generation-related topic and the policy implementation progress occupy a high ratio in the comments discourse, especially in pan-blue political talk shows, for example,

'The world air pollution ranking of Beijing in 2013 was 41 and has dropped to 184 in 2018. Cheers Ying-Wen, Tsai! Support for Ying-Wen, Tsai! Wait for the success of Non-nuclear home 2025.' (SC, C037), which represents a satirical meaning.

'Ying-Wen, Tsai plans to achieve 2024 even if she is deceived to be re-elected, but the political parties are bound to take turns. If the non-nuclear homeland or the electricity price increase cannot be completed in 2025, it is okay for her to avoid that the executive ability of the succeeding president is too bad' (I075).

'Some people think that the non-nuclear concept is good. In any case, the energy issue should not be overly anxious. I think the Non-nuclear home 2025 policy which was proposed by President Tsai in the 2016 Taiwanese presidential election is too impatient.' (H007).

It can be found that the pan-green (the ruling party) political talk shows rarely mentioned these two policies, which have a high difference of the amount of the comments in pan-blue's, it has a potential reason that the political programmes are easier to inspire negative comments in YouTube. According to examining the issue setting of the pan-green political talk shows, it shows that the topics seldom mention these two policies directly but focus on introducing renewable energy.

Table 4.10 represents the words only appearing in one type of programme, which provides some potential performance in the specific programme type, and the tag cloud (Figure 4.57) demonstrates the words are only in one of the top 100 wordlists with the highest frequency. Firstly, it has three potential performances in the comment discourse in the political talk shows, ridiculing attitude, and politics-related comments which includes the energy policies

and political ideology arguments. The related word of the ridiculing attitude is [hahaha], which is used for satirising the government or politicians, for example, 'Hahaha, the leader of a place is such a person, I really can't think of it, it is really a group of big fools leading a large group of little fools.'(SC, I004). The related words of the politic-related comments are [KMT], [DPP], [Guo-Yu, Han], [policy] and [president], which is the most frequently appearing in the political talk shows comments, for example, 'We don't want such a bad party, the only one to get rid of the DPP.' (H007) or 'Half of the anti-nuclear people are anti-KMT, and the remaining half are brainless people who go with the other half.' (I010).

Secondly, compared to the political talk shows, the comments discourse of non-affiliated talk shows is more focused on the hot topics or discusses the film on the video, the related words including [picture], [film], [virus], [facial mask] and [pneumonia]. For example, 'The guest level is really poor, it is clear that the CCP has launched a virus war. Isn't the United States at a loss not to fight back? The United States was also forced.' (SC, J019). Thirdly, the comments discourse of in-depth reportings has more discussion on energy, ecology and economy. The related words are [economy], [thermal power], [solar energy] and [earth]. For example,

'In recent days, the temperature has risen, and I feel uneasy about the DPP's energy policy. There are many disasters on the earth, and there are more man-made disasters.' (C037)

'Carbon reduction must start from the source, that is, reduce the dependence on oil and media and natural gas. Electric vehicles still need these as energy sources, and this does not include the battery pollution caused by a large number of changes to batteries.' (E002).

According to the comparison among the comments discourse of the three types of programmes, it basically reflects the issue setting of the videos, which means that the topic discussed in the video often corresponds to the discussion in the comments, and if the issue setting includes the specific political ideology, it will stimulate more discussion in the comments, which usually have a negative meaning.

Table 4. 10. The words only in one of the top 100 wordlists.

Only in list political talk shows	Only in the list non-affiliated talk shows	Only in list in-depth reportings
want (2454)	use (73)	arrive (182)
DPP (SC, 808)	film (21)	media (SC, 63)
myself (1480)	should (68)	have a look (71)
KMT (1173)	virus (41)	election (41)
KMT (SC, 439)	feel (37)	solar energy (43)
come (SC, 439)	facial mask (23)	unscrupulous (59)
what (793)	kill (20)	cheat (49)
Guo-Yu, Han (the mayor of Kaohsiung whose political status is the KMT, 1067)	treatment (33)	earth (43)
right (SC, 397)	like (33)	economy (48)
must (441)	news (32)	thermal power (48)
party (550)	downstream (24)	
most (449)	hope (31)	
can (SC, 491)	pneumonia (21)	
policy (340)	water (27)	
now (SC, 450)	worldwide (24)	
	patient (22)	



Figure 4. 57. The tag cloud of the words is only in one of the top 100 wordlists. 2022. (Print Screen)

a. Word frequency analysis

According to the previous result, it can be confirmed that some of the potential words played an important role in the comments discourse. I further experimented with aggregating the comments to look for broader patterns in word frequency that I divided all the videos into three groups: political talk shows, non-affiliated talk shows and in-depth reportings. For the precise results, it can be confirmed the brief scale of the comment reflection of the three type of programmes, according to the words common for the three top 100 wordlists (Table 4.9) which emphasise the public interests and concern for the environment issues communicated by Taiwanese media, such as the power generation in Taiwan, the governance of the power generation issues of the ruling party, especially in the economic dimension, and the comparison of policy, economy and governance mostly with Mainland and the US. However, as the multi-model analysis illustrates that these three types of programmes have an obvious difference- the agenda setting which might lead to different discussion of the environmental issues, such as attitude aroused by politicised topics or whether the amount of knowledge in the video can arouse public attention to environmental issues. Through examining frequency analysis for three types of programmes

in separate, it is useful to understand the comment differences of them in-depth. The following wordlists have excluded inapplicable words and only contain the top 100 frequency words. The selection criteria of the top 100 frequency words for follow-up analysis are followed by: words which have highly frequency ranking and related the environmental issues or the environmental policy-related issues; words which related to the research questions, such as politicians or pollution etc.; retrieving the emerging words which generated from the process of dealing with the environmental issues from knowledge to outformations.

1) political talk shows

Table 4.11 includes the comments of the political talk shows videos, although it is hard to calculate the precise number of comments in each language manually, the wordlist (Table 4.12) still illustrates a potential trend of the language use in the comments that the number of Simplified Chinese (SC) comments is almost as same as the Traditional Chinese (TC) comments.

Table 4. 11. Overview statistics of the political talk shows videos.

The type of programme broadcasting	Political talk shows
The language of the video	Traditional Chinese
Total number of comments	70,179
Total number of words in corpus text	476,772
Total number of words in frequency wordlist	58,315

According to the wordlists, the following paragraphs are divided into five-word clusters which reflect the research subject: environment-related discussion and discourse, politic-related discussion and discourse, the words relate to the actors in the comments (include politician and party, etc.), the verbs have driving meaning to the attribution of responsibility or attitude meaning and the satirical words and hate words. Besides, the hashtag and

QUOTE in the wordlists mean number in the comments, which is the automatic setting of the WordSmith tools.

The environment-related discussion and discourse:

As table 4.12 shows, the only two words which relate to environment are [power generation (rank No. 67)] and [nuclear energy (No. 96)], this phenomenon probably has two meanings that the environmental issues which accessing to human lives can stimulate more discussion, and the energy-related issues are more often be the topic in the videos, especially in the political talk shows. According to the comments discourse of the political talk shows, these two words have two common collocation patterns: describing the power generation situation of renewable energy, such as 'the effect of power generation is limited' or 'solar power generation is less than 0.7%'; related to the environmental policy which includes the goals and dilemmas, such as 'reducing the ratio of thermal power generation' or 'the generator set has tripped'.

The politic-related discussion and discourse:

The words related to politics occupy most of the wordlist (Table 4.12), which is probably due to its programme type, including [DPP (No. 16)], [DPP in SC (No. 41)], [Tsai (Surname of the Taiwanese president, No. 36)], [government (No. 43)], [KMT (No. 26)], [politics (No.57)] and [policy (99)], etc. The discussion focuses on the energy policies mostly, which were promoted by DPP, and explains the reason why most of these words are related to DPP, such as '*President Tsai's environmental policy which involves thermal power generation, has led to smog...*' or '*when the world began to work hard to reduce carbon emissions, President Tsai abolished the nuclear power policy that would not have carbon emissions, resulting in smog...*'. It needs to notice that most of these are satirical comments or hate comments, for example, '*let everyone know that the Tsai's government (the ruling party) is fake*' or

'President Tsai uses the love power generation (a satirical word meaning the ruling party promotes the nuclear-free policy which has led to numerous power outages)'.

The words relate to the actors in the comments:

Since the wordlist is from the political talk shows videos, it includes a huge amount of politician, party, and nation words, such as [Taiwan (No. 11)], [Taiwan in SC (No. 14)], [DPP (No. 16)], [KMT (No. 26)], [government (No. 43)], [Guo-Yu, Han (the mayor of Kaohsiung whose political status is the KMT)(No. 46)], [Mainland in SC (NO. 52)], [Yin-Wen (last name of the Taiwanese president)(No. 50)] and [Tsai (Surname of the Taiwanese president) (No. 36)], etc. These words in the discourse are mainly involved in the attribution of responsibility for the energy policies, air pollution, and energy use, which have negative or satirical meanings in the comments mostly, such as *'...the bastard wants to defraud the nuclear power plant? Empress Tsai does not like it!!!* (SC, the 'Empress Tsai' here means a satirical word of Taiwanese president)', *'It is obviously President Tsai's environmental policy which involves thermal power generation that has led to smog... (SC)', 'Half of Taiwan's air pollution comes from China. it's unlucky to be neighbours with China' or 'The smog problem should have become global cross-domain pollution. China, India, South Korea, and Indonesia have all experienced smog'.*

The verbs have specific meaning among the comments:

Verbs are almost always related to attribution of responsibility or indicating the discourse authority, such as [support (No. 38)], [say (No. 15)], [say in SC (No. 34)] and [beat (No. 77)].

The two main discourse of [support (No. 38)] is focused on supporting energy policies and the Taiwanese ruling party (DPP) that the negative discourse is much more than positive. For example, *'I also support non-nuclear power, but before green energy is enough to replace it, nuclear power plants must be shut down and replaced by thermal power generation...'*, *'Those anti-nuclear activists who support the DPP, please stop using electricity immediately!*

(SC)' or *'How many of those who support the DPP are willing to sacrifice for Taiwan?'* The use of [say] in both TC (No. 34) and SC (No. 15) in the discourse has two common collocation patterns: firstly, since the common discourse about air pollution between Taiwan and Mainland is that air pollution in Taiwan is caused by Mainland, the discourse of the comments is more focused on the identification and denial of this discussion. For example, *'I am in Beijing. What do I believe in? The air is good now...(SC)'*, *'There is smog in Xinjiang and smog in Yunnan as well. These places you mentioned all suffered from smog (SC)'*, or *'I admit that the smog on the mainland is serious, but some netizens say that the sky is blue and the air there is good, and it is a fact that you cannot deny the blue sky and white clouds of others just because of the pollution in parts of the mainland (SC)'*. The other pattern is focused on the attribution of responsibility to the ruling party (DPP), especially on energy use and air pollution, such as *'Peng Zu (an immortal) laughed and said: "...Hahaha, I have lived for eight hundred years, and I have never seen coal that can be washed clean"', 'Clean coal! I eat organic food every day, so my shit is clean? Then ask the DPP to eat my shit. You said it was clean.'* or *'There is clean coal which will not lead to any air pollution. Don't talk to him too much. Maybe he is not a human being but a ghost who lets you get lung adenocarcinoma'*. The [beat (No. 77)] in the discourse has two meanings: political suppression between Taiwan and Mainland or fight corruption, for example, *'The smog must from Mainland, which suppresses the Tsai's government'*, or *'It is a pity that Taiwan cannot fight corruption like Xi Jinping (a Chinese politician)'*.

The satirical words and hate words of the discourse:

[hahaha (No. 92)] and [die (No. 47)]. In the discourse of comments of political talk shows, 'Hahaha' is often used for mocking or idiomatic ending, which almost has satirical meaning, such as *'You can also choose to use love power generate electricity ~ ha ha ha ha ha ha ~ (SC)'*, *'I feel that the variety shows on the mainland are not as exciting and funny as Taiwan's political talk shows, hahaha (SC)'* or *'It is suggested that Fujian (a province on the south-*

eastern coast of China) *should repair more large fans along the coast and blowback all the pollution to Taiwan. Hahaha (SC)*'.

The word [die] is frequently categorised as a hate word due to its association with extreme, curse-laden contexts. However, its use in comments can vary significantly depending on the context. For example:

As a Hate Word: 'Politicians play politics to their deaths. Playing with fire burned his asshole. Use clean coal to burn out the dirty air. Let's use the love power generation!'

This usage combines hyperbolic language with the word [die] to express extreme disdain and frustration towards politicians, bordering on hateful and satirical commentary.

To Signal Legitimate Concerns: 'If there is no good air to breathe...what else to talk about in the future...all human beings can do is just wait to die...', 'Oh my god, the heat is killing me'. In these instances, [die] is used to dramatically highlight the serious health risks associated with environmental issues such as air pollution and extreme heat. The use here does not aim to incite hate but rather to underscore the fatal consequences of environmental neglect, serving as a stark warning rather than a curse.

Word	Definition in English	Freq.	%	Dispersion	N	Word	Definition in English	Freq.	%	Dispersion	N	Word	Definition in English	Freq.	%	Dispersion
1	of	23,828	4.93	0.85	34	of	of	954	0.2	0.78	67	of	power generation	515	0.11	0.73
2	is	8,686	1.8	0.85	35	know	know	874	0.18	0.84	68	possible	514	0.11	0.84	
3	indicates the end of the action	8,075	1.67	0.84	36	Tsai (Surname of the Taiwanese president)	Tsai (Surname of the Taiwanese president)	847	0.18	0.84	69	because	511	0.11	0.83	
4	hashtag	6,406	1.33	0.84	37	used to refer to the person or people being spoken of written to	used to refer to the person or people being spoken of written to	836	0.17	0.75	70	Japan	510	0.11	0.72	
5	in	4,168	0.86	0.84	38	support	support	830	0.17	0.75	71	do (negative meaning)	504	0.1	0.8	
6	in, exist	3,899	0.81	0.85	39	us	us	810	0.17	0.77	72	and	497	0.1	0.8	
7	intentionally, only	3,811	0.79	0.84	40	again	again	810	0.17	0.82	73	can (SC)	491	0.1	0.78	
8	have	3,773	0.78	0.84	41	DPP (SC)	DPP (SC)	808	0.17	0.68	74	us (SC)	485	0.1	0.73	
9	do not	3,602	0.75	0.84	42	what	what	793	0.16	0.8	75	no	472	0.1	0.8	
10	also	3,211	0.66	0.84	43	government	government	777	0.16	0.82	76	you	468	0.1	0.78	
11	Taiwan	2,995	0.62	0.81	44	if	if	777	0.16	0.84	77	beat	466	0.1	0.82	
12	want	2,454	0.51	0.83	45	still (SC)	still (SC)	751	0.16	0.74	78	now (SC)	450	0.09	0.75	
13	that is	2,225	0.46	0.84	46	Guo-Yu, Han (the mayor of Kaohsiung whose political status is the KMT)	Guo-Yu, Han (the mayor of Kaohsiung whose political status is the KMT)	717	0.15	0.45	79	most	449	0.09	0.84	
14	Taiwan (SC)	1,985	0.41	0.78	47	die	die	712	0.15	0.72	80	these	446	0.09	0.8	
15	say	1,876	0.39	0.82	48	one	one	705	0.15	0.83	81	this (SC)	445	0.09	0.75	
16	DPP	1,874	0.39	0.82	49	so	so	697	0.14	0.84	82	but	444	0.09	0.82	
17	no	1,503	0.31	0.84	50	Yin-Yen (the President Tsa)	Yin-Yen (the President Tsa)	691	0.14	0.84	83	must	441	0.09	0.77	
18	with	1,498	0.31	0.83	51	year	year	684	0.14	0.83	84	at	440	0.09	0.83	
19	myself	1,480	0.31	0.83	52	Mainland (SC)	Mainland (SC)	684	0.14	0.72	85	come (SC)	439	0.09	0.73	
20	can	1,413	0.29	0.85	53	everyone	everyone	667	0.14	0.79	86	KMT (SC)	439	0.09	0.77	
21	go, which means to exclude something	1,395	0.28	0.84	54	No	No	663	0.14	0.76	87	even	437	0.09	0.85	
22	very	1,311	0.27	0.84	55	democracy	democracy	657	0.14	0.78	88	who	423	0.09	0.81	
23	again	1,236	0.26	0.84	56	Quot	Quot	648	0.13	0.8	89	only	421	0.09	0.84	
24	people	1,209	0.25	0.84	57	politics	politics	618	0.13	0.84	90	nation	419	0.09	0.74	
25	come	1,187	0.25	0.81	58	but	but	617	0.13	0.82	91	only	416	0.09	0.84	
26	KMT	1,173	0.24	0.68	59	think	think	598	0.12	0.83	92	hahaha	411	0.09	0.57	
27	do not want	1,158	0.24	0.79	60	money	money	595	0.12	0.81	93	President	400	0.08	0.59	
28	for	1,152	0.24	0.82	61	now	now	571	0.12	0.84	94	right (SC)	397	0.08	0.76	
29	Mainland	1,110	0.23	0.68	62	party	party	550	0.11	0.65	95	Mainland	388	0.08	0.75	
30	Mainland (SC)	1,069	0.22	0.72	63	problem	problem	537	0.11	0.83	96	nuclear energy	385	0.08	0.82	
31	red	1,052	0.21	0.84	64	can not	can not	536	0.11	0.83	97	United States	383	0.08	0.8	
32	right	1,029	0.21	0.8	65	compare	compare	518	0.11	0.85	98	Guo-Yu, Han (the mayor of Kaohsiung whose political status is the KMT)	350	0.07	0.37	
33	and	1,001	0.21	0.82	66	them	them	518	0.11	0.82	99	policy	340	0.07	0.85	
											100	CCP		326	0.07	0.64

Table 4. 12. Wordlist of the political talk shows videos.

2) non-affiliated talk shows

Table 4.13 includes the comments of the non-affiliated talk shows videos, although it is hard to calculate the precise number of comments in each language manually, the wordlist (table 4.14) still illustrates a potential trend of the language use in the comments that the amount of TC comments is much more than the SC comments, as there are only three words in SC.

Table 4. 13. Overview statistics of the non-affiliated talk shows videos.

The type of programme broadcasting	non-affiliated talk shows
The language of the video	Traditional Chinese
Total number of comments	19,520
Total number of words in corpus text	26,214
Total number of words in frequency wordlist	7,584

According to table 4.14, it can be found some potential patterns among the comments discourse of the non-affiliated talk shows: firstly, it does not have many politic-related words rather than the political talk shows but has more multiple environment-related or derivative words, such as [virus (No. 39)], [water (No. 73)] or [rubbish (No. 83)]. Secondly, the discourse does not have many actors, besides the Taiwanese President or some nations, such as [Taiwan in SC (No. 26)], [Communist Party of China (CCP, No. 98)] or [United States (No. 79)].

The environment-related discussion and discourse:

As table 4.14 shows, there are three words related to environmental issues: [water (No. 73)], [rubbish (No. 83)], and [energy (No. 92)]. According to the comments discourse of the non-affiliated talk shows, the collocation pattern of [energy (No. 92)] has similar use as the political talk shows. The use of [water (No. 73)] has two collocation patterns in this discourse: economic orientation comments, which always appear with 'electricity', as these two livelihood resources are the common criteria of life, for example, *'Still have the face to call for force to rule Taiwan? After the winter solstice, Beijing will be cut off from water and electricity. I guess you will beg for mercy in about a week!'* and *'everything is increasing the*

price...and even the price of water and electricity is secretly increasing'; the second pattern of the water is to describe the climate change and global warming, such as *'If the Arctic Ice Shed in Greenland melts, three and a half of the world's five continents will be in the water'* and *'Because Chicago is on the south side of the vast sea of Lake Michigan, almost the entire winter of Lake Michigan will be driven by the water and wind. This year seems to be more serious'*. Besides, [rubbish (No. 83)] can be regarded as one of the environmental issues literally, however, in this discourse, the rubbish is used as a hate word, such as *'rubbish minzhu... 🗑️🗑️🗑️🗑️🗑️🗑️🗑️🗑️🗑️🗑️🗑️'* or *'It's a pity that your unscrupulous trash hasn't been burned'*.

The politic-related discussion and discourse:

Basically, the politic-related words [politics (No. 60)] and [government (No. 51)] have similar collocation patterns in this discourse, which often appear with politics (people) or the ruling party, and it needs to notice that most of these words did not have relation to environmental issues, but express personal political positions, such as *'The people who support Taiwan independence are used by political tools and are very disgusted'*.

The words relate to the actors in the comments:

The word [Yin-Wen (last name of the Taiwanese president, No. 100)] is the only actor in this discourse, which involved in the attribution of responsibility for the energy policies, air pollution, and the energy use, which is similar to the discourse of political talk shows.

The verbs have specific meanings among the comments:

[do not (No. 41)] and [say (No.13)] are the two verbs appearing in the wordlist which have specific meanings. The use of 'do not' in the discourse is often represented as *'do not hold any hope'* or *'shameless (不要臉)'*, and collocation with party and politicians mostly. The use of [say (No.13)] in the discourse is focused on the attribution of responsibility to the ruling party (DPP), government, the hosts and guests in the channel, and Xi Jinping (a Chinese

politician), which is often represented as *'tell a lie (說謊)'*, *'the host said...'* or *'to lie through your teeth (睜眼說瞎話)'*.

The satirical words and hate words of the discourse:

The three hate words of the discourse are [die (No. 42)], [kill (No. 97)], and [rubbish (No. 83)] (I have mentioned in the previous paragraph). In the discourse of comments of non-affiliated talk shows, [die (No. 42)] is usually used as a hate word in the comments, which has extreme, curse and abyss meaning, such as *'furious (氣死)'*, *'stupid (笨死)'* or *'deserve to die ten thousand deaths for your crimes (罪該萬死)'*. And the word [kill (No. 97)] is usually used for representing extreme or aggressive argument, such as *'killer'*, *'kill and set fire to (殺人放火, a Taiwanese dialect means a violent behaviour that ignores laws and morals)'*, or *'blacklist (封殺)'*.

N	Word	Definition in English	Freq.	%	Dispersion	N	Word	Definition in English	Freq.	%	Dispersion	N	Word	Definition in English	Freq.	%	Dispersion
1	of		1,298	4.9	0	34	for	used to refer to the person or people being spoken or written to	47	0.18	0	67	V/ING	the commenter	29	0.11	0
2	yes		539	2.03	0	35	should		47	0.18	0	68		do (negative)	29	0.11	0
3	action	Indicates the end of the action	383	1.26	0	36	should		46	0.17	0	69		them	28	0.11	0
4	hashtag		280	1.06	0.26	37	because		46	0.17	0	70		still	27	0.1	0
5	have		254	0.96	0	38	and		43	0.16	0	71		still (SC)	27	0.1	0
6	exist		218	0.82	0	39	virus		41	0.15	0	72		see	27	0.1	0
7	also		216	0.82	0	40	no		41	0.15	0	73		water	27	0.1	0
8	all		210	0.79	0	41	do not		41	0.15	0	74		compare	27	0.1	0
9	people		206	0.78	0	42	die		40	0.15	0	75		problem	27	0.1	0
10	do not		206	0.78	0	43	at		40	0.15	0	76		other	27	0.1	0
11	Intentionally, only		202	0.76	0	44	nation		39	0.15	0	77		Taiwan (SC)	27	0.1	0
12	Mainland		170	0.64	0	45	year		38	0.14	0	78		world	27	0.1	0
13	say		130	0.49	0	46	feel		37	0.14	0	79		United States	26	0.1	0
14	Taiwan		123	0.46	0	47	from		37	0.14	0	80		now	26	0.1	0
15	real		99	0.37	0	48	but		37	0.14	0	81		will not	26	0.1	0
16	no		97	0.37	0	49	United States (SC)		33	0.12	0	82		and	24	0.09	0
17	and		90	0.34	0	50	treatment		33	0.12	0	83		rubbish	24	0.09	0
18	can		90	0.34	0	51	government		33	0.12	0	84		worldwide	24	0.09	0
19	come		88	0.33	0	52	us		33	0.12	0	85		downstream	24	0.09	0
20	right		87	0.33	0	53	Mainland (SC)		33	0.12	0	86		money	23	0.09	0
21	see		80	0.3	0	54	like		33	0.12	0	87		facial mask	23	0.09	0
22	Mainland (SC)		79	0.3	0	55	news		32	0.12	0	88		QUOT Quot	23	0.09	0
23	go, which means to execute something		75	0.28	0	56	Liu (the commenter)		32	0.12	0	89		should	22	0.08	0
24	with		72	0.27	0	57	no		31	0.12	0	90		patient	22	0.08	0
25	but		69	0.26	0	58	hope		31	0.12	0	91		only	22	0.08	0
26	Taiwan (SC)		54	0.2	0	59	can		30	0.11	0	92		power generation	21	0.08	0
27	programme		53	0.2	0	60	politics		30	0.11	0	93		pneumonia	21	0.08	0
28	again		53	0.2	0	61	too		30	0.11	0	94		now	21	0.08	0
29	knowledge		52	0.2	0	62	look like		30	0.11	0	95		film	21	0.08	0
30	use		52	0.2	0	63	people		30	0.11	0	96		use	21	0.08	0
31	if		50	0.19	0	64	can not		30	0.11	0	97		kill	20	0.08	0
32	so		49	0.18	0	65	so		29	0.11	0	98		CCP	20	0.08	0
33	many		49	0.18	0	66	everyone		29	0.11	0	99		think	19	0.07	0
												100		Yin-Yen (the President Tsai)	19	0.07	0

Table 4. 14. Wordlist of the non-affiliated talk shows videos.

3) In-depth reportings

Table 4.15 includes the comments of the in-depth reportings videos, although it is hard to calculate the precise number of comments in each language manually, the wordlist (table 4.16) still illustrates a potential trend of the language use in the comments that the amount of TC comments is much more than the SC comments, as there are only less than five words in SC.

Table 4. 15. Overview statistics of the in-depth reportings videos.

The type of programme broadcasting	in-depth reportings
The language of the video	Traditional Chinese
Total number of comments	10,687
Total number of words in corpus text	72,580
Total number of words in frequency wordlist	16,471

According to table 4.16, it can be found a potential pattern among the comments discourse of the in-depth reportings videos that it does not have many politic-related words rather than the other types of programme broadcasting, but has more focus on global environmental issues, such as [Trump (No. 39)], [world (No. 48)], [earth (No. 99)] or [energy (No. 96)].

The environment-related discussion and discourse:

As table 4.16 shows, there are lots of words related to environmental issues, such as [power generation (No. 29)], [thermal power (No. 95)], [earth (No. 99)] or [energy (No. 96)]. The use of these energy-related words in the discourse are more focused on global energy development, such as

'Germany's electricity demand after nuclear abolition eventually turned into coal-fired power generation. The world is striving to slow down carbon emissions, but Germany burns a lot of coal to

*increase carbon emissions. This is the evil result of the government's
indiscriminate anti-nuclear power without a long-term plan!!'*

And the [earth (No. 99)] in the discourse is often used for describing the global dilemma of environmental issues, which frequently appear with global warming and climate change. Through manually examining the discourse, I found that the reason for global warming and climate change do not demonstrate in the wordlist is that the multiplicity of language expressions of both TC and SC, for example, the word 'get warm (變暖)', 'warming (暖化)', 'get warm (SC, 变暖)' and 'global warming (全球變暖)' are all substitute words for global warming.

The politic-related discussion and discourse:

The discourse does not have the obvious politic-related discussion but has some hate speech which accuses specific politicians, such as [Yin-Wen (last name of the Taiwanese president) (No. 90)] or [Trump (No. 39)].

The verbs have specific meaning among the comments:

[cheat (No. 93)], [support (No.49)], [say (No.12)] and [say (SC, No. 43)] are the four verbs appearing in the wordlist which have a specific meaning. The use of 'cheat' in the discourse has two patterns, one is to represent the cognition of whether global warming and climate change are true and have happened, which are often collocated with the argument from the politicians, such as *'Trump said that the claim that gas emissions affect climate change is a "scam" and harms the U.S. economy'*. The other pattern of the meaning of 'cheat' in the discourse is used for accusing the ruling party, such as *'return my clean air quality...please don't lie to us by the government!'*. The use of [say] in both TC and SC in the discourse is focused on the attribution of responsibility to the ruling party (DPP), government, the hosts and guests in the channel and Trump, which is often represented as *'tell a lie (說謊)'* or the

argument from any of the above source. And the [support (No.49)] in the discourse is often used for representing personal views on environmental policy, energy use or environmental issues.

The satirical words and hate words of the discourse:

The two hate words of the discourse are [die (No. 66)] and [unscrupulous (No. 88)]. In the discourse of comments on the in-depth reportings, [die (No. 66)] is usually used as a hate word in the comments, which has extreme, curse and abyss meaning, such as '*furios* (氣死)', '*hilarious* (笑死)' or '*self-destructive* (作死, a Chinese dialect)'. And the word [unscrupulous (No. 88)] is usually used for criticising the ruling party or government.

N	Word	Definition in English	Freq.	%	Dispersion N	Word	Definition in English	Freq.	%	Dispersion N	Word	Definition in English	Freq.	%	Dispersion
1	of		3540	481	0.02	34	people	139	0.19	0.03	67	politics	79	0.11	0.01
2	yes		1,423	1.93	0.02	35	can	129	0.18	0	68	still	78	0.11	0.01
3	indicates the end of the action		1,090	1.48	0.01	36	but	128	0.17	0.02	69	compare	78	0.11	0.01
4	hashtag		982	1.33	0.04	37	CCP	126	0.17	0	70	now	77	0.1	0
5	all		682	0.93	0	38	year	123	0.17	0.04	71	Mainland (SC)	75	0.1	0
6	have		610	0.83	0.02	39	Trump	119	0.16	0	72	best	73	0.1	0.02
7	exist		602	0.82	0.02	40	and	112	0.15	0.04	73	have a look	71	0.1	0.02
8	Taiwan		561	0.76	0.01	41	us	105	0.14	0.02	74	even	71	0.1	0.02
9	intentionally only		532	0.72	0.01	42	problem	105	0.14	0.01	75	do (negative)	71	0.1	0
10	and also		518	0.7	0.01	43	sgv (SC)	104	0.14	0	76	only	71	0.1	0
11	I		414	0.56	0.01	44	nation	104	0.14	0.01	77	Taiwan	70	0.1	0.02
12	say		315	0.43	0.02	45	used to refer to the person or people being spoken or written to (SC)	104	0.14	0	78	Mainland	70	0.1	0
13	Mainland		307	0.42	0	46	no	102	0.14	0.02	79	them	70	0.1	0
14	that is		306	0.42	0	47	superior	102	0.14	0	80	Tsai (surname of the Taiwanese president)	69	0.09	0.03
15	no		272	0.37	0.01	48	world	101	0.14	0	81	you	69	0.09	0
16	can		233	0.32	0.01	49	support	100	0.14	0	82	programme	67	0.09	0
17	with		227	0.31	0.01	50	so	100	0.14	0.02	83	who	64	0.09	0.05
18	United States		202	0.27	0	51	big	100	0.14	0.01	84	but	64	0.09	0.02
19	very		201	0.27	0.04	52	to ask a person about something, doubt (SC)	100	0.14	0	85	media (SC)	63	0.09	0
20	Hongkong		193	0.26	0	53	democracy	99	0.13	0	86	will not	62	0.08	0
21	Taiwan (SC)		190	0.26	0	54	Japan	98	0.13	0	87	can not	61	0.08	0
22	no		187	0.25	0.01	55	because	98	0.13	0.01	88	unscrupulous	59	0.08	0
23	and		183	0.25	0.01	56	after	95	0.13	0.02	89	rubbish	58	0.08	0.04
24	for		182	0.25	0.04	57	and	94	0.13	0.04	90	Yin-Wen (the President Tsai)	57	0.08	0.04
25	arrive		182	0.25	0	58	DPP	92	0.13	0.1	91	President	55	0.07	0.04
26	Mainland (SC)		181	0.25	0	59	Kuomintang	91	0.12	0	92	money	54	0.07	0.02
27	look		175	0.24	0.01	60	everyone	90	0.12	0.04	93	chest	49	0.07	0.02
28	United States		174	0.24	0	61	at	87	0.12	0.04	94	economy	48	0.07	0.02
29	power generation		169	0.23	0.01	62	possible	85	0.12	0	95	thermal power	48	0.07	0
30	do not		150	0.2	0.01	63	only	84	0.11	0.01	96	energy	47	0.06	0
31	knowledge		148	0.2	0	64	no	83	0.11	0	97	nuclear energy	45	0.06	0
32	mary		147	0.2	0.01	65	QUOT	82	0.11	0.05	98	solar energy	43	0.06	0
33	government		141	0.19	0.02	66	die	81	0.11	0	99	earth	43	0.06	0.08
												election	41	0.06	0.03

Table 4. 16. Wordlist of the in-depth reportings videos.

b. Findings

The Comment Term Frequency Comparison (CTFC) analysis provides a quick way to understand the composition of the comments, that is, Thelwall (2018, p.305) also pointed out that the CTFC analysis is an effective social media analytics method to gather and analyse YouTube comments around a specific topic.

However, the relevant studies mostly focused on the other YouTube's functions rather than the comments, such as channels or recommendation systems (e.g., May 2010 and Davidson et al. 2010). In addition, the comments studies are often examined through qualitative analysis, such as textual analysis Thelwall (2018). Thus, I use mixed methods to analyse the YouTube comments, which provide a more comprehensive perspective to examine the comments environment.

The CTFC analysis is divided into five-word clusters which reflect the research subject: environment-related discussion and discourse, politics-related discussion and discourse, words related to the actors in the comments (including politician and party, etc.), the verbs are driven meaning to attribute the responsibility or attitude of the government, which often used with the satirical words and hate words. The composition of the comments is slightly different in each channel genre, so the issue setting of the videos can be seen as an efficient way to arouse the specific discussion.

The result of the comments in the political talks demonstrates two typical phenomena, that environmental issues can be seen as a tool for leading to serious political polarisation; and the political talks shows only focus on specific environmental issues, such as energy issues, which are the ones most under local political control. The CTFC analysis demonstrates three typical performances of YouTube comments below the political talk shows. Firstly, the comments indicate a serious politicised environment, that the politic-related comments have the highest frequency of all of the comment genres, the related words are [Taiwan],

[Mainland] and [the US]. These words surround the issue of the cross-strait relations and the wrestling between the US and the Mainland. Besides, the forms of the comments are often tied up by political ideology or using Mainland and the U.S. Secondly, the comments only arouse specific environmental issues, often related to life behaviours, such as prices or energy use, the related words are [economy], [thermal power] and [solar energy]. Other comments focus on the energy policies, such as '*Using nuclear to nourish renewables*' and '*Nuclear-free homeland by 2025*', the related words are [power generation], [government], [the Taiwanese president], [Taiwan] and [the Taiwanese president]. Lastly, these comments easily arouse ridiculing attitudes and political ideology arguments, which means that political programmes are easier to inspire negative comments on YouTube. It also provides an explanation that the pan-green (the DDP, the ruling party) political talk shows rarely mentioned these two policies rather than the pan-blues'.

The result of the comments of the non-affiliated talk shows demonstrates two patterns. Firstly, the comments do not have many political-related words rather than the political talk shows but more focus on the hot topics or discussing the film on the video, the related words are [picture], [film], [virus], [facial mask] and [pneumonia]. Secondly, the comments do not have many actors, besides the Taiwanese President or some nations, the related words are [Yin-Wen (the Taiwanese President)], [Tsai (the Taiwanese President)] and [Taiwan].

The result of the comments of the in-depth reportings demonstrates two typical findings, Firstly, it does not have many political-related words rather than the other types of programme broadcasting, but has more focus on global environmental issues, such as [power generation], [thermal power], [earth] or [energy]. Secondly, the comments do not have an obvious politic-related discussion but have some hate speech that accuses specific politicians, which often appear with the specific verbs. For example, the use of [cheat] in the

discourse is often collocated with the argument from the politician for accusing the ruling party. The use of [say] in both TC and SC in the discourse is focused on the attribution of responsibility to the ruling party (DPP), government, the hosts and guests in the channel and Trump, which is often represented as 'tell a lie (說謊)' or the argument from any of the above source. And the [support] in the discourse is often used for representing personal views on environmental policy, energy use or environmental issues.

Besides, I find that the satirical words and hate words appear a lot in the comments, the common hate words of the discourse are [die (No. 42)], [kill (No. 97)], and [rubbish (No. 83)]. In the discourse of comments, [die (No. 42)] is usually used as a hate word in the comments, which has extreme, curse and abyss meaning, such as 'furious (氣死)', 'stupid (笨死)' or 'deserve to die ten thousand deaths for your crimes (罪該萬死)'. And the word [kill (No. 97)] is usually used for representing extreme or aggressive argument, such as 'killer', 'kill and set fire to (殺人放火, a Taiwanese dialect means a violent behaviour that ignores laws and morals)', or 'blacklist (封殺)'.

The issue setting of the videos has a positive influence on the comments, that the topic discussed in the video often corresponds to the discussion in the comments. For example, if the issue setting includes a specific political ideology, it will stimulate more discussion in the comments, which usually have a negative meaning. At the same time, if the issue setting includes specific environmental issues, it will arouse more related discussion.

2. Collocation analysis and Key Word in Context (KWIC) analysis

a. Collocation analysis

Building on the exploration of keyword frequency which highlights prevalent themes within the discourse, this study now turns to collocation analysis. This advanced statistical method delves deeper by examining words that frequently appear together, offering insights into the

contextual usage of language in the text. According to Baker (2006, p. 71), while 'frequency lists' help in identifying central themes, collocation analysis extends this by revealing how words combine within the discourse, thus providing a more nuanced understanding of textual interactions. Mutual Information (MI) is a common collocation analysis method from WordSmith tools, based on the corpus-based log-likelihood ratio (LLR). Baker (2006) notes that the MI-score, realised by a diverse set of items, is difficult to identify through manual observation alone (p. 156). MI-score, which is often used as a criterion for illustrating the word connection and adaptability. In the interpretation of the MI-score, the higher the MI-score is the tighter the word connection, which means the more often the words appear together in the text (Gablasova, Brezina and McEney 2017, p. 163). There are currently no theoretical standard criteria that MI2 is the most used in previous research (Brezina, McEney, and Wattam 2015). With more scholars having found that MI analysis often selects some collocate words with low frequency (Hunston, 2002) and the wordsmith software was upgraded, the MI2 was replaced by MI3 gradually. However, in order to highlight the results of collocation analysis, I tend to select the MI-score which is over 10. According to Kuo's (2020, p.71) result, the MI3 score over 10 is able to highlight the degree of word collocation and exclude accidental situations, which improved the meaning of statistics. The difference between the two MI3 criteria is reflected in the organised system between the English content (Gablasova, Brezina and McEney 2017) and Mandarin content (Kuo 2020), the Mandarin content is often longer than English content, which means the Mandarin content needs to refer higher MI3 score to conduct meaningful collocation analysis.

Through the above-mentioned frequency analysis, it is able to conclude some specific topics and their corresponding words at the quantitative level, which provides the angles for conducting the collocation analysis. According to the frequency wordlists, the comments below on both talk shows and in-depth reporting videos are mostly around politics-related issues rather than environmental issues, as the high-frequency words are related to politics,

such as the DPP, government, China or democracy etc. According to the frequency wordlists, the comments on both talk shows and in-depth reporting videos primarily focus on politics-related issues rather than environmental issues, as evidenced by the high-frequency words such as DPP, government, China, and democracy. Consequently, politics emerges as the mainstream discourse on environmental topics in these videos. The dominance of these terms suggests that political frames often overshadow environmental discourse in these settings. This observation aligns with Tufekci (2018) finding that the way information is presented (framed) influences the perception and discussion surrounding it. YouTube has the power to promote specific political views through agenda setting. This study provides further evidence that changes in political talk shows on YouTube are driven by this extreme phenomenon, as indicated by the comment analysis. Additionally, this finding complements Chilvers et al. 's concept of 'collective participatory practices' (2018, p.201), particularly the 'Subjects' component in the socio-technical system on digital platforms, which supports the evaluation and prediction of digital publics' behaviour.

By applying corpus analysis approaches, the study could uncover deeper layers of meaning, illustrating how environmental issues are potentially co-opted or marginalised by prevailing political narratives. I then filtered out some political words which have a high frequency or specific meaning for doing the collocation analysis. In addition, since environmental issues are the research subject, I selected some of the environment-related words for observing how the environmental issues engage with the comment discourse.

Environment-related discourse:

Before discussing the collocated wordlist of 'energy-related' words, it needs to be noted that the common environmental terms scarcely appear in the comments, such as global warming or climate change, the main environmental-based issues are focused on 'energy' terms, such as the forms of energy and the power generation. Energy is not only a derivative issue based

on global warming but can be seen as a complex issue involving the environment, politics and economy. According to table 4.17, almost all of the energy-related centre words are related to each other, and as the left column demonstrates, the emerging energy species become the mainstream topics rather than the traditional energy genres, such as thermal power.

- 1) **[power generation (TC)] and [power generation (SC)]:** In the political perspective, the centre word [power generation (TC)] often appears with the word [love power generation], which is a satirical word meaning the ruling party promotes the nuclear-free policy which has led to numerous power outages. Besides, the collocated words of nuclear energy reflect an interesting phenomenon that nuclear energy in Taiwanese comment discourses seems to be a global issue, as it has high engagement [worldwide (11.36)].
- 2) **[nuclear energy (TC)], [energy (TC)], [thermal power (TC)] and [green energy (TC)]:** Besides, through the collocated wordlist, it potentially represents more meaningful than the single word results that, though the certain two words have higher collocation ratio, it indicates that the particular centre word may lead to certain issue orientation of the discussion. For example, the centre word [nuclear energy (TC)] has high engagement with [nuclear waste (11.85)], [worldwide (11.36)] and [solar energy (10.05)], which reflects the common discussion of nuclear energy is the problem of nuclear waste disposal, which is also a global issue, and a common cognition in public that the main renewable energy can replace nuclear energy is solar energy.

Table 4. 17. The collocated wordlist of 'energy-related' words.

Total word (MI3)	Centre word
solar energy (18.25), renewable energy (14.62), love power generation (12.38)	power generation (TC)

solar energy (15.42), natural gas (13.01)	power generation (SC)
nuclear waste (11.85), worldwide (11.36), solar energy (10.05)	nuclear energy (TC)
renewable energy (13.97), solar energy (13.01)	energy (TC)
solar energy (11.22)	thermal power (TC)
solar energy (11.27)	green energy (TC)

*MI3>10.

*[Love power generation] is a satirical word meaning the ruling party promotes the nuclear-free policy which has led to numerous power outages.

Politic-related discourse:

Table 4.18 includes four pairs of words in both Traditional Chinese (TC) and Simplified Chinese (SC) as the centre words, [Taiwan], [DPP], [KMT] and [Mainland], and the other two words [politics] and [policy], which have high frequency appearing in the comment discourse and usually appear with politic-related discourse. Besides, there is a potential line that the language plays a specific ideological role in the comment discourse. For instance, [Taiwan in TC] always appears with environmental policy, politics or satirical words, which have strong Taiwanese culture awareness; the collocated words of [Taiwan in SC], apart from the environmental issues, discuss more on the political-ideological difference, such as liberty and democracy. Through the collocation analysis, it can be observed that these political comments have their own common comment types according to different centre words, for the sake of clarity, the following paragraphs are discussed in each pair of words in TC and SC except [politics] and [policy].

- 1) **[Taiwan (TC)] and [Taiwan (SC)]:** the centre word [Taiwan (TC)] often appears with the satirical word, the political view is proposed by the key political names or the nuclear-related issues, and it is important that the comments are more focused on local issues, such as [nuclear power plant] and [nuclear waste]; or dialects or the specific terms which are known by Taiwanese, such as [water spinach] and [get rich]. The centre word [Taiwan (SC)] focus on the comparison of the political ideology

between both of two main Taiwanese parties ([KMT], [DPP] or [liberty and democracy]), and the governance of energy-related issues in Taiwan, such as [nuclear power plant], [carbon emission] and [solar energy].

- 2) **[DPP (TC)] and [DPP (SC)]**: the centre word [DPP (TC)] often accompanies the comparison of the political ideology with the KMT and CCP and the environmental policy [Nuclear free by 2025] which is proposed by DPP. Compared to [DPP (TC)], the centre word [DPP (SC)] seems to have the same focus on the political ideology as [DPP (TC)], but in the environmental-related comments, the centre word [DPP (SC)] often accompanies with [natural gas], that natural gas is the replace energy for nuclear energy in Mainland, and is often used to condemn the energy replacement policy proposed by the DPP in the comments.
- 3) **[KMT (TC)] and [KMT (SC)]**: the centre word [KMT (TC)] often appears with political-related words, such as [CCP], [DPP] or [ruling party] etc., which means the comparison of the governance between the ruling party and the opposition party (KMT), and the discussion of the 'Pro-Chinese' political ideology of KMT. The centre word [KMT (SC)] has a similar political discussion of the different parties ([CCP] and [DPP]), besides, it appears with [reactionary faction] and [annihilate] as well, which can be presumed as the radical comment.
- 4) **[Mainland (TC)] and [Mainland (SC)]**: both centre words [Mainland (TC)] and [Mainland (SC)] have similar collocated words, which focus on the political comparison among [CCP], [DPP] and [KMT]. But the [Mainland (SC)] further appears with the common arguments between Taiwan and Mainland, the comparison of the environmental policy and the air pollution in Taiwan is caused by Mainland.
- 5) **[politics] and [policy]**: both centre words [politics] and [policy] have similar collocated words, which emphasise the two extreme political wrestling ([KMT] and [DPP]) on policy.

Table 4. 18. The collocated wordlist of 'politic-related' words.

Total word (MI3)	Centre word
water spinach (15.30), get rich (12.74), nuclear power plant (11.56), nuclear waste (10.72)	Taiwan (TC)
DPP (17.16), KMT (14.73), Variety Shows (12.09), nuclear power plant (11.82), carbon emission (11.19), fraudster (11.14), ideology (11.13), solar energy (10.87), liberty and democracy (10.14)	Taiwan (SC)
KMT (19.25), Nuclear-free homeland by 2025 (12.44), supporter (12.44), Guo-yu, Han (12.27), Chinese Communist Party (CCP, 10.07)	DPP (TC)
KMT (18.74), CCP (14.09), Taiwanese (12.10), natural gas (11.45)	DPP (SC)
DPP (19.46), Guo-yu, Han (14.89), corruption (14.01), the period of administration (13.01), presidential candidate (12.79), CCP (12.08), the ruling party (11.22)	KMT (TC)
DPP (16.97), CCP (14.96), reactionary faction (15.96), annihilate (15.52)	KMT (SC)
CCP (17.56), KMT (16.27), Taiwan (14.24), worldwide (13.87)	Mainland (TC)
Taiwanese (15.33), CCP (14.32), drift (14.20), Taiwan province (13.42), Communism (12.78), peaceful reunification (11.28), liberal democracy (10.76), the power plant (11.50)	Mainland (SC)
DPP (13.13), people (10.82)	politics
DPP (14.49), KMT (12.76)	policy

*MI3>10.

*'Water spinach' is a satirical word meaning the poor performance of the current Taiwanese president (Ing-wen, Tsai).

*'Get rich' is a political slogan from Guo-yu, Han.

Verbs have specific meanings in discourse

It needs to be noted that the verbs that have specific meanings exclude the cited verbs, including [say], [support] and [cheat], which have a specific usage in the comment- usually engage with the key political names in the comments, that I put them in the last section for additional discussion. Table 4.19 includes three words: [do not], [compare] and [kao 搞 [do (negative meaning)]], which have high- frequency with politic-related discourse.

Firstly, through observing the frequency wordlists, it can be found that [do not] is listed on all types of programmes, and since 'do not' is a word that has a specific meaning, which is

negative mostly, and often collocated with party and politicians mostly (see Table 4.19). It is necessary to examine how ‘do not’ is represented in the comments and collocated with other words. The use of ‘do not in the discourse is often represented as ‘do not understand (不懂、不了解、不知道)’, ‘do not take a neutral position, or biased (不中立)’, ‘do not step down (不下台)’, ‘impossible (不可能)’, ‘do not vote (不投)’, ‘do not support (不支持)’, ‘not a democracy (不民主)’, ‘no power shortage (不缺電)’, ‘no nuclear energy (不要核電)’, ‘do not take responsible (不負責任)’. Secondly, according to table 4.19, [compare] often appears with the comparison between the current ruling party (DPP) and the previous ruling party (KMT), and the comparison between alternative energy sources, especially [natural gas]. Lastly, [kao 搞 [do (negative meaning)]] in this case has a negative meaning, which is often used to express doubts and denials about policy implementation or the governance from the ruling party, according to the time interval of data collection, the ruling party means the DDP.

Table 4. 19. The collocated wordlist of ‘the specific verbs’.

Total word (MI3)	Centre word
DPP (23.65), KMT (13.93), think independently (13.45), watch Sanlih Entertainment Television (SET) (12.93), Taiwanese (12.31), CCP (11.34), nuclear waste (10.83)	do not
natural gas (11.06), KMT (10.98)	compare
DPP (11.99)	kao 搞 [do (negative meaning)]

*MI3>10.

*‘SET’ is a nationwide cable TV network operated in Taiwan which was founded in May 1993, whose political stance is pan-green.

Satirical words and hate words of the discourse:

Table 4.20 includes two words that have satirical and hate meanings: [die] and [rubbish], which have a high frequency with politic-related discourse. Both two centre words have

similar usage in the comments, which are used to enhance the tone, such as ‘both the KMT and the DPP go to hell’ or ‘both the KMT and the DPP are rubbish’.

Table 4. 20. The collocated wordlist of ‘satirical words and hate words’.

Total word (MI3)	Centre word
DPP (24.18), people (11.13), KMT (10.61)	die
DPP (12.96), KMT (10.13)	rubbish

*MI3>10.

Cited words of the discourse:

According to the frequency lists of the three types of programmes, it can be found that some of the key political names or parties have high frequency mentioned in the comments, which can be seen as the main discourse or the citation source of the comments. It reflects one of the typical comments reply to forms in this discourse that the comment consists of a part of speech from a specific citation source, such as ‘Yin-Wen, Tsai’, ‘Trump’, ‘DPP’ or ‘KMT, and opinion for the former speech. Thus, I examine the collocation between the key political names or parties and the citation words, such as ‘say’, ‘support’ or ‘cheat’, which have a high frequency in the wordlists as well.

Through the collocated wordlist (see Table 4.21), is illustrated the part of discourse patterns of the comments. However, it is needed to notice that some of the key political names or sources frequently appeared in the discourses but did not represent on in the top 100 word lists, such as ‘Jin-ping, Xi’. The probable reason is that the word of these key political names often has multiple representative forms in the comments, for example, the representative forms of ‘Jin-ping, Xi’ includes [Jin-ping, Xi], [master Xi], [Winnie-the-Pooh Xi] (the satirical name of Jin-ping, Xi, which was generated through his appearance), [ban Xi] (the satirical name of Jin-ping, Xi) and [Emperor Xi] (the satirical name of Jin-ping, Xi, which satirising Jin-ping, Xi amend the constitution to abolish the requirement that the country's vice-presidents be re-elected for no more than two-term).

Besides, it is necessary to mention that ‘Trump’ and ‘Jin-ping, Xi’ are not listed in table 4.21, the potential reasons are that the MI3 score of these political names is less than 10, or in comparison, the collocated ratio of the two words and citation words is not prominent, compared to the collocated ratio with other words.

Table 4. 21. The collocated wordlist of ‘the citation words’ words with the key political names or parties.

Total word (MI3)	Centre word
Guo-Yu, Han (14.14), Wei-Che, Huang (12.07), President Tsai (11.96), fake news (11.76), Wen-Chien, Chen (11.46)	say (TC)
DPP (14.27), KMT (11.67), Taiwanese (13.75), Ying-jeou, Ma (12.33)	say (SC)
Guo-Yu, Han (19.71), DPP (15.97), KMT(15.89), DPP in SC (12.25), president (11.54), Yin-Wen, Tsai (10.26)	support (TC)
DPP (14.70), KMT (12.98)	cheat (TC)

*MI3>10.

b. Key Word in Context (KWIC) analysis

According to the collocation analysis, it can be found how the centre words often appear with the specific words. For examining in-depth how these collocate words are engaged and discussed in the comment discourse, I then select some of the subject-related words for conducting the Key Word in Context (KWIC) analysis which is a function of the WordSmith tools and is called ‘concordance analysis’.

Environment-related discourse:

According to the collocated wordlists, which have illustrated parts of the phenomenon of how environmental issues are discussed in the comments. I then select some of the subject-related words for conducting the KWIC analysis which is a function of the WordSmith tools and is called ‘concordance analysis’. Through the KWIC analysis, I can observe how the keywords engage with other words in the comments, for instance, [power generation] has a high MI3-score with [solar energy], [renewable energy] and [love power generation], which

reach the significance level (over than 10), the comments which include two of these words at the same time will be list by the KWIC method (see Table 4.22). Regarding table 4.22, it can be confirmed that power generation usually appears with renewable energy, which has three main arguments: the problem of power shortage; judging environmental policy, such as the offshore wind power project, not enough, the base power, the *Nuclear-free homeland by 2025*, scam or love power generation; and abolishing or supporting nuclear energy.

	<p>... multi-segment fans and solar panels can't generate power 24 hours a day, so the government please tell us what we can rely on when these renewable energy sources are not enough?...</p> <p>...Although the current immature renewable energy power generation cannot be used as the base power in Taiwan, it can be used to kill Taiwanese as kill chickens, ... ('base power' and 'as kill chickens' have similar pronunciation in TC)</p> <p>... The complementarity and gains between various renewable energy power generation will make the Taiwanese power supply more and more balanced and stable...</p> <p>... The offshore wind power project which costs tens of billions is suspected to be a "scam". He said that solar power generation is not cost-effective, and the electricity saved back is far from offsetting the cost...</p>
the problem of power shortage	<p>...Idiot, the problem of being <i>Nuclear-free homeland by 2025</i> is about the wrestling of interest groups! Whether thermal power generation, wind power generation or solar power generation are involved in many benefits ...</p> <p>... The so-called being elected (the DPP) to serve the people! In the case of full firepower all day long and the whole of Taiwan covering the sky with smog, it is also extravagant to ask for solar power...</p> <p>... If it can return to this year in 7 years, it will start to engage in solar power generation, but the reality is that Taiwanese solar panel manufacturers are about to dump the world's garbage dump...</p> <p>... Two important points: benefit and harm. Let's talk about the benefits first. Compared with thermal power, wind power, and solar power, nuclear power is better or worse, don't you need to discuss it? Nuclear power is still the most efficient way of generating electricity...</p> <p>... The per degree electricity fee is about 2 NTD, but Taiwan has to pay more than 5 NTD, so I still use love power generation, ghost power or nostril power generation is the cheapest...</p> <p>... It's horrible to keep using nuclear power! Bye nuclear power let's switch to love power generation and use our lungs to generate power. Which one is more dangerous, quickly shut down Taiwan's nuclear power plants ...</p>
judging environmental policy	
abolishing or supporting nuclear energy	

Table 4. 22. The KWIC analysis of 'energy-related words' in the comments.

Politic-related discourse:

According to the KWIC analysis of politic-related words in the comments (see Table 4.23), I observe how these keywords engage with other words in the comments. Regarding table 4.23, it can be confirmed three main arguments: the problem of the political ideology, in the two main Taiwanese parties (DPP and KMT) that the KMT often be considered more 'Pro-Chinese' in common, and in Mainland and Taiwan that the ideology of Taiwan advocates 'liberty and democracy' which is a contrary point of view of the Mainland; the common arguments of air pollution between Taiwan and Mainland that the comparison of the environmental policy and the air pollution in Taiwan is caused by Mainland; and the governance of energy-related issues in Taiwan which is normally focused on condemning the energy replacement policy proposed by the DPP.

	<p>... Taiwan is a free market, and no one does business that loses money. The mainland is a dictatorial country that does not even have the freedom of coal. It is not qualified to comment on Taiwan.</p> <p>... Taiwan's political system is too populist. And the mainland's system is too dictatorial. Democracy is not exclusive to Taiwan. One day, the mainland will be democratic too.</p>
the problem of the political ideology	<p>Can you please arrest Ing-wen, Tsai (the Taiwanese President) and the Taiwan independence elements? Other Taiwan compatriots who want to return to the motherland (the Mainland) are innocent</p> <p>Yes, Taiwan's reunification of the two sides of the strait is also the moment when all Taiwanese people look forward to the return of the mainland</p> <p>Taiwan Province... (SC)</p>
the common arguments of air pollution between Taiwan and Mainland	<p>Half of Taiwan's air pollution comes from the Mainland, it's unfortunate to be a neighbour with the Mainland</p> <p>The smog in Taipei comes from Beijing! It can be restored till President Tsai is re-elected! Taiwan NO.1</p> <p>The Chinese government has begun to take measures to improve the smog this year, which is a good thing for Taiwan because the smog in northern Taiwan is basically blown from the Mainland.</p> <p>When dismantling nuclear weapons, alternatives should be considered at the same time. Don't Taiwan officials need to think clearly beforehand? (SC)</p> <p>Even if 500 people are deducted, then the other 76 will be damned? It can replace the old coal-fired with higher pollution, so why not use nuclear energy with lower pollution = =</p>
the governance of energy-related issues in Taiwan	<p>As a student who has studied green energy, I am responsible to tell you that it is impossible for green energy to replace nuclear energy. . . . The energy conversion rate is terribly low. In 2025, we don't need nuclear energy, we can only use love to generate electricity. . . . This kind of talk is to deceive people who have no knowledge. Of course, if Taiwanese can accept a doubling of electricity prices, then I don't say anything. (SC)</p>

Table 4. 23. The KWIC analysis of 'politic-related' words in the comments.

Verbs have specific meanings in discourse:

According to the KWIC analysis (see Table 4.24), two typical patterns of the collocated form of 'do not' can be found in the comments. Firstly, in the political perspective, 'do not' is represented for opposing the ruling party or president or accusing the media or the programme of not neutralising. For example, *'Taiwan media is stupid, not objective, not neutral, and deceives Taiwanese all day! !'*, *'If Yin-Wen, Tsai does not step down, Taiwan will not be good'*, *'The host is not neutral at all.'* It is necessary to mention that these types of comments are often represented with hate words. Secondly, in the environmental perspective, the 'do not' is used for highlighting the challenge or progress of energy transition, such as *'no power shortage'* or *'no nuclear energy'*, or used as *'do not understand'* to satire the politician does not have the common sense of global warming, for example, *'The whole world knows about global warming and climate change... Only Trump doesn't know...'*. The other two verbs [compare] and [kao 搞 [do (negative meaning)]] have similar meanings of [do not], which usually have negative or satirical meanings (see Table 4.24).

	<p>It doesn't take 100 years to feel the difference in 10 years. The most worrying thing for humans now is whether they were poisoned by plastic first, or died from heat or drowning due to the greenhouse effect.</p> <p>The whole world knows about global warming and climate change ... Only Trump doesn't know ...</p> <p>Taiwan media is an idiot, not objective, not neutral, and deceives Taiwanese all day! !!</p> <p>He is disgusted when he talks about politics. Not neutral at all.</p> <p>Rubbish does not distinguish between blue and green, why blue and green love to talk rubbish so much, not neutral at all. idiot.</p> <p>The host is not neutral at all.</p>
Do not	<p>What Taiwan fools often talk about is that if you don't vote for the DPP, do you want to vote for the KMT? Haha</p> <p>The number of deaths from lung adenocarcinoma in Taiwan due to coal burning is equivalent to war deaths. Abolishing nuclear power is equal to abolishing a country. If Yin-Wen, Tsai does not step down, it will lead to you and my grandchildren who will die from the dirty air in the future. I only support Guo-Yu, Han.</p> <p>If Yin-Wen, Tsai does not step down, Taiwan will not be good</p> <p>The DPP is not only a messy party but a rotten party even worse than the KMT (SC)</p> <p>Let the DPP continue to lie... Anyway, you only care about your own salary and way out... It is worse than the Kuomintang... Taiwan will not be good if the DPP does not resign</p> <p>...the cost of coal is lower than natural gas and oil...</p> <p>Anthracite has a certain effect of reducing pollution, but the amount of pollutants discharged is still much more than natural gas.</p> <p>Taiwanese will be killed by their favourite local political parties (DPP).</p> <p>()</p> <p>Even the base electricity is not handled well. What is your role? In the end, it is the people who pay the bill!</p> <p>Rubbish DPP () , SC)</p> <p>To replace nuclear power with unstable green power, I dare to say that power outages in Taiwan will become the norm in the future ()</p>
compare	
kao [do (negative meaning)]	

Table 4. 24. The KWIC analysis of 'the specific verbs' in the comments.

Satirical words and hate words of the discourse:

According to the KWIC analysis (see Table 4.25), it has two typical patterns of the collocated form of [die]: enhancing the tone, such as '*fuck* (搞死)' or '*annoying* (煩死)'; and is used to condemn the two main Taiwanese parties (DPP and KMT), for example, '*Damn it, when will the KMT and the DPP resign?*' [rubbish] has the similar usage of [die], which is a negative term for the government or the two main Taiwanese parties (DPP and KMT), such as '*As long as the system of cheating votes is not changed, blue and green* (KMT and DPP) *are rubbish*'.

	<p>The DPP should burn more coal, we will be poisoned to death by the air sooner or later, or we will be washed to death by the blasting rain! Are you still afraid of the Mainland?</p> <p>So we must rush the DPP out of power in the 2020 election, damn energy policy</p> <p>When will the KMT and the DPP be eliminated? It's annoying, just let Japan or the United States rule, anyway, a lot of people love it</p> <p>What if we were firing on all cylinders to use the coal power, anyway, other people's children can't die! Cough! Cough! What do you say!</p> <p>The DPP, please, work hard to kill Taiwan, come on</p> <p>The greatest sadness of the Taiwanese is to treat politics as a child's play, rather than a major matter of life and death interests (SC)</p> <p>The DPP has been lying about the good air in Taiwan, which will kill people</p> <p>Is it true that the KMT is anti-political corruption? You short-sighted dead Taiwanese feel their conscience, and want a classic car of more than ten years to run on the road in a squid car? Where is the future nuclear waste that supports nuclear power generation? Taiwan?</p>
die	<p>As long as the system of cheating votes is not changed, blue and green (KMT and DPP) are rubbish</p> <p>Since blue and green (KMT and DPP) are all rubbish, please vote for the DPP in 2020, because I want to see Taiwan continue to rot</p> <p>The DPP is rubbish, prices keep rising, the governance is rotten and deserves to be scolded</p> <p>The KMT is rubbish and will only engage in infighting, and they will only criticise the government for such laws on the mainland. They can't do anything, and they don't even dare to say a fart.</p> <p>The DPP is here to deceive carbon reduction, the DPP is a rubbish fraud party!</p>
rubbish	

Table 4. 25. The KWIC analysis of 'satirical words and hate words' in the comments.

Cited words of the discourse:

According to the KWIC analysis (see Table 4.26), I select four key politician names and parties as an example to examine the discourse genres which are commonly cited in the comments. Firstly, the citation word 'say' mostly appear with satirical words or hate words in the comments, which often not direct citation, but reorganised by adding personal opinions, for example, the comment '*Tsai (Yin-Wen, Tsai) said: 2025 smog Taiwan*' which is not a real speech from the politician, but adding the personal opinion that if the *Nuclear-free homeland by 2025* is realised, the thermal power generation will lead serious air pollution. The speech from Trump which is commonly cited in the comments is related to global warming, such as '*The speech Trump said is right, where is global warming?... (SC)*' which has a satirical meaning.

Secondly, the citation word 'support' is mostly used for representing the political opinion, such as '*I am a Chinese, and I support the DPP (SC)*' or '*Support for Yin-Wen, Tsai's governance!*'. But it sometimes has satirical meaning, which mostly appears in the SC comments, for example, '*I still support the DPP, keep ruling Taiwan, and look at the anti-intellectual Taiwanese. Haha (SC)*', it emphasises a common satirical form in the comments between Mainland and Taiwan that the Mainland people use '*support the DPP*' as a satirical word to represent the DPP will ruin Taiwan. Thirdly, the citation word 'cheat' has a high MI3 score with the DPP and the KMT, which is always represented as '*the DPP cheat votes*' or '*the DPP or the KMT cheat Taiwanese*', for example, '*The DPP uses the Nuclear-free homeland by 2025 policy and cheat the voters*'.

I then do the KWIC analysis to list the comments which consist of these political names and citation words and conduct the manually qualitative analysis from these comments. Table 4.27 demonstrates the two typical citation forms in the comments: directly citing the speech and assuming the tone of the politician. The first form directly cites the speech from the specific politicians, which is mostly used for highlighting the specific speech and representing

the personal opinion. For example, the commenter cited Trump's speech that refusing global warming is happening and added the personal opinion of the speech that '*the speech Trump said is right*'; or cited the speech from Yin-Wen, Tsai, and added the personal opinion which is against the speech with the hate word (see Table 4.27). The other form is to assume the tone of the politician, with the opinion or conjunction to the meaning of the politician's speech, most of these comments are negative and with satirical or hate words. For example, the comment demonstrates" Trump: *Climate warming ?? Global warming?! That's fake news!* (川普：“气候变暖?? 全球变暖·?! 假的·假新闻！)” to accuse the political behaviour of environmental issues by Trump.

citation words	cited
say	<p>A president (Yin-Wen, Tsai) said: Fast now, don't take the opportunity to go to the voters to give me the vote.</p> <p>Tsai (Yin-Wen, Tsai) said: 2025 smog Taiwan</p> <p>Every time Wen-Chien, Chen, says about the Taiwan pollution issues, it is directly to defend the government and even push it to the people....</p> <p>Wen-Chien, Chen said that Taiwan green can match the high risk. It's really a joke. It is equivalent to asking those European countries to eat shit that has already used a lot of green energy....</p> <p>The DPP said: That is the fault of Ma Ying-jeou! (the deposit and abolishment issues of the Fourth Nuclear Power Plant)</p> <p>The DPP said that non-nuclear free in 2025 is a fault, which should be the same as 2050 and 2060? In the current conditions, it is impossible to die.</p> <p>Clean coal! I eat organic food every day so the shit I pull out is clean?? Then ask the DPP to eat my shit, you say it is clean....</p> <p>Trump said: I have a wing to the aircraft carrier, and I will fly over and fire!</p> <p>Tsai (Yin-Wen, Tsai) said: Suck more, get lung cancer, don't be afraid, we have the best health insurance card. (SC)</p> <p>The speech Trump said is right, where is global warming? ... (SC)</p>
support	<p>Strongly support Yin-Wen, Tsai continuing to be re-elected, just ask who would love Taiwan so much (SC)</p> <p>I am a mainland, and I support the DPP. (SC)</p> <p>Support for Yin-Wen, Tsai's governance! (the <i>Nuclear-free homeland by 2025</i> policy)</p> <p>I still support the DPP ruling and look at the anti-intellectual Taiwanese. Haha (SC)</p> <p>Jin-ping, Xi blatantly lied at the United Nations and wants to cheat all countries in the world</p> <p>The DPP uses the <i>Nuclear-free homeland by 2025</i> policy and cheats the voters.</p> <p>The DPP has been cheating that Taiwan's air is great, which will kill people.</p> <p>The DPP cheats Taiwan, the KMT cheats the Mainland!</p>
cheat	<p>The DPP cheats Taiwan, the KMT cheats the Mainland!</p>

Table 4. 26. The KWIC analysis of the citation words by the key politician names or parties.

cited forms	cited
	The speech Trump said is right, where is global warming?...(SC)
	Jin-ping, Xi said on his knees at the United Nations: ... We will never seek power, and we are willing to fight a cold war with any country in order to stand by our own responsibility and resolve the possibility.
directly cited the speech	'We must have independence, to strive for national sovereignty, and let go of China!' (Yin-Wen, Tsai) Then he came over: American grandfather, can I do your sex slave? (SC)
	Wen-Chien, Chen has said in her programme that Microsoft's Bill Gates has studied 'nuclear power generation that does not produce nuclear waste', but must wait for more than ten years...
	Jin-ping, Xi: Ok, the meeting between Jin-ping, Xi and Taiwanese President Yin-Wen, Tsai is selected in Qincheng prison. (SC)
	Trump: I have a wing to the aircraft carrier, and I will fly over and fire!
	Tsai (Yin-Wen, Tsai): 2025 smog Taiwan
personal opinion or conjunction to the meaning of the politician's speech	Tsai (Yin-Wen, Tsai): Suck more, get lung cancer, don't be afraid, we have the best health insurance card. (SC)
	Wen-Chien: Who said that I don't learn anything! I predicted accurately! (SC)

Table 4. 27. Table 4.27. The KWIC analysis of two typical citation forms in the comments.

To sum up, the mixed methods of collocation analysis Key Word In Context (KWIC) analysis provides a comprehensive perspective to observe the environmental issues engaged with the comment discourse. The centre words can be seen as points, the relation between the centre words and the total words can be seen as lines, and the KWIC analysis lists the complete comment narrative with points and lines. The following findings explain how the environmental issues engaged with the comment discourse in terms of four potential indexes: lack of environmental-related comments, environmental issues are politicised in comments, the position of comments is differentiated by language, use satirical words and hate words to enhance the tone and exist some of common political opinions.

Firstly, according to the centre words on the collocated wordlist of 'energy-related' words, it emphasises that the comments rarely discuss the non-man-made global environmental issues, such as climate change, except for energy issues. As the KWIC analysis of 'energy-related words' in the comments indicates three main arguments: the problem of power shortage; judging environmental policy, such as the offshore wind power project, not enough, the base power, the *Nuclear-free homeland by 2025*, scam or love power generation; and abolishing or supporting nuclear energy. Secondly, as the KWIC analysis of 'politic-related' words in the comments shows, the environmental issues usually exist as the common arguments of air pollution between Taiwan and Mainland or the governance of energy-related issues in the comments, which reflected that environmental issues are rarely discussed without political views in comments. It can be confirmed that the two types of talk shows and in-depth reporting potentially stimulate more political discussion. Thirdly, according to the four pairs of words in both TC and SC, there is a potential line that the language plays a specific ideological role in the comment discourse. For instance, [Taiwan in TC] always appears with environmental policy, politics or satirical words, which have strong Taiwanese culture awareness; the collocated words of [Taiwan in SC], apart from the environmental issues, discuss more on the political-ideological difference, such as liberty

and democracy. Fourthly, as the frequency lists demonstrate, both of [die] and [rubbish] appear frequently in the comments. They have negative meaning and similar usage in the comments: enhancing the tone or condemning the two main Taiwanese parties (DPP and KMT). Finally, the comments exist some of common political opinions: according to the KWIC analysis of 'the citation words' in the comments, which emphasise that some of the key political names or parties have high frequency mentioned in the comments, which can be seen as the main discourse or the citation source of the comments. It is needed to notice that there are some specific political opinions appear in the comments frequently: the ruling party (DPP) continues to use thermal power as an alternative to nuclear energy, which is thought resulting in air pollution; air pollution in Taiwan is led by Mainland; 'non-nuclear free in 2025' is impossible to reach; and Trump does not believe global warming is happening currently. Besides, these comments have two typical citation forms in the comments, including directly citing the speech and assuming the tone of the politician.

c. Findings

The KWIC analysis provides a comprehensive perspective to observe the environmental issues engaged with the comment discourse. The centre words can be seen as points, the relation between the centre words and the total words in a line, and the KWIC analysis lists the complete comment narrative with points and lines. The KWIC analysis also can be seen as the extended analysis of the CTFC analysis, which provides a more comprehensive perspective to examine the comments environment.

The result of the KWIC analysis demonstrates four findings, which provide stronger evidence to the CTFC analysis. Firstly, the lack of environmental-related comments, that the 'energy-related' words as the centre words on the collocated wordlist point out that the comments rarely discuss the natural global environmental issues, such as climate change, except for energy issues. For example, the KWIC analysis of 'energy-related words' in the comments

indicates three main arguments: the problem of power shortage; judging environmental policy, such as the offshore wind power project, not enough, the base power, the *Nuclear-free homeland by 2025*, scam or love power generation; and abolishing or supporting nuclear energy.

Secondly, environmental issues are politicised in comments, and the 'politic-related' words in the comments demonstrate that the two types of talk shows and in-depth reporting potentially stimulate more political discussion. For example, environmental issues usually exist as the common arguments of air pollution between Taiwan and the Mainland or the governance of energy-related issues in the comments, which reflected that environmental issues are rarely discussed without political views in comments. In addition, the comments exist some common political opinions, and the citation words in the comments emphasise that some of the key political names or parties have high frequency mentioned in the comments, which can be seen as the main discourse or the citation source of the comments. It is necessary to notice that these comments have two typical citation forms in the comments, including directly citing the speech and assuming the tone of the politician. There are some specific political opinions appear in the comments frequently, including the ruling party (DPP) continues to use thermal power as an alternative to nuclear energy, which is thought to result in air pollution; air pollution in Taiwan is led by Mainland; 'non-nuclear free in 2025' is impossible to reach; and Trump does not believe global warming is happening currently.

Thirdly, the position of comments is differentiated by language, that according to the four pairs of words in both TC and SC, there is a potential line that the language plays a specific ideological role in the comment discourse. For example, [Taiwan in TC] always appears with environmental policy, politics or satirical words, which have strong Taiwanese cultural

awareness; the collocated words of [Taiwan in SC], apart from the environmental issues, discuss more the political-ideological difference, such as liberty and democracy.

Lastly, the comments frequently use satirical words and hate words to enhance the tone, such as [die] and [rubbish], which appear frequently in the comments. They have negative meanings and similar usage in the comments: enhancing the tone or condemning the two main Taiwanese parties (DPP and KMT).

V. Discussion and Reflection

This chapter delves into the engagement dynamics of the digital publics in concerning environmental issues by drawing on socio-technical theories. It analyses the factors that determine how effective a digital public can be when it comes to deliberating on environmental concerns. Furthermore, it investigates the methods used in addressing these factors to improve online participation quality in platforms dedicated to handling environmental matters. The chapter presents four sections, each offering a theoretical analysis of the socio-technical system governing digital platforms and how the three dimensions of collective participatory practices shape digital public engagement. The first section focuses on the subjects involved, including Asian-based participants and YouTube users. The second section examines the models of participation, specifically looking at YouTube's built-in functions such as the Like/Dislike ratio, comments, and algorithms. The third section explores the objects of digital public engagement, including controversy, issue spaces, and arenas of innovation pathways. The chapter further investigates how agenda-setting practices influence public engagement with environmental topics, particularly through YouTube comments and popularity, and examines their contribution to raising public awareness and motivating action towards environmental issues. This chapter also examines the role of YouTube as a 'hybrid forum' in communicating environmental issues across different program types. It highlights the impact of the 'Up-Next algorithm' on content exposure and user engagement. Additionally, it investigates how political talk shows, non-affiliated talk shows, and in-depth reporting contribute to agenda setting and content reproduction for climate change and other environmental issues in digital deliberative forums. The main goal is to provide valuable insights into digital public engagement and its impact on promoting environmental discourse and action.

A. What factors influence the effectiveness of digital publics in engaging with environmental deliberations, and how can their participation quality be improved on environmental platforms?

Political talk shows, nonpartisan talk shows, and in-depth reporting have created a mature space for discussion that has resulted in particular social outcomes, including the formulation of policies. As proposed by Warner (2002, p.53), the public is imaginary and difficult to identify, being more a product of discourse than a clearly defined object. Often, external tools, mediums, and mechanisms—such as voting—are relied upon to define publics and counterpublics. YouTube as a popular digital platform is questioned about lacking an external tool to evidence for identifying the public (Warner 2002, p.61). YouTube engagement metrics (views, likes, dislikes, and subscriptions) is an external tool to address the publics who have the common social goals, the function is similar to the election in entity society.

This section has been divided into three parts to address the understanding ecologies of participation in systems:

1. Subjects: Asian based participants and YouTube users.
2. Models of participation: YouTube built-in functions, including Like/Dislike ratio, comment or algorithm.
3. Objects: Controversy or issue space or an arena of innovation pathways.

Through Chilvers, Pallett and Hargreaves's (2018, p.201) relational and co-productionist framework, it shapes a root for systematically understanding the participating practices of digital publics (heterogeneous groups) and the interweaving of digital publics, deliberation and material elements (YouTube built-in functions).

1. Subjects: Asian based participants and YouTube users

The comments represent the subjects of participation and refer to the particular identities of the public and imaginaries of the public. YouTube comments are one source of evidence for identifying the flows between public and counterpublics, allowing us to visualise their dynamics and recognise the specific issues that led to the overflows. These visualisations also suggest the distribution dynamics of this content in forming publics/counterpublics. As Warner (2002, p.64) mentioned, the final aim of the public is to “thematise circulation” and “ideologisation”, thus organising social imagination.

According to the KWIC analysis of the verbs that have specific meanings in discourse, it provides us with a brief idea of the participants in YouTube and in-depth identifies the public understanding of environmental issues. The analysis of verbs with specific meanings in the comments sheds light on public engagement and the perception of environmental issues on YouTube. Verbs such as [say], [support], and [cheat] are frequently used within a politically charged discourse, indicating an overlap of environmental discussions with political debates. The usage of the phrase 'do not' across different contexts, such as '*do not understand* (不懂、不了解、不知道)', '*do not take a neutral position, or biased* (不中立)', '*do not step down* (不下台)', '*impossible* (不可能)', '*do not vote* (不投)', '*do not support* (不支持)', '*not a democracy* (不民主)', '*no power shortage* (不缺電)', '*no nuclear energy* (不要核電)', '*do not take responsible* (不負責任)'. It suggests a general sentiment of negation or opposition among the participants. This pattern implies a resistance to certain policies or a dissatisfaction with the current discourse, rather than a complete cessation of public participation. It is crucial to interpret these findings as indicating a type of participatory engagement that is critical rather than absent.

Furthermore, the phrase 'do not' might reflect a lack of sufficient knowledge or dissatisfaction among the public, which hinders constructive debates and the formation of a collective consensus on environmental solutions. This interpretation aligns more closely with the context of the political talk shows, which often frame environmental issues within a highly politicised narrative.

The CTFC analysis confirms a significant degree of ideologization within the YouTube comments, particularly in relation to long-standing regional political tensions. Comments frequently politicise environmental issues, focusing primarily on energy policies like '*Using nuclear to nourish renewables*' and '*Nuclear-free homeland by 2025*'. The frequent references to [Taiwan], [Mainland], and [the US] highlight the geopolitical dimensions of environmental discourse, emphasising cross-strait relations and international dynamics.

This politicisation often limits the discussion to specific thematic areas, thereby restricting broader engagement with the environmental topics themselves. The analysis shows that while the political framing might engage viewers, it often does so in a way that polarises opinions and emphasises conflict rather than fostering a nuanced understanding of environmental policies.

The comments reflect a clear divide between different political factions—evident from terms related to specific political ideologies and parties, which can often lead to a ridiculing attitude and reduce the potential for constructive dialogue. Such dynamics indicate that while political talk shows can mobilise public opinion, they also risk entrenching divisions and curtailing meaningful discourse on environmental action.

The findings on subjects reveal that YouTube comments serve as a source of evidence for identifying collective participatory practices of the digital publics and their specific identities. The analysis of verbs used in comments provides insights into the public's understanding of

environmental issues, highlighting the presence of political discourse and the lack of knowledge for effective debates and consensus building. Furthermore, the comments demonstrate the influence of regional political culture, the politicised environment, and specific energy policies in shaping discussions and the circulation of political ideology within the digital public sphere.

The findings on subjects, particularly the collective participatory practices and identities within digital publics, provide a basis for understanding the influence of YouTube's built-in functions on participatory dynamics. The analysis of YouTube's functions, including the Like/Dislike ratio, comments, and algorithm, reveals their role in stimulating both positive and blurred overflows within digital publics. These overflows diverge from the current focus and animate the objects of socio-technical change, as discussed by Chilvers, Pallett, and Hargreaves. This sets the stage for the next section, which examines the models of participation in the digital platform and their impact on environmental discussions.

2. Models of participation: YouTube built-in functions, including Like/Dislike ratio, comment or algorithm

YouTube's built-in functions play a significant role in stimulating different types of overflows, including positive overflows and blurred overflows. According to Chilvers, Pallett, and Hargreaves (2018, p. 206), overflows refer to new categories or perspectives that arise in digital publics through their hybrid form, diverging from the current focus and continually transforming the assumed objects of socio-technical change.

The analysis of 'Up Next' recommendations reveals how YouTube's algorithm may lead users from a specific video about climate change to videos discussing related issues like renewable energy technologies or geopolitical aspects of environmental policies. These overflows are significant because they can alter the viewer's engagement trajectory, broadening their exposure to a wider range of topics and possibly altering their perception or understanding

of the original subject. For example, in the algorithm performance of global warming videos, although energy policy, climate change, and global warming are not directly related to the global warming issue, they can be regarded as flow derivative issues, such as the function of sentinel, innovation, and education.

However, this study found that the flows of specific environmental issues, such as extreme weather, exceeded the original framing of the issue and overflowed into videos from the same channel or the latest published video. A positive 'overflow' effect can be observed in the recommendation network of in-depth news reports about global warming (as depicted in Figure 4.52). The key difference between this and the previous example is the number of videos related to extreme weather (N=8, or 1.81%) versus those related to global warming (N=39, or 9.03%) that are eventually recommended to viewers through YouTube's algorithm. In this case, the number of global warming videos recommended far surpasses that of extreme weather videos, meaning that most of the initial seeds are directed towards videos unrelated to environmental issues.

Upon closer examination of Figure 4.52, it can be observed that only a small fraction of recommended videos is related to extreme weather, while the majority of recommended videos on global warming pertain to topics such as energy policy, COP26, or agricultural waste reuse. The 'blurred overflow' phenomenon is exemplified in a group of in-depth news reports about extreme weather that form a cluster network (represented in figure 4.56). Despite being the starting point of the network, only a small percentage of videos (23, or 5.69%) related to extreme weather and other environmental issues (16, or 4.03%) are eventually recommended to viewers through YouTube's recommendation algorithm. Instead, most of the videos in the network end up being recommended to topics unrelated to the environment, such as politics and conflicts between countries like Ukraine and Russia.

Thus, I agree with Matamoros and colleagues (2021) that YouTube's recommendation algorithms give a visibility boost to channel queries (p.238). The 'Up Next' algorithm's results suggest that view count and channel subscriptions are the two most influential factors in determining a video's performance. However, it is important to investigate how much more influential channel subscription numbers are in boosting video visibility compared to video view count and if it only happens in specific cases. As certain programs lack individual channels and are published on the same channel, utilising YouTube's recommendation algorithms on a channel with a large subscriber base can help draw attention to videos with low view counts, promote flow between digital publics, and generate positive "overflow" effects by setting an agenda for particular environmental issues.

3. Objects: Controversy or issue space or an arena of innovation pathways

The objects of participation refer to the space of difference where multiple participatory collectives cohere within a controversy or issue space. In the environmental ecology in Taiwan, these issues can include global warming, air pollution, or energy shortage.

Alternatively, objects of participation can also refer to an innovation pathway of development shaped by the participants, such as energy transition and the development of clean energy technologies.

The role of agenda-setting and the composition of the public and counterpublics is reflected through the multimodal methodologies that systematically identify the practices of agenda-setting in environmental communication in Taiwanese media by different dimensions, including the specific communicative modes, modal density and agenda setting. These dimensions suggest the mobilised ability of current affairs in environmental communication, that is, the relationship between the public, counterpublics and their role in the deliberative system. As Warner (2002, p.50) proposed, the dynamic between the public and

counterpublics, as products of discourse, is flowing all the time. The deliberative system emerges from the opinions produced in this dynamic by the public's debating with the discourses of counterpublics. The previous section identified the communicative modes influencing the deliberative sphere and the flow between the public and counterpublics. In particular, the agenda-setting potential of the programmes analysed in this thesis demonstrates their crucial role in the deliberative sphere by providing the common substance of these debates with multimodal content on issues such as air pollution, global warming, climate change, nuclear waste, nuclear energy, green energy, *using nuclear to nourish renewables* and *Nuclear-free homeland by 2025*. In addition, the specific communicative modes of these programmes and the platform that hosts them also can be regarded as an approach to promote debate, helping to sustain deliberative spaces.

Upon examining the dynamics of Taiwan's environmental deliberation sphere, it becomes evident that certain long-term effects have shaped its current state. Firstly, the statement regarding a 'long-term lack of scientific knowledge in the media environment' may benefit from further clarification. While it was intended to highlight a deficiency in the accessibility and utilization of scientific data in mainstream media debates, it is important to acknowledge the extensive discussions surrounding climate change, energy, and environmental issues. These discussions are indeed prevalent, driven by both public and counterpublics. Therefore, the lack of debate materials might be more accurately attributed to the uneven distribution and interpretation of available scientific knowledge rather than its sheer absence. This misalignment can hinder productive dialogue and the development of actionable environmental policies.

Secondly, while digital platforms like YouTube have the potential to foster a well-informed public sphere through algorithms that link content, the analysis suggests that environmental issues often become mere appendages in political discourse. This situation can exacerbate

political polarization rather than fostering informed debate. Thus, the digital deliberative forum, while vital, must be scrutinized for its role in balancing the interaction between publics and counterpublics, potentially more impactful than traditional offline forums in mobilizing public opinion and action. The use of multimodal and comment analysis further confirms these interactive modes, emphasizing the need for a more nuanced understanding of how scientific knowledge is presented and debated in digital environments.

However, the genre of environmental issues alters the conventional understanding of how the public and counterpublics function in the digital deliberative forum. It aggravates the solid principal opinion of the deliberative system that the scientific discipline usually needs high-quality knowledge. It means that the role of the major opinion of the deliberative system in ideological hegemony (Hess 2009; Warner 2002, p.62) is controlled by specific groups, including experts or media. It confirmed the empirical study from Shapiro and Park (2018, p.116), who found that climate change on YouTube is dominated by a small group of 'elites', which maintain the long-term communicative modes of environmental issues. In my thesis, I find that the media play a similar position as the expert, demonstrating the control of the issue set, leading to the effects of the deliberative system. These deliberative processes also decrease the effect of the flow between the public and counterpublics, which leads to the limitation of policy implementation.

B. How do agenda-setting practices impact public engagement with environmental topics via YouTube comments and popularity?

The multimodal style of these programmes and the mode of the deliberative sphere have formed a typical political public in Taiwan. The result of the multimodal analysis demonstrates that all genres of programmes have similar aims— to promote their arguments by reducing the ambiguity of the contents and highlighting the arguments. They also use

similar communicative practices to each other, including the use of speeches and title bars, the use of data and numbers, the editing techniques of the footage, gestures, sounds and feeling numbers. However, each programme type has a different agenda setting, which is determined by the composition of the public. Warner (2002, p.59) proposed that establishing a common language is a way to promote public unity. Regarding his contribution, the agenda setting of each type of programme can be regarded as a means to address the public and construct the cognitive quality of public attention. It means the agenda setting not only reflects the particular environmental issues which media prefer but form the different level of discussion sphere by each genre of programme, which influences the cognitive quality of the public. Through the mixed methods, I identify the communicative modes of environmental communication on both the political and non-political programmes and the programme types (talk shows and in-depth reporting), which reflect an obvious difference in agenda setting and the composition of mediated actions. The agenda-setting on environmental issues in current affairs programmes (political talk shows, non-affiliated talk shows and in-depth reporting) plays a crucial role in constructing environmental risk and awareness, which increases the visibility of environmental issues and influences environmental policymaking. According to the two significant energy policies in Taiwan, *'Nuclear-free homeland by 2025'* and *'Using nuclear to nourish renewables'*, the final results of the referendum were passed; the public reflected a similar opinion of comments below the current affairs programmes, which indicated the effect of the media and the policymaking.

The agenda-setting on environmental issues in political talk shows identified a new environmental risk of deliberative policy-making and environmental communication and advocated for a broader addressing of agenda-setting of regional environmental policy, energy efficiency and air pollution issues, communicating these issues to policy, media and science spheres and focusing on environmental plannings and programming's, to meet the

sustainable development goals. For example, the title bar of a pan-blue talk reads 'DPP made a U-turn in the policy of *Nuclear-free homeland by 2025!* They stole nuclear power and fought against air pollution to defraud votes? (I035)'. This is a typical case of discussing environmental issues from the perspective of energy policy, using strong words to promote a specific point of view, and this point of view appears throughout the video. In addition, most of the agenda-setting of the political talk shows focuses on specific political events rather than more 'everyday' environmental issues, and the role of the environmental issues is to supply or reinforce the political argument. A typical example is reflected in the environmental policy issues, that the political talk shows usually set the environmental policy issues as the agenda setting. However, the substance of discussion in the programmes is the political focus, such as politicians, rather than the opinion they speak. It is evidenced by the position of the issue-attention cycle by Lin and Lo (2010), that the discussion of environmental issues is usually closed or refocused at fixed times when the political events end or start completely.

The agenda-setting on environmental issues in non-affiliated talk shows plays a double-edged channel for environmental communication. The issue setting centred on unusual or sensational environmental issues, such as air pollution or energy shortages, which not only drew public attention but, as with much political discussion on social media, could lead to misinformation. Because environmental issues typically involve a large amount of scientific information that is not widely known by the general public. It means that while sensational environmental issues help to raise public concern, there are also relative risks when the programme misinterprets environmental risk. It is worth noting that, while non-affiliated talk shows have fewer overt political views than political talk shows.

The agenda-setting on environmental issues in in-depth reporting identified a new channel of environmental communication in Taiwan, the issue setting is often implicit framing for

specific environmental issues, such as climate-related hazards or ecological environment. From the perspective of the producer, the in-depth reporting videos focus on global environmental issues, such as global warming and extreme weather, and they are relatively more focus on the perspective of science, not politics. For example, 'Global warming is getting worse. The Ministry of the Environment Government of Japan estimates that there may be an "exciting summer" throughout the year in 2100 (C131)' and 'Mission impossible? Beijing invested 120 billion in fixing air pollution (C037)'. It is necessary to mention that the in-depth reporting broadcast is a format familiar in other countries (e.g., Japan, China, Singapore). In the case of Taiwan, it not only selects the global environmental issue but interprets Taiwanese local environmental issues with a global perspective, which can be seen as a translation into the Taiwanese media ecology. However, the academic literature has focused on the spectacularization and catastrophization of the in-depth reporting videos, since the in-depth reporting videos do not have obvious politicisation of issue setting like political talk shows, which get less discussion to the role of the in-depth reporting programmes in both environmental communication and the potential political influence. This thesis identifies the role of in-depth reporting in constructing the environmental society in Taiwan.

I then use multimodal analysis to examine the performance of environmental communication in the political talk shows, non-affiliated talk shows and in-depth reporting, to find out how environmental issues are reproduced on these channels. The communicative practices include visual elements and textual elements, to reduce the ambiguity of the contents, arousing public awareness and taking action. As Jasanoff (2004, p.3) argues, scientific knowledge both embeds and is embedded in social practices, discourses and institutions, which form an 'invisible roles of knowledge, expertise, technical practices and material objects in shaping, sustaining, subverting or transforming relations of authority'. Talk shows and in-depth reporting form a regional scientific discourse space in Taiwan,

which directly reflect environmental governance. The communicative practices represent the deliberative capacity of environmental governance through the interaction between each related spheres, such as politics, policy science and science. Regarding the multimodal analysis, I adopt Norris's (2004, p.1) classification of communicative modes, that the programmes are constructed by verbal (language) and nonverbal communicative modes. As Backer et al. 's (2020, p.562) proposed that both verbal and nonverbal communicative modes play an important position in constructing an interactive environment. The results of multimodal analysis in this case indicated the similar performance that language and nonverbal channels should be in the same position and have the same research value. In the following paragraphs, I discuss the effect of each communicative notions in three types of programmes at first, and then in-depth discuss the compound communication modes, including lower-level and higher-level action. As Norris (2004, p.11) proposed that the higher-level action consists of several linked lower-level actions, which are more significant and provide a thorough approach to examine the interaction and environment of a particular context. The lower-level action can be thought of as the smallest interacting unit. I identified seven notions of the mediated action in this thesis: speeches (verbal communicative mode); title bars (nonverbal communicative mode); the use of footage via symbols, editing techniques and montage (nonverbal communicative mode); the use of numbers and data (nonverbal communicative mode); gestures (nonverbal communicative mode); sounds (verbal communicative mode); code-switching (verbal communicative mode).

1. political talk shows

The multimodal analysis's results indicate two obvious forms that environmental problems are addressed on political talk shows: the politicisation of the environment and the use of spectacularization and catastrophization in videos. The political talk shows aim to promote specific political arguments, which is evidenced by the politicisation of the environment in

the videos, through reducing or enhancing the ambiguity of the contents in both background construction and the influence of environmental issues. For example, in the environmental policy issues, the conflicting title bars 'DPP made a U-turn in the policy of *Nuclear-free homeland by 2025!* They stole nuclear power and fought against air pollution to defraud votes?' (I035) not only represents the political opposition to the '*Nuclear-free homeland by 2025*' but accuses the DPP of playing a word game that reducing air pollution (reducing burning coal) is used as an excuse that the policy cannot be implemented. The use of footage via symbols, editing techniques and montage appears a lot in political talk shows through using numerous editing techniques with different camera angles for similar usage. For instance, using 'close-up' shots to emphasise the argument; using specific symbols to emphasise the cause of air pollution problems, such as 'smoke', 'factory', 'building', 'grey sky'; or using montage to emphasise the severity of the environmental issue, such as using 'time-lapse' editing technique to emphasise how the temperature changed in a week. In addition, the multimodal analysis conducted reveals that environmental issues on political talk shows are primarily addressed through the use of spectacularization and catastrophization. These findings are supported by specific evidence derived from the analysis of visual and auditory editing techniques used in the videos. The analysis shows that talk shows employ dramatic editing techniques to emphasise the severity and immediacy of environmental problems. This approach is illustrated through: Editing Techniques, which frequently use a combination of 'zoom-in', 'zoom-out', 'look-down', 'rotate', and 'vibrating' effects not just for dramatic emphasis but to visually represent the scale and intensity of environmental issues (Figure 4.13); Montage, which is another critical technique used to convey environmental changes over time (Figure 4.14). The videos have lots of numeric elements within title bars, speeches and data, which can be divided into two representative forms: round numbers and precise numbers. The round numbers usually represent the percentage, fraction and cost of money or energy, which are

used to emphasise the severity of the environmental issues through the speeches or titles. For instance, *'...we have lost 50% of the melting ice... (speech, I035, position 25)'* and *'One-third of kids in New Delhi had lung problems and there were more than a million people who died of air pollution per year (speech, C037, position 30)'*. The precise numbers are used widely in data representation for complementing and emphasising the information sources or profession, such as *'the PSI of Yilan increased from zero to 7.499 (speech, H006, position13)'* and *'statistics displayed that the average concentration of PM2.5 was 153 $\mu\text{g}/\text{m}^3$ and PM10 was 286 μg in 2014 (speech, C037, position38)'*. The gestures are quite common to see in political talk shows, aimed at two main representative meanings: emphasising the speeches, arguments, and expression; indicating the main point. For example, the host and guests often use 'number', 'height', 'length' or 'size' gestures to emphasise the speeches or data; or using 'exaggerate' gesture means severity, 'indignant' gesture means opposition, 'push' gesture means active promotion or 'wave' gesture means disagreement to show the arguments and expression of the topics. In addition, the gesture 'pointing with index finger', is commonly used on data or information sources for accusing the other guests.

The practices of sounds have been divided into two forms: human voice and natural voice. The human voice is used to strengthen the tone or highlight the keywords of the speeches, and most of them have negative meanings, such as 'orotund', 'exaggerate', 'aggressive', 'husky', 'loud', and 'contemptuous' voice. For example, the host uses a husky voice to represent a conflicting and satirical speech, *'That is my first time to know about coal without pollution (H006, position 24)'*. However, as the talk shows hardly use video as the material, music or natural voice are hardly used in the political talk shows. Code-switching here means moving between two different languages: Taiyu and Mandarin. Taiyu is not only the most personal and familiar language in Taiwan, but it also plays a key role in the power dynamics of linguistic and political communication. It is frequently used in political talk shows to raise

public awareness. The power of the language community is reflected in the use of code-switching in political talk shows, which means Taiwanese political talk shows are sometimes used to censor the opposing party or appeal to political demands. For example, in the enhanced speech from the political talk show "*The friends (residents) from Kaohsiung, let's take a look* (G006, position 2)," Taiyu is used to emphasise solidarity with the Kaohsiung residents rather than "the residents."

2. non-affiliated talk shows

The multimodal analysis's results indicate two obvious forms that environmental problems are addressed on the non-affiliated talk shows: to catch public attention, which has obvious evidence by using massive communicative practices, which represent spectacular and catastrophic meanings. The use of catastrophization in non-affiliated talk shows is a potent tool for capturing public attention, utilising dramatic and sensational communicative practices to convey the urgency of environmental issues. This method draws from narratives that emphasise extreme climatic events, effectively demonstrating the potential consequences of climate change. According to Lowe et al. 's (2006) study suggests that while such portrayals increase urgency, they often do not equip viewers with the practical knowledge needed to act effectively, highlighting the dual nature of catastrophization as both mobilising and potentially paralysing. Additionally, techniques like time-lapse are employed to bridge temporal scales, making the gradual impacts of climate change seem more immediate and dramatic. Jasanoff (2010) notes that such techniques enhance environmental awareness by compressing long-term changes into moments graspable by the public.

These strategies in non-affiliated talk shows not only engage viewers but also shape their perceptions of environmental urgency and agency. This underscores the critical role of strategic communication in environmental issues, which should not only alarm but also

guide public understanding and action, addressing the challenges of conveying complex environmental dynamics in ways that foster both concern and informed response.

Non-affiliated talk shows have similar communicative practices to political talk shows, since they have similar composition of participants and the broadcasting type. The clear distinction between the use of speeches and title bars on political talk shows and non-affiliated talk shows is that the former frequently employ exaggerated content rather than specific political arguments. For example, an enhanced title bar from a non-affiliated talk show, 'The temperature of the North Pole has reached up to 38° Centigrade, and the underground resources have opened a *'decisive battle' between China, the United States and Russia!* (B022, position 2). Compared to the other two programme genres, spectacularization and catastrophization are the two communicative practices that are most prevalent on non-affiliated talk shows, which typically have a negative meaning. For example, using a barely visible city scene to emphasise the severity of the air pollution issue; using catastrophizing images or news footage to emphasise the extreme climates around the world.

non-affiliated talk shows usually represent round numbers to emphasise the severity of the environmental issues, which provide more crisis than precise numbers. For example, a speech from the non-affiliated talk shows represents *'You see that almost all of the west section was over air polluted (J007, position 7)'* which uses the fraction and a huge integer to inspire action on the air pollution issue. To compare with the round numbers, non-affiliated talk shows use less precise numbers in both the content and the scene, the potential reason is that the main purpose of the non-affiliated talk shows is to attract public attention. The use of gestures, sounds and code-switching have the similar practices in both in political talk shows and non-affiliated talk shows, which have similar representative meanings, including emphasising the speeches, arguments, and expression. Overall, code-switching seldom appears in non-affiliated talk shows and in-depth reportings. In the previous discussion of

the role of Taiyu (*A-1, Analysis chapter*), Taiyu plays a role in representing a power relationship between language and political communication. Through multimodal analysis, I find that the practices of code-switching only exist in the politic-based context, that Taiyu is a specific communicative practice in the political talk shows, for evoking the political consciousness.

3. In-depth reporting

The multimodal analysis's results indicate the roles of in-depth reporting: communicating global environmental issues and interpreting Taiwanese local environmental issues with a global perspective. In the comparative analysis of the in-depth reporting, I found that the voice-over narrative and on-screen text are the two main communicative practices for reducing ambiguity, which play the role in leading the arguments. For example, the content in figure 4.28 shows an enhanced title bar, *'Southern Europe, Greece, should have been dry and hot in summer, but a sudden ice storm caused 600 casualties'* (C131, position 16). In the use of footage via symbols, editing techniques and montage, the in-depth reporting videos often use two kinds of images as symbols to represent the environment, one shows 'cause', and the other shows 'effect'. For example, using 'smoke', 'factory', 'building', and 'grey sky' in air pollution issues, the symbols, to emphasise the cause of air pollution problem; using 'heavy rain', 'floods', 'houses', 'melting ice' in climate change issues, to represent global warming is getting worse. In addition, the in-depth reporting videos use numerous editing techniques with different camera angles for a similar usage, such as using 'close-up' shots for emphasising the argument or highlighting the number or data.

From the perspective of the contents, the 'feeling numbers' is a common communicative practice in the videos, including round numbers and precise numbers. These two types of representation satisfy the two important purposes of environmental communication: providing scientific knowledge through round numbers and arousing practical action through precise numbers. For example, *'The world produces about 8 million tons of marine debris*

every year, of which 50 to 60% are plastic products (speech, E006, position 1)', *'One-third of kids in New Delhi had appeared lung problems and there were more than a million people died of air pollution per year* (speech, C037, position 30)' and *'Thousands of fires engulfed about two-thirds of the size of the U.S., which is equal to the land from Detroit to Los Angeles* (speech, C144, position 21)'. And the precise numbers are used widely in data representation for complementing and emphasising the information sources or profession, such as *'the government provided allowance project for developing biogas electricity to small pig farms which occupied 93.7 % of Taiwan farms in 2017* (speech, N010, position 10)' and *'statistics displayed that the average concentration of PM2.5 was 153 $\mu\text{g}/\text{m}^3$ and PM10 was 286 μg in 2014* (speech, C037, position 38)'. The sounds have been divided into two forms, human voice, and music or natural voice. It is needed to notice that the in-depth reporting videos use more background music (BGM) for creating the specific atmosphere of the topic. The human voice appears frequently in the in-depth reporting videos to strengthen the tone or highlight the keywords of the speeches. For example, the host uses a husky voice to highlight the specific keywords (C144, position 2), which emphasises the wildfire spreading quickly; or the host uses an orotund voice to censure the governance (C144, position 42). The music or natural voice are often used for the background of the footage or speeches, which helps the audience to immerse the specific context which includes the specific arguments, such as using tense music as the BGM to emphasise the severity of the plastic pollution (E006, position 3). Overall, code-switching seldom appears in in-depth reporting videos rather than in political talk shows. There are two possible reasons: the use of Taiyu illustrates that Taiwanese political talk shows are sometimes used to appeal to political demands or censor the hostile party, which does not exist in the narratives of in-depth reports; code-switching occurs more in talk shows due to their broadcasting style that the talk shows place extra emphasis on dialogue, while in-depth reportings are almost no dialogue but a single-person report.

The multimodal analysis within this study has corroborated the significant influence of modal density in compound communication modes on public attention. For instance, the analysis revealed that the layout of the scenery in the right-side image of broadcasts enables identification of the TV program type, underscoring Norris's (2004, p. 99) findings on the relationship between modal density and viewer engagement. Programs with higher modal density, like political talk shows, typically show higher view counts compared to in-depth reporting, which features less sensory complexity. Conversely, the left-side image provides detailed visual cues that not only confirm the episode's focus on air pollution but also allow for the interpretation of underlying arguments through the subject's gestures and expressions, as illustrated in Figure 5.1. This nuanced use of visual elements in broadcasting effectively guides viewer perception and engagement, highlighting the critical role of multimodal strategies in agenda setting and audience interaction.

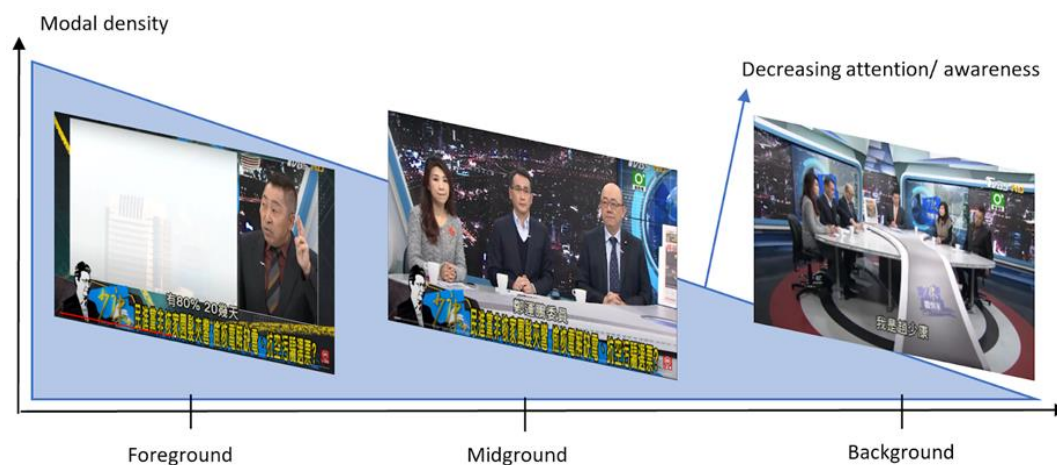


Figure 5. 1. The practice of modal density in air pollution issue.

However, none of the relevant studies in Taiwan focuses on non-affiliated talk shows, and there were only few studies focused on political talk shows and in-depth reporting. Also, there are no relevant YouTube-based studies in these genres of programmes. Since these types of programmes represent a crucial position in mediating and guiding digital deliberative systems, this thesis can be regarded as the pilot study to construct the digital deliberative system on environmental issues in Taiwan.

C. How are environmental issues communicated in various program types on YouTube?

The recommendation algorithms can be regarded as the most influential system on YouTube, as well as the only function that is produced from an internal system, which aims for reinforcing scrutiny and increasing user engagement. As Matamoros et al. (2021, p.238) proposed, the view count and channel subscription are believed to be the two factors which influence the performance of the 'Up Next' video in Youtube. According to the Up Next algorithm analysis in this study, I confirm that both of these two queries do boost video visibility in the recommendation system. When comparing these two factors, channel subscription numbers boost video visibility in recommendations more than video view counts.

As O'Callaghan et al. (2015) proposed, a common assumption of political communication in relation to the recommendation system is that YouTube's recommendation system directs users to increasingly extreme or polarised material. Through preliminary observation, Tufekci (2018) asserted that YouTube's recommendation has played an important role in the online strategy of the extreme right's ideological makeup. However, since Tufekci only conducts manual observation for a short period of time and on a single issue, a lack of systematic observation makes it difficult to understand how the recommendations work in depth. In this thesis, I conducted a systematic observation of the recommendation system over a long period of time, 4 years, from JAN 2017 to JAN 2021, and conducted both sizes of 'crawl depth' 0 and 1 on YTD, which is capable of observing the initial connection between the seed videos to other seed videos with no additional recommendations, as well as the precise recommended practises on the specific clusters. Through this method, I have contributed to the understanding through an in-depth examination of the digital platform, contributing to constructing the digital society. In this case, I find three findings of environmental communication and political communication in the digital platform:

1. the distribution of environmental issues in the digital platform.
2. identifying these programmes are classified as environmental issues or political issues on YouTube.
3. distinguishing the communication effect of individual environmental issues in depth.

The aim of YouTube's recommendation system further brings up a problem— implicit bias. From the perspective of political videos, this filtering criterion can quickly guide videos with extreme content and lead to political polarisation. From the perspective of environmental communication, the filtering algorithm can result in users being excluded from videos that are different from their existing perspective, potentially leading to immersion within an extremist ideological bubble. The recommendation network of the energy policies on both pan-blue and pan-green political talk shows has similar communication effects, that is, the political videos possibly lead to political radicalisation through recommendation networks on YouTube. As figure 5.2 demonstrates, the seeds are eventually recommended to the videos which have the same political ideology, and the phenomenon is more obvious in the pan-blue populist videos, compared to the pan-green populists.

The following sections explain the clustered performance of each of the three programmes, as well as examine the recommended behaviours on political issues and environmental issues through the YouTube recommendation system and focus on three specific perspectives: the issue of political radicalisation; the issue of environmental spectacularisation and catastrophization; and the awareness construction of global warming.

1. The issue of political radicalisation

According to the multimodal analysis, it can be confirmed that the political radicalisation mostly exists in the political talk shows, that is, this study only focus on the performance of the political talk shows. The up next algorithm analysis of crawl 0 demonstrates the eight available clusters, which are divided by a variety of political biases. It confirms the

assumption that political radicalisation exists in the recommendation system (O'Callaghan et al. 2015; Tufekci 2018). Overall, the recommendation network of the energy policies on both pan-blue and pan-green political talk shows has similar communication effects. According to the up next algorithm analysis of crawl 0, I identify three potential reasons for how YouTube clusters different videos together, such as similar political bias, the event which happened during the same period and the nodes from the same programme. For example, the clusters have a strong political bias, which focuses on the two main Taiwanese energy policies and the other two common environmental issues— *Using nuclear to nourish renewables*, *Nuclear-free homeland by 2025*, air pollution issues and power outages.

In addition, the cluster analysis of the political talk shows also demonstrates that the larger the size of the nodes, the stronger the connection with other nodes in the network, which means that the clusters with a similar political bias are easily formed as the filtering bubbles on YouTube. It provides strong evidence of the power of political radicalisation in the recommendation system. For example, a bigger-sized cluster demonstrates the strong political biases of the 311 anti-nuclear parades, that the main argument is condemned the ruling party (the DPP), that it advocates non-nuclear but was absent from the 311 anti-nuclear parades and questions the DPP do not acknowledge that non-nuclear is impossible.

The up next algorithm analysis of crawl 1 indicates the YouTube video recommendation system encourages political radicalisation, which means the videos with the same political bias are more likely to appear in the recommended list. For example, the up next algorithm analysis of crawl 1 concentrates on two clusters, each with pan-blue (the KMT) populist content and pan-green (the DPP) populist content (Figure 5.2), the seeds of both pan-blue populist and pan-green populist are eventually recommended to the videos which have the same political ideology, video category (news and politics) and specific political talk shows.

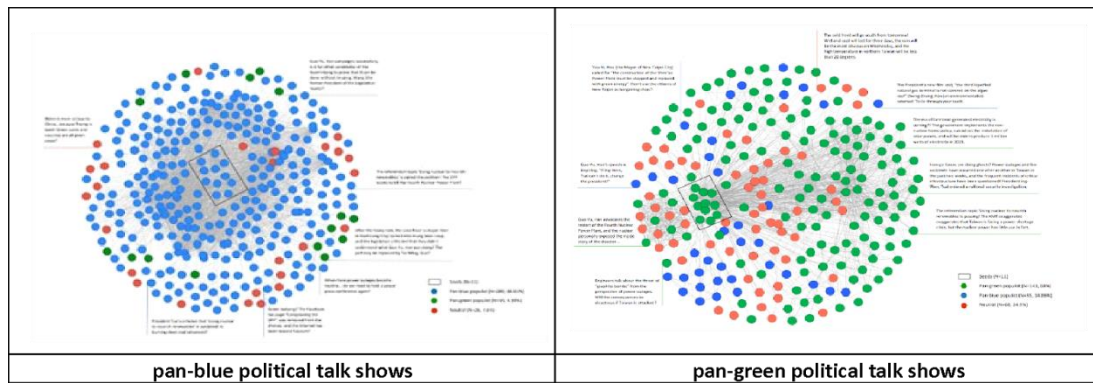


Figure 5. 2. Recommendation network of the energy policies cluster by political populist metric.

In addition, according to the cluster analysis in both pan-blue (the KMT) populist content and pan-green (the DPP) populist content, I find a similar media logic between the new media and old media that Taiwanese media remain the same dominance of channels in the new media. As figure 5.3 demonstrates, the seeds are eventually recommended to the videos from the same channel, rather than extending viewers' knowledge of the same topic.

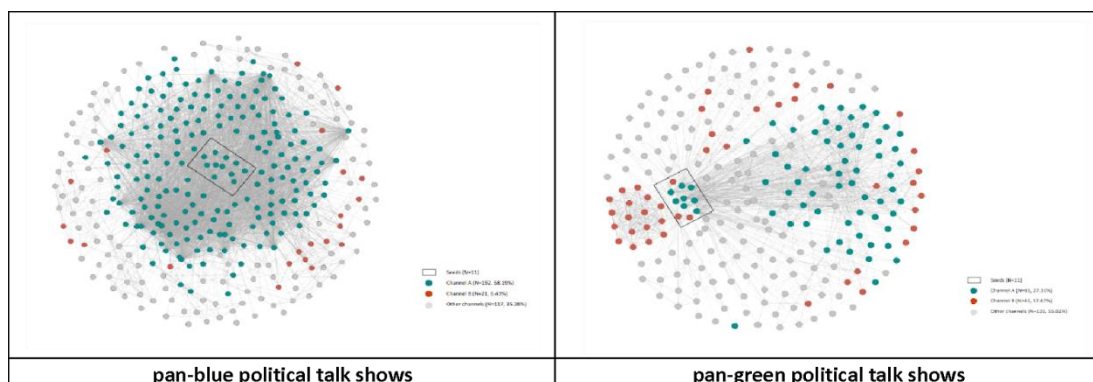


Figure 5. 3. Recommendation network of the energy policies cluster by channel metric.

2. The issue of environmental spectacularisation and catastrophization

According to the cluster network analysis, most of the videos in the clusters of the non-affiliated talk shows and the in-depth reporting are gathered by extreme weather. As Lowe's (2006) and Nicholson-Cole (2009 p.368) proposed, spectacularisation and catastrophization on environmental issues have an obvious effect on attracting people's attention to climate change, but it could lead to a negative and bleak outlook for the future climate at the same

time. This raises the question of whether the recommendation system aids in the dissemination of extreme weather videos or supports this ideology. The in-depth analysis for each cluster of the non-affiliated talk shows indicates two potential reasons for how YouTube clusters different videos, including the similar issues and the same programme. The common issues of the clusters are extreme weather events, the referendum proposals *'Using nuclear to nourish renewables'* and *'Nuclear-free homeland by 2025'*, renewable energy development and electricity consumption and nuclear waste disposal, environmentally friendly issues and environmental issues which are related to international relations. The in-depth reports are clustered by global environmental issues which happened at the same time, such as the 2018 California wildfires and deforestation of the Amazon rainforest.

To further examine whether the recommendation system encourages the spread of extreme climate videos or reinforces this ideology, I then conduct the up next algorithm analysis of crawl 1 of the non-affiliated talk shows and the in-depth reporting, to examine the destination of these seeds that were eventually guided. Overall, the phenomenon of environmental spectacularization and catastrophization is not obvious in all of the recommendation networks on both non-affiliated talk shows and the in-depth reporting, there are only a small number of videos eventually directed to the extreme weather videos and other environmental issues through recommendation networks on YouTube. In addition, I also found that the spread effect of these videos is concentrated on YouTube, and these destination videos are often connected to the initial programmes.

3. The awareness construction of global warming

According to the multimodal analysis, in-depth reporting can be seen as an educational platform for environmental communication. The issue setting and the content of in-depth reporting selects global environmental issues and interprets Taiwanese local environmental

issues with a global perspective. Through the up next algorithm analysis of crawl 1 of a global warming cluster, I have evidence that the recommendation network of the global warming issues on in-depth reportings has positive communication effects. The difference can be found in the number of videos between extreme weather videos (N=8, 1.81%) and global warming videos (N=39, 9.03%), which are eventually directed through recommendation networks on YouTube (see Figure 4.55). As the number of global warming videos is far greater than extreme weather videos, the videos through the YouTube recommendation system will not exacerbate the catastrophizing of environmental issues. In addition, most of the small-sized seeds will eventually be recommended to non-environmental destinations that were recommended to breaking news, such as the conflict between Ukraine and Russia.

Compared to the effect of environmental spectacularisation and catastrophization, which appear a lot in political talk shows, in-depth reporting has positive communication effects on global environmental issues, which have significant implications for constructing the digital environmental sphere. For instance, in-depth reporting on global warming issues can help audiences understand the impact of climate change on various sectors, such as energy policy and ecology. It contributed to motivating audiences to take action to address these issues and encourage policymakers to develop more effective policies to mitigate the negative impact of global warming.

Furthermore, the study's findings also highlight the need for greater diversity and breadth of content in the recommendation network of videos related to global environmental issues. While the number of global warming videos exceeds extreme weather videos, most of the recommended videos are still from the same channel as the initial seed videos. This indicates that viewers may be limited in their exposure to different perspectives on environmental issues, which reflects the communication logic of television.

D. To what extent do these programs contribute to agenda setting and content reproduction in the digital deliberative forum?

This thesis examines the crucial role of current affairs programmes (political talk shows, non-affiliated talk shows and in-depth reporting) in mediating and guiding the public debates about climate change. In this study, the current affairs programmes on Youtube realised the cognitive and democratic functions of environmental communication and actions and established a deliberative system by producing the information flows between the public and the counterpublics. These programmes provide a significant source of information on environmental issues, with the arguments made through the agenda-setting function and the composition of the communicative modes in the videos. These programmes provide scientific knowledge and political information through the arrangement of the host and guests in the programmes, which mobilised to facilitate energy policies through setting SDGs and energy policies as the subject of discussion on the programmes, such as ‘2025 Fei He Jia Yuan 2025 非核家園 [Nuclear-free homeland by 2025]’ and ‘Yi He Yang Lyu 以核養綠 [using nuclear to nourish renewables]’. However, deliberation is occurring on the current affairs programmes, but these deliberative modes are generally difficult to identify in deliberative democratic theory on both the offline public and the online public, which has two common reasons: difficult to identify the location of the users of the virtual space and the members of the public. Through the multiple initial tools (YouTube comments and views), which can examine how publics and counterpublics organise themselves online. The digital deliberative sphere increased public understanding of and engagement within Taiwan's public and scientific sphere and improved environment-politic interactions across the deliberative systems. The specific practices are demonstrated in the KWIC analysis in the comment analysis section (*C-2-b, IV. Analysis Chapter*).

Environmental reporting is a multidisciplinary news product, including science, environment and politics disciplines, which provides a crucial epistemic context for policymaking, science, education, and sustainable development in Taiwan. It is a continuous product in the deliberative systems which is formed by the hybrid media system, agenda setting and the particular scientific discourse space. The deliberative system can be seen as a dynamic sphere of politics, media and science, which aims to realise the democratisation of global environmental governance (*A, II. Literature Review Chapter*). The multimodal analysis of political talk shows has demonstrated the capacity of the deliberative system in digital media, and the degree of deliberative impact is dependent on the interaction of the sphere of politics, media and science. The results of the 2018 Taiwanese referendum have represented that the deliberative sphere has concrete power in environmental policymaking. The materials of the deliberative system, which primarily consist of scientific information and political ideology, also involve agenda setting, which is closely linked with public opinion. The operation of the deliberative system reflects the importance of framing and discourse, which directly influence which issue is worth concentrating on, why and how. The section has been divided into two parts to demonstrate how the deliberative system operates in the different genres of programmes: dealing with the environmental issues from knowledge to information; the practices of constructing the environment, public and policy issues in political talk shows, non-affiliated talk shows and in-depth reporting, and bringing out the social impact, such as policy science and policymaking.

1. Dealing with the environmental issues from knowledge to outformation

Environmental issues can be seen as a kind of science content, and often be mentioned in political communication, such as the background knowledge of environmental policy or the supporting data for political opposition. As environmental issues have been an emerging topic nowadays, it is necessary to understand how to deal with environmental issues in the

political talk show. Through the definition of transition from knowledge to information to outformations, the concept of the science contents is close to “outformations” (Ezrahi 2004). The transition from knowledge to information can be seen as a “more socially inclusive means of knowing facts or accounting for, and guiding, action, has been a response to the need to keep knowledge objective or technically valid in...” (p.257). “By comparison with knowledge and information, outformations, however, are more like wisdom in combining cognitive, emotional, aesthetic and other dimensions of experience. ..., but unlike it, they are largely disconnected templates of stimuli” (p.258). This concept is particularly relevant in the context of scientific content, which often undergoes simplification or modification to become more palatable or compelling to a general audience.

'Outformation' essentially bridges the gap between raw, complex scientific knowledge and the polished, often oversimplified information consumed by the public. It involves the strategic framing or presentation of information to make it more engaging or persuasive, aligning with specific agenda-setting goals. In the case of political talk shows and media discussions on environmental issues, 'outformation' manifests as the selective presentation of data or facts that support a particular political stance or policy, thereby steering public discussion and opinion in a desired direction.

Besides, the meaning of the role of outformations in political communication in the lives, as Ezrahi (2004) mentioned:

“It may indicate a cultural, perhaps a postmodern, shift from foundational to non-foundational and dynamic conceptions of reality, a growing move from reason to the imagination as the faculty which consciously mediates the making and the unmaking of political worlds in our time.” (P.260)

According to the move from information to outformations, it not only provides more public accessibility, but the fact may be produced based on the user who has provided it, which means the fact has already transformed absolute fact into relative fact. However, according to Fan (2023, p. 58), the radical democratisation of science involves public contestation of existing scientific framings of environmental problems, potentially leading to the identification of novel environmental risks and changing the understanding of what constitutes an environmental threat. It demonstrates that the environment issues generally are believed to be more complicated than other issues in political communication, which is difficult to detect but easily the target of political manipulation.

YouTube is a robust online tool for political communication; most of the related studies of YouTube were studied for entertainment, commercial purposes and less studied for 'Science and Technology'. However, a common debate is that YouTube demonstrated a rising problem- a lack of scientifically high-quality information on YouTube, as Allgaier (2016) mentioned, such as the environmental issues which have attracted attention in recent years and always mentioned with the politics, such as the environmental policy act, or as the central policy of election. Allgaier (2016) mentioned that "Many citizens do use YouTube as a source of information about issues concerning science, technology and medicine." (P. 1) Schäfer (2017) and Allgaier (2016, p.17) have explained the lack of professional knowledge on YouTube, one of the reasons was that scientists and scientific organisations are still reluctant to communicate through social media, and non-scientific actors often dominant discourses about science and health in social media. Thus, it is worth discussing the knowledge capacity on YouTube.

According to the multimodal analysis of the three types of programmes, I confirm the potential problem of "the lack of professional knowledge on YouTube" which was proposed by Schäfer (2017) and Allgaier (2016, p.17), also exists in this case. The imbalance of

scientific information and political information is evidenced by the participants of the programmes (political talk shows and non-affiliated talk shows). The participants of the political talk shows are mainly politicians, and the proportion of experts is extremely low (usually one or none per episode) the role of the experts is assigned to interpret the data. The participants of the non-affiliated talk shows are mainly media practitioners, such as minzui, newsreaders and cultural workers, which is followed by the aim of the programme position, using spectacular or catastrophe images or films rather than using scientific data, to stimulate environmental awareness. Compared to the talk shows, the in-depth reporting videos can be seen as the news extension by their similar broadcasting style, which focus on global environmental issues, such as global warming and extreme weather, and they are relatively more focused on the perspective of science, not politics. I also confirm that the format of in-depth reporting broadcast is familiar in other countries (e.g., Japan, China, Singapore), in this case, the in-depth reporting programmes are not only an education platform for receiving environment-related information but an important communication platform which interprets Taiwanese local environmental issues from a global perspective.

The previous section points out that in the analysis of YouTube programs, it has been observed that despite a prevalent perception of a lack of scientific depth, the three types of programs analysed—political talk shows, in-depth reporting, and specialised science channels—actually exhibit a substantial amount of scientific information. This information is not merely incidental but is intertwined with political content, serving strategic purposes in the agenda-setting process of each programme. The next section discusses the specific practices of agenda-setting in the deliberative sphere: issue setting, visual elements and textual elements.

2. Practices of constructing the environment, public and policy issues

The practices of constructing the environment, public, and policy issues in political talk shows, non-affiliated talk shows, and in-depth reporting differ slightly depending on their identified role in society. They bring out the social impact of these issues, such as in policy science and policymaking.

The multimodal analysis of talk shows illustrates the role of them in shaping a digital deliberative sphere, and it indeed realises the deliberation in some parts. According to Callon et al. (2011, p. 30, 32), the 'controversy' plays an implemented role in the social-technic system, with two specific practices in developing science and technic issues. Firstly, the exploration of 'overflows' is engendered by the development of science and techniques, which are inseparably technical and social and give rise to unexpected problems by highlighting unforeseen effects and potentially identified issues that experts do not predict. This genre of overflows can be identified as having a positive effect on issue implementation, as the public's concerns and expectations bring it out. Secondly, the overflows brought out by the learning-based controversy will positively lead the public to integrate the different dimensions of the debate to arrive at a 'robust' solution, not a continuous existing question.

Talk Shows on YouTube have realised a form of idealised deliberation by the conflicted agenda-setting, the dialogue-based broadcasting style and the public participatory function (YouTube comments and recommendation algorithm), which has primarily restored the image of the public sphere by Habermas. Moreover, the imagined function of talk shows in a digital society is to establish a sphere for public participation and result in public learning and policy implementation. However, the impact of the overflows in talk shows has resulted in a stagnated public sphere, where the focus is on political discussions rather than effective deliberations on environmental issues due to the lack of scientifically high-quality information and knowledge capabilities.

The environment-based issues are often tangled with politics. This results in public participation being focused on political discussions and debates. The obvious example is energy policy, a multi-discipline topic within politics, environment and economics. The contents and the comments of the programme's sphere are mainly focused on the political discussions, although the discussions are always more intense than in-depth reporting. The possible reason is the lack of scientifically high-quality information in both public understanding itself and the contents in the programmes. This means talk shows have a deliberative function, but they do not have the knowledge capability to proceed with practical discussions or debates, such as the environment-based overflows. In the long-term perspective, if the public lacks understanding of environmental issues and the media only promotes political discussions. Environmental discussions will only revolve around well-known problems such as climate change, global warming and ongoing energy policies. In this case, there will be no progress towards finding solutions to less-known environmental problems.

Compared to talk shows, in-depth reporting provides more scientifically high-quality information in both agenda-setting and content. However, as its broadcasting style is similar to mainstream news broadcasting, and it often has fewer view counts, it is difficult to produce effective deliberation and result in policy implementation. However, comments from viewers demonstrate that in-depth reporting on environmental issues has generated some unintended consequences, such as increased public debate about the relative costs of green energy versus nuclear energy.

VI. Conclusion and Outlook

A. The aims of the study

This study aimed to investigate and analyse the presentation of environmental communication on YouTube, specifically focusing on Taiwanese political talk shows, non-affiliated talk shows, and in-depth reporting. It sought to understand the role of YouTube as a 'hybrid forum' for environmental communication and examine how environmental issues are packaged and discussed within the participatory socio-technical system of digital media. The study also aimed to explore the influence of YouTube's algorithm on content exposure and user engagement, as well as the contribution of these programs to agenda setting and content reproduction related to climate change and other environmental issues. Four research questions were addressed, including:

1. the factors influencing the effectiveness of digital publics in engaging in deliberations on environmental issues.
2. the influence of agenda-setting practices on public engagement with environmental topics through YouTube comments and popularity.
3. the communication of environmental issues in different program types.
4. the extent to which these programs contribute to agenda setting and content reproduction in a digital deliberative forum.

The study utilised a mixed-methods approach, including multimodal analysis, comment analysis, and Up-next algorithm analysis, to provide a comprehensive understanding of this emerging communicative practice. The findings were expected to provide evidence to stimulate climate actions and support public arguments for the benefits of a sustainable environment. Additionally, the study aimed to provide a systematic guide for setting a

communication strategy on environmental and environmental policy-based issues on specific program types and examine the communication effect of environmental issues on digital platforms. The possible strategies include maintaining a balance of the agenda setting between policy and scientific information, addressing the known issue of information imbalance, enabling digital publics to make strategic decisions in referendums, and ultimately achieving climate action. Another approach could be focusing on specific terms used in YouTube to effectively spread information through the recommendation system.

Overall, the study intended to contribute to the understanding of environmental communication on YouTube, shed light on the role of digital platforms in promoting energy policies, and address challenges in the participatory system, specifically related to the democratisation of science and public engagement in environmental issues.

The aim of this research was to examine the socio-technical system in digital media, which is composed of modalities of participation, subjects, and objects. This thesis refers to Chilvers, Pallett, and Hargreaves' (2018, p.202) socio-technical system and generates a socio-technical system on a digital platform with relevant weights, aiming to understand whether the models of participation (YouTube's built-in functions) play the most important role in this system. The research focuses solely on the communicative ecology on digital platforms and examines how it operates in substantive cases, specifically related to policies and regional concerns about global warming, climate change, and air pollution in the Taiwanese context. The dissertation presents evidence to support the reasons for the solidification of the digital socio-technical system, leading to unpredictable overflows, including political agenda-setting, insufficient knowledge, and issues of environmental spectacularization and catastrophization.

B. Main research findings

This dissertation argues that the offline socio-technical systems associated with energy transition have become entrenched and stagnant, a situation exacerbated by the digital shift in public engagement. This entrenchment is evident in the exacerbation of elitism within environmental debates, where a limited group of stakeholders dominates discussions, as highlighted by Shapiro and Park (2018). This domination contributes to the solidification of a deliberative system that persistently focuses on a narrow set of well-established topics, neglecting emergent or peripheral environmental issues. The analysis of media content and public comments indicates a stalled development in the democratization of science, where public engagement in scientific discourse remains limited and controlled. This is further evidenced by the solidification of long-term issue frameworks and the public's imagination about environmental challenges, which tend to align more with media producers' perspectives than a diverse public consensus.

Moreover, the ossification of the STS discipline itself is reflected in how traditional participatory models fail to adapt to the complexities of modern public engagements, as critiqued by Chilvers and Kearnes (2020, p.4). They point out that the prevailing realist approaches in STS underplay the dynamic nature of public interactions in contemporary settings. This dissertation underscores the need for evolving models of participation that better reflect the multiplicity of public engagements and facilitate a broader, more inclusive deliberation on environmental issues. Through a detailed examination of 481 videos across three environmental genres, the findings reveal that media agenda-setting continues to mirror the rigidity seen in offline deliberative contexts, primarily focusing on long-term environmental issues, climate actions, and energy policies. This selective emphasis limits the scope of digital deliberation, preventing a comprehensive exploration of less prominent but equally critical environmental concerns.

The second argument focuses on the limited mobilisation capacity of digital publics. In collective tasks, the comment has reflected the agenda-setting by the media, which realises the deliberative function. Through comment analysis, it can be identified the mobilised ability and the overflows of the digital publics. In previous studies, it was hard to identify the characteristics of the digital publics and generate two debates, including deficiency in implementing policies that lead to unpredictable overflows. The main goal of the current study was to determine the composition of the digital publics and the role of YouTube as a hybrid forum, assess the feasibility of YouTube as an environmental communicative channel by examining the YouTube built-in functions. This dissertation provides evidence for the reasons for solving the existing problems: deficiency in implementing policies to unpredictable overflows. In the energy policies (*Nuclear-free homeland by 2025* and *Using nuclear to nourish renewables*), the cognition of the energy policies did not have a lot of change in the digital publics within the time between 2017 to 2021, which means the standstill of the deliberative system. Additionally, there is an obvious overflow on these topics, as the discussions always direct to politics. Overall, the evidence strongly supports the argument that the media's agenda-setting in the digital deliberative sphere mirrors the solidification observed in offline deliberative spheres. The media's selective focus and the resulting limited space for deliberation restrict the range of topics and perspectives discussed, thereby reducing the capacity for understanding energy policies and mobilising climate actions among digital participants. The dissertation develops a model for analysing the digital socio-technical system by utilising the built-in function and adjusting the dimension of the object. It is able to solve these two existing problems, which will be beneficial to achieving better public engagement in these issues in the context of the emerging net-zero target by 2050 that highlights its focus on public engagement with the process through stimulating discussion.

The findings of the videos' multimodal analysis (see *A, IV. Analysis Chapter*) reflected the objects of climate change and other environmental issues in a digital deliberative forum. Firstly, political and non-political programmes have different approaches to the same issues due to their distinct aspirations. For instance, in the case of nuclear energy issues, political programs have a strong focus on promoting specific political arguments, such as energy transition, and tend to use "numbers and data" and "code-switching." The use of numbers directly transmits background knowledge without lengthy explanations, while code-switching aims to raise people's awareness, playing a role in the power dynamics of political communication. Non-political programs aim to raise public concern through sensational environmental agenda setting, such as nuclear disasters, which represent spectacular and catastrophic meanings. Secondly, I identified seven metrics to evaluate the regional videos, considering cultural and historical backgrounds. Drawing on relevant studies in visual analysis (Norris, 2004; Bernad-Mecho, 2021; Kress, 2010) and considering cultural and historical backgrounds, I propose several mediated action notions in this thesis, including speeches (verbal communicative mode), title bars (nonverbal communicative mode, use of footage through symbols, editing techniques, and montage (nonverbal communicative mode), use of numbers and data (nonverbal communicative mode), gestures (nonverbal communicative mode), sounds (verbal communicative mode), and code-switching (verbal communicative mode).

The findings of the Up Next algorithm analysis reflected the models of participation, highlighting YouTube as a 'hybrid forum,' and confirmed three findings. Firstly, channels have the power to control the overflow problem. The recommendation network of the extreme weather cluster (Figure 4.54) and the global warming cluster (Figure 4.55) confirmed that almost all of the videos are from the initial program. This is similar to the siloed media logic of one or two-channel television media, where Taiwanese media continue

to dominate the channels in the new media landscape. Secondly, specific environmental issues (energy policies) have more collective power in the Up Next algorithm compared to general issues. Compared to long-term existing environmental issues such as climate change, which have been overused and resulted in numerous overflows, the investigation of 'energy policies' reveals that emerging terms, such as specific energy policies or climate actions, may have more mobilising potential in the socio-technical system of the digital platform. An evident example is the Up Next algorithm analysis of crawl 0, which demonstrates that political programs are clustered based on specific topics or issues related to the environment, such as using nuclear energy to promote renewable sources, achieving the Nuclear-free homeland by 2025, addressing air pollution, and power outages. These nodes play a central role in the network, and the larger the size of the nodes, the stronger their connections to other nodes. This indicates that these nodes serve as core issues in the network, and clusters with similar political biases in energy issues easily form filtering bubbles on YouTube, promoting specific political ideologies. Additionally, the analysis shows that programs with specific political stances have more collective power in the Up Next algorithm compared to non-political programs. Lastly, the Up Next algorithm does not significantly contribute to the spread of environmental spectacularization and catastrophization. The investigation of extreme weather in an in-depth reporting program revealed that the extreme weather clusters do not contribute to the spread of environmental spectacularization, catastrophization, or the promotion of specific environmental ideologies. Most of the seeds eventually lead to video recommendations unrelated to environmental issues. One of the significant findings from this study is that in-depth reporting plays a role in spreading knowledge capability in the digital deliberative sphere. With multiple environmental agenda settings and coverage of scientific knowledge, in-depth reporting addresses the problem of knowledge insufficiency in the digital public and serves an educational function. However, the current quantity of in-depth reporting

remains limited (244 videos in total between 2017 and 2021), and there is a need to increase the number of programs.

The findings of the YouTube comments analysis revealed significant aspects related to the subjects (the digital publics) in the socio-technical system in digital platforms. Firstly, it was observed that political discussions were highly prevalent, as evidenced by the investigation of word frequency analysis, which indicated that approximately 85% of the top 100 words in the three genres of programs were politically oriented. Secondly, the analysis of comment term frequency and keyword context highlighted those environmental issues served primarily as a platform for political debates rather than fostering deliberative discussions, with environment-related words being used to criticise the ruling party. Additionally, the study demonstrated that the digital publics' ideologies were heavily influenced by long-term political culture and the paradoxical nature of environmental issues. It was further noted that knowledge capability played a pivotal role in facilitating meaningful discourse and mitigating the occurrence of invalid overflows. Overall, these findings underscored the significance of YouTube's built-in functions, media agenda setting, and the digital publics they create in shaping the effectiveness of the digital socio-technical system.

C. Intellectual contribution

This research significantly advances the understanding of participation in environmental issues and policy on digital platforms. While previous studies, such as those by Chilvers, Pallett, and Hargreaves (2018), recognized digital platforms as spaces for participation, they did not comprehensively analyse the complex interaction between digital publics, media agenda-setting, and channel sources as this research has done. Contrary to the perception of digital publics as 'decentred' participatory practices, this research reveals their influence and accountability in the digital deliberative sphere. 'Decentred' participatory practices refer to the idea that the digital publics on digital platforms like YouTube are often seen as

distributed or dispersed individuals without a centralised locus of control or authority. In other words, they are not part of a single, unified entity but rather act independently in engaging with content and discussions on digital platforms. Traditional forms of participation might have a more centralised structure, such as citizens participating through established organisations or institutions. The findings provide foresight for participation models that may shape future climate actions and impact emerging goals through deliberative debates on digital platforms, emphasising the significance of digital publics in fostering democratic participation and shaping environmental discourse. Additionally, this research introduces methodological innovation to the study of environmental communication on YouTube by utilising mixed methods, including multimodal analysis, visual analysis, corpus analysis, and up next algorithm analysis, which offer a comprehensive examination of videos, comments, and the recommendation algorithm. These diverse research approaches uncover various aspects of environmental communication on YouTube, such as the different approaches taken by political and non-political programs in addressing environmental topics and shedding light on the influence of media agenda-setting and political culture. Furthermore, the study demonstrates how in-depth reporting plays a vital role in spreading knowledge capability in the digital deliberative sphere, addressing knowledge insufficiency among digital publics, and serving an educational function. These findings provide new insights into the mechanisms through which digital platforms shape political discussions and public engagement with environmental issues in the context of Taiwanese politics, transforming the understanding of agenda-setting processes and their impact on the public's awareness and mobilisation towards environmental concerns. This research contributes novel perspectives and tools to the existing literature on digital media's role in shaping political discourse and environmental communication.

This research provides novel and actionable insights into the socio-technical system based on 'participation'. 'Participation' is a prerequisite for systemic understanding and change,

and in this perspective, the term 'participant' refers to the digital publics. It makes empirical and theoretical contributions by emphasising the significance of the digital socio-technical system in environmental communication and offering insights for its future development. These findings align with earlier studies on public imaginaries and energy policy implementation (Chilvers, Pallett, and Hargreaves, 2018), highlighting the accountability function within the digital deliberative sphere. Additionally, I declare that the digital publics participation plays a pivotal role and provides foresight for models of participation that may be central in future energy democracies, positioning them at the core of the ecologies of participation in environmental communication, contrary to their positioning as an external collective in socio-technical change, as suggested by Chilvers, Pallett, and Hargreaves (2018, p.206). While digital publics are often considered 'decentred' participatory practices, the mixed methods analysis confirms their influence from media agenda setting and channel sources, revealing a more complex interaction. In conclusion, this research advances the understanding of participation models and their central role in future energy democracies and the ecologies of participation in environmental communication. It suggests that the implementation of future energy policies can be mobilised through deliberative debates on digital platforms, ultimately aiding in predicting the impact of emerging climate actions or goals.

The methodological innovation in this study is highly significant, employing a comprehensive array of research methods to realise the theoretical approach (socio-technical system) discussed in *A, II. Literature Review* and its practical application in subsequent chapters (*B, C, D, and E, II. Literature Review Chapter*). The chapter elaborates on the researcher's decision-making process in three key areas: the strategic selection of the research subjects' setting, the utilisation of YouTube Data Tools (YTDT) to access platform data, and the methods employed for data analysis. Notably, the chapter carefully outlines the selection of video lists, comment lists, and video networks on YouTube as the research setting, providing

intricate insights into the distribution of Taiwanese current affairs program videos present in the research data. Moreover, the study incorporates innovative research methods, such as multimodal analysis, visual analysis, corpus analysis, and up next algorithm analysis, which are thoughtfully elucidated, and the chapter effectively reflects on their successful implementation in the field. This methodological approach highlights three essential categories for analysis: videos, comments, and the recommendation algorithm, further enhancing the rigour and depth of the study's findings. It provides a comprehensive framework for future research in the digital method field and offers a series of methodologies for assessing specific issue communicative practices.

D. The limitations of the current study

1. Sentiment analysis of the Chinese-based comments:

A limitation of this study is that I employed sentiment analysis to identify environmental issues that elicit particularly strong positive or negative sentiment. However, during the sentiment analysis, I found that both Sentistrength and BUTTER, which are two typical sentiment analysis (opinion mining) programs, could not generate the expected results. According to the multimodal analysis, clear sentiment data were anticipated, but both of these systems only recognized sentiment words in less than 10 comments on average, out of more than 100 comments. It is important to note that upon manually reviewing those comments that were not identified with emotional words, it was found that most of these comments did indeed contain emotional expressions. Despite its limitations, this study contributes to the understanding of the limitations of current sentiment recognition tools and the language boundaries they face. After comparing relevant literature, two possible reasons for the inability to obtain reasonable results with YouTube comments in this case were speculated upon. First, the form of the comments used more emojis, question marks, exclamation marks, or complete event descriptions instead of emotional words. For

example, in a comment condemning a politician, exclamation marks were used with the politician's name instead of a precise emotional word. Second, differences in sentence and word organization in different languages may pose challenges. In this case, the majority of comments were in Chinese, and the composition of Chinese is not as easily recognizable as English due to the use of proverbs or dialects that software cannot easily identify.

2. Limited coverage of specific programs:

This study is limited to specific programs, including talk shows and in-depth reporting, and does not cover other genres such as news programs. News videos are less important in environmental communication in this thesis for two reasons: the agenda-setting of news videos have shorter periods of issue fermentation; news videos have time limitations for a single news piece, resulting in less influence compared to talk shows and in-depth reporting. While this study did not confirm the communicative effects of news programs, it did provide partial evidence of communicative effects in talk shows and in-depth reporting, especially regarding specific energy policies.

3. Limitations regarding the representation of online political communication:

One limitation of this study is that not all parties have their own YouTube channels, which means it may not represent the complete online political communication on YouTube in other regional studies. Nevertheless, this study enhances the understanding of the comprehensive Taiwanese environmental communication ecology on digital platforms, despite its limitations. Additionally, despite the relatively limited sample used in the multimodal analysis, this work provides valuable insights into the evolving forms of socio-technical systems in the digital realm and confirms the deliberative capacity of the socio-technical system in digital platforms by defining each composed dimension and their weights from a participatory practices perspective.

4. Unmeasured factors in YouTube comment analysis:

Another unmeasured factor is the possibility that the ranking of comments, which is typically influenced by multiple metrics, may affect the actual rank of these metrics. For example, it can be observed that the top one or two comments may not have many likes or may not be related to the video, while comments at the bottom may have high engagement in terms of likes or replies. Nevertheless, despite these limitations, this study offers insights into the deliberative ecology of environmental issues among the digital public through content analysis of comments, such as understanding knowledge gaps and overflow practices.

5. Limited evaluate the performance of environmental policy implementation

Since the study covered all environmental issues rather than focusing on the specific energy policies, it was only able to verify the power of stimulating discussion but was not possible to evaluate the performance of environmental policy implementation. While this study did not confirm the policy performance of digital platforms, it did provide partial evidence of the socio-technical system in digital media, through aligning with the methodology arrangement. It was able to narrow the discussions of the digital publics down to the specific environmental issues, for in depth verifying the policy performance through analysing the contents, comments and recommendation algorithm of the filtered videos which cover the specific energy policies.

E. Recommendations for further research work

The study should be repeated using different environmental topics, which will complement the socio-technical system in digital media and accelerate the implementation of climate action. This would be a fruitful area for further work, particularly in the field of global environmental communication. The future work study could assess the long-term effects of implementing energy policies, including the progress of regional energy policies and global

climate action. The socio-technical system in digital media provides a deliberative forum as a bridge between the government, the digital public, and experts, facilitating knowledge construction and addressing the issues that the digital public is genuinely concerned about. From the perspective of the object and subject dimensions in the socio-technical system, this study focuses on regional-based issues as the research objects. It has demonstrated the communicative effects of the socio-technical system and the practices of each dimension (modalities of participation, subjects, and objects) through a comprehensive methodology. What is now needed is a cross-national study to identify collective needs and solutions to the climate crisis. Starting with East Asian countries that share similar collective consciousness regarding climate action goals and energy transition routes, such as Japan, South Korea, and Singapore, would be the best approach. Furthermore, from the perspective of the dimension of modalities of participation in the socio-technical system, further research work is required to determine the knowledge gap and the execution process of global climate action. Obtaining more information on the practices of the digital socio-technical system would help establish a greater degree of accuracy on this matter.

F. Recommendations for practice or policy

Other types of climate actions could include known energy policies, the global goal (such as the Net-Zero Emissions Commitments), or additional measures to mitigate or transition existing targets and adapt to new environmental issues. Therefore, there is a definite need to utilise the emerging digital socio-technical system to achieve effective deliberation and consensus on environmental issues, which will help policy implementation and ultimately achieve global climate action goals that highlights its focus on public engagement with the process. The challenge now is to enhance the visibility of environmental content on digital platforms. Courses of action for this challenge include adjusting the agenda-setting mode to separate political content from environmental content, adding more experts as sources for knowledge transition to address the deficit of expertise that hinders deliberation, and

utilising YouTube's built-in functions to increase visibility in front of digital audiences, such as setting an accurate hashtag.

The findings of this study have several important implications for future practice. Future studies should explore the dynamics and evolution of climate actions and the connections within digital deliberative systems that lead to flows and overflows.

According to the summaries of the development of renewable energy and nuclear energy between 2017 and 2022, it indicates that the socio-technical system on digital platforms might serve as an alternative program to enhance the implementation of energy policies. During this period, Taiwan witnessed significant developments in renewable energy and nuclear energy. The government implemented policies to transition towards a sustainable and low-carbon energy system. There was a notable increase in the installation of wind and solar power, with renewable energy accounting for 8.27% of total power generation in 2022 compared to 6.00% in 2017. While the development of renewable energy sources such as wind, solar, and geothermal expanded, contributing to a decrease in reliance on nuclear energy for power generation, the originally scheduled goal of renewable energy accounting for 20% of total power generation by 2025 was not achieved.

Under these circumstances, an emerging global goal on adaptation at COP 27 has been proposed. The United Nations (2022) states that to limit global warming to no more than 1.5°C as called for in the Paris Agreement, emissions need to be reduced by 45% by 2030 and reach a net-zero world by 2050. In Taiwan, the current adapted actions mainly focus on the development of solar energy and other renewable energy sources. However, renewable energy only accounts for 20% of total power generation, while the remaining 80% still relies on fossil fuels. To decrease carbon emissions and achieve the goal of reaching net-zero by 2050, it is evident that the current centred discussion on renewable energy alone is impracticable.

To reach net-zero by 2050, it is necessary to achieve the mid-term goal of reducing emissions by 45% by 2030. This requires reducing human carbon emissions by improving deep communication between multiple industries, such as industrial, agriculture, livestock, and energy consumption. According to the government's released "2050 Net-Zero Emission Pathway and Strategy Overview (NDC 2022)," the government has prioritised the energy transition as a crucial task for achieving the net-zero emissions pathway. It emphasises the expansion of renewable energy installations, particularly in wind and solar, which contribute to an overall increase in the proportion of renewable energy in the power generation mix. The change in pathway reflects a shift towards more ambitious energy transition strategies and a long-term commitment to achieving net-zero emissions by 2050. This transition involves not only a focus on renewable energy development but also comprehensive actions and policies across various sectors to reduce greenhouse gas emissions and foster a sustainable and low-carbon society.

It is essential to rely on the socio-technical system on digital platforms, where media plays a significant role in restricting digital publics within the present deliberative space. This can be achieved through features such as the YouTube recommendation system, comments, and subscribe functions. These digital platforms provide a space beyond time and space constraints that cannot be accomplished by an offline participatory system.

VII. Bibliography

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VIII. Appendix

A. Glossary

English	Taiwanese Mandarin	Definition in English
1992 consensus	九二共識	The “1992 consensus,” a term which was admitted by the former Mainland Affairs Council chairman Su Chi (蘇起) in 2000, refers to a tacit understanding between the KMT and the Chinese government that both sides of the Strait acknowledge that there is ‘one China,’ with each side having its own interpretation of what ‘China’ means.
2019 Siberia wildfires	2019 年西伯利亞火災	The 2019 Siberian wildfires began in July 2019 in poorly accessible areas of northern Krasnoyarsk Krai, Sakha Republic and Zabaykalsky Krai, all in Siberia, Russia. By the end of the month the size of the fires reached 2,600,000 hectares (6,400,000 acres), an area roughly the size of Belgium.
57 Bao Sin Wun	57 爆新聞	A talk show channel which has no party affiliation.
Agenda Setting		Agenda Setting refers to the process of determining the specific issues or topics that receive the most attention in public discourse. It describes how the media attempts to influence the audience and establishes a hierarchy through the media logics.
Arirang TV	阿里郎電視台	Arirang TV is an English-language South Korean television. It was established on February 3, 1997, by the KMT.
Apple Daily	蘋果日報	Apple Daily is a news media launched in May 2003. It is an anti-China media.
Bao-Jie, Liou	劉寶傑	A no party affiliation newsreader.
Belle Show	國民大會	A pan-blue talk show channel.
Belle Yu	于美人	A pan-blue television show host
Bing-Jie, Jhuang	莊秉潔	A scholar from the department of environmental engineering in the National Chung Hsing University

Bloomberg News	彭博社	Bloomberg News is an international news agency headquartered in New York City.
Bo-Wun, He	何博文	A pan-green Taipei City council member.
Cable Radio and Television Act	有線廣播電視法	This Act is enacted to promote the sound development of the cable radio and television industry, to safeguard the audio-visual rights and interests of the public, to enhance public interest and well-being, and to maintain the audio-visual diversity.
Can-Rong, Liu	劉燦榮	A no party affiliation television show host.
Changhua	彰化	A country in the middle of Taiwan.
Chih-Cheng, Lo	羅致政	A pan-green member of the Legislative Yuan.
Chih-Chieh, Hsu	許智傑	A pan-green member of the Legislative Yuan.
China Central Television (CCTV)	中國中央電視台	China Central Television (CCTV) is a Chinese state-controlled broadcaster.
China Television Company (CTV)	中國電視公司 (中視)	The China Television Company is a television broadcasting company based in Taipei, Taiwan. It was established on September 3, 1968, by the KMT.
China Times	中國時報	China Times is a news media launched in 1950. It is a pan-blue media.
Chinese Television System (CTS)	中華電視公司 (華視)	The Chinese Television System is a terrestrial television station in Taiwan and was founded in 1971.
Chin-shan Nuclear Power Plant (NPPI)	核一廠	The Chin Shan Nuclear Power Plant is the first and smallest nuclear power plant being shut down in Shimen District, New Taipei, Taiwan.
Chunghwa Telecom (CHT)	中華電信	A service provider with the highest users in Taiwan.
Cian-Ping, Huang	黃倩萍	A no party affiliation newsreader.
Cin-Huang, Syu	徐嶽煌	minzui (no party affiliation)

Cross-strait relations	兩岸關係	International political relations between Taiwan and China. Since the separation of the two sides of the strait at the end of 1949, the two sides have legally sovereignty over the whole of China, which has become a problem between the two sides of the strait.
Crucial Moment	關鍵時刻	A talk show channel which has no party affiliation.
CTS News Magazine	華視新聞雜誌	An in-depth reporting channel which has no party affiliation.
Democratic Progressive Party (DDP)	民進黨	The ruling party from 2016 until now.
Din-Lin, Chao	趙天麟	A pan-green member of the Legislative Yuan.
Economic Daily News	經濟日報	Economic Daily News is a news media launched in April 1963. It is a pan-blue media.
Facenews	新聞面對面	A talk show channel which has no party affiliation.
Fan Ci Fei De Huan Yu Man You	范琪斐的寰宇漫遊	A talk show channel which has no party affiliation.
For A New Taiwan	前進新台灣	A pan-green talk show channel.
Global Views Monthly	遠見雜誌	Economic Daily News is a news magazine launched in July 1986. It is a non-affiliation media.
Guanyin District	觀音區	Guanyin District is a rural, coastal district in western Taoyuan City, Taiwan. And the largest gas-fired power plant in Taiwan, the Tatan Power Plant is a gas-fired power plant in Guanyin District, Taoyuan City, Taiwan.
Guei-Ya, Syu	徐俊相	A no party affiliation newsreader.
Guei-Ya, Syu	許貴雅	A pan-green newsreader.
Guo-Guang, Zheng	鄭國光	The Vice Minister of the Ministry of Emergency Management of the People's Republic of China.
Guo-yu, Han	韓國瑜	The mayor of Kaohsiung whose political status is the Kuomintang.
Hit the Headlines	頭條開講	A pan-blue talk show channel.

Hsi-Ping, Ma	馬西屏	A no party affiliation minzui.
Huei-Jhu, Cin	秦慧珠	The pan-blue Taipei City council members.
Huaibei	淮北	Huaibei was often called the north of China.
Huainan	淮南	Huainan was often called the south of China.
Jeff Berardelli		Jeff Berardelli is CBS News' meteorologist and climate specialist
Jhao-Hao, Liou	劉權豪	A pan-green member of the Legislative Yuan.
Jhen-Jhen, Li	李偵禎	A no party affiliation newsreader.
Jheng-Liang, Guo	郭正亮	A pan-green member of the Legislative Yuan.
Jhong-Bo, Jiang	江中博	A no party affiliation minzui.
Jin-De, Chen	陳金德	A pan-green politician and used to be the Chairman of the Chinese Petroleum Corporation (CPC).
Jing-Ping, Huang	黃敬平	Taoyuan council member whose political status is the Kuomintang.
Jyun-Yi, Lin	林俊義	An anti-nuclear activist
Kuomintang (KMT)	國民黨	The biggest opposition party from 2016 until now.
Kuosheng Nuclear Power Plant (NPPII)	核二廠	The Kuosheng Nuclear Power Plant is the second nuclear power plant in Wanli District, New Taipei, Taiwan. The plant is currently the largest nuclear power plant in Taiwan.
Legal Evening News	法制晚報	Legal Evening News was a Beijing-based legal affairs newspaper published in the People's Republic of China in simplified Chinese, which was inaugurated in May 2004 and was shut down in January 2019.
Liberty Times	自由時報	Liberty Times is a news channel launched in April 1980. It is a pan-green media.
Li Sihduan De Yunduan Shihjieh	李四端的雲端世界	An in-depth reporting channel which has no party affiliation.

Li, Yin	尹立	A pan-blue politician, and the initiator of the '2020 Kaohsiung mayoral recall vote' which is called 'Wecare'.
Lungmen Nuclear Power Plant (NPPIV)	核四廠	The Lungmen Nuclear Power Plant formerly known as Gongliao and commonly as the Fourth Nuclear Power Plant, is an unfinished nuclear power plant in New Taipei City, Taiwan.
Mediatization		The mediatization practices of YouTube are based on technological innovation, spanning from television to interactive social media. Mediatization impacts not only public opinion but also the structure and processes of political communication, decision-making, and democratic procedures.
Mei-Mei, Yu	余莓莓	A pan-green minzui.
Min-Fong, Chen	陳敏鳳	A no party affiliation minzui.
Min Shih Yi Yan Tang	民視異言堂	An in-depth reporting channel which has no party affiliation.
Min, Li	李敏	The Dean of the College of Nuclear Science in National Tsing Hua University, who has no party affiliation.
Min-Kuan, Ciou	邱敏寬	A no party affiliation financial expert.
Minzui	名嘴	They play an important role in the political talk shows as a host or a guest, who engage in discussion with themselves and propagate the specific political opinion.
Mu-Hua, Ruan	阮慕驊	A no party affiliation newsreader.
National Communications Commission (NCC)	國家通訊傳播委員會	The National Communications Commission is a national agency of Executive Yuan of Taiwan, which is responsible for regulating the development of the telecommunication and broadcasting industries, promoting competition and consumer protection, and regulating licensing, radio frequency and spectrum, programming content, communications standards and specifications in Taiwan.
National Tsing Hua University (NTHU)	國立清華大學	The College of Nuclear Science in NTHU is the sole educational and research institution focusing on the peaceful applications of nuclear power in Taiwan.

New Taiwan Refueling	新台灣加油	A pan-green talk show channel.
Newstalk	新頭殼	Newstalk is an online news media launched in 2009. It is a pan-green media.
Norilsk diesel oil spill	諾里爾斯克柴油泄漏事故	The Norilsk diesel oil spill is an ongoing industrial disaster near Norilsk, Krasnoyarsk Krai, Russia. It began on 29 May 2020 when a fuel storage tank at Norilsk-Taimyr Energy's Thermal Power Plant No. 3 (owned by Nornickel) failed, flooding local rivers with up to 17,500 tonnes of diesel oil.
Nuclear-free homeland by 2025	非核家園	A goal for energy transition which was put forward by DDP as a topic in the 2018 referendum.
People First Party (PFP)	親民黨	The People First Party is a political party in Taiwan which was established in 2000. The position of political status is close to the KMT, especially in the 'Cross-strait relations' which advocates the 1992 'consensus'.
Post-war Taiwan	臺灣戰後時期	It means the period since the end of WWII in 1945, which was also known as the period before the 1990s when Taiwan was dominated by the KMT.
Po-wei, Chen	陳柏惟	A member of the Legislative Yuan, whose political status is the Taiwan State Building Party.
Ren-Jyun, Kang	康仁俊	A People First Party mizui.
Rong-Jin, Chen	沈榮津	The head of the Ministry of Economic Affairs in Taiwan from 2017 to 2020.
Ruo-Fang, Yan	顏若芳	A pan-green Taipei City council member.
SET News Channel	三立新聞台	SET News is a news channel launched in March 1998. It is a pan-green media.
Shen'ao Power Plant	深澳燃煤電廠	Shen-Ao Power Plant is a thermal power plant located in Shen-Ao, New Taipei City, Taiwan, which is operated by TPC. When completed, it is Taiwan's largest power plant in terms of power generation. It is also the first large-scale power plant in Taiwan. It is currently out of service.
Shanghai	上海	Shanghai is one of the four direct-administered municipalities of China.
Shao-Kang, Jhao	趙少康	A pan-blue minzui.

Shih-Ci, Wang	王時齊	A pan-green minzui.
Shih-Cong, Huang	黃世聰	A no party affiliation minzui.
Siang-Long, Tang	唐湘龍	A pan-blue minzui.
Sih-Duan, Li	李四端	A no party affiliation newsreader.
Sin Wun Shen Hu Si	新聞深呼吸	An in-depth reporting channel which has no party affiliation.
Siou-Lin, Ping	平秀琳	A pan-blue minzui.
Sisy's World News	文茜世界周報	An in-depth reporting channel which has no party affiliation.
Situation Room	少康戰情室	A pan-blue talk show channel.
Smog face	霧霾臉	A bad influence on children who wear masks for a long time, such as buck teeth or stiff expressions, etc.
South China Sea	南海	The South China Sea is a marginal sea between East Asia and Southeast Asia. It is a part of the Western Pacific Ocean, which is surrounded by mainland China, Taiwan, the Philippine Islands, the Malay Islands and the Indochina Peninsula. It is not only a major maritime transport route but rich in oil and natural gas, which involves the interests of many neighboring countries.
Sun-han, Hung	洪申翰	A pan-green member of the Legislative Yuan.
Syuan, Lan	蘭萱	A no party affiliation minzui.
Syue-Heng, Jhu	朱學恆	A pan-blue minzui.
Taichung Power Plant	台中火力發電廠	Taichung is a special municipality located in central Taiwan. And the fourth largest coal-fired power station in the world, the Taichung Power Plant is a coal-fired power plant in Longjing, Taichung, Taiwan.
Tainan	台南	Tainan is a special municipality in southern Taiwan facing the Taiwan Strait on its western coast.
Taiwan Statebuilding Party (TSP)	台灣基進黨	The Taiwan Statebu Tian-Yi, 李天 Li 怡 A no party affiliation newsreader.

		ilding Party is a political party in Taiwan which was established in 2016. The position of political status is close to DDP, which advocates Taiwan independence.
Taiwan Television Enterprise (TTV)	台灣電視公司 (台視)	Taiwan Television Enterprise is the first terrestrial television station in Taiwan. It was established and started formally broadcasting later that year on October 10, 1962.
Taiyu	台語	A dialect which most people use in Taiwan.
TechNews	科技新報	SET News is an online news media launched in 2013. It is a non-affiliated media.
The Disappearing Borders	消失的國界	An in-depth reporting channel which has no party affiliation.
The Electricity Act (EA)		This Act is enacted for the purpose of developing effectively managing the national electric power resources, regulating electricity supply, facilitating the transformation of energy production, reducing the carbon emission, promoting the supply diversification of the electricity industry, fair competition and reasonable business practice, protecting the interest of the users, and improving the welfare of the society, so as to fulfill the goal of sustainable development of the country.
The old three	老三台	It is derived from the three oldest wireless television stations (TTV, CTV and CTS), established by Taiwan in the 1960s and 1970s, which were controlled by the KMT.
The Regulations for the Control of Radio, Radio and Television Receivers during the Period of Mobilization	動員戡亂時期無線電收音機及電視接收機管制辦法	It is stipulated that all radio users in the country should register with the telecommunications bureau within one month. The users are also obliged to accept inspections. To ensure military secrets, to facilitate national security and public security.
The Regulations for TV broadcasting receiver	電視廣播接收機登記規則	All of the audio-visual equipment, including televisions, radios, etc., must be registered with the government at the time of purchase.
The Taiwan Power Company (TPC)	台灣電力公司	The Taiwan Power Company is a state-owned electric power industry providing electricity to Taiwan and off-shore islands of the Republic of China.

Under the Dome	穹頂之下	A 2015 self-financed Chinese documentary by Chai Jing, a former CCTV journalist, concerning air pollution in China.
United Daily News	聯合報	United Daily News is a news media launched in September 1951. It is a pan-blue media.
Using nuclear to nourish renewables	以核養綠	A goal for energy transition which was put forward by DDP as a topic in the 2018 referendum.
Wei-Che, Huang	黃偉哲	The mayor of Tainan whose political status is the Democratic Progressive Party.
Wei-Jhong, Yang	楊偉中	A pan-blue politician.
Wen-Chien, Chen	陳文茜	A no party affiliation minzui.
William Ching-te, Lai	賴清德	The Premier which ran from September 8, 2017, to January 14, 2019. He is the Vice-President currently.
Wun-Jie, Liang	梁文傑	A pan-green Taipei City council member.
Yangtze River	長江	The Yangtze River is the longest river in China, the third-longest in the world and the longest in the world to flow entirely within one country.
Ying-jeou, Ma	馬英九	The sixth president of the Republic of China (Taiwan) from 2008 to 2016.
Yongan District	永安區	Yongan District is a coastal suburban district of Kaohsiung City in southern Taiwan. And the oldest coal-fired power plant in Taiwan, the Hsinta Power Plant is in Yongan District in Kaohsiung, Taiwan.
Yong-Ping, Li	李永萍	A pan-blue minzui.
Yueh-chien, Lai	賴岳謙	The newspaper proprietor of the China Times, People First Party.
Yue-Ying, Shih	施月英	Head of Changhua County Environmental Protection Alliance.
Yu-fang, Lin	林郁方	A pan-blue politician.
Yun-Peng, Jheng	鄭運鵬	A pan-green member of the Legislative Yuan.
Yu-Shao, Jhang	張宇韶	A pan-green minzui.

B. Code switching (Taiyu/English)

English	Taiyu	Definition in English
The friends from Kaohsiung	Ko-hiông ê pîng-iú	It means the residents from Kaohsiung, the 'friends' in Taiyu in the sentence represent the feeling of being close to the people.
smelled very pungent	ū-bī	It is an emphasized word to illustrate the smell from the fire disaster is bad.
smell like plastic	sok-ka bī	It is an emphasized word to illustrate the smell from the fire disaster. It has a heavy plastic smell, and the plastic smell is a common toxic substance for the people.
What is the problem	būn-tê tsāi tó-ūi?	the answer is clear, but the respondent has no response or does not admit mistakes.
Is this problem not big enough?	tsit-tsióng būn-tê koh bô-kàu tuā mā?	It is a rhetorical question, which means the problem is serious enough.
At least	siōng khí-má	It is an emphasized word to illustrate that someone should do something small, even if they do nothing else.
Is that really achievable?	ū-iánn-bô	It is a question which often includes personal conjecture.

C. The checklist of research subject (programmes)

programme	have available quantity of videos discuss environmental issues (≥5, Y/N)	continue broadcast ing after JAN 2017(Y/N)	have a complete YouTube channel or YouTube playlist (Y/N)	the type of programme broadcasting
CTS News Magazine	Y	Y	Y	in-depth reporting
57 Bao Sin Wun (57 爆新聞)	Y	Y	Y	talk show
Sisy's World News	Y	Y	Y	in-depth reporting
Sin Wun Shen Hu Si (新聞深呼吸)	Y	Y	Y	talk show
The Disappearing Borders	Y	Y	Y	in-depth reporting

Li Sihduan De Yunduan Shihjieh (李四端的雲端世界)	Y	Y	Y	in-depth reporting
For A New Taiwan	Y	Y	Y	talk show
Belle Show	Y	Y	Y	talk show
Situation Room	Y	Y	Y	talk show
Crucial Moment	Y	Y	Y	talk show
Hit the Headlines	Y	Y	Y	talk show
Facenews	Y	Y	Y	talk show
Fan Ci Fei De Huan Yu Man You (范琪斐的寰宇漫遊)	Y	Y	Y	talk show
Min Shih Yi Yan Tang (民視異言堂)	Y	Y	Y	in-depth reporting
New Taiwan Refuelling	Y	Y	Y	talk show
Zheng JihdaoLiao (『鄭』。知道了)	N	Y	Y	talk show
54 Viewpoint	N	Y	N	in-depth reporting
True Voice of Taiwan (政經關不了)	N	Y	Y	talk show
Deep Throat News (新聞深喉嚨)	N	Y	Y	talk show
Late-Night Punch (夜間打權)	N	Y	Y	talk show
Our Island	Y	Y	N	in-depth reporting
Shu Min Da Tou Jia (庶民大頭家)				talk show
In Depth Report	N	Y	Y	in-depth reporting
Yi Ci Kan Shih Jie(益起看世界)	N	Y	Y	in-depth reporting
You Ping You Jyu Kan Tai Wan(有評有據看台灣)	N	Y	Y	talk show
Sin Wun Shuo Liang Hua(新聞說亮話)	N	Y	Y	in-depth reporting

News Capture	N	Y	Y	talk show
Hua Shih Yu Di Ciou Duei Hua(華視與地球對話)	Y	Y	N	in-depth reporting
Da Kai Shih Jie Jih Men(打 開世界之門)	Y	Y	N	in-depth reporting
Taiwan Front Line	N	Y	Y	talk show

D. Multimodal analysis (I035, C131, G006, K006, B022, H006, J007, C037, N010, G002, C144, E006, F008)

The first video I choose is code I035 which meets the following criteria: firstly, the highest number of video views and has the second highest number of subscribers of all of the programmes. Secondly, the topics discussed in the video include both an important environmental issue and crucial energy transition policy, ‘air pollution’ and ‘nuclear free by 2025’, which structures a typical environmental discussion in Taiwan. Thirdly, the video has the fifth highest number of comments in the channel.

It is important to note that the talk show and host have the pan-blue political perspective which means the political status is the Kuomintang of China (KMT). The participants consisted of three pan-blue minzui (see the *p.1, III. Methodology Chapter*), two pan-green Members of the LY (the political status is the Democratic Progressive Party (DDP)) and an independent minzui. As the title is depicted in table 9.1, the issue of this video discussed the policy of Nuclear free by 2025 which was pushed forward by the ruling party (DDP) at that time. It is needed to notice that the policy of ‘*Nuclear-free homeland by 2025*’ and ‘*Using nuclear to nourish renewables*’ are the two major energy policies to mitigate environmental degradation as long-term solutions in Taiwan. There are two arguments featured within the video I035: firstly, the policy (‘nuclear free by 2025’) of the ruling party has been repeatedly changed. Due to the lack of electricity in the summer, the ruling party had recently decided to reopen the Kuosheng Nuclear Power Plant (the second nuclear power plant). Besides,

after considering the power shortage, the DPP tried to reopen the second nuclear power plant as a countermeasure to the difficulty of progress in the energy transition.

Overview of video I035

Code	I035
Channel	Situation Room
The type of programme broadcasting	Political talk show
Title	DPP made a U-turn in the policy of Nuclear free by 2025 ! They stole nuclear power and fought air pollution to defraud votes? ()
Host	Shao-Kang, Jhao (): minzui (KMT)
	Siang-Long, Tang (): minzui (KMT)
The participants	Jheng-Liang, Guo (): Members of the Legislative Yuan (DDP)
	Yun-Peng, Jheng (): Members of the Legislative Yuan (DDP)
	Yong-Ping, Li ():minzui (KMT)
	Syuan, Lan (): minzui (Independent)
Subscribers	1.06M
View Count	201,626
Comment Count	1,259

It is needed to mention that the terms using for describing the communicative practice of ‘using footage via symbols, editing techniques and montage’ in below refers to James Monaco's scheme (Monaco 2009) which includes narrative analysis and video analysis and has a series of terminology for describing the compositional interpretation of both images and moving images, such as film, television and video:

- a. Camera Shots:
 1. Shot distance: extreme long shot, long shot, full, three-quarters, medium, head and shoulders, close-up shot.
 2. Shot focus: deep or shallow, sharp or soft.
 3. Shot angle: angle of approach, angle of elevation, angle of roll.
 4. Point of view: character, third person, establishing, reverse angle.

5. Pans tilts, zooms and rolls, when camera remains in one position.
 6. Tracking and crane shots, when the camera itself moves.
- b. Cuts (that was applied to describe the montage of a moving image):
1. Type of cut: unmarked, fade, dissolve, iris, jump.
 2. Rhythm. (Monaco 2009, p.197 and 224)

Overall, the video I035 does not use any sound element to emphasise the content (see table 9.2). There are some notable scenes in the video which demonstrate the use of five communication techniques. Firstly, the title bars in the talk shows are usually used to highlight the emphasise of the topic of current discussion and are sometimes accompanied with the specific political opinions (see position 1, 4). Secondly, the video uses the media which has same political status as the source of the argument of this video, for instance, this video uses The China Times as the source of the argument of this video, which is a pan-blue and pro-Chinese news media and represents the political status of the video at the same time (see position 2). Thirdly, the content of the video uses a lot of political satire and wordplay figures of speech, such as the satirical content in position 3 when the host said 'The Taiwan Power Company (TPC) wants to fight for parallel power generation on April 1, April Fool's Day, as if it treats everyone as fools'; and the content of the title bar, such as 'steal nuclear power', 'cheat votes' and 'U-turn', with the speech of interviewee (see the voice-over of position 15). Satirical content also often appears in the video, for instance, the content of the title bar under the bottom of the screen (see position 7) uses the proverb as a satire which said 'no overall plan for a fundamental transformation (頭痛醫頭 · 腳痛醫腳)' to point out that the ruling party (DDP) passively deals with the energy policies and does not solve the problem fundamentally; the content in position 13 uses 'U-turn' as a satire which means that the 'nuclear free by 2025' policy has been turning; the content in position 21

uses 'word game' as a satire which means using vague or uncommon words to blur the focus of the sentence; the content in position 22 uses a video which displays that 'the building is shrouded in smoke and almost invisible' as a satire means that the air pollution is getting worse.





Fourthly, the video uses 'close-ups' and 'zoom in' shots as an element to highlight the subject of the argument, which could be a person or a sign. For instance, a close-up shot is used to emphasise the speeches which produce the argument (see position 11), the data of electricity consumption which emphasises the risk of power shortage (see position 12), and using a 'zooms in' shot in the following few seconds, which emphasises the person who publishes the speech, here mentioned William Ching-te, Lai (賴清德), the Premier at that time.

Positions 6 and 12 show a phenomenon that the political talk shows often use the visual element with numbers to support political arguments, which is a kind of common rhetoric of quantification in the data-driven society nowadays. Kennedy and Hill (2018, p.845) called these numbers 'feeling numbers' that the data which is able to perceive and engage by ordinary people almost exists in visual elements. They further mentioned the other meaning between emotion and the rational that privileging the rational over the emotional meant a kind of group superiority (p.845) that certain groups, such as media, politics and scientists which have a computational background than others, and indirectly controls the 'knowledge' through determining how expertise is presented.






Regarding the film editing, 'changing-over' and 'split-screen' are the two common editing techniques in the video, for instance, the visual element in position 10 which edited the visual reference with changing-over the same person's speech in different periods to highlight the inconsistent speeches. The split-screen is used in position 14 which uses an





interpellation video as a visual element and editing by a split-screen process which is cut into two to represent the dialogue situation. Finally, according to data visualisation, it only occurs once in the video, the area chart in position 6 points out that the electricity consumption has risen sharply, with a warning about the power supply and a sentence 'almost lights the red light with electricity consumption' with red highlight colour.





The multimodal analysis of the video I035

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:12		A conflicting title bar with the word game, 'DPP made a U-turn in the policy of Nuclear free by 2025! They stole nuclear power and fought air pollution to defraud votes? (民進黨非核家園髮夾彎！偷核電、抗空汙騙選票?)'.							Title or speech (conflict, negatives, word game)
2	0:21								Source from The China Times.	Source (news)
3	0:32		A conflicting speech, 'The Taiwan Power Company (TPC) wants to fight for parallel power generation on April 1, April Fool's Day, as if it treats everyone as fools (台電要拚4月1日，愚人節當天併聯發電，好像把大家當成傻瓜)'.	Using a 'close-up' shot to highlight the main topics discussed in the video.						Title or speech (conflict, negatives) Footage (close-up)
4	1:04			Using a 'close-up' shot to highlight the main topics discussed in the video.						Footage (close-up)

5	1:10		An enhanced title bar with a word game, 'William Ching-te, Lai: not to restart the nuclear power plant, but to apply for transfer after major repairs (賴清德: 不是重啟, 是大修後申請再轉)'.		Title or speech (enhancement, negatives, word game)
6	1:48			An 'area chart' with a warning limit of power supply, with a precise number.	Using highlight colour in the numbers. Data (area chart, precise number) Highlight
7	3:05		An enhanced title bar with political satire, 'New Taipei City advocates to clarify where to put nuclear waste at first? The behaviour of the DDP seems like "no overall plan for a fundamental transformation" (新北喊話先釐清核廢料放哪? 民進黨頭痛醫頭, 腳痛醫腳)'.		Title or speech (enhancement, negatives, political satire)
8	3:08			A 'close-up' shot to highlight who makes the main argument of the video.	Footage (close-up)
9	3:16			Using a 'zoom in' shot during the following few seconds.	Montage (zoom-in)

10	3:21			A 'close-up' shot to highlight who makes the main argument of the video.		Footage (close-up)
11	3:24		A complementary speech, 'operating the nuclear power plant is the last means (運轉核能電廠是最後的手段)'.	A 'close-up' shot with the camera frame to emphasise the speeches which produces the argument.		Title or speech (complement) Footage (close-up)
12	3:30			Using a 'close-up' shot to the number of electricity consumption.	The number of electricity consumption, with precise numbers.	Footage (close-up, precise number)
13	3:37		A conflicting and satirical speech, 'the DPP's attitude of nuclear power issues, which is like a U-turn (民進黨對核電的態度，髮夾彎似乎又來了)'.			Title or speech (conflict, satire)
14	3:43			Using an interpellation footage as a visual element and editing by a split-screen process which is cut into two		Footage (split-screen, head and shoulders, close-up) Source (interpellation)

15	3:57		An enhanced speech, 'If the power shortage problem can be solved, of course, I hope that the first nuclear power plant is able to operate again (如果能解決缺電問題，當然希望核二能夠運轉)'.	Using an interview video as a visual element with a 'close-up' shot.	Title or speech (enhancement) Footage (close-up, interview)
16	4:24		A conflicting speech, 'It is shameful for the ruling party (DDP) to restart the first nuclear power plant (蔡政府要重啟核一是丟臉)'.		Title or speech (conflict)
17	6:52		An enhanced speech with political satire, Tang said 'the ruling party (DPP) needs to explain to everyone how to explain the drifting of 'nuclear free by 2025' (民進黨需要向大家解釋如何解釋核能政策漂流的過程)'.		Title or speech (enhancement, political satire)
18	9:13		A conflicting speech with political satire, 'Is the initiation of the second nuclear plant to slow down the air pollution problem caused by the Taichung thermal power plant so that the mayor of Taichung city can be re-elected? (啟用核二廠是不是為了減緩台中火力發電廠造成的空汙問題，讓台中市長可以連任)'		Title or speech (conflict, political satire)

19	9:55		An enhanced speech ,Jheng-Liang, Guo, 'It is inevitable that the development of renewable energy has to go through a dark period (再生能源發展本來就會有一個黑暗期)'.			Title or speech (enhancement)
20	10:01			A close-up shot within a second to show the expression after listening to the opinion by Jheng-Liang, Guo in the position 19.		Footage (close-up)
21	10:41		A conflicting speech, 'the speeches by William Ching-te, Lai said that it was not 'restarting' but 'applying for re-operation of the nuclear power plant, which is a word game (賴清德說的不是重啟而是申請再運轉根本是文字遊戲)'.			Title or speech (conflict, word game)
22	20:20		A complementary speech, Siang-Long, Tang, 'PM2.5 is the number one carcinogen listed by the WHO... In Kaohsiung, people in Kaohsiung cannot go out 80% of the time in January 2018 (PM2.5 是 WHO 列管的致癌物第一名...以高雄來說，	The footage represents that the building was shrouded in smoke and almost invisible.	The minzui represents his argument with a orotund voice.	Title or speech (compliment) Sound (orotund)

2018年1月份，有80%的時間，高雄人是不能出門的。

23

20:57



Using a 'wide shot' as the background with air pollution videos during the following 15 seconds.

Footage (wide shot)

To understand the public engagement, the comments shown under each video provide a useful metric for observation. However, I only choose top 5 comments with highest engagement as my research data (see Table **The top 5 comments of I035**, generated from YTDT), because the content of the following comments after that have high similarity. It is needed to notice that the top 5 comments are sorted by the top comments as the YouTube interface shows, which means the comments with the highest engagement and likes. As the top 5 comments of the video shown in table **The top 5 comments of I035**, I think the reason that determines the ranking on YouTube is the relevance between the comment and the video, which have high engagement with the video. For instance, the fifth comment of the video mentions one of the guests- Siang-Long, Tang (唐湘龍, a minzui), and the third comment mentions the main topic of video- nuclear power and anti-nuclear activists (Jyun-Yi, Lin (林俊義)) which was mentions in the video. Besides, it is needed to notice that there are six comments with hate speeches, which occupied a high proportion within all the top 5 comments. For instance, the first comment of the video was 'The DPP said that poop can eat, which also means the DDP proponents eat poop! (民進黨說大便可以吃綠色群眾於是吃了大便！)' Which is full of negative satires and obvious political status. It is needed to mention the characteristics of the commenters that they only use pseudonyms on YouTube, even if the other videos have, there are only few users who have real names on YouTube. Besides, the Mainland Chinese occupies a high ratio in the top 5 comments that three of the five commenters are Mainland Chinese (see the ranking No.3 and No.5 in table **The top 5 comments of I035**). Also, some of the commenters are verified users, such as the news channel on YouTube.

The top 5 comments of I035

Ranking	id	Reply Count	Like Count	Published At	author Name	Comment	Reply comment
1	UgzLLBZ0K-b-znU-bb14AaABAg	0	44	2018/3/6	Tian Gao Shuo Shu De ()	The DPP said that poop is able to eat, which also means the DDP proponents eat poop! ()	
2	UgyMU-aTJPE7aZ9jvLx4AaABAg	0	25	06/03/2018	1005332	As long as there are the DPP guests on the programme, there is no rational discussion. ()	
3	UgzFb3jaL-y2lx8Dmah4AaABAg	2	75	06/03/2018	Siao -Yao, Li ()	In Jyun-Yi, Lin's collected works said, the anti-nuclear is for anti-dictatorship. So, does the activation of nuclear power mean the activation of dictatorship... ()	you got the point! People with low IQ can write this kind of articles. People with such a low IQ. (Tee Leo ())
4	Ugx1xd3MkBDQLaXkyZ94AaABAg	0	11	06/03/2018	HsiaoFang MacDonal d	Does the DPP have logic? The DPP has only political colors, and the DPP has no social morality and rule of law. The DPP only has green laws, those who follow it will prosper while those who resist will perish! ()	
5	Ugz4RDvxh9E04f5HliZ4AaABAg	1	41	06/03/2018	Tu-San, Wan ()	Siang-Long, Tang is really good, his eloquence is really good. ()	Although it's a bit unfavorable, but the point of view is always incisive, hit the nail on the head. ()

The detailed information for the top 5 'Up Next' videos of I035 are shown in table **The top 5 'Up Next' videos of I035**. According to the second column in table **The top 5 'Up Next' videos of I035**, the channel which 'up next' videos come from are the 'TVBS Programme Selection', 'Situation Room' and 'Academia Sinica', the former two channels are related to the video source that the 'TVBS Programme Selection' is the TV station broadcasting this talk shows. In addition, in the subject of the 'Up Next' videos, only the ranking 2 discuss the relevant topic with the video. It is needed to notice that the content of the videos has no relevance to the video I035 after the ranking No.2. Overall, I consider that the key metrics related to the videos are channel and video title.

The top 5 'Up Next' videos of I035

Ranking	Channel	Video Title	Topic	Published At	Channel Subscribers	View Count
1	TVBS	Kai-Jie, Wang (a Chinese musicians, chefs and TV host), causing uproar in U.S screen () (TVBS)	An interview with a Chinese musicians, chefs and TV host	26/02/2018	299K	510K
2	Situation Room	South Korea shuts down nuclear power, and Taiwan restarts the Kuosheng Nuclear Power Plant (the second nuclear power plant) and the Anshan Nuclear Power Plant (the third nuclear power plant)! South Korea shuts down nuclear power, Taiwan restarts nuclear two nuclear three! Is the Cai government's 'nuclear free by 2025' a lie? ()	Energy-related environmental issue	21/01/2017	1.06M	114K
3	TVBS	New discovery in Pompeii, there are two remains in the mystery villa () (TVBS)	Archaeological issue	15/02/2021	299K	874K
4	Academia Sinica	The wonderful journey of semiconductors—from quantum exploration of atomic structure to the artificial intelligence ()	Technology and economic issue	08/01/2019	49K	1M
5	Situation Room	Ci-Chang, Hong (a DDP politician) and Kui-bo, Huang (a deputy secretary-general of KMT) feat Shao-Kang, Jhao (KMT minzui)!! Guo-Jheng, Ciou (Minister of National Defense): We will stay with us as long as we need to fight! Donald Trump: Taiwan is only 2 feet away from Mainland China. If China invades Taiwan, Taiwan can do nothing! If the mainland army invades Taiwan, it will not be able to wait for the US army!?	National defense issue	20/03/2021	1.06M	4K

The second video I choose is code C131 which meets the following criterias: firstly, the highest number of video views and has the second highest number of subscribers of all of the in-depth reporting programmes. Secondly, the 'Sisy's World News' has the most relevant videos among all of the programmes, which means the environmental issues are the main topic in the 'Sisy's World News'. Thirdly, the video has the fifth highest number of comments in the channel.

It is important to note that the type of programme broadcasting is in-depth reporting, which means that the participant has only one host. The production mode of the type of the in-depth reporting programmes is focused on news aggregation and discusses the news incidents in-depth. The production group usually focuses on the compilation and editing of the episodes, and the host, reporter and the news materials will interact with the narrative.

The host also often puts forward his own opinions on the event. As the title is depicted in table **Overview of video C131** that the topic of this video discusses the global warming issue, and the argument is that the severity of extreme weather which may lead to the climate staying in summer the whole year.

Overview of video C131

Code	C131	
Channel	Sisy's World News	
The type of programme broadcasting	in-depth reporting	
Title	Global warming is getting worse. The Ministry of the Environment Government of Japan estimates that there may be an "exciting summer" throughout the year in 2100. (気 候 変 化 予 報 委 員 会 報 告 書 2100 年 候 季 節 予 報)	
The participant	Host	Wen-Chien, Chen (陳 文 建): minzui (no party affiliation)
	Guests	None
Subscribers	480K	
View Count	230,904	
Comment Count	349	

Overall, compares to the video I035, the video C131 uses more sound elements and complementary film as the visual element to emphasise the content (see table **The multimodal analysis of the video C131**), and a typical video frame of in-depth reporting type of programme consists of a title bar, a host with a 'head and shoulders' shot and a virtual element (see position 1). In addition, the video uses 'provocative headlines' and the host's speeches as a way to segment the different aspects of the topic, which often bring some meaning of warning. For instance, the title bar under the bottom of the screen said: '*global warming hits the economy, which causes to lose 80 million full-time powers in a decade*' (see position 28), which collocates the host's speech: '*2.2% of global working hours will be lost...the total loss even reached US\$2.4 trillion.*' (See position 29).

There are some notable scenes in the video which demonstrate the common techniques, firstly, the video uses lots of schematic films to collocate with the host's speeches. For

instance, the film uses the 'CBS' as the source which represents the melting ice sheet to collocate the host's speech: *'this is what the earth looks like today'* (see position 12). Secondly, as the topic of this video is 'extreme weather', the video uses lots of disaster films, such as flood, heat disaster, storm, forest fire and tornado films for description, which repeatedly play in video for two or three times. However, the content of the host's speeches and the schematic visual element are sometimes have no relevance, for instance, the host said: *'the serious hailstorm took place in Mexico'*, but the film represents a destroyed forest (see position 4), which also occurs in position 3, 5 and 10. Thirdly, the voice-over of video uses lots of satirical words to emphasise the severity of climate change, such as in position 38, it uses 'Shuiliandong 水濂洞 (waterfall cave)' as a satire means that the subway has been flooded, which also occurs in position 7, 12 and 16. Besides, the host also uses a rhetorical question to emphasise the public consciousness of the environmental issues (see position 13).

Fourthly, the elements of videos which are framed in the C131, the video is framed through a 'head and shoulders' shot for the host and a visual element which is used to match or emphasise the host's speeches and represents the broadcasting situation (see position 1). Regarding the film editing, 'montage' and 'split screen' are the two common editing techniques in the video, for instance, the excerpt from position 15, the film uses a montage which consists of forest fire and storm, to emphasise the disaster brought by global warming. And from position 30 and 32, these three films use two editing techniques, one is the rotating film from eye level to look-down, which emphasises that the iceberg area has shrunk. The other is a montage of films that speed up the playback speed to emphasise the Iceberg is melting faster than before.

As same as the video I035, the video C131 uses lots of intertextualities to indicate the severity of the main topic of the video through using reports from various countries which





represents the extreme weather has already been a global problem (see position 23, 25 and 27), but it does not use any specific images or symbols in the video. Finally, according to the sound performance, it divides into two forms, one is the voice of the host, for instance, the host said 'so' with a husky voice which emphasises the unusual climate (see position 11). The other is the background sound, such as the sound of rainstorm or tense music which are used to construct the emergency of extreme weather and the climate action (see position 6, 14 and 16).





The multimodal analysis of the video C131





Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:34		An enhanced title bar, 'Global warming is getting worse. The Ministry of the Environment Government of Japan estimates that there may be an "exciting summer" throughout the year in 2100 (全球暖化日益嚴重 日環境署預估 2100 年恐全年「激夏」)'. (Global warming is getting worse. The Ministry of the Environment Government of Japan estimates that there may be an "exciting summer" throughout the year in 2100 (全球暖化日益嚴重 日環境署預估 2100 年恐全年「激夏」)).	A split-screen process which is cut into two, including a 'head and shoulders' shot for the host and the visual element.					Source from the Guardian.	Title or speech (enhancement) Footage (split-screen, head and shoulders, negatives, road, heavy rain) Source (news)
2	0:40		A complementary speech, 'The drought and heavy rains in India have affected more than 700 villages and up to 400,000 people (最近印度既乾旱又暴雨，影響了 700 多個村莊，高達 40 萬人). (The drought and heavy rains in India have affected more than 700 villages and up to 400,000 people (最近印度既乾旱又暴雨，影響了 700 多個村莊，高達 40 萬人)).	The footage represents the Indian village which continuously plays for 10 seconds.	A complementary speech with a round number.				Source from the Guardian.	Title or speech (compliment, round number) Source (news) Footage (split-screen, head and shoulders, negatives, road, heavy rain, village) Source (news)



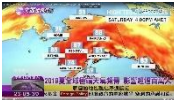

3	0:51		A complementary speech, 'The temperature in France was as high as 40 degrees a while ago (法國在前一陣子氣溫高達40度)'.	The footage represents a Greek beach which was destroyed.		Source from the 'France 24'.	Title or speech (compliment) Source (news) Footage (split-screen, head and shoulders, negatives, destroyed beach)
4	0:54		A complementary speech, 'Severe hail has hit Mexico (墨西哥發生大冰雹)'.	The footage represents a destroyed forest.		Source from the 'France 24'.	Title or speech (compliment) Source (news) Footage (split-screen, head and shoulders, negatives, wildfire, forest)
5	0:58		A complementary speech, 'Heavy rains have hit in both China and India (中國和印度分別出現暴雨)'.	The footage represents two elderly people walking by the seaside which was destroyed.		Source from the 'France 24'.	Title or speech (compliment) Source (news) Footage (split-screen, head and shoulders, negatives, destroyed beach)
6	1:09		A complementary speech, 'The recent tropical	The footage represents that the floods from	Using tense music as the	Source from the	Title or speech (compliment) Source (news)





7	1:13		<p>storm in the United States has increased the threat of flooding, including Louisiana and New Orleans, the severity similar to the Hurricane Katrina (美國最近迎來的熱帶風暴，使得洪水威脅升高，包括路易斯安那州和紐奧良州，很像當年的卡崔娜颶風)'. </p>	tropical storms flooded the city.	background sound.	'France 24'	Footage (negatives, heavy rain, floods, landslide) Sound (tense music)
8	1:23		<p>A complementary speech, 'The daily rainfall of Washington, DC which caused the White House to be flooded and the subway station turned into the 'Shuiliandong 水濂洞 (waterfall cave)' (白宮所在的華盛頓特區，一天的降雨量導致白宮淹水，地鐵站變成水濂洞)'. </p>			Source from the 'France 24'.	Title or speech (compliment) Source (news) Footage (negatives, heavy rain, floods, road, building, subway)
9	1:35		<p>A complementary speech, 'Tornadoes hit the northern area of Greece (龍捲風也襲捲希臘的北部)'. </p>				Title or speech (compliment) Footage (beach)

10	1:38		A complementary speech, 'South Korea also issued a drought forecast (韓國也發布乾旱預報)'.		Source from CBS.	Title or speech (compliment) Source (news)
11	1:42		A complementary speech, 'Korea has never been so dry in the past (過去韓國從來沒有如此乾旱過)'.	The host said 'so' with a husky voice.	Source from CBS.	Title or speech (compliment) Source (news) Footage (hot, road, umbrella) Sound (husky)
12	1:43		An enhanced speech, 'This is what the earth looks like today (這是今天的地球)'.	The footage represents the melting ice sheet.	Source from CBS.	Title or speech (enhancement) Source (news) Footage (melting ice)
13	1:57		An enhanced speech, 'Global climate change has continuously happened in the entire world. So, is it possible that human beings still survive in the earth where you and I live after 100 years later? (全球氣候變遷持續發生，100年後，你我居住的地球，當時人類還能生存嗎)'	The footage represents a barren land.	Source from CBS.	Title or speech (enhancement) Source (news) Footage (barren land)






14	2:01			Montage: vibrating.	Using tense music as the background sound.	Montage (vibrating) Sound (tense music)
15	2:03			Montage: mixing up the footage, including forest fire and storm.		Montage (mixing up) Footage (wildfire, storm)
16	2:12		An enhanced title bar, 'Southern Europe, Greece, should have been dry and hot in summer, but a sudden ice storm caused 600 casualties (南歐希臘夏 季本該乾熱，突降冰風 暴導致 600 死傷)', which emphasises the severity of climate change.		Using a rainstorm sound.	Source from the Guardian. Title or speech (enhancement) Sound (rainstorm) Source (news)
17	3:05		A complementary speech, 'A monthly rain fell in Washington within an hour (華府在短短一小 時內下了一個月的雨 量)'.	The footage represents that the water overflows from the sewer which emphasises the extremely heavy rain at short notice.		Title or speech (compliment) Footage (heavy rain, floods)



18	4:34			The footage uses scorching sun to emphasise the severity of extreme weather in summer.		Footage (scorching sun)
19	4:37			The footage uses a heat haze to emphasise the severity of extreme weather in summer.	Using tense music as the background sound.	Footage (heat haze, car, road) Sound (tense music)
20	4:40		A complementary speech, 'The record-breaking high temperature of 45.9 degrees Celsius appeared in southern France (在法國南部率先出現破紀錄的攝氏45.9度的高溫)'.			Title or speech (compliment)
21	4:46		A complementary speech, 'The temperature in Germany, Poland and the Czech Republic also rose to 40 degrees Celsius (德國、波蘭和捷克的溫度也升至40度)'.	The footage shows a man putting water in his hat to dissipate heat, which emphasises the extremely high temperature in summer.		Title or speech (compliment) Metonymy

22	4:53			The footage uses snow disaster and heat disaster as a strong weather comparison which occurred at the same time.			Footage (snow, car, road)
23	5:33		A complementary speech, 'the reporter said, 'India's daily rainfall today was equivalent to 60% of rainfall in June (印度今天的降雨量相當於六月的60%降雨量)', with a round number.	The footage represents a report with a head and shoulders shot which emphasises the persuasion of the extremely heavy rain at short notice.	A complementary speech with a round number.		Title or speech (compliment, round number) Footage (head and shoulders)
24	5:38			Montage: Time-lapse photography to represent how the temperature changed in 12 hours.	A 'temperature distribution map' to illustrate the heat disaster in the polar region, with a precise number.		Data (temperature distribution map, precise number) Montage (time-lapse)
25	6:21		An enhanced speech by climatologist, Jeff Berardelli, 'we have lost	The footage represents significant		Using a warning music as	Source from CBS. Title or speech (enhancement, round number)

26	6:24		50% of the melting ice', with a round number.	changes in the size of melting ice in 40 years.		the background sound.	Sound (warning music) Source (news)
27	6:32		A complementary speech by climatologist, Jeff Berardelli, 'as the changes of weather fundamentally changes during patterns all over the world, the extreme weather will become ordinary, and it is extraordinary, such as the heat disaster in France or the flooding in the US'.	The footage consists of news reporters and a climatologist.			Source from CBS. Title or speech (compliment) Source (news)
28	7:12		An enhanced title bar, 'Global warming hits the economy, it causes the loss of 80 million full-time power in a decade (全球暖化衝擊經濟，十年損失 8 千萬全職力)', with a round number.	The footage uses 'factory with cloudy sky' to mean 'losing a job'.	An enhanced title bar with a round number.	Using a warning music as the background sound.	Title or speech (enhancement, round number) Sound (warning music)
29	7:18		A complementary speech, '2.2% of global working hours will be lost...the total loss even reached US\$2.4 trillion (全球總工作時數將喪失 2.2%...'		A complementary speech with a round number.		Source from YouTube. Title or speech (compliment, round number) Source (YouTube)

損失更是達到 2.4 兆美元), with a round number.

30	7:42		Montage: rotating film from eye level to look-down, which emphasises that the iceberg area has shrunk, and time-lapse to emphasise the Iceberg is melting faster than before.	Using a warning music as the background sound.	Source from YouTube.	Sound (warning music) Source (YouTube) Montage (time-lapse, rotate)
31	7:45					
32	8:07					
33	11:49		Using a 'wide shot' as the background with a documentary film which used to promote the concept of environmental protection.			Footage (wide shot) Montage (time-lapse)
34	18:58		Montage: time-lapse to emphasise the Iceberg is melting faster than before.			Montage (time-lapse)

35	24:17		<p>Montage: zoom-in and look-down editing techniques to represent the severity of the '2018 Japan floods' which happened at the end of June 2018.</p>	<p>Montage (zoom-in, look-down)</p>
36	39:28		<p>Montage: zoom-in and look-down editing techniques to represent the severity of the '2018 Japan floods' which happened at the end of June 2018.</p>	<p>Montage (zoom-in, look-down)</p>

As the top 5 comments of the video shown in table **The top 5 comments of C131**, I think the reason that determines the ranking No.1 to No.3 of comments on YouTube is the relevance to the video, which has high engagement with the video. However, there is an exception to ranking No.4 that the content of it does not represent any relevant content but represents in the reply comments which has the highest number of engagement of others. Besides, it is needed to notice that only the last two comments are full of hate speeches, and the positive comment occupies the No.1 and No.2 comments. For instance, the fourth reply comment of the ranking No.4 comment was 'I support the Hong Kong police. (我支持香港警察 打爆廢青 打殘廢青)' which is full of negative speeches and obvious political status. It is needed to mention the characteristics of the commenters in this video that they use real names more than pseudonyms on YouTube.

The top 5 comments of C131

Jian Shih Jie De Gu Shih (從台灣看見世界的故事 Seeing the story of the world from Taiwan)' is the channel which is selected by this study. In addition, in the subject of the 'Up Next' videos, only the ranking No. 2 and No. 4 discuss similar topics to the video. It is needed to notice that the content of the videos after the ranking No.4 have no relevance to the video C131. Overall, I consider that the key metrics related to the videos are channel, video title, channel subscribers and view count. The ranking No.5 of this video has no relevance to the video C131, but it has both the highest number of channel subscribers and view count than others.

The top 5 'Up Next' videos of C131

Ranking	Channel	Video Title	Topic	Published At	Channel Subscribers	View Count
1	TVBS Sisy's World News (TVBS 新聞雜誌)	Joe Biden is on stage. The first battle against China's science and technology: Semiconductor (美國總統拜登在舞台上，與中國在科技領域的競爭：半導體)	Technology and economic issue	07/03/2021	262K	330K
2	TVBS Programme Selection (TVBS 節目精選)	2019 Global Economic Risk Report Natural Disasters. The biggest hidden worry of cyberattacks (2019全球經濟風險報告：自然災害。最隱憂的網路攻擊)	Global economic issues, including natural disaster and cyber warrior	27/01/2019	287K	16K
3	TVBS Sisy's World News (TVBS 新聞雜誌)	Immunotherapy not only have strong breakthrough but big controversy but have great controversy (免疫療法不僅有重大突破，但仍有大爭議)	Medical issue	16/12/2018	497K	188K
4	Cong Tai Wan Kan Jian Shih Jie De Gu Shih (Cong Tai Wan Kan 從台灣看見世界的故事)	Memories turn to ashes! The worst "California Forest Fire" in U.S. history turned Paradise into a hell. People in the disaster-affected area angrily pointed out that "this is not a natural disaster" (加州森林大火，加州史上最嚴重的森林大火，天堂變成地獄。災區民眾憤怒地指出「這不是自然災害」)	Natural disaster	16/03/2019	312K	10K
5	TEDx Talks	Interest has no destination, by Bo-En, Ceng (興趣沒有目的地，Bo-En, Ceng)	A presentation with a youtuber	22/03/2019	30.2M	1.2M

The video G006 meets the following criteria: firstly, the highest number of view counts in pan-green channels. Secondly, the topics discussed in the video include a typical environmental issue in Taiwan: 'air pollution'. Thirdly, the video has the highest number of comments in the channel.

It is important to note that the talk show and host have the distinctive pan-green political perspective. The participants consisted of two pan-green minzui (see the *p.1, III. Methodology Chapter*), a pan-green Member of the Legislative Yuan, a Member of the LY from Taiwan State Building Party (the position of political status is close to DDP, which advocates Taiwan independence), a pan-blue Taipei City council member and a pan-blue politician who is the initiator of the '2020 Kaohsiung mayoral recall vote'.

As the title is depicted in table Overview of video G006, the issue of this video discussed the fire disaster which happened in Kaohsiung and caused air pollution to the worst degree, and censured the solution from Guo-yu, Han, the mayor of Kaohsiung. It is needed to notice that air pollution plays an important role in an incentive to promote the energy transition, which is pushed forward by the ruling party (DDP). The argument of video G006: How the mayor of Kaohsiung (Guo-yu, Han) faces problems that the fire disaster happened in Kaohsiung may have caused air pollution to the worst degree.

Overview of video G006

Code	G006	
Channel	For A New Taiwan	
The type of programme broadcasting	Political talk show	
Title	Guo-yu, Han, the mayor of Kaohsiung, which leads the Kaohsiung city government with "any inaction" of crisis management?! The fire disaster that happened in Kaohsiung may have caused air pollution to the worst degree...and the solution from Guo-yu, Han is behind the times?! (何 國 瑜 何 國 瑜 "何 國 瑜"?! 何 國 瑜 何 國 瑜 何 國 瑜 ...何 國 瑜 何 國 瑜 何 國 瑜 ?!)	
The participants	Host	Guei-Ya, Syu (郭 瑤 瑤): newsreader (in pan-green TV station)
	Guests	Yu-Shao, Jhang (詹 郁 少): minzui (DDP) Po-wei, Chen (陳 博 偉): Members of the Legislative Yuan (Taiwan State Building Party) Li, Yin (李 尹): politician (KMT), and the initiator of the '2020 Kaohsiung mayoral recall vote'. Shih-Ci, Wang (王 世 杰): minzui (DDP) Huei-Jhu, Cin (陳 煨 菊): Taipei City council member (KMT) Jhao-Hao, Liou (劉 朝 豪): Members of the Legislative Yuan (DDP)
Subscribers	79K	
View Count	55,941	
Comment Count	174	




Overall, the video G006 uses many sound elements to emphasise the content (see table **The multimodal analysis of the video G006**). There are some notable scenes in the video which demonstrate the use of six communication techniques. Firstly, the title bars in the talk shows are usually used to highlight the emphasise of the topic of current discussion and are sometimes accompanied with the specific political opinions (see position 1, 3). Secondly, the video uses the media which has the same political status as the source of the argument of this video, for instance, this video uses SET News Channel as the source of the argument of this video, which is a pan-green news media (see position 1).




Thirdly, the content of the video uses a lot of political satire and wordplay figures of speech, such as the content in position 16 when the host said 'even the district where the members of the LY Din-Lin, Chao is located smells very strong. Is this problem not big enough?'; the




content of the title bar, such as 'The mayor is not awake yet?' (see position 3); 'U-turn' (see position 20). Satirical content also often appears in the video, for instance, the host said 'the mayor must at least go to work on time', which uses 'at least' as a satirical word means 'the mayor can't even do the most basic work (市長"最起碼" 要準時上班)' (see position 22); the content in position 20 uses 'U-turn' as a satirical word which means that the attitude of post-election policy for Guo-yu, Han has been turning; the content in position 5 uses 'you can't see your fingers (伸手不見五指)' as a satirical word which means the severity of the fire disaster in Kaohsiung; the content in position 6 uses a video which displays that 'the city was shrouded in smoke and almost invisible' as a satirical word means that the fire disaster has led to the air pollution. It is needed to mention that the video uses lots of emphasised gestures to highlight the argument of speeches (see position 4, 14 and 16).

Fourthly, the video uses 'close-ups' and 'zoom in' shots as an element to highlight the subject of the argument, which could be a person or a sign. For instance, a close-up shot is used to emphasise the speeches who produce the argument (see position 8). The 'zooms in' shot is used in position 7, a 'Real-time Air Quality Index' which emphasises the severity of the air pollution in Kaohsiung. Finally, according to sound elements, it is needed to mention that the host represents the argument with an orotund voice (see position 2, 4, 14, 15, 16, 21 and 22). And the argument often uses lots of dialect (Taiyu) as sound elements to highlight the specific words of speeches (see position 2, 3, 4, 14, 16 and 22).

The multimodal analysis of the video G006





Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	2:13		An enhanced with a satirical title: 'Guo-yu, Han finally wakes up? The Kaohsiung fire alarm may cause air pollution to become red... Guo-yu, Han is behind the times? (終於睡醒?高雄火警空屋恐達紅害... 韓慢半拍?)'.						Source from SET News Channel.	Title or speech (enhancement, satire) Source (news)
2	56:57		An enhanced speech, "The residents from Kaohsiung", let's look. The air this morning "smelled very pungent". (高雄的朋友，我們要來看，今天一早的空氣有味，很刺鼻)'. .				The host represents her argument in Taiyu with an orotund voice.	An enhanced speech, 'smelled very pungent' with Taiyu.		Dialect (Taiyu) Sound (orotund, negative)
3	57:06		An enhanced title bar with satirical words: 'There was a fire in the factory and the poisonous fog was permeated. Din-Lin, Chao: The mayor is not awake yet? (工廠火警毒霧瀰漫 趙天麟:市長還沒醒?)'.							Title or speech (enhancement, satire)

4	57:10		A complementary speech, 'The scene is full of heavy smoke, and the smoke comes with a "smell like plastic". (現場都是濃煙，而且這個煙飄過來是有塑膠味的).'	An emphasised gesture.	The host represents words in Taiyu with a orotund voice.	A complementary speech, 'smell like plastic' with Taiyu.	Title or speech (compliment) Gesture (exaggerate) Dialect Sound (orotund, exaggerate)
5	57:31		A complementary speech with exaggerate words, 'The fog so thick that you can't see your fingers (濃到伸手不見五指).'				Title or speech (compliment, exaggerate)
6	57:47		A complementary speech with exaggerate words, 'The smoke began to fill up from southern Kaohsiung, and half an hour later even the sky in northern Kaohsiung was 'foggy' (黑煙從南高雄開始瀰漫，半小時後連北高雄的天空都一片'霧茫茫').' An enhanced title bar with satirical words: 'Kaohsiung was enveloped by air pollution, and fire alarm burns out the crisis of the city (高雄受空汙籠罩，火警燒出市府危機).'	Using footage as a visual element and represents that the city was shrouded in smoke and almost invisible.			Title or speech (enhancement, satire, compliment, exaggerate) Footage (smoke, air pollution, negatives)
7	57:51			Montage: zoom-in shot.	A 'Real-time Air Quality Index'.		Data Footage (zoom-in)

8	58:06		<p>An enhanced speech with satirical words, Din-Lin Chao, 'We don't know exactly where the city government is doing. The Kaohsiung city government only sends a superficial SMS notification. (市政府到底做到哪裡，我們完全不知道，高雄市政府簡單的 line 丟出來，講起來不痛不癢)'</p>	<p>Using an interview video as a visual element with a 'close-up' shot.</p>	<p>Title or speech (enhancement, satire) Footage (close-up, interview)</p>
9	58:29		<p>An enhanced title: 'Guo-yu, Han just went to the site to investigate nearly five hours after the fire broke out... (火災發生近五小時後...韓國瑜現場勘查)'</p>	<p>Montage: a short version of the timeline of the solution from the mayor of Kaohsiung, and a 'wide shot' as the background with an air pollution image.</p>	<p>Title or speech (enhancement) Footage (short version, wide shot, smoke, air pollution, negatives)</p>
10	58:37		<p>An enhanced speech, 'I knew there was a fire at 7 in the morning. (七點就知道了)'</p>	<p>Using a news video as a visual element and represents the scene in that time with a</p>	<p>Title or speech (enhancement) Footage (interview)</p>

			negative title bar.	
11	58:45		An enhanced speech with satirical words, 'It was the scene of the fire obviously, but Guo-yu, Han still walked into the scene and touched the collapsed steel frame, and only stayed for 15 minutes (明明是火災現場，韓國瑜還走進去摸摸倒塌的鋼架，且只停留 15 分鐘就離開)'.	Title or speech (enhancement, satire)
12	58:51		Using an interview video as a visual element with a 'close-up' shot.	Footage (interview, close-up)
13	59:03		A conflicting speech, 'Guo-yu, Han was afraid of being criticized for inaction that he not only self-recorded a video explaining that an air pollution warning had been issued but rushed to the scene. A fire disaster shows that the Kaohsiung City Government team has low ability of crisis handling (就怕被批沒作為，不但趕緊自錄影片說明已經發布空汙警報，還匆忙跑到現場。一場	Title or speech (conflict, negatives)

			<p>火警顯示出高雄市府團隊的危機處理不積極)'. A conflicting speech, : 'Han Yu stayed only for 15 minutes to inspect the scene of the fire and without wear a mask (視察火場未戴口罩，韓瑜僅停留 15 分鐘)'.</p>				
14	59:20		<p>An enhanced speech, 'the Mayor of Kaohsiung took time to check the scene after the fire had happened for five hours, and he stayed for only 15 minutes. "What is the problem?" (高雄市長在火災已經發生五個小時了，他撥空到現場去看看，只停留 15 分鐘就離開了。這問題是什麼?)'.</p>	The host represents the speech with an enhanced gesture.	The host represents her argument with an orotund voice.	An enhanced speech, 'What is the problem?' with Taiyu.	<p>Gesture (number) Sound (orotund, exaggerate) Title or speech (enhancement) Dialect</p>
15	59:26		<p>A conflicting speech, 'Even the district where the members of the LY Din-Lin, Chao is located smells very strong. "Is this problem not big enough?" (趙天麟委員所在的那區都聞到很濃的味道了，"這問題還不夠大嗎?)"'.</p>	The host represents the speech with an emphasised gesture	The host represents her argument with an orotund voice.	A conflicting speech, 'Is this problem not big enough?' with Taiyu.	<p>Gesture (exaggerate) Sound (orotund, exaggerate) Dialect Title or speech (conflict)</p>
16	59:37						
17	59:45		<p>A 'close-up' shot of the speeches from the post.</p>			Source from Din-Lin, Chao's	Source (Facebook post) Footage (close-up)

					Facebook page.
18	1:00:10		A conflicting speech, 'Is the solution from Guo-yu, Han behind the times? (今天的作業程序是不是反應慢半拍?)'.		Title or speech (conflict)
19	1:00:34		A conflicting speech, Li, Yin, 'the Kaohsiung City Government team are not just behind the times, but the crisis handling system has a problem (整個市府團隊不只是慢半拍，而是整個危機處理系統出了問題)'.	Using a video as a visual element and represents that the whole city was shrouded in smoke.	Title or speech (conflict) Footage (split-screen, head and shoulders, smoke, air pollution, negatives)
20	1:02:29		A conflicting title with a word game: 'Guo-yu, Han made a U-turn in the post-election attitude of post-election! Low-key, hiding...He just wants to put aside the controversy (選後態度髮夾彎! 低調、躲起來...韓只想撇爭議)'.	The footage represents that the building was shrouded in smoke and almost invisible.	Title or speech (conflict, word game) Footage (split-screen, head and shoulders, smoke, air pollution, negatives, building)
21	1:05:10		An enhanced speech, 'I suggest that the mayor should at least go to work on time (我建議市長至少要做到準時上班)'.	The guest represents her argument with an orotund voice.	Sound (orotund, exaggerate) Title or speech (enhancement)

22

1:06:42



An enhanced speech, the mayor must "at least" go to work on time. (市長"最起碼"要準時上班)'.

The host repeats the host's speech with an orotund voice.

An enhanced speech, 'at least go to work on time' with Taiyu.

Sound (orotund, exaggerate) Dialect

The video K006 meets the following criteria: firstly, the highest number of view counts in pan-blue channels. Secondly, the topics discussed in the video include a typical environmental policy in Taiwan: 'nuclear free by 2025' and 'thermal power'. It is important to note that the video is a cut version from the full episode, but it has ten times more video views than the full episode, which means the topic in this video has higher attention than others in the full episode.

It is important to note that the talk show and host do not have a distinctive political perspective but criticise the 'nuclear free by 2025' policy by individual perspective. The participants consisted of a no party affiliation minzui (see the *p.1, III. Methodology Chapter*), the newspaper proprietor of the China Times from People First Party (the position of political status is close to KMT, especially in the 'Cross-strait relations' which advocates the 1992 'consensus'), the mayor of Tainan from pan-green political status, a pan-blue politician and the no party affiliation dean of the College of Nuclear Science in National Tsing Hua University.

As the title is depicted in table **Overview of video K006** that the issue of this video discussed the cost of 'nuclear free by 2025' and censured the current progress from the ruling party (DDP). It is needed to notice that 'nuclear free by 2025' is not only an important goal for energy transition but the solution of global warming, which is pushed forward by the ruling party (DDP). The argument of video K006 is that the first nuclear power plant and the second nuclear power plant are decommissioned at present, which means that if the proportion of green energy cannot fill the gap of nuclear energy, the proportion of thermal power will reach over 50% in 2020.

Overview of video K006

Code	K006								
Channel	Hit the Headlines								
The type of programme broadcasting	Political talk show								
Title	The happiness of the next generation? The cost of nuclear free by 2025 is 'firing on all cylinders' which is a word game that means using thermal power extensively! (核 能 免 費 的 下 一 代 幸 福 嗎 ？ 2025 年 前 核 能 免 費 的 代 價 是 全 部 開 火 ！)								
The participants	<table border="1"> <tr> <td>Host</td> <td>Siou-Lin, Ping (蕭 臨 平): minzui (KMT)</td> </tr> <tr> <td rowspan="5">Guests</td> <td>Wen-Chien, Chen (文 建 仁): minzui (no party affiliation)</td> </tr> <tr> <td>Wei-Che, Huang (黃 偉 哲): the mayor of Tainan (DDP)</td> </tr> <tr> <td>Yueh-chien, Lai (賴 岳 謙): the newspaper proprietor of the China Times (People First Party)</td> </tr> <tr> <td>Yu-fang, Lin (林 玉 芳): politician (KMT)</td> </tr> <tr> <td>Min, Li (李 敏): Dean of the College of Nuclear Science in National Tsing Hua University (no party affiliation)</td> </tr> </table>	Host	Siou-Lin, Ping (蕭 臨 平): minzui (KMT)	Guests	Wen-Chien, Chen (文 建 仁): minzui (no party affiliation)	Wei-Che, Huang (黃 偉 哲): the mayor of Tainan (DDP)	Yueh-chien, Lai (賴 岳 謙): the newspaper proprietor of the China Times (People First Party)	Yu-fang, Lin (林 玉 芳): politician (KMT)	Min, Li (李 敏): Dean of the College of Nuclear Science in National Tsing Hua University (no party affiliation)
Host	Siou-Lin, Ping (蕭 臨 平): minzui (KMT)								
Guests	Wen-Chien, Chen (文 建 仁): minzui (no party affiliation)								
	Wei-Che, Huang (黃 偉 哲): the mayor of Tainan (DDP)								
	Yueh-chien, Lai (賴 岳 謙): the newspaper proprietor of the China Times (People First Party)								
	Yu-fang, Lin (林 玉 芳): politician (KMT)								
	Min, Li (李 敏): Dean of the College of Nuclear Science in National Tsing Hua University (no party affiliation)								
Subscribers	723K								
View Count	868,248								
Comment Count	728								

Overall, K006 uses many kinds of sound elements to emphasise the content (see table **The multimodal analysis of the video K006**), and compared to the videos G006 and B022, the video is a cutted version from the full episode. There are some notable scenes in the video which demonstrate the use of six communication techniques. Firstly, the title bars in the talk shows are usually used to highlight the emphasise of the topic of current discussion and are sometimes accompanied with the specific political opinions (see position 1, 10). Secondly, the video does not use the media which has the same political status as the source of the argument of this video but uses a 'pie chart' which is made by the talkshows and adds a negative label 'face slapped by Bloomberg News', to represent a detailed electricity portfolio in 2012, 2016 and 2025 (see position 3).



Thirdly, the content of the video uses a lot of political satire and wordplay figures of speech, which are often accompanied by emphasised gestures, such as the satirical word in position 12 when the guest said, '*Are you really believers in environmental protection?*'; and the

content of the title bar, such as *'Is that achievable?'* (see position 10). Satirical content also often appears in the video, for instance, the speech in position 11 uses 'the Guinness World Record' as a satire with a 'pointing' gesture and 'looking all-round' with the other guests, which means that the 'nuclear free by 2025' policy is impossible. It is needed to mention that the video uses lots of gestures to highlight the argument of speeches, such as representing the speech with a 'wave' gesture, which means 'no' (see position 7); the expression of the guest with a 'head shake' gesture, which means 'disagreement' (see position 8).

Fourthly, the video uses 'close-ups' shot as an element to highlight the subject of the argument, which could be a person or a sign. For instance, a close-up shot is used to emphasise the speeches which produce the argument (see position 8, 12), the pie chart which emphasises the risk of electricity portfolio in 2012, 2016 and 2025 (see position 3). Position 3 shows a phenomenon that the political talk shows often use the visual element with numbers to support political arguments, which is a kind of common rhetoric of quantification in the data-driven society. Regarding the film editing, 'adding a highlight sentence' and 'split screen' are the two common editing techniques in the video, for instance, the visual elements in position 18 to 22 which edited the visual reference with adding a highlight sentence to highlight the inconsistent speeches.

The split-screen is used in position 2 and 4 which use an interpellation video as a visual element and editing by a split-screen process which is cut into two to represent the dialogue situation. Finally, according to sound elements, it is needed to mention that the host and the guest represents the argument with a orotund voice (see position 6, 13, 14, 18 and 22); a husky voice (see position 2 and 8); a loud voice, which only occur once in position 7 that the guest interrupts another guest's speech, and a contemptuous voice, which only occur once in position 8.

The multimodal analysis of the video K006

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:02		An enhanced title bar: 'If green energy cannot keep up the power generation ratio of the first and the second Nuclear Power Plant, the proportion of coal burning in 2020 will exceed 50%! (核一核二除役後，若綠能趕不上，2020 燃煤占比將破 5 成!).		An enhanced title bar with a round number.					Title or speech (enhancement, round number)
2	0:12		A conflicting and satirical speech, Wen-Chien, Chen, 'You just said that you only took over the mayor of Tainan in 2016. Then let's look at the electricity portfolio in 2016. As the pie chart shows that natural gas accounted for 36%. Please ask the world, which country's leader	A split-screen, a 'head and shoulders' shot for two guests.			The guest said her speech with an aggressive voice and said 'dare' with a husky voice.		Using highlight colour in the keywords: 'face slapped by Bloomberg News'.	Sound (aggressive, husky) Footage (split-screen, head and shoulders, close-up) Data (pie chart, precise number) Title or speech (conflict, satire, precise number) Highlight

3

0:19






dares to do this kind of thing. If you know what natural gas is? (你剛剛講說你 2016 年才接政權，那我們看看 2016 年的能源配比，天然氣比例佔 36%，請你請教全世界，哪一個國家的領導者敢做這種事。如果你知道什麼叫天然氣的話?)’.

A conflicting speech, Wei-Che, Huang replied ‘I know it! It’s just that the natural gas in other countries is transported by a pipeline, instead of shipping (我知道阿！只是別的國家的天然氣是管線，不是海運)’.



A close-up shot to represent a detailed electricity portfolio in 2012, 2016 and 2025.



A pie chart of ‘detailed electricity portfolio in 2012, 2016 and 2025’, with a precise number. A conflicting and satirical speech with a precise number.





4	0:34		<p>A complementary speech, Wen-Chien Chen, 'The only country that dares to use natural gas is Singapore, because it used a pipeline to transport natural gas from Malaysia. But they will also consider energy security issues, not to mention that Taiwan is transported by shipping (唯一敢用天然氣的就是新加坡，因為他是從馬來西亞用一根管子接過來。可是他們也會考慮能源安全問題，何況台灣是海運過來的)'.</p>	<p>A split-screen, a 'head and shoulders' shot for two guests.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (complement) Footage (split-screen, head and shoulders) Gesture (indignant)</p>
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5	0:48		<p>A conflicting and satirical speech, Wen-Chien, Chen, 'If you understand what natural gas is, you will know that it must be stored and ballasted before being shipped. So, there are only two storage locations in Taiwan currently, Yongan and Taichung. So the government tends to build the third storage location in Guanyin now (如果你了解天然氣，他是一個必須被儲存下來並壓艙後，才能海運。所以台灣只有兩個儲存地點，一個在永安，一個在台中，所以要在觀音蓋第三個)'.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (conflict, satire) Gesture (number)</p>
6	1:03		<p>A conflicting speech, Wei-Che, Huang, 'Natural gas is not stored, but unloaded (他不是儲存，而是卸載)'.</p>	<p>The guest represents her argument with a voice.</p>	<p>Title or speech (conflict) Sound (orotund)</p>




7	1:05		<p>A complementary speech, Wen-Chien Chen, 'Jin-De, Chen, a pan-green politician, had two characteristics when he was the Chairman of the Chinese Petroleum Corporation (CPC). Although he was unprofessional, he had a big function that he could coordinate the problems between the locals and environmental protection groups, which mediated the locals whether it was possible to set up the third storage in Guanyin. However, so far there is no following (陳金德當中油董事長有兩個特點，雖然他不專業，但他有一個很大的功能，就是他可以協調當地的反抗者跟環保團體。調解當地民眾是不是可以讓觀音這個地方，設第三個儲存槽跟卸載點。可是，目前為止沒有任何下文)'. </p>	<p>The guest, Wen-Chien Chen, represents the speech with a 'wave' gesture, which means 'no'.</p>	<p>The guest interrupts with a loud voice.</p>	<p>Title or speech (complement) Sound (loud) Gesture (wave)</p>
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8	1:32		<p>An enhanced speech, Wen-Chien, Chen, 'If the third storage is not built this year (2017), the natural gas will not reach the expected supply in 2022, and then the policy of nuclear free by 2025 will not be discussed anymore (如果今年沒有開始蓋，天然氣在 2022 年將達不到預期供應量，然後 2025 年非核家園的政策就不用談了)'.</p>	<p>A close-up shot to show the expression of Min, Li.</p>	<p>A 'head shake' gesture, which means 'disagreement'.</p>	<p>The guest said 'but' and 'in 2022' with a husky voice and said 'no need to talk' with a contemptuous voice.</p>	<p>Title or speech (complement) Sound (contemptuous, husky) Gesture (head shake) Footage (close-up)</p>
9	1:35		<p>A conflicting title bar with political satire, 'Electricity cannot withstand any failures! Who makes Taiwan's electricity portfolio so dangerous? (電力禁不起任何閃失！誰讓台灣能源結構如此危險?)'.</p>				<p>Title or speech (conflict, political satire)</p>

10	1:57		<p>An enhanced title bar with political satire, 'The pan-green version of electricity portfolio in 2025: 30% coal, 50% natural gas and 20% green energy. "Is that really achievable?" (綠版 2025 能源配比：燃煤 30%、天然氣 50%、綠能 20% 有影無?).</p>	<p>A close-up shot to represent a detailed electricity portfolio in 2012, 2016 and 2025.</p>	<p>An enhanced title bar with political satire and a round number.</p>	<p>An enhanced title bar with political satire, 'Is that really achievable?' with Taiyu.</p>	<p>Title or speech (enhancement, political satire, round number) Footage (close-up) Dialect</p>
11	2:06		<p>A conflicting and satirical speech, Wen-Chien, Chen, 'The thermal power plant in Taichung currently supplies 20% of Taiwan's electricity portfolio, which can be called the Guinness World Record. But all of these are produced by coal burning. Do you attach importance to global warming? (現在台中的金氏世界紀錄的火力發電廠，供給台灣總電量 20%，燒的都是煤炭，你們把全球暖化當什麼?)'</p>	<p>A 'pointing' gesture means accusation.</p>	<p>Title or speech (conflict and satire) Gesture (pointing)</p>		

12	2:19		A conflicting and satirical speech, Wen-Chien, Chen, 'Are you really believers in environmental protection? (你們真的是環保的信仰者嗎?)'	A 'close-up' shot to show the expression of Wei-Che Huang.			The expression of Wei-Che, Huang, which means accusation.	Title or speech (conflict and satire) Footage (close-up)
13	2:20		A conflicting speech, Wen-Chien, Chen, 'Are you a fake or true believer in environmental protection? (你是假的還是真的?)'		A looked straight gesture which means of accusation.	The guest represents her argument with an orotund voice.		Title or speech (conflict) Sound (orotund) Gesture (looked straight)
14	2:25		A conflicting speech, Wen-Chien Chen said 'May I ask how you can be responsible for all the children in the central region and the countryside? (我請問你怎麼對得起所有在中部地區及鄉下的小朋友?)'		An emphasised gesture, which means accusation.	The guest represents her argument with an orotund voice.	Using highlight colour in the keywords: 'how you can be responsible for...?'. Highlight	Title or speech (conflict) Gesture (exaggerate) Sound (orotund) Highlight
15	2:32		A conflicting speech, Wen-Chien Chen said 'Can you be responsible? (你對得起嗎?)'	A split-screen, a 'head and shoulders' shot for two guests.	A looked straight gesture which means of accusation.			Title or speech (conflict) Gesture (looked straight) Footage (split-screen)

16	4:14		A conflicting speech with political satire, Wen-Chien Chen said 'An irresponsible political party and politician will make Taiwan vulnerable (一個不負責任的政黨，一個不負責任的政治人物，他就會讓台灣變得這麼脆弱)'.	An emphasised gesture, which means accusation.			Title or speech (conflict, political satire) Gesture (exaggerate)
17	4:21		A conflicting speech with political satire, Wen-Chien, Chen said 'The speech of both DPP political party and politician is only for votes and for personal power (民進黨講話只是為了選票還有為了個人權力)'.				Title or speech (conflict, political satire)
18	4:25		A conflicting speech, Wen-Chien Chen said 'How does the DPP care about Taiwanese, Taiwan's electricity portfolio, and energy investment environment in Taiwan? (民進黨怎麼	An emphasised gesture, which means accusation.	The guest represents her argument with an orotund voice.	Using red highlight colour in some numbers and keywords.	Title or speech (conflict) Gesture (exaggerate) Sound (orotund) Highlight
19	4:27						

20	4:29		會在乎台灣的人民、台灣的能源還有台灣的能源投資環境呢?)'				
21	4:31						
22	4:34		A conflicting speech, Wen-Chien Chen said 'You don't care. You only care about your votes.'	An emphasised gesture, which means accusation.	The guest represents her argument with an orotund voice.	Using red highlight colour in some numbers and keywords.	Title or speech (conflict) Gesture (exaggerate) Sound (orotund) Highlight

The video B022 meets the following criteria: firstly, the third highest number of subscribers in all of the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include a global environmental issue: 'extreme weather'.

It is important to note that the talk show and host do not have a distinctive political perspective but discuss the 'extreme weather' which occurred in the North Pole and China. The participants consisted of two no party affiliation minzui (see the chapter III, p.1), a pan-blue minzui, a no party affiliation cultural worker, a no party affiliation financial expert and a no party affiliation newsreader.



As the title is depicted in table **Overview of video B022** that the issue of this video discussed the extreme weather which happened in the North Pole and China. The video B022 has two arguments, one is that the underground resources of the North Pole may lead to a 'decisive battle' between China, the United States and Russia. The other is that the extreme climate of China may be the culprit of the heatwave in the North Pole.



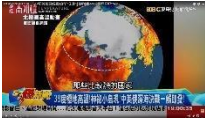

Overview of video B022

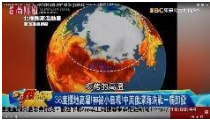





15). For instance, the 'finger-counting' gesture, which means a series of extreme weather happened during summer, 2020 (see position 4).

Fourthly, the video uses 'close-ups' and 'zoom in' shots as an element to highlight the subject of the argument, which could be a person or a visual element. For instance, a 'close-up' shot is used to highlight the main topics discussed in the video (see position 1, 18); or used to emphasise the main topics discussed in the video (see position 23). The 'zooms in' shot is used in position 17, which illustrates the high temperature accelerates ice melting, and used to illustrate the massive pollutants which were produced by the Norilsk diesel oil spill (see in position 21). Finally, according to sound elements, it is needed to mention that the host and the guest represents the argument with a orotund voice (see position 2, 3, 5, 31, 33, 35 and 37), a husky voice (see position 4, 7, 8, 10 and 11) and a loud voice, which only occur once in position 26 that the host goes along with the guest's speech.





The multimodal analysis of the video B022



Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:07			A 'close-up' shot to highlight the main topics discussed in the video						Footage (close-up)
2	0:11		<p>A complementary speech, 'Do you feel so hot! When will it end? I'm afraid it will get hotter and hotter (你有沒有覺得好熱啊!到底還要熱到甚麼時候?只怕會越來越熱)'.</p> <p>An enhanced title bar, 'The temperature of the North Pole has reached up to 38° Centigrade, and the underground resources have opened a 'decisive battle' between China, the United States and Russia! ((北極飆 38 度揭中美俄「決戰」!))</p>			An emphasised gesture.	The host said 'hot' and 'get hotter and hotter' with an orotund voice.			Title or speech (complement, enhancement) Footage (close-up) Gesture (exaggerate) Sound (orotund)

3	0:18		A complementary speech, 'Taipei has the second hottest weather in June in history (台北熱出史上第二高溫的六月天氣)'.	An emphasised gesture.	The host said 'in history' with an orotund voice.	Title or speech (complement) Gesture (exaggerate) Sound (orotund)
4	0:27		A complementary speech, 'The weather is weird this year. The high temperature did not appear in India, nor in Vietnam, where it should be hot. (今年的天氣真的非常詭異，高溫沒有出現在應該高溫的印度，也沒出現在越南，那些比較熱的國家)'	A 'finger-counting' gesture, which means a series of extreme weather happened during summer, 2020.	The host said 'India', 'Vietnam' and 'should be hot' with a husky voice.	Title or speech (complement) Gesture (finger-counting) Sound (husky)
5	0:30		An enhanced speech, 'The polar regions have hot high temperatures unexpectedly, can you believe it appears in the North Pole? (熱的氣候居然出現在極地，出現在北極你敢相信嗎?)'		The host said 'unexpectedly' with an orotund voice.	Title or speech (enhancement) Gesture (exaggerate) Sound (orotund)
6	0:31			Montage: zoom-in shot.	A 'temperature distribution map'.	Data (temperature distribution map) Montage (zoom-in)




7	0:40		An enhanced speech, 'The North Pole has a high temperature of 38 degrees Celsius, which is like a scorching heat (北極居然出現高達攝氏 38 度，炙烤般的高溫)'.	Montage: Time-lapse photography to represent how the temperature changed in a week.	The host said 'scorching heat' with a husky voice.	Title or speech (enhancement) Montage (time-lapse) Sound (husky)
8	0:49		An enhanced speech, 'This kind of high temperature seems like a curse (這樣的高溫彷彿像是詛咒一般)'.		The host said 'like a curse' with a husky voice.	Title or speech (enhancement) Sound (husky)
9	1:00		An enhanced speech, 'The high temperature of the North Pole melted a group of small islands under the ice. There are precious resources below, which make China, the United States and Russia compete (北極的高溫融出一座一座在冰塊底下的小島。下面有珍貴的資源，讓中國、美國跟俄國競相爭奪)'.			Source from a thriller movie 'Hunter Killer'.
	1:02					
	1:03					
10	1:10		An enhanced speech, 'The high temperature has triggered hunting under the deep sea in China, the United States and Russia (高溫竟引發中國、美國)'.		The host said 'hunting' with a husky voice.	Title or speech (enhancement) Sound (husky)

			跟俄國，深海底下的獵殺’。			
11	1:17		An enhanced speech, When the North Pole becomes the next 'South China Sea, who can win? (當北極變成下一個南海，誰能勝出?)		The host said, 'who can win?' with a husky voice.	Title or speech (enhancement) Sound (husky)
12	1:24		An enhanced speech, Shih-Cong, Huang, Can you imagine it? The current temperature in the North Pole is 38 degrees Celsius, which is the same as Taiwan (大家能想像的到嗎? 目前北極的溫度跟台灣一樣是攝氏 38 度).		An emphasised gesture.	Title or speech (enhancement) Gesture (exaggerate)
13	1:26		An enhanced speech, 'It is very scary (好可怕)'.		An agitated gesture after listening to the opinion by Jheng-Liang, Guo in the position 12.	Title or speech (enhancement) Gesture (agitated)
14	1:28			Montage: close-up and zoom-in shot to illustrate the heat disaster in the polar region.	A temperature distribution map.	Footage (close-up) Montage (zoom-in)

15	1:41			An emphasised gesture which shows the height difference of the temperature changing.		Gesture (height)
16	1:46		An enhanced speech, Shih-Cong, Huang, 'Scientists originally estimated that such extreme temperature differences would only occur in 2100, but they did not expect it to happen 80 years in advance (科學家原本估計 2100 年才會出現這樣的極端溫差，沒想到提前 80 年發生)'.		Source from 'AI JAZEEAR'.	Title or speech (enhancement) Source (news) Footage (melting ice)
17	1:54			Montage: zoom-in editing technique to illustrate how the high temperature accelerates ice melting.		Montage (zoom-in) Footage (melting ice)
18	2:06		A complementary title bar, 'The global warming led to the Norilsk diesel oil spill, the 2019 Siberia	Using a 'close-up' shot to highlight the main topics		Title or speech (complement) Footage (close-up)

			wildfires and the plague of moths in China (北極高溫引發俄羅斯漏油事件、西伯利亞大火和蛾災)'. discussed in the video.	
19	2:13		Montage: rotate shot from eye level to look-down, which emphasises that over 20 thousand tons of diesel leaked into the water and soil, turning the Ambar Naya River red.	Montage (rotate) Footage (river, water)
	2:17			
20	2:19		Montage: rotate shot from eye level to look-down, which shows the fuel storage tank at Norilsk-Taimyr Energy's Thermal Power Plant.	Montage (rotate) Footage (Power Plant)
21	2:24		An enhanced speech, The Norilsk diesel oil spill, which is full of black, red, and disgusting Montage: zoom-in shot to illustrate the massive	Title or speech (enhancement) Montage (zoom-in)

	2:38		pollutants. Is this just a human-made disaster? (這個烏烏鴉鴉、黑色的跟紅色的、骯髒噁心的地球浩劫，這難道只是單純的人禍嗎?)	pollutants which were produced by the Norilsk diesel oil spill.		Footage (diesel oil spill, pollutants, river)
22	3:02		A complementary speech, Shih-Cong, Huang, 'Because of the melting ice of the North Pole, many small islands that used to be covered under the ice slowly emerged (因為北極冰層融化的關係，過去很多覆蓋在冰層下面的小島慢慢浮現)'.	Montage: zoom-in shot to illustrate the small islands occurred by the melting ice of the North Pole.		Title or speech (complement) Montage (zoom-in) Footage (melting ice)
23	3:15			Using a 'close-up' shot to highlight the five islands emerge after the melting ice of the North Pole.		Footage (close-up, melting ice)
24	3:23			Montage: rotate film from eye level to look-down, which shows the five islands	Source from YouTube, 'Manila Bulletin'	Montage (rotate) Footage (islands)

				in Russia, which emerged near the North Pole.		
25	3:46		A complementary speech, Shih-Cong, Huang, 'The emergence of small islands will trigger competition among countries for priority development rights, which is similar to the economic battle of the South China Sea (小島的浮現將引發各國對優先開發權的競爭，類似於南海規模的經濟爭奪戰)'.		An emphasised gesture.	Title or speech (complement) Gesture (exaggerate)
26	3:59				An agitated gesture to go along with the Shih-Cong, Huang's speech in the position 25 with.	The host goes along with the guest's speech with a loud voice. Gesture (agitated) Sound (loud)
27	4:09		An enhanced speech, 'Crisis turns into business opportunities!?' Eruption of methane combustible ice may lead to Russia's first research and development and enrichment (危機變商	Using a 'close-up' shot to highlight the main topics discussed in the video.		Title or speech (enhancement) Footage (close-up)

機！？ 甲烷可燃冰噴發，
俄羅斯搶先研發恐先致
富）'.

28

4:15



Using a 'close-up' shot to highlight the main topics discussed in the video that there is a large amount of methane hidden under the North Pole.

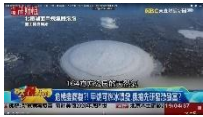
Footage (close-up)

29

4:28



4:32



A 'close-up' shot.
Montage:
zoom-in editing technique to illustrate the development of the emerging energy-methane.

Footage (close-up)
Montage
(zoom-in)





30

4:34






An enhanced speech, Shih-Cong, Huang, 'Methane is the solution to the energy shortages currently (甲烷是現階段能源短缺的解決方式)'.

Title or speech
(enhancement)

31	14:15		<p>A complementary speech, 'The Yangtze River, which spans 3,000 kilometres from east to west, is now caught in wind and thunder (東西跨距廣達 3000 公里的長江流域，現在正陷入風、電、雷，這個水深火熱的情況中)'.</p>	<p>An emphasised gesture which shows the length of the Yangtze River in China.</p>	<p>The host said the speech with a orotund voice.</p>	<p>Title or speech (complement) Gesture (length) Sound (orotund)</p>	
32	14:22		<p>The footage shows the heavy rains and floods in Chongqing, China.</p>	<p>Source from Twitter.</p>	<p>Source (Twitter)</p>		
33	14:27		<p>An enhanced speech, 'The waters of the Yangtze River occupies nearly 20% of China that is unexpectedly threatened by extreme weather now (長江水域占了將近 20%的大陸國土，現在居然陷入極端氣候的威脅)'.</p>	<p>The footage represents that the water overflows from the sewer which emphasises the extremely heavy rain and floods.</p>	<p>An enhanced speech with a round number.</p>	<p>The host said 'unexpectedly' with a orotund voice.</p>	<p>Title or speech (enhancement, round number) Montage (rotate, look-down) Sound (orotund) Footage (waterfall, heavy rain, floods)</p>
34	14:26		<p>Montage: rotate and look-down shot to represent the severity of the heavy rains and floods in</p>				

Chongqing,
China.

35	14:37		An enhanced speech, 'Shanghai, located in the lower reaches of the Yangtze River, was hit by heavy rain and thunder at the same time (位在長江水域下游的上海，居然同時受到暴雨、大雨、雷電的襲擊)'.		The host said 'heavy rain and thunder' with an orotund voice.	Title or speech (enhancement) Sound (orotund)
36	14:42		A complementary speech, 'Even Chongqing has the biggest flood in 80 years. (連重慶都出現 80 年最大的水患)'	The footage represents that the houses were destroyed by the flood which emphasise the extremely heavy rain and floods.		Title or speech (complement) Footage (houses, heavy rain, floods)
37	15:36		An enhanced speech, 'Jhong-Bo, Jiang said 'Shanghai suffers from heavy rain for five days. (上海連下了五天暴雨)'		The guest said the speech with a orotund voice.	Title or speech (enhancement) Sound (orotund)

The video H006 meets the following criteria: firstly, the third highest number of subscribers in all the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include an environmental issue, 'air pollution'. Table **Overview of video H006** shows that H006 is a pan-blue talk show and the participants consisted of two no party affiliation minzui, a pan-blue minzui, a pan-blue Taoyuan council member and a People First Party minzui.

The topic discusses the reopening of the Shen'ao Power Plant, which is a typical issue of the energy transition in Taiwan. There are two arguments in the video, one is the speech from William Ching-te, Lai, a pan-green former Premier, who said that the Shen'ao Power Plant uses 'clean coal' to generate power, as an excuse for using thermal power to solve the problem of power shortage. The other is the PSI index simulated by scholars and official data has a huge difference that the DPP is suspected of falsifying data to reopen the Shen'ao Power Plant.

Overview of video H006

Code	H006
Channel	Belle Show
The type of programme broadcasting	talk show

Title	Shen'ao Power Plant uses clean coal to generate power!? After passing	
The participants	Host	Belle Yu (徐 瑜): A pan-blue television show host
	Guests	Syue-Heng, Jhu (許 恆 志): minzui (KMT)
		Shih-Cong, Huang (許 宗 憲): minzui (no party affiliation)
		Cin-Huang, Syu (辛 黃 鈺): minzui (no party affiliation)
		Jing-Ping, Huang (黃 景 平): Taoyuan council member (KMT)
		Ren-Jyun, Kang (康 仁 峻): minzui (People First Party)
Subscribers	364K	
View Count	52,783	
Comment Count	134	

Overall, the video H006 uses many kinds of complementary elements to emphasise the speeches (see table **The multimodal analysis of the video H006**) and has obvious political status, which can be found in the numerous satirical title bars and speeches.




There are some notable communication practices in the video which are often used for complementing each other. Firstly, the video includes a great number of enhanced speeches with gestures (e.g., position 16, 21 and 29). The conflicting title bars are often arranged in pairs with a complementary speech which is used to emphasise the argument, and sometimes including satirical words (e.g., position 1 and 3).



Secondly, the video uses lots of close-up shots to emphasise the opinion leader (e.g., position 29, 33 and 41) or the complementary footage (e.g., position 44 and 45). Thirdly, the video uses a mimic diagram of 'Air Quality Index' (position 6) and the pie chart of '2016 fuel ratio of thermal power' (position 43), with precise numbers, as scientific evidence of the







speeches from host and guests. Besides, the round numbers mostly appear in the speeches or the complementary footage. Fourthly, gestures and voices appear a lot in the video for the similar meaning: highlighting the arguments of the video. Finally, the dialect only appears once in the video (position 14) which is used for imitating the tone of the information source.





The multimodal analysis of the video H006






Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:19		A complementary speech, the host said 'Do you think the air is bad, so you must turn on the air purifier? (你有沒有覺得空氣不好，所以你要開空氣清淨機呢)'. A conflicting title bar with satirical words: 'Are we using clean coal to generate power? Is it an elegy of sacrificing lung to generate power after passing environmental appraisal of Taiwan Shen'ao Power Plant? (用乾淨的煤發電!? 深澳電廠環評過關。全民用肺發電悲歌?)'							Title or speech (enhancement, complement, satire)
2	0:27		A complementary speech, the host said 'Shen'ao Power Plant is going to commercialize in 2025 but passing of environmental appraisal causes discussions and fights in parties (2025年深澳電廠即將進入商轉，而環評通過引起各方討論和抗爭)'. A conflicting title bar with satirical words: 'Are we using clean coal to generate power? Is it an elegy of sacrificing lung to generate power after passing environmental appraisal of Taiwan Shen'ao Power Plant? (用乾淨的煤發電!? 深澳電廠環評過關。全民用肺發電悲歌?)'							Title or speech (compliment)






3	0:40		<p>A complementary speech, the host said 'How can people live without water? (人怎麼可能沒有水)'.</p> <p>A conflicting title bar with satirical words, 'Dominate energy! Move Nuclear Power Plant. Adding a lid onto the volcano, is it a start of an energy technology fight? (制霸能源! 移動核電廠。火山上加蓋發電, 能源黑科技戰開打?)'</p>	<p>An emphasised gesture and expression.</p>	<p>An orotund voice.</p>	<p>Title or speech (conflict, satire) Gesture (exaggerate) Sound (orotund, exaggerate)</p>
4	0:45		<p>An enhanced title bar with satirical words: 'Is bottled water full of plastic particles? Are plastic bags edible? What is the truth of the earth ecology killer? (瓶裝水含塑膠微粒? 能吃的塑膠袋? 揭地球生態殺手真相?)'</p>			<p>Title or speech (enhancement)</p>
5	1:22		<p>An emphasised speech, the host said 'We are used to paying cheap electricity bill, but it is impossible without nuclear electricity in the future (我們習慣電費是很便宜的...可是在未來沒有核能發電的情況下, 這是不可能的)'.</p>	<p>An emphasised gesture.</p>	<p>The guest said 'impossible' with a husky voice.</p>	<p>Title or speech (enhancement) Gesture (exaggerate) Sound (husky)</p>




6	2:09		<p>An enhanced speech, the interviewee (Yue-Ying, Shih) said 'Taiwan Power Company imports almost 50% of traditional peats and lignite and has signed long term contract with foreign. How to substantially replace them with sub-bituminous coals? (台電自國外購買逾五成傳統泥煤、褐煤，且與國外都簽長約，如何大幅度更換亞煙煤).</p> <p>A complementary speech, the interviewee (Bing-Jie, Jhuang) said 'Supercritical coal-burning power is still dirtier than gas-fired power and the air pollution is 138 times higher, including heavy metal and dioxin. (超超臨界的燃煤發電仍比燃氣發電髒，空汙多達 138 倍，會排放重金屬、戴奧辛)'. An enhanced title with satirical words: 'Is Shen'ao Power Plant a line of air pollution? (深澳電廠，空汙一條龍?)'</p>	<p>A mimic diagram of 'Air Quality Index', and a table which includes the simulation data from Shen'ao Power Plant and scholars respectively, with the precise number. An enhanced speech with the round number. A complementary speech with the precise number.</p>	<p>Using red highlight colour in some numbers and keywords. Source from Apple Daily.</p>	<p>Data (table, precise number) Title or speech (enhancement, compliment, round number, precise number) Source (news) Highlight</p>
7	2:12		<p>A conflicting title bar with a satirical word: 'Getting worse? Does the renaissance of Shen'ao Power Plant make 9 million Taipei residents become Air pollution refugees? (再惡化?深澳電廠死灰復燃，大台北 900 萬人成空汙難民?)'</p>	<p>Title or speech (conflict, satire)</p>		





8	2:16		An enhanced speech, the guest (Syue-Heng, Jhu) said 'The white bed quilt became gray, which I had dried in the sun all the afternoon (我曬一個白色的棉被，下午的時候變灰色的)'.			An emphasise d gesture.	Title or speech (enhancement , exaggerate) Gesture (exaggerate)
9	2:25			A 'close-up' shot of the mimic diagram of 'Air Quality Index'.	A 'Air Quality Index'.		Footage (close-up, data)
10	2:30					A hand gesture showing size.	Gesture (size)
11	2:46		An enhanced speech, the guest (Syue-Heng, Jhu) said 'This table only includes most of cities, except Yilan. That's insulting (這個表格只包含大部分城市，宜蘭都還沒有，很忽略)'.	A 'close-up' shot of the comparison table.	A comparison table.	Using red highlight colour in some numbers.	Title or speech (enhancement) Footage (close-up, data) Highlight
12	3:10			A 'close-up' shot of the speech from an expert.			Footage (close-up)
13	3:30		An enhanced speech, the guest (Syue-Heng, Jhu) said ' The PSI of Yilan increased from zero to 7.499 (宜蘭的空汙指標從零變成 7.499)'.		An enhanced speech with a precise number.	A hand gesture showing the number.	Title or speech (enhancement , precise number) Gesture (number)



14	3:39		An enhanced speech, Syue-Heng, Jhu said 'That's why Jin-De, Chen said "This is not OK" when he heard that Yilan would face serious air pollution (所以陳金德聽到宜蘭會面臨到這麼嚴重的空汙才會說"這樣不行")'.			An enhanced speech, 'This is not OK', with Taiyu.	Title or speech (enhancement) Dialect
15	3:52		A conflicting title bar with a satirical word: 'Being a line of air pollution? From Shen'ao to Taichung Power Plant (空汙一條龍!? 從深澳到中火)'				Title or speech (conflict, satire)
16	3:57		An enhanced speech, the guest (Syue-Heng, Jhu) said 'According to the PSI index simulated by scholars and official data, Hsinchu is 19 times higher, Keelung is 8.6 times higher, and Taoyuan and New Taipei City are 7 times and 3 times higher respectively (學者的模擬結果，新竹 19 倍之外，基隆也到 8.6 倍、桃園是七倍、新北有 3 倍)'.	An enhanced speech with the round number.	An emphasised gesture.		Title or speech (enhancement, round number) Gesture (exaggerate)
17	4:12					Show a serious expression to the guest's speech.	Expression

18	4:15			An emphasised gesture showing PM2.5 diffusion.	Gesture (diffusion)
19	4:21			A hand gesture showing the number.	Gesture (number)
20	4:27		A 'close-up' shot of the comparison table.	Using red highlight colour in some numbers.	Footage (close-up) Highlight
21	4:35		An enhanced speech, the guest (Syue-Heng, Jhu) said 'That's tolerable if only in Taipei. However, the pollution got into Taoyuan, which was always less polluted (如果只是北電北送就算了，但汙染卻一路跑到一向少污染的桃園)'.	An emphasised gesture showing the locations.	Gesture (location)
22	4:48		An enhanced speech, the guest (Syue-Heng, Jhu) said 'And the most important is that he spoke lots of technical skills, like Supercritical (而且最重要的是他講了很多技術面的東西，像是"超超臨界")'.	An emphasised gesture.	Gesture (exaggerate)




23	4:53		A complementary speech, the host said 'I do not know what Supercritical is (我不知道什麼是"超超臨界")'.		Show a confused expression to the guest's speech.	Title or speech (compliment) Expression
24	4:56		A conflicting and satirical speech, 'That is my first time to know the coal without pollution (我還第一次聽到沒有污染的煤)'.	The host said 'zero pollution' with a husky voice.	Show a confused expression.	Title or speech (conflict, satire) Sound (husky) Expression
25	4:58		A conflicting title bar with satirical words: 'That' dirty! Clean coal from William Ching-te, Lai includes heavy metal and dioxin. The pm2.5 also exceeds! (就是髒! 賴揆"乾淨的煤"含重金屬、戴奧辛。pm2.5 破表!?)'			Title or speech (conflict, satire)
26	5:17		A complementary speech, the guest (Syue-Heng, Jhu) said 'Dirtiest but the most accessible were peats and lignite, but 50% of operation from TPC were peats and lignite recently (最髒但最易取得的煤就是泥煤和褐煤，但目前台電開採的五成都是泥煤和褐煤)'.	A complementary speech with the round number.		Title or speech (compliment, round number)
27	5:32		An enhanced speech, the guest (Syue-Heng, Jhu) said 'The extremely worst was... (最爛最爛的就是...)'.	The guest said 'The extremely worst is...'		Title or speech (enhancement) Sound (husky)

						with a husky voice.	
28	5:51		A complementary speech, the guest (Syue-Heng, Jhu) said 'Taiwan imported 6.12 million tons of bituminous coal and 150 thousand tons of sub-bituminous coal. The former was 40 times more than the latter (2016 年台灣有進口 612.39 萬噸有煙煤及 15.03 萬噸的次煙煤，次煙煤只有有煙煤的 40 分之 1。)'.	A 'close-up' shot of the speech from an environmentalist.	A complementary speech with the precise number.	The guest said '612.39 million tons' and 'one-fortieths' with a husky voice.	Title or speech (compliment, precise number) Footage (close-up) Sound (husky)
29	6:04		An enhanced speech, the guest (Syue-Heng, Jhu) said 'Thus we need to shed some lights on communication of TPC, is it for the policy of Nuclear free by 2025 or for requirement of government? (所以我們需要釐清，台電的溝通到底是為了非核家園的政策，還是政府的需求?)'.			An emphasized gesture.	Title or speech (enhancement) Gesture (exaggerate) Footage (close-up)
30	6:11		An conflicting speech, the guest (Syue-Heng, Jhu) said 'Did government really speak clearly to people that after the policy of Nuclear free by 2025, the electricity price would increase 3 % at least per year (政府到底有沒有跟民眾講清楚，非核家園後的電價，每年至少漲 3%)'.		A conflicting speech with the round number.	An emphasized gesture showing the coin.	Title or speech conflict, round number) Gesture (coin)

31	6:27		An enhanced speech, the host said 'Electricity price is not the problem. The question is that would we loss power without this power plant? (不是電價的問題，是不蓋這個電廠會沒電嗎?)'.		An emphasise d gesture.	The host said, 'Will there be no electricity?' with a orotund voice.	Title or speech (enhancement) Gesture (exaggerate) Sound (orotund)
32	6:31		An enhanced title bar with a satirical words: 'Standby power is insufficient by 15%". The truth of Shen'ao Power Plant being commercialized in 2025 (再恐嚇!?"備載電力不足 15%"台電 2025 深奧商轉真相?)'.				Title or speech (enhancement , satire)
33	6:36		An conflicting speech, the guest (Shih-Cong, Huang) said 'To support Shen'ao Power Plant, William Ching-te, Lai especially said to use" clean coal" (賴揆為了支持深澳火力發電廠，他還特別說用"乾淨的煤")'.			The host said 'clean coal' with a husky voice.	Title or speech (conflict, satire) Sound (husky) Footage (close-up)
34	6:39		A conflicting speech, the interviewee (William Ching-te, Lai) said 'Use clean coal to generate power (用乾淨的煤發電)'. A conflicting speech, the interviewee (Sun-han, Hung) said 'Shen'ao Power Plant would finish and the volume of standby power can keep above 15% in 2025. Thus, it won't have	The image on the top is 'Taichung Power Plant' which uses a warm filter.	A pie chart of '2016 fuel ratio of thermal power', with the precise number. A conflicting speech with the round number. Two complementar	Using red highlight colour in some numbers and keywords. Source from Economic Daily News.	Title or speech (conflict, round number, complement, precise number) Data Highlight Source (news) Montage (warm filter)

			<p>concerns about power shortage in future (深澳電廠機組，2025 年興建完成，2025 年備用容量可維持 15%以上，未來沒有缺電疑慮)'. Two complementary contents: ' There were 15 countries joining PPCA and they planned to weed out coal burning power in 2030 (15 國加入發電棄用煤聯盟，2030 年淘汰燃煤發電)' and 'percentage of coal power decreased from 51% to 31% in the US. Belgium stopped burning coals after 2016. Netherland will close all of coal power plants in 2030 (美國煤電佔比從 51%降至 31%，比利時 2016 年後停用燃煤，荷蘭將於 2030 年關閉所有燃煤電廠)'. An enhanced title: '15 countries will weed out burning coals. How about Taiwan? (15 國 2030 棄燃煤，台灣呢?)'</p>	<p>y contents with a precise number.</p>	<p>Footage (Taichung Power Plant)</p>
35	6:47		<p>A 'close-up' shot of the speeches from two pan-green politicians.</p>		<p>Footage (close-up)</p>
36	7:15		<p>An enhanced speech, the host said 'So power shortage would not happen without Shen'ao Power Plant (所以不用深澳電廠也不會缺電嗎?)'.</p>	<p>Show a suspected expression.</p>	<p>Title or speech (enhancement Expression)</p>

37	7:17		An enhanced speech, the guest (Shih-Cong, Huang) said 'Sun-han, Hung thinks that though power shortage happens now, it won't happen after 2025 (他(洪申翰)認為現在雖然會缺電，但到 2025 年之後就不會缺電了)', with a word game.	An emphasise d gesture.	The guest said 'There will be no shortage of power after 2025' with a orotund voice.	Title or speech (enhancement , word game) Sound (orotund) Gesture (pointing with index finger)
38	8:12		An enhanced speech with satirical word, the host said 'TPC insisted to construct this power plant because of incomes (所以台電堅持要蓋這個電廠，是因為這樣才有進帳)'.			Title or speech (enhancement , satire)
39	8:25		An enhanced title bar: 'Argue against the world! 15 countries will ban to burning coals in 2030, while Taiwan plans to restart Shen'ao Power Plant in 2025 (逆勢而為! 當 15 國 2030 年禁燃煤，台灣卻在 2025 年重啟深澳燃煤電廠...)'			Title or speech (enhancement)
40	8:25		A complementary speech, the guest (Shih-Cong, Huang) said 'Serious acid rain and air pollution would generate after burning coals (使用燃煤會產生兩個嚴重汙染，酸雨跟空汙)'.	A hand gesture showing the number.		Title or speech (complement) Gesture (number)
41	8:36			Using a 'close-up' shot.		Using a 'close-up' shot to Footage (close-up) Expression

						show a resigned expression of Syue-Heng, Jhu.
42	8:42		An enhanced speech, the guest (Shih-Cong, Huang) said 'Nowadays, all the world gradually abandons to burning coals and Belgium has even gone into the state of non-coals (目前全世界都在慢慢棄用燃煤，且比利時已經要進入無煤的狀態)'.			Title or speech (enhancement)
43	8:57		A 'close-up' shot of the pie chart of '2016 fuel ratio of thermal power'. The image is the 'Taichung Power Plant' which uses a warm filter.	A pie chart of '2016 fuel ratio of thermal power', with precise numbers.		Footage (close-up, factory) Data
44	9:19		A 'close-up' shot of the complementary content which mentions the 15 countries have the consensus on stopping coal burning.		Footage (close-up)	Footage (close-up, complement)

45	9:27		<p>A 'close-up' shot of the complementary content which mentions the coal usage in Europe and North America currently.</p>	<p>Footage (close-up, complement)</p>		
46	10:01		<p>An enhanced title bar with satirical words: 'Under the dome! The smog faces of kids. The lifespan decreases 3 to 7 years, which is elegy of pm2.5 in China (穹頂下!小孩"霧霾臉"。壽命少3至7年，大陸 pm2.5 悲歌?)'</p>	<p>Title or speech (enhancement, satire)</p>		
47	10:03		<p>An enhanced title: 'China has the matter of extreme urgency (中國大陸有燃煤(眉)之急)', with a word game. Four complementary contents: 'Heating that is supplied from China government and coal-fired power plants are all the main factors of raging smog (中國政府供應的暖氣跟燃煤發電廠都是霧霾肆虐主因)', 'Huaibei was 3.1 years less than Huainan in average. Other heavy industrial cities were 6.9 years less (淮北地區平均比淮南少3.1年，其他重工業城市則少6.9年)', 'Smog would cause damage of respiratory system,</p>	<p>The image on the top is 'the child wears a mask', the other is the 'a schematic diagram of a coal-fired power station' which means the consequence from Coal-fired power and air pollution.</p>	<p>Using red highlight colour in some numbers and keywords. Source from TechNews.</p>	<p>Title or speech (enhancement, complement, word game) Source (news) Highlight Footage (close-up, children, mask)</p>

lung, sperm and morph of kids' facial features(like grumpy and smog face (霧霾會導致呼吸系統、肺部、精子損傷，以及兒童五官變形(像是暴牙、霧霾臉)))' and coal power plants consumed 74 billion cubic meter water, thus they caused water shortage in parts of areas' (中國燃煤場年耗 74 億立方米水量，導致部分地區缺水)'.

48 10:40



A 'close-up' shot of the complementary content: 'The average of lifespan of northern China is lower than southern (中國北方的人均壽命比南方低)'.

Title or speech (enhancement , satire)
Footage (close-up, complement)




49 10:49






An enhanced speech, the guest (Jing-Ping, Huang) said 'Lifespan of people in northern China is 3 to 7 years lower than southern (中國北方人的壽命居然比南方人少了 3 到 7 年)'.

A hand gesture showing the number.

Title or speech (enhancement)
Gesture (number)

50	11:22		<p>An enhanced speech, the guest (Jing-Ping, Huang) said 'through energy transition, the average lifespan of China increased 3 to 5 years (經過能源轉型後，中國平均壽命延長 3 至 5 年)'.</p> <p>An enhanced speech, the host said 'The whole country has been improved! (全國都改善阿)'.</p> <p>An enhanced title bar: 'Defeat air pollution! China changed coals to gas in order to reorganize and made people in Beijing live 3.3 years longer (戰勝空汙!?中國"煤改氣"重手整頓，北京人多活 3.3 年!?)'</p>	<p>The host said, 'The whole country!' with a orotund voice.</p>	<p>The host shows a surprised expression.</p>	<p>Title or speech (enhancement) Sound (orotund)</p>
51	11:30		<p>An enhanced speech, the host said 'it only took years for China to improve (中國不過 5 年而已就改善了)'.</p>	<p>A hand gesture showing the number.</p>	<p>The host said 'only five years' with an orotund voice.</p>	<p>Title or speech (enhancement) Gesture (number)</p>
52	12:00		<p>An enhanced speech, the guest (Jing-Ping, Huang) said 'China also noticed a phenomenon that caused injuries to kid's body, like smog face (中國也注意到一個現象，對小孩會造成人體傷害，像是霧霾臉)'.</p>	<p>A 'close-up' and 'zoom in' shot of the image.</p>	<p>Title or speech (enhancement) Footage (close-up, children, mask) Montage (zoom-in)</p>	

53	12:40		<p>A 'close-up' shot of the complementary content which mentions the physical injury for new-born babies.</p>	<p>Title or speech (complement) Footage (close-up, complement)</p>		
54	13:03		<p>An enhanced speech, the host said 'Not only burn coals but also plunder water sources (而且使用燃煤還掠奪水源)'. An enhanced title bar: 'Seriously hit environment! Coal-fired power consumes water resource, and the rivers will cut off in China (重創環境! 燃煤發電耗水資源, 大陸河川面臨斷流命運!?)'</p>	<p>An emphasised gesture. The host said 'water sources' with an orotund voice.</p>	<p>Title or speech (enhancement) Sound (orotund) Gesture (number)</p>	
55	13:53		<p>Four complementary contents: 'There are 14 nuclear power plants in the world which locate in earthquake zone with highly active fault, all concentrated in Japan and Taiwan (全球 14 座危險核電廠位處高活動斷層地震帶, 全集中在日本及台灣)', 'Seven of the anchor bolts of the second nuclear plant were broken, which has no broken or damaged cases in the world (核二廠錨定螺栓斷七支, 全球沒斷裂毀損例子)', '15 nuclear</p>	<p>A topographic map of 'distribution of mountains around the nuclear power plants in Taiwan'.</p>	<p>Using red highlight colour in some numbers and keywords. Source from Liberty Times and Newtalk.</p>	<p>Title or speech (complement, enhancement) Source (news) Data Highlight</p>

reactors around the world are facing the dual risks of earthquakes and tsunamis, and the first and the second nuclear plant in Taiwan are on the list (全球 15 個核反應爐面臨地震與海嘯雙重風險，台灣核一核二廠的反應爐全上榜) and 'The second nuclear plant has not been in operation for 21 months, but problems occurred after only 35 minutes of operation after maintenance (核二廠已 21 個月未運轉，且大修後只啟動 35 分鐘，運轉就出現問題)'.

An enhanced title bar: 'Restart at the end of March! The Fault zones under Kuosheng Nuclear Power Plant staggers, which be listed as a world dangerous power plant (3 月底重啟!?核二廠下方斷層帶交錯，列世界危險電廠!?)'

An enhanced title: 'The safety of the second nuclear plant is a hidden worry for Taiwan!?' (核二廠安全，台灣隱憂!?)'.

56

15:47



An enhanced title bar: 'Be unnerved! The screw line broke in Kuosheng Nuclear Power Plant and tripped the circuit breaker after repairing. Isn't it a hazard for northern Taiwan? (慌目驚

Title or speech (enhancement)

心!核二廠螺栓斷，大修後跳電。北台灣未爆彈!?)

57 17:06



A 'close-up' shot of the complementary content which mentions that the Kuosheng Nuclear Power Plant faces high risk for operating again though it has been shutted-down about 21 months and easily malfunctioned.

Title or speech (complement)
Footage (close-up, complement)

58 17:47



An enhanced speech, the host said 'There is a saying that "The lesser of two evils." DDP needs to choose making Taiwan another Fukushima or having a more seriously polluted Shen'ao Power Plant (俗話說:兩害相權取其輕，民進黨要選擇台灣變福島，還是一個汙染更嚴重的深澳電廠)'.
An emphasise d gesture.

The host said the arrangement with a husky voice.

Show a confused expression.

Title or speech (enhancement)
Sound (husky)
Gesture (exaggerate)

59 23:01



An enhanced title bar: 'Is it a song of ice and fire? Does the geonet live forever as if adding covers on volcanoes and taking out hot batteries in Iceland? (冰與火之

Title or speech (enhancement)

歌?冰島幫"火山加蓋"取熱電池。地熱永不枯竭?'

60

23:11



Four complementary contents: 'There are 30 volcanos and plentiful geothermal resources (冰島擁有 30 座火山及豐富地熱資源)', 'Supercritical steam power plant can provide renewable clean power, which can support 200 thousands people (超臨界蒸氣發電廠供應可再生清潔能源，可供 20 萬人用電)', 'Iceland built 1000 kilometres IceLink in 2016, which would provide electricity power to 1.6 million families in the UK (冰島於 2016 年蓋 1000 公里 IceLink，將為 160 萬個英國家庭提供電力)' and 'Due to 100% from renewable powers, the electricity price was much cheaper. However, it caused mine grounds to enter, thus the power for digging minerals would be higher than for people livelihoods in Iceland (冰島 100%來自再生能源，電費相對廉價，導致礦場湧入，挖礦用電將超過民生用電)'.



An enhanced title: 'Iceland borrowed power from volcanoes (冰島向火山借能源)'.



The image on the top is 'the geothermal power plant in Iceland', the other is a schematic diagram of how geothermal power works.

A complementary content with a round number.

Using red highlight colour in some numbers and keywords. Source from TechNews and China Times.

Title or speech (complement, round number, enhancement) Source (news) Highlight Footage (geothermal power plant)

61	26:24		<p>Four complementary contents: 'In the world's most powerful 20 offshore wind farms, Taiwan owned 16 (世界風力最強 20 座離岸風場中，台灣占 16 座)', 'The volume of Taiwan offshore wind power device can reach 290 billion watt, which can support 20 billion families a year (台灣離岸風電裝置容量達 290 億瓦，可供 2000 萬戶一年用電量)' and 'though it was invested 40 billion dollars, it had once faced bankruptcy crisis because the government wasted amounts of time (投入資金 40 億元，但因政府曠日廢時，曾經面臨倒閉危機)'.</p> <p>An enhanced title: 'Taiwan Strait hid green energy (台灣海峽隱藏綠金寶藏)'.</p> <p>An enhanced title bar: 'Get green energy! The treasure of Taiwan Strait, called offshore wind power, valued over a trillion (淘綠金!?台灣海峽寶藏發威。"離岸風電"商機超過一兆!?)'</p>	<p>The image on the top is a schematic diagram of how offshore wind power works, the other is 'the offshore wind power in Taiwan'.</p>	<p>A complementary content with a round number.</p>	<p>Using red highlight colour in some numbers and keywords. Source from TechNews and China Times.</p>	<p>Title or speech (complement, round number, enhancement) Source (news) Highlight Footage (offshore wind power plant)</p>
62	35:57		<p>A complementary speech, the host said 'Is this the water you drink? 93% of bottled water was tested to have plastic particles (這就是你喝的水嗎?瓶裝水大檢驗發現 93%含有塑膠微粒)'.</p>	<p>A complementary speech with a precise number.</p>	<p>Title or speech (complement, enhancement)</p>		

			An enhanced title bar: 'Is bottled water full of plastic particles? Are plastic bags edible? What is the truth of the earth ecology killer? (瓶裝水含塑膠微粒?能吃的塑膠袋?揭地球生態殺手真相!?)'					
63	35:28		A complementary speech, the host said 'It's okay! I still have 7% of choices (還好!我還有 7%的選擇).	A complementary speech with a precise number.	An emphasised gesture.	The host said 'fortunately' with an orotund voice.	Show an exaggerated expression.	Title or speech (complement) Sound (orotund) Gesture (number)
64	36:12		Two complementary contents: '93% of bottled water was tested to have plastic particles, including Evian, S. Pellegrino and Nestle (93%瓶裝水驗出塑膠微粒, 包含依雲、聖沛黎洛和雀巢)' and 'There were actually 18 plastic bags in 3 stranded killer whales each (三隻擱淺虎鯨肚內竟含有 18 個塑膠袋)'. An enhanced title: 'Plastic, killer of global ecology!?' (塑膠, 地球生態殺手!?)'. An enhanced title bar: 'Look like starry sky! Containing plastic particles, it is the century scam of bottled water (宛如星空! 9 成瓶裝水含塑膠微粒, 瓶裝水百年世紀騙局!?)'	The image on the left is a photomicrograph of the microplastic in a plastic bottle, the other is that the killer whale's belly is stuffed with plastic bags.	A complementary content with a round number.		Using red highlight colour in some numbers and keywords. Source from United Daily News.	speech (enhancement) Source (news) Highlight



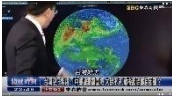
The video J007 meets the following criteria: firstly, the second highest number of subscribers in all the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include an environmental issue, ‘air pollution’. Table **Overview of video J007** shows that J007 is a non-affiliated talk show and the participants consisted of three no party affiliation minzui and a pan-blue minzui. The topic represents how serious the air pollution in Taiwan is, and through numerous mixing up footage of street, landscape and the aerial images.

Overview of video J007


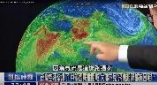

Code	J007	
Channel	Crucial Moment	
The type of programme	Non-affiliated talk shows	
Title	The standard of Taiwan air pollution exceeded! The central area was surrounded with smog. The great Buddha disappeared and planes took off and landed in difficulty. ()	
The participants	Host	Bao-Jie, Liou (): A no party affiliation television show host
	Guests	Syue-Heng, Jhu (): minzui (KMT)
		Shih-Cong, Huang (): minzui (no party affiliation)
		Can-Rong, Liu (): minzui (no party affiliation)
	Hsi-Ping, Ma (): minzui (no party affiliation)	
Subscribers	2.31M	
View Count	558,384	
Comment Count	485	

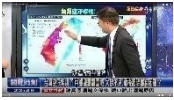



Overall, the communication practices of video J007 are similar to H006 (see table **The multimodal analysis of the video J007**). The two obvious differences are the use of satirical words and the use of numbers. Since video J007 is a non-affiliated talk show, it does not have a lot of speeches with political satire, it is replaced by numerous footages of mixing-up images for highlighting the severity of air pollution problem in Taiwan. Besides, the video does not use numbers to describe the air pollution problem but uses lots of colours to highlight that the air pollution is getting worse (e.g., position 3, 7 and 9).




The multimodal analysis of the video J007

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	47:05		<p>A complementary speech, the host said 'Nowadays, many people think that air pollution is serious in Taiwan, so how serious is it? (現在很多人覺得台灣現在的空汙很嚴重，嚴重到什麼程度呢)'</p> <p>An enhanced title bar: 'The standard of Taiwan air pollution exceeded! The central section was surrounded with smog. The landscape disappeared, planes took off and landed difficulty!?' (台灣空汙紫爆了!中部遭霧霾圍城，大佛不見，飛機起降都有困難!?)'</p>			An emphasised gesture.				Title or speech (complement, enhancement) Gesture (pointing with index finger)
2	47:07				A 'World Air Quality Index'.	A pointing gesture.				Data Gesture (pointing with index finger)
3	47:15		<p>An enhanced speech, the host said 'The darker the color, the worse the air quality. Oh my god! How dark Taiwan is! (顏色越深代</p>	A 'zoom in' shot of the World Air Quality Index.						Title or speech (enhancement) Data

表空氣品質越糟糕。我的天啊!
台灣好黑!)

4	47:19		<p>A complementary speech, the guest (Shih-Cong, Huang) said 'Recently, all western of Taiwan is almost in the state of badly air polluted (目前台灣整個西半部大概都是處於空氣汙染非常嚴重的狀況)'.</p>	<p>A 'close-up' shot of the World Air Quality Index.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (complement) Footage (close-up, data) Gesture (pointing with index finger)</p>
5	47:30		<p>An enhanced speech, the guest (Shih-Cong, Huang) said 'Based on the direction of air current, it seemed like a truth if putting blames on China (看氣流的方向，如果要把責任歸咎到中國上，好像是說不清的事實)'.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (enhancement) Gesture (pointing with index finger)</p>	
6	47:38		<p>Using a news image that shows the middle and south of Taiwan suffers from serious air pollution and is almost invisible. Montage: editing the news video and keeping the serious parts.</p>	<p>Source from Apple Daily.</p>	<p>Montage (filter out) Source (news) Footage (air pollution, Taiwan, landscape)</p>	

7	47:43		<p>An enhanced speech, the guest (Shih-Cong, Huang) said 'You see that almost all of west section was over air polluted (你看西半部幾乎都紫爆)'.</p> <p>An enhanced title: 'Air pollution problem reaches the worst level in Taiwan! (台灣空汙紫爆!)'</p>	<p>A mimic diagram of the 'Air Quality Index' in Taiwan.</p>	<p>An emphasised gesture.</p>	<p>The guest said, 'the west of Taiwan' and 'the middle of Taiwan' with a rotund voice.</p>	<p>Using the red highlight colour and enclosing the important part.</p>	<p>Title or speech (enhancement) Data Sound (rotund) Highlight Gesture (pointing with index finger)</p>
8	47:50		<p>A complementary speech, the host said 'As the value shows and compared with the map of air pollution. No matter people in central section get angry (你看這個值，對比到空汙地圖，難怪中部人會這麼生氣)'.</p>		<p>An emphasised gesture.</p>	<p>The host said 'No wonder people who live in the middle of Taiwan are so angry' with a rotund voice.</p>	<p>Using the red highlight colour and enclosing the important part.</p>	<p>Title or speech (complement) Sound (rotund) Gesture (pointing with index finger) Highlight</p>
9	47:56		<p>A complementary speech, the guest (Shih-Cong, Huang) said 'the colours which above yellow indicate that the air quality exceeds the standard (只要顏色在黃色以上都屬於超標)'.</p>		<p>A pointing gesture.</p>			<p>Title or speech (complement) Gesture (pointing with index finger)</p>
10	47:58			<p>Using a 'close-up' shot to show an agreement expression of Syue-Heng, Jhu.</p>			<p>An agreement expression of Syue-Heng, Jhu.</p>	<p>Footage (close-up) Expression</p>

11	48:04		<p>An enhanced speech, the guest (Shih-Cong, Huang) said 'Residents in Changhua could see this landscape (the great buddha) when opening windows generally, but it couldn't see completely recently (平常彰化居民打開窗戶就可以看到大佛，可是最近完全看不到這個大佛)'.</p> <p>An enhanced speech, the host said' The great buddha disappeared! (大佛不見了!)</p> <p>An enhanced title: 'Is the great buddha disappeared because of air pollution? The remarkable landmark in Changhua had fallen into smog (大佛因空汙神隱?彰化知名地標如墜五里霧)'.</p>	<p>Using a news image that shows the landscape in the middle of Taiwan suffers from serious air pollution and is almost invisible.</p>	<p>An emphasised gesture.</p>	<p>The host said the arrangement with a husky voice.</p>	<p>Using the red highlight colour and enclosing the important part.</p>	<p>Title or speech (enhancement) Sound (husky) Gesture (pointing with index finger) Highlight Footage (air pollution, Taiwan, landscape)</p>
12	48:26	 	<p>Using a street image that shows the middle of Taiwan suffers from serious air pollution and is almost invisible.</p> <p>Montage: mixing up the street image and the aerial image and keeping the serious parts.</p>	<p>Footage (sky, grey, road, building, smoke, negatives) Montage (mixing up)</p>				

13

48:36



An enhanced title: 'It's over polluted! The central section was surrounded by air pollution (空汙紅爆了!中部空汙圍城!).

Using a pair of news images with obvious contrast that show both before and after suffering from air pollution in Taichung.

An emphasised gesture.

Title or speech (enhancement)
Footage (split-screen, air pollution)
Gesture (height)

The video C037 meets the following criteria: firstly, the third highest number of subscribers in all the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include an environmental issue, 'air pollution'. Table **Overview of video C037** shows that C037 is an in-depth report, and the topic of this video is the air pollution governance among the representative countries, such as the US, China, India, and Taiwan. The main argument is the comparison of the air pollution governance between China and Taiwan that the issue is a target as important as economic development in China, but Taiwan puts it behind in energy issues and thinks the cause of air pollution is transboundary pollution from China.

Overview of video C037

Code	C037	
Channel	Sisy's World News	
The type of programme broadcasting	in-depth reporting	
Title	Mission impossible? Beijing invested 120 billion in fixing air pollution.	
The participants	Host	Wen-Chien, Chen (陳 文 建): minzui (no party affiliation)
	Guests	none
Subscribers	480K	
View Count	162,907	
Comment Count	736	

Overall, the video C037 uses many kinds of complementary elements to emphasise the speeches (see table **The multimodal analysis of the video C037**) and has an obvious personal perspective, which can be found in the numerous speeches (e.g., position 5, 8, 9, 10 and 13).



There are some notable communication practices in the video which are often used for complementing each other. Firstly, the video includes a great number of enhanced or conflicting speeches with voices (e.g., position 5, 7, 8 and 15), which are usually used for emphasising the arguments, and sometimes including political satire (e.g., position 13, 14, 15 and 32).




Secondly, the video uses lots of montage techniques to represent the consequence of air pollution around the world, including mixing up, zoom-in/out or vibrating the footage (e.g., position 3 and 26).





It is needed to notice that the elements of the footage in this video consist of a great number of negative images, such as smoke, air pollution, building, sky, grey, factory clean road, highways and street (e.g., position 1, 2, 3 and 5).

Thirdly, the video not only uses a pie chart of 'sources of emissions of PM2.5 in Beijing in 2017' (position 18), with precise numbers, but uses lots of both round numbers and precise numbers as scientific evidence of the speeches (e.g., position 30, 35, 38 and 39). Besides, the round numbers mostly appear in the speeches to emphasise the amount of population or deaths (e.g., position 30 and 35). Fourthly, gestures and voices appear a lot in the video for the similar meaning: highlighting the arguments of the video. Finally, this video does not use any dialect in the speeches.

The multimodal analysis of the video C037




Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:31		<p>An enhanced speech, 'Overviewing topics of international energy policies, there are 4 main projects (縱觀國際因應能源政策關注的議題，共有四個主要項目)'.</p> <p>An enhanced title bar: 'China waged war against air pollution. The 4-year effect exceeded 10-year in the US. (陸向空汙宣戰，四年治理成效超越美十年努力)'</p>	Using a street image that shows China suffers from serious air pollution and is almost invisible. A split-screen, a 'head and shoulders' shot for the host and an image.						Title or speech (enhancement) Footage (air pollution, street, china)
2	0:35		<p>A complementary speech, 'Including concerns of domestic power stability, energy independence that related to sovereignty (包含關心國家電力穩定；跟主權有關的能源自主)'.</p>	A split-screen, a 'head and shoulders' shot for the host and an image. Montage: mixing up,						Title or speech (complement) Montage (mixing up, fast-forward, vibrating) Footage (split-screen, head and shoulders,





			<p>vibrating and fast-forward five footages, and shows serious air pollution and is almost invisible.</p>		<p>crossroads, car, highways)</p>
3	0:43		<p>A split-screen, a 'head and shoulders' shot for the host and an image. Montage: mixing up two footages.</p>	<p>A complementary speech, 'Deep concerns of global warming and air pollution (還有非常關心全球暖化，以及空氣汙染)'.</p>	<p>Title or speech (complement) Montage (mixing up)</p>
4	0:56		<p>An enhanced speech, 'most of countries put air pollution on top issue (其中大多數的國家都把空氣汙染放在非常前面)'.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (enhancement) Gesture (exaggerate)</p>



5	1:01		<p>A conflicting speech, 'However, Taiwan put air pollution behind in energy issues. That is a unique think in energy policy (而台灣在能源議題裡，把空氣汙染放在很後面，這是非常少見的能源政策的思考)'.</p>	<p>Montage: mixing up two footages.</p>	<p>An emphasised gesture.</p>	<p>The host said 'put it at the end' with a husky voice.</p>	<p>Title or speech (conflict) Montage (mixing up) Sound (husky) Gesture (exaggerate)</p>
6	1:12		<p>A complementary speech, 'According to the announcement of WHO, there are at least 7 million people who die of air pollution per year. Most population concentrates in Asia (根據世界衛生組織宣告，全球每一年至少有 700 萬人死於空氣汙染，這些死亡人口主要集中在亞洲)'.</p>	<p>Montage: mixing up two footages.</p>	<p>A complementary speech with a round number.</p>	<p>The host said 'air pollution' with a husky voice.</p>	<p>Title or speech (complement, round number) Montage (mixing up) Sound (husky)</p>
7	1:38		<p>An enhanced speech, 'Air pollution used to happen most seriously in China, but now is India (而在亞洲空氣汙染最嚴重的曾經是中國，現在則是印度)'.</p>	<p>The image shows serious air pollution and is almost invisible.</p>	<p>The host said 'India' with a husky voice.</p>	<p>Title or speech (enhancement) Sound (husky) Footage (air pollution)</p>	
8	2:08		<p>A conflicting speech, 'Air pollution happens in Taiwan after 2014, but the answer from</p>	<p>The image shows serious air pollution and</p>	<p>The host said 'transboundary pollution' with a husky voice.</p>	<p>Title or speech (conflict) Sound (husky)</p>	

			government is transboundary pollution (台灣在 2014 年後空氣汙染在全台發生，而政府給的答案卻是境外汙染)'. is almost invisible.			Footage (air pollution)
9	2:15		A complementary speech, 'In brief, sandstorm and smog in China resulted in air pollution in Taiwan (簡單來說就是中國沙塵暴跟霧霾導致台灣的空氣汙染)'. The footage shows the street suffers from serious air pollution and is almost invisible.			Title or speech (complement) Footage (air pollution, street)
10	2:56		A conflicting speech with satirical words, 'China Beijing government has remarked management of air pollution a target as important as economic development since 2014. Even though realizing the pollution in Beijing came from other areas, no country treated it with shirking responsibility (中國北京政府於 2014 年開始已經將空氣汙染治理作為與經濟發展同等的國家目標。即使知道北京的空氣汙染來自其他地區，沒有一個國家以推卸責任的方式看待問題)'. The image shows the building suffers from serious air pollution and is almost invisible.	A 'wave' gesture, which means 'no'.	The host said 'shirk the responsibilities' with a husky voice.	Title or speech (conflict, satire) Sound (husky) Gesture (wave) Footage (air pollution, building)



11	3:01		<p>An enhanced speech with satirical words, 'Beijing is so closed to sandstorm and has known that most pollution is from burning raw coals nearby in Hebei. Thus, it is very easy to shirk responsibility of pollution if it wants (北京離沙塵暴這麼近，也知道附近的河北省燒的都是產生最多污染的生煤。想卸責汙染源是很容易的事情啊)'.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (enhancement, satire) Gesture (exaggerate)</p>
12	3:56		<p>A complementary speech, 'The main policy of air-polluted management in Beijing was to stop rebuilding new coal-fired plants and gradually weed out old plants in recent (目前北京對空汙治理的主要政策就是不在興建新的燃煤場，並慢慢淘汰就燃煤場)'.</p>		<p>Title or speech (complement)</p>
13	4:11		<p>An enhanced speech with satirical words, 'Beijing didn't choose to shirk all responsibilities to transboundary pollution like Taiwan government's</p>	<p>The footage shows the buildings suffering from serious air pollution</p>	<p>Title or speech (enhancement, satire) Footage (air pollution, building)</p>



			choice (北京沒有像台灣政府一樣選擇把全部的污染推給境外污染)'. and is almost invisible.		
14	4:18		A conflicting speech with satirical words, 'Like Taiwan hoped to shirk all responsibilities of air pollution to China (就像台灣希望把空汙的責任全部推給中國)'. The footage shows the highways suffering from serious air pollution and is almost invisible.		Title or speech (conflict, satire) Footage (air pollution, highways)
15	4:26		An enhanced speech with political satire, 'Conflicts between Taiwan and China have transferred from government and economy to air pollution. It becomes the best excuse in fight of two countries (台灣與中國之間的對抗，已經從政治和經濟上，轉移到空汙，成為兩國對抗最好的藉口)'. The host said 'excuse' with a husky voice.		Title or speech (enhancement, political satire) Sound (husky)
16	4:31		A complementary voice-over, 'Environmental pollution is trouble of livelihoods that needs to Montage: mixing up three footages and A complementary voice-over with		Title or speech (complement, precise number)





			<p>manage positively, especially emission of sulphur dioxide and nitrogen oxides. They should reduce around 3% and 5% separately (環境汙染是民生之患，要積極治理，特別是二氧化硫和氮氧化物的排放，要分別減少3%和5%左右)。</p>	<p>zoom-out shot.</p>	<p>a precise number.</p>		<p>Montage (mixing up, zoom-out) Footage (china, live stream, prime minister)</p>
17	5:05		<p>An enhanced title bar: 'Getting rid of GDP myth, sunny day had become normal since 2018 in Beijing. (擺脫 GDP 迷思，2018 年北京藍天白雲成為常態)</p>				<p>Title or speech (enhancement)</p>
18	5:38			<p>A 'close-up' shot of the pie chart of 'sources of emissions of PM2.5 in Beijing in 2017', with precise numbers.</p>	<p>The pie chart of 'sources of emissions of PM2.5 in Beijing in 2017', with precise numbers.</p>	<p>Source from China Central Television.</p>	<p>Footage (close-up, precise number, clean road) Data Source (news)</p>
19	5:56		<p>A complementary speech, 'According to newest statistics from China environmental protection</p>	<p>The footage shows the clean roads without air pollution.</p>	<p>A complementary speech with a round number.</p>	<p>sounds: bright background music</p>	<p>Title or speech (complement, round number, enhancement)</p>

			<p>department, air pollution concentration reduced over 40% last year compared to a year ago in Beijing (根據大陸環保部門最新數據，去年 10 月至 11 月，北京空汙濃度比去年同期下降超過 40%)’.</p> <p>An enhanced title bar: ‘Mission impossible? NY times reported: Beijing invested 120 million US dollars in the management of air pollution. (不可能任務? 紐約時報:北京投入 1200 億美元治理空汙)</p>			Sound (bright music)	
20	7:35		<p>An enhanced title bar: Parts of laws transferred from stuff to extreme. China’s management of air pollution caused popular grievance. (部分法規從強硬走鄉極端，中國治理空汙引民怨)</p>	<p>Montage: fast-forward the footage. Source from <i>Under the Dome</i>, a documentary film.</p>		<p>Title or speech (enhancement) Montage (fast-forward) Source (documentary film)</p>	
21	8:13		<p>A complementary speech, ‘Serious air pollutants in cities, especially turning rust belts from black to</p>	<p>The footage shows serious air pollution.</p>	<p>A complementary speech with a</p>	<p>Source from <i>Under the Dome</i>, a</p>	<p>Title or speech (complement, precise)</p>

	<p>blue, all resulted from the Clean Air Act of the United States in 1966. In fact, it took at least 10 years more for the US to reach the same effectiveness that only took 4 years in China. The effectiveness was 32% pollution reduction (美國城市嚴重的空氣汙染，尤其是鐵鏽帶從黑轉藍，都歸功於 1966 年通過的清淨空氣法案。但事實上美國又花了十多年，才達到中國僅花四年就達到的成效，即 32% 的空汙降比)'. A conflicting title bar: It took 4 years for China to manage air pollution and the effectiveness exceeded more than 10 years of efforts of the US. (中國花四年治理空汙，成效超越美國十數年努力)</p>	<p>Montage: mixing up many footages from the documentary film.</p>	<p>precise number.</p>	<p>documentary film.</p>	<p>number, conflict) Montage (mixing up) Source (documentary film) Footage (factory, smoke, air pollution)</p>	
22	8:42		<p>An enhanced speech, 'In these decades, the US decider had tried many ways to reduce air pollution. Facts proved that only through market monitoring, the cost</p>	<p>Montage: fasting- forward the footage.</p>	<p>Source from Legal Evening News.</p>	<p>Title or speech (enhancement) Montage (fast- forward) Source (news)</p>

			effectiveness would be the highest (在數十年間，美國決策者為降低空汙，嘗試過許多手段，事實證明，唯有透過市場監控，成本效益最高)'. An enhanced title bar: <i>Under the dome</i> , a documentary film, it aroused environmental awareness in China and started the management of air pollution (穹頂之下，喚醒環保意識，中國治理空汙里程碑)			
23	8:59		An enhanced title bar: <i>Under the dome</i> , a documentary film, it aroused environmental awareness in China and started the management of air pollution (穹頂之下，喚醒環保意識，中國治理空汙里程碑)		sounds: allegro symphony, which shapes tense feeling and the feeling of time going fast.	Source from <i>Under the Dome</i> , a documentary film. Title or speech (enhancement) Sound (allegro symphony) Source (documentary film)
24	10:20		An enhanced speech, 'A proper regulation of Air Pollution Control should focus on adjustment of industrial structure and majorization of energy allocation (一個妥善的空汙防制規劃，必須立足於調整產業結構與優化能源配置)'. An enhanced title bar: It was a long way to solve air pollution. It needed energy supporting of all industries. (空汙得長期抗戰，需全面產業能源配套)	Montage: mixing up, vibrating and fast-forward the footage, and shows serious air pollution and is almost invisible.'	sounds: allegro symphony, which shapes the feeling of war.	Title or speech (enhancement) Montage (mixing up, fast-forward, vibrating) Sound (allegro symphony)

25	11:28		<p>A complementary speech, 'Smog could be seen sometimes, a dull grey might be PM10 or coal ash (霧霾有時候是你看的見的，有時一片灰濛濛，那可能是 PM10 或是煤灰)'.</p> <p>An enhanced title bar: India had serious air-pollution problem and so did Taj Mahal. (印度空汙問題嚴，泰姬瑪哈陵也難逃霾害)</p>	<p>The footage uses 'wide shot' as the background shows serious air pollution. Montage: mixing up and fast-forward the footage and shows serious air pollution and the plastic pollution.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (complement, enhancement) Montage (mixing up, fast-forward) Gesture (exaggerate)</p>	
26	11:41		<p>A complementary speech, 'A while ago, owing to renovation works of Linkou Thermal Power Plant, the coal ash floated nearby with northeast monsoon. Therefore, many people found a layer of ash on the cars. It was not smog but more vital coal ash. (前一陣子，林口發電廠附近貯存煤灰的地點，由於廠房改造工程，導致煤灰隨東北季風飄到附近。因此很多人發現車子上多了一層灰，這個不是</p>	<p>An emphasised gesture means the wind direction and coal ash.</p>	<p>The host said 'where to store coal ash' with a husky voice.</p>	<p>Source from The Guardian.</p>	<p>Title or speech (complement) Sound (husky) Gesture (direction) Source (news)</p>

30	13:40		<p>A complementary speech, 'One-third of kids in New Delhi had appeared lung problems and there were more than a million people died of air pollution per year (新德里有三分之一的兒童肺部已經出現問題，印度一年死於空汙的人數高達百萬以上)'.</p>	<p>Montage: mixing up the footage.</p>	<p>A complementary speech with a round number.</p>	<p>The host said 'up to a million or more' with a husky voice.</p>	<p>Source from The Arirang TV.</p>	<p>Title or speech (complement, round number) Montage (mixing up) Sound (husky) Source (news)</p>
31	13:51			<p>Montage: mixing up and vibrating the footage and shows the Taj Mahal.</p>		<p>sounds: a background music which shapes the tense and secret feeling.</p>		<p>Montage (mixing up, vibrating) Sound (tense music)</p>
32	13:53		<p>An enhanced speech with satirical words, 'Taj Mahal used to witness an everlasting love and how the court destruction happened to environment (泰姬瑪哈陵的存在曾見證一段情深到來生的愛情，也見證環境如何一步一步走向自我毀滅)'.</p>	<p>Montage: mixing up the footage.</p>		<p>sounds: a background music which shapes the tense and warning feeling.</p>		<p>Title or speech (enhancement, satire) Montage (mixing up) Sound (warning music)</p>
33	14:19		<p>An enhanced title bar: Air and water pollution had the white walls of Taj Mahal disappear. (空汙水)</p>					<p>Title or speech (enhancement)</p>

汙染，泰姬瑪哈陵潔白
牆身不在)

34	14:53		<p>A complementary speech, 'Based on severe pollution in recent years, it grew abundant of insects in Yamuna River. These insects defecated on outside walls of Taj Mahal (亞穆納河近年來由於重度汙染，滋生出大量昆蟲，這些昆蟲在泰姬瑪哈陵外牆排便)'. An enhanced title bar: Yamuna River, the biggest tributary of Ganges River, suffered sabotage and was agonal. (恆河最大支流亞穆納河，遭人為破壞頻死邊緣)</p>	<p>Montage: mixing up three footages and zoom-in shots.</p>	<p>sounds: a background music which shapes the tense and warning feeling.</p>	<p>Source from The Guardian.</p>	<p>Title or speech (complement, enhancement) Montage (mixing up, zoom-in) Sound (warning music) Source (news)</p>
35	15:47		<p>A complementary speech, 'To support domestic water to 18 million people in upstream of Delhi, government built a dam in upstream. The results not only cut off abundant of river water, but also made much industrial and domestic wastewater directly flow into river. That made Yamuna River a river of death (為了給上游德里</p>	<p>Montage: mixing up three footages.</p>	<p>A complementary speech with a round number.</p>	<p>Source from The Guardian.</p>	<p>Title or speech (complement, round number) Montage (mixing up) Source (news)</p>

1800 萬人提供生活用水，政府在上游興建水壩，結果不但截斷大量河水，許多工業與民生廢水被直接排入河中，讓亞穆納河成了一條死亡之河)。

36

16:47






A complementary speech, 'According to WHO newest world air pollution report, in five metropolises, both having over 14 million population and the highest PM10 concentration, there were two in India (根據世界衛生組織最新全球空氣污染報告，在人口超過1400 萬的都市區中，PM10 濃度最高的五大城市中，印度就佔了兩個)'.




An enhanced title bar: Smog degree in India had exceeded China and became the dirtiest country in the world. (印度霾害程度超越中國，成為全球最髒國度)

Montage: mixing up three footages.

Source from The New York Times.

Title or speech (complement, enhancement) Montage (mixing up) Source (news)

37	16:58		<p>A complementary speech, 'And 14 cities of the highest PM2.5 concentration were all in India (而 PM2.5 濃度最高的 14 個城市，也都在印度)'.</p>	<p>The map of 'top 10 polluted cities for PM2.5 pollutants. Source from WHO 2016 Data.</p>	<p>Title or speech (complement) Data Source (WHO)</p>	
38	17:22		<p>A complementary speech, 'Statistics displayed that the average concentration of PM2.5 was 153$\mu\text{g}/\text{m}^3$ and PM10 was 286μg in 2014. They were all twice than Beijing (統計數據顯示，2014 年新德里 PM2.5 的濃度平均為每立方公尺 153 微克，PM10 為 286 微克。新德里都是北京的兩倍)'.</p>	<p>The bar chart of 'pollution statistics in Delhi and Beijing' in 2014, with precise numbers. A complementary speech with a precise number.</p>	<p>Source from Patent yogi. Title or speech (complement, precise number) Data (precise number) Source (commercial sites)</p>	
39	17:32		<p>A complementary speech, 'Serious smog would cause cardiovascular disease and cancer, which resulted in death of more than 3 million people per year in the world (霾害嚴重會導致心臟血管疾病及癌症，每年造成全球 300 多萬人死亡)'.</p>	<p>Montage: mixing up three footages.</p>	<p>A complementary speech with a round number.</p>	<p>Title or speech (complement, round number, enhancement) Montage (mixing up)</p>

			An enhanced title bar: Serious smog in India injured health of young and old. (印度霾害嚴 重，傷害幼老年人身體 健康)			
40	18:20		An enhanced title bar:It was hard to escape even hiding indoors, just like living in gas chamber. (躲 在室內也難逃 PM2.5， 宛如活在毒氣室)	Montage: mixing up the footage.	Source from The New York Times.	Title or speech (enhancement) Montage (mixing up) Source (news)
41	19:10		An enhanced title bar: India announced Ten Articles on Air Quality, but it was unwilling to face truth of serious air pollution. (印度公布大氣 10 條，卻不願正視空汙 嚴重事實)			Title or speech (enhancement)
42	19:39		A complementary speech, 'The degree of air pollution in India had exceeded China, becoming the most fatal air-polluted country in the world (印度的空汙程 度已經超越中國，成為 世界上最致命的空氣汙 染大國)'.	An enhanced title bar with a round number. The table of 'pollution statistics in Delhi and Beijing', with precise numbers.	Source from CNN.	Title or speech (complement, enhancement, round number) Data (precise number) Source (news)

An enhanced title bar:
PM2.5 injured health.
There were almost a million people died of it per year in India. (PM2.5 傷害健康，印度每年約 100 萬人因此喪命).

43

20:17



A complementary speech, 'Hawaii owned a special geo-environmental hotspot, which would cause eruption of monticules, called overflow. Now it appeared a new pollutant, laze, which was a toxic gas (夏威夷擁有一個特殊的地質環境"熱點"，熱點會造成小型火山噴發，稱為溢流。現在則出現了一個新的污染物- 熔岩霧靄，他是一個有毒的氣體)'.

An enhanced title bar:
Hawaii volcanoes continuously erupted, and the US had checked risks within its border. (夏威夷火山持續噴發，美清查境內火山風險).

The footage uses two screens as the background shows serious wildfire. Montage: mixing up the footage.

The host said 'Laza' with a husky voice.

Title or speech (complement, enhancement)
Montage (mixing up)
Sound (husky)
Footage (split-screen)

44	21:07		<p>The footage uses two screens as the background shows molten lava. Montage: mixing up the footage.</p>	<p>Source from The Wall Street Journal.</p>	<p>Montage (mixing up) Source (news) Footage (split-screen)</p>	
45	21:24		<p>A complementary title bar: Hot magma was bleeding out from cracks and volcanic gas generated blue flame. (滾燙岩漿從裂縫滲出，火山氣體產生藍色火焰).</p>	<p>Montage: mixing up and vibrating the footage.</p>	<p>Title or speech (complement) Montage (mixing up, vibrating)</p>	
46	22:47		<p>A complementary speech, 'The interaction between volcanic lava and sea was called laze. This hot gas was composed of thin air, toxic gases and volcanic fragments. It contented hydrochloric acid and high temperature, which severely stimulated human lung, eyes and skin (火山熔岩與海水間的交互作用，稱為熔岩霧靄，這種由稀薄蒸氣、有毒氣體及火山噴發碎片所形成的炙熱氣體，其中含有鹽酸且高</p>	<p>Montage: mixing up and vibrating the footage.</p>	<p>sounds: a background music which shapes the tense and warning feeling.</p>	<p>Title or speech (complement, enhancement) Montage (mixing up, vibrating) Sound (warning and tense music)</p>

溫，會嚴重刺激人體肺部、眼睛和皮膚)'.
An enhanced title bar:

Laze looked harmless, but
it would stimulate lung,
eyes and skin actually. (火
山"熔岩霧靄"看似無
害，實會刺激肺眼皮膚).




The video N010 meets the following criteria: firstly, the highest number of subscribers in all the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include an emerging energy, 'biogases'. Table **Overview of video N010** shows that C037 is an in-depth report, and the topic introduces the emerging energy in Taiwan, which is a part of the proportion of green energy, and it is also one of a supporting policy to replace nuclear energy.




Overview of video N010

Code	N010	
Channel	Min Shih Yi Yan Tang (民 視 一 言 堂)	
The type of programme broadcasting	in-depth reporting	
Title	Taiwan uses pigs to generate electricity. (豬 糞 製 成 電 力)	
The participants	Host	Jhen-Jhen, Li (陳 陳 李): A no party affiliation newsreader.
	Guests	None
Subscribers	None	
View Count	12424	
Comment Count	7	




Overall, the communication practices of video N010 are similar to C037 (see table **The multimodal analysis of the video C037**).

The multimodal analysis of the video N010

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:03		An enhanced speech, 'President Tsai made all-out efforts to achieve Nuclear free by 2025 and develop green energy. It included utilizing wastewater from stock farming to promote biogas power generation (蔡政府力拼 2025 年非核家園，全力發展綠能，當中包含要利用畜牧業產生的廢水，推展沼氣發電)'.	A split-screen, a 'head and shoulders' shot for the host and footage.		An emphasised gesture means push.				Title or speech (enhancement) Gesture (push) Footage (split-screen, head and shoulders)
2	0:10		An enhanced speech, 'She estimated to have a million pigs generate green energy in 2017 originally. However, a year passed and there were only 380 thousand pigs successfully being utilized (原本預計 2017 年就要讓全台灣 100 萬頭豬隻產生綠電。然而一年過去了，卻只有 38 萬頭豬成功用於綠電)'.	Montage: mixing up the footage.	An enhanced speech with a round number.		The host said 'a million pigs' with a husky voice.			Title or speech (enhancement, round number) Montage (mixing up) Sound (husky)
3	0:28		An enhanced speech, 'Target achieving rate was only one third (目標達成率只有三分之一)'.		An enhanced speech with a round number.	A hand gesture showing the number.	The host said 'only one-third' with a husky voice.			Title or speech (enhancement, round number) Sound (husky)

					Gesture (number)	
4	0:32		A complementary speech, 'The main reason was that traders would face problems with laws and insufficient infrastructures when generating each kilowatt-hour of electricity ('主要原因因為業者每發一度電，都面臨到法律配套及基礎設施不足的問題)'.		A hand gesture showing the number.	Title or speech (complement) Gesture (number)
5	0:43		An enhanced speech with satirical words, 'Would it be a dream again to utilize biogas to generate recycled green energy? (想利用沼氣產生循環綠能的目標，會部會又是一場空呢?)'		A hand gesture showing the suspicion.	Title or speech (enhancement, satire) Gesture (suspicion)
6	2:00		A complementary speech, 'These pig farm not only built pig house, feed mill but also installed large sewage treatment system. Its target was to find a solution for power shortage in Taiwan (位在屏東的這個養豬場，不但蓋豬舍、建飼料廠，更設置龐大的廢水處理系統，為的就是要替台灣的缺電問題找解方)'. Montage: mixing up five footages and zoom-out shots.			Title or speech (complement) Montage (mixing up, zoom-out)
7	2:37		A complementary speech, 'Biogas power generation could also sell money (沼氣發電又可以賣錢)' Footage: head and shoulders shot.			Title or speech (complement) Footage (head and shoulders)

8	5:38		An enhanced speech, 'Except space problem, biogas power generation and many infrastructures in pig farm also needed to be solved (而除了空間問題要解決外，養豬場想做沼氣發電，還需要許多基礎設施)'.	Montage: mixing up the footage.	sounds: a background music which shapes the vivid feeling.	Title or speech (enhancement) Montage (mixing up) Sound (vivid music)
9	6:47		A complementary speech, 'Traditional small pig farm had low generating efficiency because it lacked stilts and slopes and thus caused high moisture content of biogas (傳統的小型養豬場，因為沒有高床跟斜坡，導致沼氣含水量高，發電效率低落)'.	A split-screen, a pair of 'comparing footage'.		Title or speech (complement) Footage (split-screen)
10	8:42		An enhanced speech, 'The government provided allowance project for developing biogas electricity to small pig farms which occupied 93.7% in Taiwan farms in 2017 (2017年，政府針對占全台 93.7%比例的小型養豬場，端出補助發展沼電計畫)'.	Montage: zoom-out shots.	An enhanced speech with a precise number.	Title or speech (enhancement, precise number) Montage (zoom-out)
11	8:58		An enhanced speech, 'However, after 9 months passing, 5 biogas power plants still stayed theoretical in Taiwan. The concrete effect was zero (然而，9個月過去，全台 5 個沼氣發電場仍停留在紙上談兵階段，具體成效掛零)'.			Title or speech (enhancement)

12	9:26		A pie chart of 'the effectiveness of biogas power generation in 2017', with round numbers.		Data
13	9:33		An enhanced speech, 'Researchers thought that the government put too much expectancy on big pig farms to lead small pig farms (學者認為，政府過於寄望大型養豬場來帶領小型養豬場)'.		Title or speech (enhancement)
14	11:21		An enhanced speech, 'Although biogas power generation could contribute to green energy, the recent laws and infrastructures hadn't kept up steps (即使沼氣發電可以貢獻綠能，但是當前法律配套和基礎設施卻還跟不上腳步)'.	sounds: a background music which shapes the tense and warning feeling.	Title or speech (enhancement) Sound (warning and tense music)

The video G002 meets the following criteria: firstly, the third highest number of subscribers in all the channels and has the highest number of view counts of the channel. Secondly, the topics discussed in the video include an important environmental issue, 'nuclear free by 2025'. Table **Overview of video G002** shows that C037 is a pan-green talk show. The participants consisted of three pan-green Taipei City council members, a non-affiliated minzui, a pan-blue politician, a pan-green minzui and a pan-green member of the Legislative Yuan.

The topic of this video propagates that the government pushes the Nuclear free by 2025 policy through the financial subsidy for installing solar panels. One of the arguments of the video is that if the government wanted to achieve the Nuclear free by 2025 policy, only rooftop solar power generation was insufficient. The other is that solar energy is able to be a part of green energy, in other words, the Nuclear free by 2025 policy is able to be achieved.

Overview of video G002



Code	G002	
Channel	For A New Taiwan	
The type of programme broadcasting	Political talk show	
Title	A new era of all people generating electricity is coming? The government implemented Nuclear free by 2025 with attiring solar panels. They generated 3 million watt electricity in 2020. { 新 時 代 全 人 民 發 電 是 來 了 嗎 ？ 政 府 實 施 了 2025 年 前 實 現 核 電 零 排 放 政 策 ， 裝 配 太 陽 能 電 池 。 他 們 在 2020 年 發 電 3 萬 瓦 特 。 }	
The participants	Host	Cian-Ping, Huang (黃 建 興) : A no party affiliation newsreader.
	Guests	Bo-Wun, He (何 博 文) : A pan-green Taipei City council member.
		Wei-Jhong, Yang (楊 偉 中) : A pan-blue politician.
		Min-Fong, Chen (陳 敏 洪) : A no party affiliation minzui.
		Mei-Mei, Yu (俞 美 美) : A pan-green minzui.
		Ruo-Fang, Yan (顏 若 芳) : A pan-green Taipei City council member.
		Chih-Cheng, Lo (羅 智 誠) : A pan-green member of the Legislative Yuan.
Wun-Jie, Liang (梁 文 傑) : A pan-green Taipei City council member.		
Subscribers	79K	
View Count	55,941	
Comment Count	174	




Overall, the video G002 uses many kinds of complementary elements to emphasise the speeches (see table **The multimodal analysis of the video G002**) and has obvious political status, which can be found in the numerous positive title bars and speeches (e.g., position 4, 5, 10 and 13).




There are some notable communication practices in the video which are often used for complementing each other. Firstly, the video includes a great number of enhanced speeches with emphasised voices (e.g., position 3, 4, 5 and 15). Since the political status of the talk shows is the DDP which is the initiator of the ‘Nuclear free by 2025; policy, there are no satirical words in the video. Secondly, the video uses lots of head and shoulders shots to emphasise the opinion leader (e.g., position 17 and 20). Thirdly, the video uses a short version of the illustration and benefits of the “Green Energy Roofs project” (position 10), with a round number, which is simplified to read. Besides, the round numbers mostly appear in the speeches for illustrating the amount of cost (e.g., position 1,

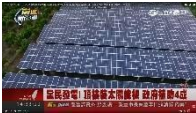



3 and 4). Fourthly, gestures and voices appear a lot in the video for the similar meaning: highlighting the arguments of the video. Finally, the dialect only appears once in the video (position 19) which shows a down-to-earth meaning that everyone can install solar panels.




The multimodal analysis of the video G002




Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other	Processes of knowledge selection
1	0:47		<p>A complementary speech, 'Executive Yuan was now going to implement Nuclear free by 2025. In order to encourage people to install solar panels on roofs, they planned to subsidize full cost and 40% of construction cost (行政院現在要落實非核家園，鼓勵全民在自家屋頂安裝太陽板，政府要補助全額規劃費用及 40%的建置費)'.</p> <p>An enhanced title bar: 'To implement Nuclear free by 2025, solar energy roofs were subsidized around 40 %? Were people going to buy the bill? (落實"2025 非核家園"，太陽能屋頂補助 4 成? 人民買單?)', with a round number.</p>	A split-screen, a 'head and shoulders' shot for the host and an image of news.	<p>A complementary speech with a precise number.</p> <p>An enhanced title bar with a round number.</p> <p>A pie chart with precise numbers.</p>				Source from Apple Daily.	Title or speech (complement, precise number, enhancement, round number) Data Source (news) Footage (head and shoulders, split screen)
2	1:00		<p>A complementary speech, 'There were people said: This was more profitable than</p>		An enhanced title bar with a round number.					Title or speech (complement, enhancement, round number)



			bank interest (有民眾也說，這比銀行利息還好賺). An enhanced title bar: 'Green energy was a penny-pincher? 99.2 square meters roof could take 8 years to earn its cost and could earn 4 thousand NT dollars per month ("綠能"精打細算?!30 坪屋頂種電 8 年回本?還有每月賺 4000).				
3	33:43		An enhanced speech, 'Government said that now solar energy roof could get 40% allowance and it rose questions for people that how could it built if the house was illegal (政府說太陽能屋頂現在可以補助 4 成，引起民眾疑問，如果果家有違建要怎麼蓋)'. An enhanced speech with a round number.	An emphasised gesture.	The host said 'can subsidize 40% of the cost' with a husky voice.	Source from Apple Daily.	Title or speech (enhancement, round number) Sound (husky) Gesture (pointing with index finger) Source (news)
4	33:52		An enhanced speech, 'Also, there were people said: If your roof is 99.2 square meters, it can earn its cost in 8 years at the earliest (還有人說，如果你家有 30 坪屋頂，最快 8 年就可以回本)'. An enhanced speech with a round number.	An emphasised gesture.		Source from Apple Daily.	Title or speech (enhancement, round number) Gesture (pointing with index finger) Source (news)
5	34:18		An enhanced speech, 'The government gave good temptation. In order to promote Nuclear free by An enhanced speech with a round number.		The host said 'fundt' with a husky voice.		Title or speech (enhancement, round number) Sound (husky)

			2025, it announced to give 40% allowance to people for installing solar panels on roof (政府祭出好康，說為了推動非核家園，宣布從 2018 年開始提供民眾太陽能屋頂建置費用 4 成)'. 				
6	34:38		A complementary speech, 'There were people said that the income of selling electricity alone could get more than 10 thousand dollars (有民眾也說，光是賣電的收入，每月就可以進帳一萬多)'. 	A complementary speech with a round number.	The host said 'earn about 250 pounds per month' with a husky voice.		Title or speech (complement, round number) Sound (husky)
7	34:46		A complementary speech, from the footage source, 'In order to implement Nuclear free by 2025, solar panels could start installed in 2018 and the government would provide allowance (為落實非核家園，2018 年開始就可以加裝太陽能板，政也將提供補助)'. 	Montage: zoom-out and zoom-in shots.		Source from SET News Channel.	Title or speech (complement) Montage (zoom-in, zoom-out) Source (news)
8	34:55		An enhanced speech, Rong-Jin, Che 'As long as promoting solar energy roofs, the whole domestic demand would be driven (推動屋頂太陽能以後，整個就會帶動內需)'. 	Footage: 'head and shoulders' shot of interviewee.		Source from SET News Channel.	Title or speech (enhancement) Source (news) Footage (head and shoulders)



9	34:58		An enhanced title bar: 'People generated electricity! The government would give '40% of implement for installing solar panels on top roofs (全民發電! 頂樓裝太 陽能板, 政府補助 4 成).	Montage: sliding transition and zoom-in shots.	An enhanced title bar with a round number.	Title or speech (enhancement, round number) Montage (zoom-in, sliding transition)
10	35:07		A complementary speech, from interviewee of two public, 'Right! It is a good way to generate electricity! (對阿! 這樣發電方式很好!)' and 'It is pretty good that it could increase little income (這樣可以增加些微收入滿 好的).'	Montage: mixing up the footage.	A short version of the illustration and benefits of the "Green Energy Roofs project", with a round number.	Title or speech (complement) Montage (mixing up) Footage (short version, round number)
11	35:26		An enhanced speech, 'People who get allowance were glad to see the outcome (有補助 民眾樂觀其成). An enhanced title bar: People generated electricity! It earned 10 thousand dollars a month by installing solar panels on top roofs. (全民發 電! 頂樓裝太陽能板, 賣電 月賺 1 萬元)	Montage: mixing up the footage.	A short version of the benefits of the "Green Energy Roofs project", with a precise number.	Title or speech (enhancement) Montage (mixing up) Footage (short version, precise number)
12	35:34			Montage: mixing up the footage.	A short version of the benefits compared the interest rate from the bank	Montage (mixing up) Footage (short version)



				with the income from the “Green Energy Roofs project” with a round number.		
13	35:41		A complementary speech, from interviewee of public, ‘As for idle fund, it is the best way to utilize (對閒置資金來說，這是最好的運用)’.			Title or speech (complement)
14	36:14		An enhanced title bar: ‘99.2 square meters roof could take 8 years to earn its cost in the earliest. (30 坪屋頂種電，最快 8 年回本)’.			Source from the Liberty Time. Title or speech (enhancement) Source (news)
15	36:23		A complementary speech, ‘Also, there was a person regarding that could it utilize roofs to generate electricity even though an illegal structure? (也有人提到一個問題，就是違建戶也可以屋頂種電嗎?)’ An enhanced title bar: It would get 40% of allowance to generate electricity with roofs and so did illegal structures. (屋頂種電補助 4 成，違建戶也行)	An enhanced title bar with a round number.	The host said ‘Illegal establishment’ with a husky voice.	Source from the Liberty Time. Title or speech (complement) Sound (husky) Source (news)

16	36:30		An enhanced title bar: Shocked! Illegal tin houses also generate electricity? Be doubtful about security? The government would give allowance. (驚!鐵皮屋違建戶也種電?安全有疑慮?政府要補助?)					Title or speech (enhancement)
17	36:36		An enhanced speech, Mei-Mei, Yu, 'I thought that laws must be complete to avoid people's doubt about building then demolishing (我覺得法規一定要多補充, 不要讓民眾有建了又被拆的疑慮).'	A split-screen, a 'head and shoulders' shot for the host and footage. Montage: mixing up the footage.				Title or speech (enhancement) Montage (mixing up) Footage (head and shoulders, split screen)
18	36:48		An enhanced speech, Mei-Mei, Yu, 'Besides, as for a house around 99.2 square meters, after adding allowance from government, it only need to take 8 year to earn its cost basically (另外, 一個 30 坪左右的房子, 加上政府補助的 4 成建置費用, 所以基本上只要 8 年就可以回本).'	A split-screen, a 'head and shoulders' shot for the host and footage. Montage: mixing up the footage.	A hand gesture showing the number.	The guest said 'a 100-square-meter house' with a rotund voice.		Title or speech (enhancement) Montage (mixing up) Sound (rotund) Gesture (number) Footage (head and shoulders, split screen)
19	37:25		An enhanced speech, Mei-Mei, Yu, 'Then, it was just put there to earn money each period, so I thought above a	A split-screen, a 'head and shoulders' shot for the host and footage.	An emphasised gesture.	The guest represents the speech with an rotund voice.	An enhanced speech 'Then, it	Title or speech (enhancement) Montage (mixing up)

			<p>certain square meters, it was a good deal (“然後呢，每一期就放著賺錢就好”，所以我覺得在一定的坪數以上很划算)’. shot for the host and footage. Montage: mixing up the footage.</p>		<p>was just put there to earn money each period, so I thought above a certain square meter, it was a good deal’ in Taiyu.</p>	<p>Sound (orotund) Gesture (exaggerate) Footage (head and shoulders, split screen) Dialect</p>
20	38:01	 <p>An enhanced title bar: ‘Generation of electricity by people started up! The government gave an allowance for installing solar panels. They could generate 3 million kilowatt electricity in 2020(全民種電啟動!? 裝太陽能板政府補助。2020年產3百萬千瓦電力).</p>	<p>An enhanced title bar with a round number.</p>			<p>Title or speech (enhancement, round number)</p>
21	38:09	 <p>A complementary speech, Mei-Mei, Yu, ‘I had a german friend and his income from selling electricity to the government per month was 500 euro dollars. It was a nice income! (我有一個德國朋友，每個月賣電給政府的收入大概是500歐元。這收入很不錯啊!’</p>	<p>Montage: mixing up the footage.</p>	<p>An emphasised gesture.</p>	<p>The guest said, ‘The income is pretty good!’ with a orotund voice.</p>	<p>Title or speech (complement, enhancement) Montage (mixing up) Sound (orotund) Gesture (exaggerate)</p>

			An enhanced title bar: The high energy users installed forcibly. Sun shading, lower temperature and generation of electricity were targets both for government and users in promoting green energy. (用電大戶強制裝設，遮陽降溫發電，蔡政府推綠能有共識)			
22	38:58		A conflicting speech with satirical words, Mei-Mei, Yu, 'Ying-jeou, Ma, the former president, had promoted wind power about four or five years ago, "but the Bureau of Energy suddenly rejected it because of blocking tunnels". Thus, there were eight wind power plants being wasted (4、5年前馬政府就有推動風力發電，但能源局規劃半天，"突然說抱歉，擋到航道了"。所以8個風場就浪費了)'. A split-screen, a 'head and shoulders' shot for the host and footage.	Montage: mixing up the footage.	An emphasised gesture.	A conflicting speech 'but the Bureau of Energy suddenly rejected it because of blocking tunnels' in Taiyu. Title or speech (conflict) Montage (mixing up) Gesture (exaggerate)
23	40:34		A complementary speech, 'It regarded that cross departments should cooperate just a moment ago, so the solar energy could be promoted continuously (剛才提到要趕	A split-screen, a 'head and shoulders' shot for the host and footage.	An emphasised gesture.	Title or speech (complement, enhancement) Montage (mixing up) Gesture (exaggerate)

			<p>緊跨部會整合，才能持續發展太陽能發電)'. An enhanced title bar: It cost 60 thousand dollars to install 9.92 square meters. It was hard to reach a consensus between the government and apartments. (裝 3 坪要 6 萬。公寓大樓難有共識...)</p>	<p>Montage: mixing up the footage.</p>		<p>Footage (head and shoulders, split screen)</p>
24	40:49		<p>An enhanced speech, Min-Fong, Chen, 'Now the problems are that it takes 4 to 6 month only for running process and the government only admits applications that finished in these 2 year. If I was an occupant in building, I was afraid that our building just achieved consensus after 2 years passed (現在問題在光是跑流程就要 4 到 6 個月，然後政府又限定優惠要在 2 年內申請完畢才有效。如果我是大樓住戶，恐怕我們大樓協商完成 2 年都過去了)'. A split-screen, a 'head and shoulders' shot for the host and footage. Montage: mixing up the footage.</p>	<p>An emphasised gesture.</p>		<p>Title or speech (enhancement) Montage (mixing up) Gesture (exaggerate) Footage (head and shoulders, split screen)</p>
25	44:01		<p>An enhanced speech, 'So the government could not think with its own perspective, it should think out more supporting measures (所以政府不能只用自己的視角思考，要多想一點配套措施)'. An emphasised gesture.</p>	<p>An emphasised gesture.</p>		<p>Title or speech (enhancement) Gesture (exaggerate)</p>

26	50:09		<p>An enhanced speech, Wei-Jhong, Yang, 'I thought that if the government wanted to achieve Nuclear free by 2025, only rooftop solar power generation was insufficient. Based on the problem of power failure before, It could be find that problems like uneven power generation or environmental assessment existed (我覺得如果政府要達到 2025 非核家園，只有屋頂種電這個措施是不夠的。根據之前停電的問題，可以發現用電結構的問題還是存在，像是南北發電不均或是環評的問題)'.</p>	<p>A split-screen, a 'head and shoulders' shot for the host and footage. Montage: mixing up the footage.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (enhancement) Montage (mixing up) Gesture (exaggerate) Footage (head and shoulders, split screen)</p>
27	51:56		<p>An enhanced speech, Bo-Wun, He, 'I thought that it could actually achieve for solar power (我覺得太陽能綠電其實是可以達成的)'.</p>	<p>A split-screen, a 'head and shoulders' shot for the host and footage. Montage: mixing up the footage.</p>	<p>An emphasised gesture.</p>	<p>Title or speech (enhancement) Montage (mixing up) Gesture (exaggerate) Footage (head and shoulders, split screen)</p>

The video C144 meets the following criteria: firstly, the fifth highest number of video views and comments of the programmes. Secondly, the topic discussed in the video is ‘ecological environment’ which has the third highest number of all of the environmental topics in in-depth reporting (see table **Overview of video C144**). Thirdly, the ‘Sisy's World News’ has the most relevant videos among all of the programmes, which means the environmental issues are the main topic in the ‘Sisy's World News’. As the title is depicted in table **Overview of video C144**, the topic of this video discusses the Amazon rainforest wildfires issue, and there are three main arguments in the video: the Amazon rainforest wildfires result in 'human behaviour' (see **The multimodal analysis of the video C144**, position 3); the Amazon rainforest wildfires is related to global economy that the China–United States trade war is the combustion aid of the wildfires (see table **The multimodal analysis of the video C144**, position 37); and anti-Brazilian government decision to develop rainforest.

Overview of video C144

Code	C144	
Channel	Sisy's World News	
The type of programme broadcasting	in-depth reporting	
Title	The guardian of amazon was slaughtered, and the Brazil government encouraged to plunder rainforest wantonly (護 林 工 人 被 殺 害 ， 巴 西 政 府 鼓 勵 掠 奪 雨 林 無 所 顧 忌)	
The participants	Host	Wen-Chien, Chen (陳 文 建) : minzui (no party affiliation)
	Guests	none
Subscribers	480K	
View Count	123,306	
Comment Count	611	

Overall, the video C144 uses more footage via editing techniques and sounds practices to represent the topic (see table **The multimodal analysis of the video C144**), and a typical video frame of in-depth reporting type of programme consists of a title bar, a host with a ‘head and shoulders’ shot and a virtual element (C144, position 4). The paragraphs below describe how the six communicative practices are represented in the video C144.

Firstly, in the part of speeches and title bars, firstly, the video uses lots of 'provocative title bars' and 'complementary speeches' as a way to segment the different aspects of the topic, which often bring some meaning of warning. For instance, the title bar under the bottom of the screen said: 'the wildfires occurred in the Amazon rainforest due to deforestation, and turning the Amazon rainforest into a forest cemetery' (C144, position 7), which collocates a complementary speech: 'the state of Hondonia occurs the wildfires due to deforestation, the prosperous land instantly turns into a forest cemetery and the atmosphere of death permeates everywhere' (C144, position 8). The video use lots of aggressive words in the speeches, which almost have negative meanings, such as 'mournful' (C144, position 1), 'this is not just a burning forest, this is almost a cemetery, because all you can see is death' (C144, position 13) and 'Amazon's natives petition the United Nations to protect the Amazon rainforest, however, it is still difficult to curb the ambitions of politicians' (C144, position 26).



Secondly, the video uses lots of schematic footage to collocate with the host's speeches and catastrophizes environmental issues with a large amount of devastating footage (C144, position 11, 22 and 49). For instance, as the topic of this video is 'wildfire', the video uses lots of disaster footage, such as fire, withered plants, smoke and dead animal footage for description (C144, position 11, 44, 16 and 25). Almost all of the in-depth reporting videos use lots of editing techniques in footage, such as a 'head and shoulders and 'close-up' shot which is used to emphasise the opinion leaders (C144, position 41 and 43). Regarding the 'montage' editing techniques, which is used to mix up the similar video to emphasise how severe the wildfire is (C144, position 8 and 12); using time-lapse editing techniques to represent how the fire disaster spreading in Brazil in a short time (C144, position 21); and using rotating footage and zoom-out to emphasise the range of the wildfire (C144, position 14).

Thirdly, the video uses lots of complementary speeches with round numbers, rather than the precise numbers, such as using fractions to represent the size of area, which is a common colloquial expression in the video. Fourthly, the sounds elements appear frequently in this video, for creating the specific atmosphere of the topic or highlighting the keywords of the speeches. For instance, using tense music as the background sound to emphasise the severity of the wildfire (C144, position 48) or representing the negative governance (C144, position 40); the host uses a husky voice to highlight the specific keywords (C144, position 2 and 20); or the host uses an orotund voice to censure the

governance (C144, position 42). Besides, the gestures and code-switching elements are little used in this video.

The multimodal analysis of the video C144

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other
1	0:24		<p>An enhanced speech, 'Today's topic maybe was not just a program but a mournful event. It was because that the fire in amazon forest did not slow down and was not disappear either (今天的主題可能不是一級電視節目，而是一個哀悼的節目，因為亞馬遜森林大火既沒有減緩，也沒有消失)'.</p> <p>An enhanced title bar, 'The Amazon wildfire burned continuously, thus the Brazil government finally agreed to help (亞馬遜雨林野火持續延燒，巴西終答應救援)'.</p>	Using footage of Amazon rainforest wildfires with a wide shot and aerial shot.			The host said 'the Amazon wildfire did not slow down and didn't disappear either' with a husky voice.		
2	0:40		<p>A complementary speech, 'Under arid climate, as long as these rainforests got fire, the fire would constantly spread out (這些熱帶雨林在乾燥的氣候下，一旦起火燃燒，就會不斷對外擴散)'.</p>	Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.		An emphasised gesture which means 'diffusion'.	The host said 'constantly spread out' with a husky voice.		

3	1:00		<p>An enhanced speech, 'This time, the catastrophe was only caused by human factor instead of arid climate. It levelled lands to act in concert with local cropping pattern, which resulted in a wide range of forest fire (這次的浩劫並不是因為氣候乾旱，純粹就是當地的人為，為了整地配合當地耕種方式，導致大範圍森林大火)'.</p>	<p>Using mixed footage of Amazon rainforest wildfires with a wide shot and aerial shot.</p>	<p>The host said 'man-made' with a husky voice.</p>
4	1:31		<p>A complementary speech, 'The area scale of wildfire was almost two thirds of American continent (這次的野火規模大約是美國三分之二的面積大小)'.</p>	<p>Using footage of Amazon rainforest wildfires with a wide shot and panning shot, which consists of smoke, fire, plants, and forest.</p>	<p>A complementary speech with a round number.</p>
5	1:45			<p>Montage: vibrating the footage.</p>	<p>Using tense music as the background sound.</p>
6	1:46		<p>The content of footage shows 'climate change', 'global warming' and 'calamity' appearing together, which emphasises the viewpoint of the environmental issues.</p>	<p>Montage: mixing up the footage, including forest fire and storm.</p>	

7	1:53		An enhanced title bar, 'Deforestation and wildfire made the Amazon rainforest a cemetery (濫伐雨林遇上野火，亞馬遜雨林化為森林墳場)'.		Source from Sky news.
8	2:10		A complementary speech, 'Here is Rondônia, where injured most seriously. Due to deforestation and wildfire, vigorous lands became	Montage: mixing up the footage, including forest burned by fire and a fleeing snake.	Source from Sky news.
	2:15		cemeteries immediately (這裡是受創最嚴重的宏東尼亞州，濫伐雨林遇上野火，生意盎然的土地瞬間化為森林墳場，遍地瀰漫死亡的氣息)'.		
9	2:30		A complementary speech, a Brazilian local farmer, 'My neighbour had a hundred cows, but no gross	Using an interview video with a 'close-up' shot. Using footage of Amazon rainforest wildfires with a wide shot and panning shot, which consists of smoke, fire, plants, and forest.	Source from Sky news.
	2:37		reminded. Hole of his family almost died in this forest fire (我的鄰居有一百頭牛，卻沒有剩下一根草，整個家庭幾乎死於這場森林大火)'.		
10	2:42		An enhanced title bar, 'Brazil government sent 40,000 troops and over a thousand police officers to put out the wildfire, but it did not work	Using footage of Amazon rainforest wildfires with an aerial shot and panning shot,	

(巴西政府派出 4 萬軍隊和上千警消，難以撲滅野火)'. which consists of smoke, fire, plants, and forest.
 An complementary speech with satirical words, 'Although Brazil government claimed to send thousands of troops and police officers, the fire still expanded continuously (巴西當局雖然號稱出動數萬軍隊和上千名警消積極滅火，但火勢依舊持續擴大)'

11 2:50



An enhanced speech, 'Looking down from above, you would find that the lung of earth can't breathe at all in rainforest (從上方鳥瞰雨林會發現地球的肺根本無法呼吸)'.
 Montage: mixing up the footage, which consists of smoke, fire, and forest.

Although Brazil government claimed to send thousands of troops and police officers, the fire still expanded continuously

Source from ALJAZEERA.

12 2:59



Montage: mixing up and vibrating the fire footage.



13

3:03



A complementary speech, Rosana Villar, a member of the Greenpeace, 'This was not only a burning forest, but almost a cemetery. Because all you could see are death (這不僅僅是一片正在燃燒的森林，這幾乎就是一片墓地，因為所有你能看到的都是死亡)'.

Using an interview video with a 'close-up' shot. Using footage of Amazon rainforest wildfires with an aerial shot, which represents a lifeless rainforest.

14






3:09











A complementary speech, 'Based on newest testing data from the Instituto Nacional de Pesquisas Espaciais (INPE), it increased at least 1,200 fires in Brazil in only 8 days (根據巴西國家太空研究院最新觀測資料顯示，僅在 8 天內，巴西境內又新增至少 1200 起火災)'.
An enhanced title bar, 'Desiccation and strong winds made Amazon rainforest expanded rapidly (乾燥外加強風助長，亞馬遜雨林迅速蔓延)'.

Montage: zoom-out and look-down editing techniques to represent the severity of the spread of fire disaster in Brazil.

A complementary speech and a heatmap with a round number.

15	3:26		<p>A complementary speech, a reporter from ABC news, 'Firefighters can't resist this fierce fire at all (消防人員根本無法抵擋這種兇猛的火勢)'.</p>	<p>Using an interview video with a 'close-up' shot, and the wildfire footage as background.</p>	<p>Source from ABC news.</p>	
16	3:31	  	<p>An enhanced title bar, 'The wildfire devoured the rainforest and it was helpless to put out it by helicopters in the air (野火吞噬熱帶雨林地，直升機空中澆灌杯水車薪)'.</p> <p>A complementary speech, 'The fire expanded rapidly with strong winds and no one alive in arid grove (火勢在強風助長下迅速蔓延，乾燥的樹叢無一倖免)'.</p>	<p>Montage: mixing up and vibrating the footage, which consists of smoke, fire, and forest.</p>	<p>Source from ABC news.</p>	
17	3:45		<p>A complementary speech, a reporter from ABC news, 'People cannot imagine how fast the fire expanded. We had seen it burning 200 codes in distance in just minutes (人們無法想像火勢蔓延有多快，光是短短五分鐘內，我們已經看到火勢延燒 200 碼距離)'.</p>	<p>Using an interview video with a 'close-up' shot, and the wildfire footage as background.</p>	<p>A complementary speech with a round number.</p>	<p>Source from ABC news.</p>

18	4:07		An enhanced speech, 'This apocalypse still expanded constantly (這樣的末日場景還在不斷擴大)'.	Using footage of Amazon rainforest wildfires with a wide shot and panning shot, which represents serious wildfire.		Source from ABC news.
19	4:12		An enhanced title bar, 'The extent of fire was unprecedented. It expanded to surrounding countries in south America (燃燒規模前所未有，一路延伸到南美多鄰國)'. A complementary speech, 'The fire even expanded to Bolivia, Paraguay and Peru nearby (火勢甚至延燒到鄰近的玻利維亞、巴拉圭和秘魯)'.	Using the fire footage.		Source from ABC news.
20	4:20		A complementary speech, Andres Ruzo, an environmentalist, 'Extent of these fires were enormous and unprecedented. We might lose three pitch size of forest each minute somewhere (這些火災的規模絕對是非常巨大的，是一個前所未有的燃燒規模，每分鐘我們都可能在某個區域，損失三個足球場大小的森林)'.	Using an interview video with a 'close-up' shot.	A complementary speech with a round number.	The host said 'every single minute' with an emphasised voice. Source from ABC news.

21	4:31	 	<p>An enhanced title bar, 'Ignitions were numerous. Fires of rainforest were almost outside cities and hard to put out (起火點千上萬，雨林野火多在化外之境難撲滅)'.</p> <p>A complementary speech, 'Numerous ignitions occupied almost two third of American domain, which equalled to the area from Detroit to Los Angeles (成千上萬起火點吞沒大約美國三分之二面積大小，相當於從底特律到洛杉磯的土地)'.</p>	<p>Using the wildfire footage.</p> <p>Montage: time-lapse editing techniques to represent the speed of the fire disaster spreading in Brazil.</p>	<p>A heatmap.</p> <p>A complementary speech with a round number.</p>	<p>Source from ABC news.</p> <p>Highlight two representative cities in the East and West of the U.S.</p>
22	4:56	  	<p>An enhanced title bar, 'The fire equipment was crude. Few firefighters were urged to deal the strong fire (滅火工具簡陋，極少消防員被迫處理廣大火場)'.</p> <p>A complementary speech with satirical words, 'Even though owning the best fire equipment, it was not sure to put out the strong fire in the Amazon rainforest, not to mention defenceless Brazil. Brazil fixed the fire that twice bigger than New Jersey only by 30 firefighters (大規模的火勢，讓即使擁有最好設備也未必能成功'.</p>	<p>Montage: mixing up and vibrating the footage.</p>	<p>A complementary speech with a round number.</p>	<p>Source from ABC news.</p>

撲滅亞馬遜雨林野火，更何況是毫無準備的巴西，僅仰賴 30 個消防員，就要處理紐澤西兩倍大的火場}.

23

6:01



An enhanced title bar, 'The guardian of amazon was slaughtered, and the Brazil government encouraged to plunder rainforest wantonly ('亞馬遜守護者"遭屠殺，巴西鼓勵大肆掠奪雨林}'. A complementary speech with political satire, 'When facing wildfires, most frustrated people were nothing more than aborigines. They were original guardians of rainforest, but helplessly saw the government violating constitution after the president of right, Jair Bolsonaro was elected (面對野火，最無奈莫過於當地原住民，舊時的雨林守護者，卻在右翼總統波索納洛上台後，眼睜睜看著政府罔顧憲法}.

Source from CNN news.

24



6:16









An enhanced speech with satire words, 'Brazilian president, Jair Bolsonaro greatly welcomed gold diggers, miners, herders and

The footage shows a tweet from Brazilian president.

Source from Twitter.

			fellers and gradually plundered home of aborigines (巴西總統波索納洛大舉鼓勵淘金者、礦工、牧民及伐木工，一步步向原住民的家園瘋狂掠奪)'.	Using footage of the Amazon rainforest as background.		
25	6:25		An enhanced speech, an Indigenous people of the Amazon Rainforest, 'Brazilian government was slaughtering our rights and aborigines (巴西政府正在屠殺我們的權利和原住民)'.	Using an interview video with a 'close-up' shot. The footage shows a dead animal.		Source from CNN news.
26	6:29		An enhanced title bar, 'Aborigines in Amazon pleased the UN, but it was hard to stop ambition of politician (亞馬遜原住民向聯合國請命，難遏止政客野心)'. An enhanced speech with satire words, 'They used to please UN for Amazon many times, but cannot stop ambitious politicians and developer (他們曾多次為了亞馬遜向聯合國請命，卻遏止不了充滿野心的政客和開發商)'.	Montage: mixing up two footages.	The host said 'hard to stop' with an emphasised voice.	Source from CNN news.

27	6:42			<p>Montage: mixing up and rotating footage which emphasises that people protest on the street for climate justice.</p>	Source from NBC news.
28	6:47		<p>A enhanced voice-over, 'Brazilian president, Jair Bolsonaro, became a hot issue both in Brazil and the world (巴西總統波索納洛在全球變成熱話題，不管在巴西或是全球)'. An enhanced title bar, 'After Amazon calling for help, global politics and folks supported generously one after another (呼救亞馬遜雨林，全球政界民間先後慷慨解囊)'.</p>	<p>Using a 'close-up' shot of Jair Bolsonaro, the President of Brazil. Montage: mixing up and rotating footage which emphasises the disagreement about the environmental governance from Jair Bolsonaro, the President of Brazil.</p>	Source from NBC news.
29	7:05		<p>A complementary speech, a participant in the protest, 'we are really scared that the</p>	<p>Using an interview video with a 'close-up' shot.</p>	

33	8:31		<p>An enhanced title bar, 'Rescue rainforest! Brazil government banned to fire amazon rainforest for 60 days (搶救雨林! 巴西禁止亞馬遜雨林放火正地 60 天)'.</p> <p>An complementary speech, 'Under pressure from in and out, Brazil president, Jair Bolsonaro, banned to fire amazon rainforest for 60 days (巴西總統波索納洛在內外壓力下，禁止亞馬遜雨林放火正地 60 天)'.</p>	<p>Using a 'close-up' shot of Jair Bolsonaro, the President of Brazil.</p>	<p>Using tense music as the background sound.</p>	
34	9:10		<p>An enhanced title bar, 'Each year during wildfire peak time, Brazil government plaited how hard it is to carry out laws (每年九月野火高峰期，巴西政府嘆執法不易)'.</p> <p>An complementary speech, 'Brazilian rainforest was almost fired in September, but rainy season needed to wait until later September (因為巴西雨林整地幾乎都是在九月進行，雨季最快要等到九月下旬)'.</p>	<p>Using footage of Amazon rainforest wildfires.</p>	<p>Using tense music as the background sound.</p>	<p>Source from CityNews.</p>
35	9:33		<p>An enhanced speech, 'As long as the fire kept burning and let over 20 percent rainforest disappear, it</p>	<p>Montage: mixing up and vibrating the footage.</p>	<p>An enhanced speech with a round number.</p>	<p>Using tense music as the background sound.</p>

would become so called 'graveyard spin'. The amazon rainforest would gradually become African savannas (一旦大火繼續延燒，讓超過20%的雨林消失，就會形成所謂的死亡螺旋，亞馬遜雨林將逐漸變成非洲稀樹草原)'.

36

11:16



An enhanced title bar, 'Impacts of trade war were that China refused to buy soybeans from America and Brazil was crazy about fire rainforest (貿易戰惡果，陸拒買美大豆，巴西瘋種燒雨林)'.

An complementary speech, 'The reason of having high attention from global was that the amazon rainforest had close relationship with oxygen emission and carbon dioxide absorption (亞馬遜雨林之所以受到全球重視，跟它可以排放的氧氣和吸收的二氧化碳有極大關聯)'.

Using footage of Amazon rainforest with a wide shot and aerial shot.

37

13:19



An enhanced speech, 'Had you once thought that the China–United States trade war was helping force of this century fire (你曾經想過中

美貿易戰是這場世紀大火
的助燃劑嗎)'.

38

13:20



An enhanced title bar,
'The China–United States
trade war pushed fire in
amazon and Brazilians were
culpable (中美貿易戰"助燃"
亞馬遜，巴西人也難辭其
咎)'.
A complementary speech,
'Jair Bolsonaro, who valued
economy not environment,
was elected, so it was
culpable for Brazilians to
become abettors (選出波索
納洛，輕環境重經濟的右
派強人，巴西人也難辭其
咎成為本案的幫兇)'.

Using tense music
as the background
sound.
The host said
'Accomplices of
the Amazon
Wildfire' with an
emphasised voice.

Source from
France 24.

39




13:30



The title of the news shows
'Trump's Trade War Could be
Fueling Amazon Fires'.

The footage
shows a news post
from Bloomberg.

Source from
Bloomberg.

40	16:10		<p>An enhanced title bar, 'Jair Bolsonaro scorned environmental protection and pushed citizens to fire forest for livelihood (波索納洛輕蔑環保，催化巴西人燒林耕地糊口)'.</p> <p>An enhanced speech from Jair Bolsonaro, the President of Brazil, 'NGOs are losing money, without money from Norway and Germany, they are without jobs, so they try to bring me down'.</p>	<p>Using a 'close-up' shot of Jair Bolsonaro, the President of Brazil.</p>	<p>Using tense music as the background sound.</p> <p>The interviewee represents the speech with an emphasised voice.</p>
41	16:24		<p>A complementary speech, 'Jair Bolsonaro accused NGOs in left wing set on fire in rainforest to have he resign (波索納洛指控環保政策與他對立，巴西左派非政府組織在雨林縱火，藉政治算計令它垮台)'.</p> <p>An enhanced speech with political satire, 'but politicians' salvias couldn't put out fire (但政治口水無法滅火)'.</p>	<p>The host said 'But political slobber can't put out the fire' with a contemptuous voice.</p>	<p>Source from PBS news.</p>
42	18:17		<p>An enhanced title bar, 'Go greening was a blind alley for election to nationalists (國家民族主義者，環保行動是選票死路)'.</p>	<p>Using footage of the presidential election in Brazil.</p>	<p>The host said 'environmental action is a blind alley for votes' with an orotund voice.</p>

An enhanced speech with political satire, 'Compared to climate change, Jair Bolsonaro cared more about national right and economic development. As to nationalists, go greening was a blind alley for election (比起氣候變遷，波索納洛更關心國家主權和經濟發展。對這種國家民族主義者來說，環保行動是選票死路)'.

43

18:27






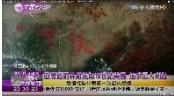

An enhanced speech with political satire, 'In the US, climate change was political issue and republican party supported petrochemical industries. Donald John Trump was committed to overthrow environmental laws and his latest movement was to repeal ban of methane emission that set by Obama's government (在美國氣候變遷便是政治議題，共和黨擁護美國石化業者，川普上台後致力推翻環保法規，新作為是著手廢除歐巴馬時期訂定的甲烷排放限令)'.

Using a 'close-up' shot of Trump, the former President of the U.S. Montage: zoom-in editing techniques to emphasise the key person.

Using tense music as the background sound. The host said 'Start to repeal the methane emission limit order which was established by Obama, the former President of the U.S.' with an orotund voice.

Source from C-span.

44	22:09		<p>An enhanced title bar, 'Disappearance of rainforest would bring disaster. We perhaps lost drug for deadly disease (雨林消失將帶來災難，恐失去致命疾病的藥方)'.</p> <p>A complementary speech, 'When we lose 20 percent global oxygen emission provided by amazon forest, the biggest change in future is murky seasons and high appearance of extreme climate (當我們失去亞馬遜森林提供的 20%全球排氧量，未來最大的變化就是四季不再明顯，且會加速極端氣候的出現)'.</p>	<p>Using footage of withered plants with a wide shot as background.</p>	<p>A complementary speech with a round number.</p>	<p>The host said 'the seasons are no longer obvious and will accelerate the emergence of extreme weather' with an orotund voice.</p>
45	22:30		<p>An enhanced speech, 'The biggest threat for human life was drought because it caused shortage of food most easily, so was famine (其中對人類生活威脅最大的是乾旱，它最容易造成糧食短缺，也最容易造成飢荒)'.</p>	<p>Using footage of barren land and dead wood with a wide shot as background.</p>	<p>An emphasised gesture means 'whole human life'.</p>	<p>The host said 'it's easy to cause food shortages and famine' with an orotund voice.</p>
46	22:40		<p>An enhanced speech, 'The common discourse of global warming thought droughts was gradually extending. When Europe and other</p>	<p>An emphasised gesture.</p>	<p>The host said, 'political turmoil is inevitable' and 'a series of environmental</p>	

			<p>countries started to be affected by droughts, political unrest was unavoidable (目前全球暖化的常見論述認為乾旱正逐漸擴大，而當歐洲及其他國家開始受到乾旱的影響後，政治的動盪幾乎是不可避免的)。</p> <p>An enhanced speech, 'So this time was actually not only a death of rainforest, but also a line of elegies (所以這次的事件其實僅僅是一個熱帶雨林的死亡，而是一連串的悲歌)'。</p>			elegy' with a husky voice.	
47	26:21		<p>An enhanced title bar, 'Operation of amazon rainforest was like 19 century in the U.S., which pursued the largest benefits (亞馬遜雨林拓荒如 19 世紀美國，追求最大利益)'。</p>	<p>Montage: time-lapse and rotating editing techniques to represent the speed of development of the Amazon rainforest.</p>	A heatmap.	Using warning music as the background sound.	Source from BBC EARTH.
48	27:06		<p>An enhanced title bar, 'Decreasing of rainfall caused droughts more seriously. It was hard to reverse disaster in the Amazon rainforest (降雨減少導致乾旱加劇，亞馬遜雨林災難難逆轉)'。</p> <p>A complementary speech, 'Scientists also represented</p>	<p>Using footage of the Amazon rainforest with a wide shot.</p>		<p>Using tense music as the background sound.</p> <p>The host said 'very few are natural disasters, most are man-made disasters' with a husky voice.</p>	Source from World Economic Forum.

that most reasons of burning in rainforest were artificial, less by nature (科學家也表示，潮濕的雨林起火原因，極少是天災，多數是人禍)。

49

28:09



An enhanced title bar, 'The centre of Africa also featured wildfires. The scale was twice of the Amazon wildfire (非洲中部也傳野火，規模是亞馬遜兩倍)'.

Using footage of the Africa Forest fires with a wide shot.

An enhanced title bar with a round number.

Source from Africa News.

50

28:19



A heatmap shows the density of wildfires in Africa.

51

39:32



An enhanced title bar, 'Logging illegally and mining speedy became the biggest threat to jungle ecology (非法伐木採礦加速，成叢林生態最大威脅)'.

The video E006 meets the following criteria: firstly, the highest number of video views and comments of the programmes. Secondly, the topic discussed in the video is 'ecological environment' which has the third highest number of all the environmental topics in in-depth reporting. As the title is depicted in table **Overview of video E006**, the topic of this video discusses the plastic pollution issue, and there are three main arguments in the video: the plastic pollution and marine pollution result in 'human behaviour' (see table **The multimodal analysis of the video E006**, position 7 and 21); the plastic pollution is related to national economic and development (see table **The multimodal analysis of the video E006**, position 22); the plastic pollution need immediate action, otherwise it may cause irreversible global pollution (see table **The multimodal analysis of the video E006**, position 1).

Overview of video E006

Code	E006
Channel	The Disappearing Borders
The type of programme broadcasting	in-depth reporting
Title	Melted in warm water in sixty seconds. The India has created a ban failed but subverted the world's environmental soluble bag (60秒内熔化的温水。印度已经创建了一个失败的禁令，但颠覆了世界的环境可溶性袋子。)
The participants	Host: Tian-Yi, Li (李天怡): A no party affiliation newsreader. Guests: none
Subscribers	none
View Count	82,226
Comment Count	78

Overall, the video E006 uses more footage via editing techniques and sounds practices to represent the topic (see table **The multimodal analysis of the video E006**), and a typical video frame of in-depth reporting type of programme consists of a title bar, a host with a 'full body' shot and a virtual element (E006, position 4). The paragraphs below describe how the six communicative practices are represented in the video E006.

Firstly, in the part of speeches and title bars, firstly, the video uses lots of 'enhanced title bars' and 'complementary speeches' as a way to segment the different aspects of the topic, which often bring




some meaning of warning or praise. For instance, the title bar under the bottom of the screen said: 'plastic is hard to be digested after eating, 30% of cattle and sheep hide plastic bags in their stomachs' (E006, position 20), which collocates a complementary speech: 'among the animals which are slaughtered by the Nairobi Public Slaughterhouse, three out of tenth had plastic bags hidden in their stomachs' (E006, position 20). Or the enhanced title bar which highly praised the countries which prohibit the use of plastic, as the following title bar showed, 'Kenya, the most stringent country banning the use of plastic around the world' (E006, position 9). The video use lots of aggressive words in the speeches, which almost have negative meanings, such as 'addictive' (E006, position 3), 'plastic bags paralyzed the entire city's drainage system' (E006, position 16) and 'the rubbish all over the ground is the killer of the earth which has never been transformed' (E006, position 26).

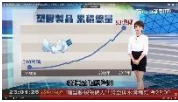
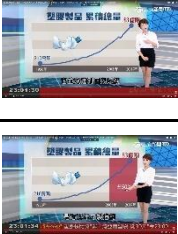


Secondly, the video uses lots of schematic footage to collocate with the host's speeches and catastrophizes environmental issues with a large amount of devastating footage (E006, position 16, 19 and 21). For instance, as the topic of this video is 'plastic pollution', the video uses lots of footage full of rubbish (E006, position 27, 32 and 34). Almost all of the in-depth reporting videos use lots of editing techniques in footage, such as a 'close-up' shot which is used to emphasise the topic of the video (E006, position 15 and 28). Regarding the 'montage' editing techniques, which is used to mix up the similar video to emphasise how severe the wildfire is (E006, position 16 and 32); using time-lapse editing techniques to represent how the slums in the Philippines are filled with rubbish in a short time (E006, position 27); and using rotating footage and zoom-out to show the severity marine pollution on Hong Kong (E006, position 33).

Thirdly, the video uses lots of complementary speeches or enhanced speeches with round numbers, rather than the precise numbers, such as using fractions to represent the huge amount of the rubbish, which is a common colloquial expression in the video. For instance, the enhanced speech uses '50% to 60% are plastic products' (E006, position 1) with a round number which emphasises that plastic products occupy an extremely high proportion of marine pollution. Fourthly, the sounds elements appear frequently in this video, for creating the specific atmosphere of the topic or highlighting the keywords of the speeches. For instance, using tense music as the background sound to emphasise the severity of the plastic pollution (E006, position 3) or using gloomy background music to represent the






helplessness feeling of the severe plastic pollution (E006, position 16); the host uses a husky voice to highlight the specific keywords (E006, position 2 and 6); or the host uses an orotund voice to praise the governance (E006, position 8). Finally, the gesture elements appear in the video frequently to emphasise the meaning of the key point, for example, the host uses a spreading hands gesture which means 'where did the remaining plastic go?' (E006, position 6), or uses a grab gesture which means 'arrest' (E006, position 12). Besides, the code-switching element is not used at all in this video.




The multimodal analysis of the video E006






Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other
1	0:21		An enhanced speech, 'There has eight million tons of garbage spreading into the ocean, and about fifty percent of them were plastic products. If there is no more restraint, the amount of garbage by 2050 may be unimaginable (全球每年有八百萬噸的垃圾流向海洋，其中有 5 到 6 成是塑膠製品。如果再不節制的話，到 2050 年的垃圾量可能難以想像)'.		An enhanced speech with a round number.		The host said 'If there is no more restraint, the amount of garbage by 2050 may be unimaginable' with a husky voice.		
2	0:35		An enhanced speech, 'The main reason that cause the ocean pollution is the characteristic of the plastics in composable. You can imagine the plastic ingredients still exist but it's over three hundred and fifty years (塑膠不易分解的特性是造成海洋環境污染的主因，可以想像當一個塑膠原料在 350 年前的流入海洋，它可能現在依然存在)'.	Montage: rolling editing techniques to show that lots of plastic flows in the ocean.			The host said 'the plastic may still exist' with a husky voice.		
3	0:53		An enhanced speech, 'Human has addicted to the numerous used of plastic (人類對於塑膠的大量使用已經是成癮的等級)'.				Using tense music as the background sound.		





4	1:25		A complementary speech, 'According to the statistics, since the plastic has been invented, humans totally produced 8.3 billion tons of plastics (根據統計，在塑膠發明以來，人類一共生產 83 億噸的塑膠)'.	A 'close-up' shot of the line chart of 'accumulation of plastic products usage'	A line chart with a round number.	The host said '8.3 billion tons of plastic products' with a husky voice.	
5	1:33		An enhanced speech, 'Among them has 5.7 billion tons of plastics didn't go in the recovery system, and half of them were made in fifteen years (其中有 57 億噸的塑膠並沒有進到回收系統，而且有 50% 塑膠製品，是近 15 年才製造的)'.		An enhanced speech with a round number.	An emphasised gesture means 'enter'. A pointing gesture.	Highlight
6	1:37		An enhanced speech, 'There's only eighteen percent of plastic products been recovered, and expect the twelve percent were burned, where did the remaining plastic go?' (這 50% 塑膠製品只有 9% 被回收，12% 被焚燒而剩下的七成九的塑膠到哪裡去了呢?)		An enhanced speech with a round number.	A spreading hands gesture means 'where did the remaining plastic go?'.	The host said 'only 9% is recycled' with a husky voice. The host said, 'where did the remaining plastic go?' with an orotund voice.
7	1:45		An enhanced speech, 'More and more people think that the ocean is the garbage dump of the moderns (越來越多人認為，海洋就是現代人的垃圾場)'.				The host said 'landfill' with an orotund voice.
8	1:53		An enhanced speech, 'The Luanda government started to ban plastic bags since 2003. It became the first country in the world which banned	A 'close-up' shot of the 'no plastic prohibition signs.			The host said 'It became the first country in the world to ban

			<p>the plastic bags. And Kenya has also banned the plastic bags in 2017. How did they come to realize?' (盧安達政府早在 2003 年時就開始禁用塑膠袋，它變成全球第一個禁用塑膠袋的國家。肯亞也在 2017 年開始實施禁用塑膠袋，甚至也嚴格禁止著稱。讓我們來看看他們是怎麼醒悟的?)</p>		<p>plastic bags' with an orotund voice.</p>
9	2:36		<p>An enhanced title bar, 'The world's most severe banned country: Kenya (世界最嚴禁塑國：肯亞)'.</p>	<p>Using a wide shot of Kenya's city image. Montage: zoom-in editing techniques to emphasise visual immersion.</p>	
10	2:50		<p>An enhanced speech, 'We can't see plastic bags on the street in Nairobi, the capital city of Kenya (奈洛比，肯亞首都，我們在街上看不到塑膠袋)'.</p>	<p>Using a wide shot of Kenyan street image.</p>	<p>The host said 'we can't see plastic bags on the street' with an orotund voice.</p>
11	3:02		<p>A complementary speech, 'In Kenya, use plastic bags will cause the fine of thirty thousand new Taiwan dollars (在肯亞，使用塑膠袋將會被處以 30000 台幣的罰款)'.</p>		<p>A hand gesture showing the number.</p>
12	3:10		<p>A complementary speech, 'No matter you are the local or tourists, the police can arrest you as a red-handed criminal if you use the plastic bag on the street (不管是本</p>		<p>An 'grab' gesture means 'arrest'. The host said 'the police can arrest you as a red-handed criminal'</p>

			地人或觀光客，只要在街上使用塑膠袋，警察都可以以現行犯逮捕你)'. with an orotund voice.
13	3:48		An enhanced speech, 'Not only is plastic bags banned, the government also bans the manufacture of plastic bags that completely cut off from the root cause (不只禁用塑膠袋，政府也禁止製造塑膠袋，要從根源徹底斷絕)'. The host said 'to cut weeds and eliminate the roots' with an orotund voice.
14	3:59		A complementary speech, Salome Machua, the head of the National Environment Management Authority, 'We decided to take the strict measure is because this country was filled with plastics and suffocating (我們決定採取這麼嚴格的措施，是因為我們發覺這個家正在被塑膠袋淹沒，令人窒息)'. Using an interview video with a 'close-up' shot.
15	4:10		An enhanced title bar, 'The fine is thirty thousand, the bag is red-handed criminal (罰金 3 萬，提袋即為現行犯)'. A 'close-up' shot of the plastic bag.
16	4:24	 	A complementary speech, Edwin Ambani, a Kenyan guide, 'Now I'm standing on the drain, but all drains are filled with plastics (我現在正站在排水溝上，但所有排水溝都讓塑膠淹沒了)'. Montage: mixing up the footage of plastic pollution in Kenya. sounds: gloomy background music.

			An enhanced speech, 'Plastic bags has paralyzed the whole city's drainage system (塑膠袋癱瘓了整個城市的排水系統)'.			
17	5:25		An enhanced title bar, 'Crisis! Plastic bag destroy the city、Blocked the drainage system (危機！塑膠袋毀城、堵大排)'. A complementary speech, Salome Machua, the head of the National Environment Management Authority, said, 'Each year, we produce 24 million small bags which have speeded in our environment and are not going to decompose'.	A complementary speech with a round number.	sounds: gloomy background music.	Sadness expression.
18	6:00		An enhanced speech, 'Plastic bags are not only an environmental problem but an economic problem. Half year of the rainy season, Nairobi must be flooded, and it caused the traffic shut down, impacting the business works. The huge amount of plastic bags was enough to destroy the city.' (塑膠袋不但是環境問題更是經濟問題。一年約6個月的雨季，奈洛比一定淹水，導致交通停擺，影響公務及商業運作。環境中爆量的塑膠袋，足以毀城。)	A 'close-up' shot of the blocked drainage channel.	sounds: gloomy background music. The host said 'Nairobi must be flooded' and 'enough to destroy the city' with an orotund voice.	
19	6:55		An enhanced speech, 'Look around, all of them are plastic bags. After these bags came along the water,	A pointing gesture.	sounds: gloomy background music.	

			they were all stocked and does not flow anymore.’ (放眼望去，全部都是塑膠袋，這些塑膠袋順著水流過來後，全部都堵在這理之後，就不再流動了)			The host said 'it doesn't flow anymore' with an orotund voice.
20	8:34		An enhanced title bar, 'The plastic is hard to be digested, thirty percent of cows and sheep have plastic bags in their stomach (食不化，3成牛羊胃藏塑膠袋)'. A complementary speech, 'Among the animal killed in Nairobi Public Slaughterhouse, three of tenths have plastic bags in their stomachs (奈洛比公營屠宰場宰殺的牲畜中，十隻內有三隻的胃裡都藏有塑膠袋)'.	A 'close-up' shot shows that the living environment of animals is full of plastic waste.	An enhanced title bar with a round number.	sounds: a background music which shapes the tense and warning feeling.
21	9:18	  	An enhanced speech, 'There are forty sounds and seven hundred and sixty rivers in the world, about one to two million tons of plastics flowed into the ocean each year. And two of third were from the severe polluted countries.' (全世界有 4 萬 760 條河流，每一年會將 100 到 200 萬噸的塑膠排入大海。且其中三分之二是來自 20 條嚴重污染的國家)	A 'close-up' shot of three areas with severe plastic pollution within the Caribbean Islands, Jakarta and the Hawaiian Islands.	An enhanced speech with a round number.	A pointing gesture. sounds: a background music which shapes the tense and warning feeling.
22	9:34		An enhanced speech, 'The garbage-intensive area in footage were mostly in Asia, such as China、Indonesia and Philippine, their		A heatmap of global waste distribution.	A pointing gesture. sounds: a background music which shapes the

			<p>common points is the middle-income country which economic growth sharply (圖中的垃圾密集區幾乎都在亞洲，像是中國、印尼和菲律賓，他們的共同點就是經濟快速增長的中等收入國)'. </p>			<p>tense and warning feeling. The host said 'middle-income country' with an orotund voice.</p>
23	9:44		<p>An enhanced speech, 'Garbage will go with ocean current flowing and become a huge garbage area (垃圾會隨著洋流形成巨大垃圾帶)'. </p>	<p>An ocean current chart.</p>	<p>An emphasised gesture means 'ocean current flowing'.</p>	
24	9:57		<p>An enhanced speech, 'The biggest flow area is Pacific circulation, the garbage area can be 3 times as big as French territory (流動面積最大為太平洋環流，垃圾帶可以大到法國領土 3 倍大)'. </p>	<p>An enhanced speech with a round number.</p>	<p>A hand gesture showing the area.</p>	<p>The host said '3 times as big as French territory' with an orotund voice.</p>
25	11:01		<p>An enhanced title bar, 'The earth killer! Plastic indecomposable in thousand years (地球殺手！塑膠袋千年不化)'. </p>	<p>A wide shot and aerial shot of the landfill. Montage: rotating, time-lapse and zoom-out the footage which emphasises that the landfill occupies a large area.</p>		
26	11:24		<p>A complementary speech, 'The thing all over the ground is the indecomposable earth killer (這個遍</p>			<p>The host screamed at the sight of plastic all over the floor.</p>

也有印度矽谷之稱，但這邊垃圾污染的現象超乎你我想像)

31 28:50



An enhanced title bar, 'Bill Gates in environment: decomposed bag (環保界比爾蓋茲：“可溶袋”)'.

A 'close-up' shot show that the soluble bag can be decomposed with water

32 39:31



An enhanced speech, 'The ocean and the wind direction always let the coast in Hong Kong undergo innumerable garbage tsunami (海洋跟風向總是讓香港的海岸，經歷一場場的垃圾海嘯)'.



Montage: mixing up and rolling editing techniques to show a lot of garbage piled up on Hong Kong's coast.

The host said 'trash tsunami' with an orotund voice.

33 39:38



An enhanced title bar, 'Thrill! The garbage all around Hong Kong (悚！直擊港島“樂”)'.

Using footage of polluted bay with a wide shot and aerial shot.
Montage: rolling editing techniques to show a lot of garbage piled up on Hong Kong's coast.

34 39:40



Using close-up shots of the garbage.
Montage: invert colour and rolling editing techniques to emphasise a lot

of garbage piled up
on Hong Kong's
coast.

35

48:55



An enhanced speech, 'Although we put the attention on the ocean garbage problems, but there's still lot of ocean trash which absorb toxic plastic particle didn't be cleaned and quietly went into the food chain. Therefore, how to get the balance between convenience life and environment is the war that everyone needs to confront.' (海洋垃圾的問題雖然逐漸受到重視，但還有更多未被清理的海洋廢物可仍吸附有毒塑膠粒子，悄悄的進入食物鏈中。因此，如何在便利的生活跟環境之間取的平衡，是一場每個人都需要面臨的戰爭)

The host said 'how to strike a balance between a convenient life and the environment' with an orotund voice.

36

48:58



An enhanced speech, 'The origin of war is also for us (而戰爭的起源也是人類自己)'.

An emphasised gesture means 'censure'.

The host said 'the origin of war is also human beings' with an orotund voice.

The video F008 meets the following criteria: firstly, the highest number of video views and comments of the programmes. Secondly, the topic discussed in the video is ‘climate change’ which has the highest number of all the environmental topics in in-depth reporting. As the title is depicted in table **Overview of video F008**, the topic of this video discusses the climate change issue, and there are two main arguments in the video: extreme weather is happening constantly and frequently (see table **The multimodal analysis of the video E006**, position 7); global warming is getting worse than before (see table **The multimodal analysis of the video F008**, position 8).

Overview of video F008

Code	F008
Channel	Li Sihduan De Yunduan Shihjieh
The type of programme broadcasting	in-depth reporting
Title	The biggest flood peak for seventy-one years! The flame destroy the aircraft carrier and America’s mood (71年最大洪水峰 71年最大洪水峰 71年最大洪水峰 71年最大洪水峰 71年最大洪水峰)
The participants	Host Sih-Duan, Li (李思端): A no party affiliation newsreader. Guests none
Subscribers	351K
View Count	240,959
Comment Count	516

Overall, the video F008 uses more footage via editing techniques, gestures and sounds practices to represent the topic (see table **The multimodal analysis of the video F008**), and a typical video frame of in-depth reporting type of programme consists of a title bar, a host with a ‘half-body’ shot and a virtual element (F008, position 1). The paragraphs below describe how the six communicative practices are represented in the video F008.

Firstly, in the part of speeches and title bars, firstly, the video uses lots of ‘enhanced title bars’ and ‘complementary speeches’ as a way to segment the different aspects of the topic, which often bring some meaning of warning. For instance, the title bar under the right of the screen said: ‘the largest flood peak in 71 years has caused the Yangtze River to flood, and it also emphasises global warming is

getting worse' (F008, position 8), which collocates a complementary speech, 'frightening floods entrained rolling mud and sand, rushing straight to the houses ahead after scouring the bridge piers' (F008, position 10). The video also uses lots of aggressive words in the speeches, which almost have negative meanings, such as 'unusual weather' (F008, position 5), 'the beautiful historic city has become a city ravaged by badwater' (F008, position 18) and 'the flood, which has been rare in decades, has caused considerable damage' (F008, position 13).



Secondly, the video uses lots of schematic footage to collocate with the host's speeches and catastrophizes environmental issues with a large amount of devastating footage (F008, position 9, 10 and 18). For instance, as the topic of this video is 'climate change', the video uses lots of extreme weather footage (F008, position 12 and 20). Almost all of the in-depth reporting videos use lots of editing techniques in footage, such as a 'close-up' shot which is used to emphasise the topic of the video (F008, position 10 and 13). Regarding the 'montage' editing techniques, which is used to mix up the similar video to emphasise how severe the flood is (F008, position 8 and 12); using rolling editing techniques to represent the serious landslide (F008, position 16); and using zoom-in to show the village after being hit by heavy rain (F008, position 12).



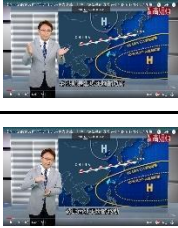

Thirdly, the video uses enhanced speeches with round numbers to emphasise the severe global warming, rather than the precise numbers, such as using whole numbers to represent that the glaciers at the head of the Yangtze River have shrunk 1,200 meters in 40 years (F008, position 22).

Fourthly, the sounds elements appear frequently in this video, for creating the specific atmosphere of the topic or highlighting the keywords of the speeches. For instance, using tense music as the background sound to emphasise the severity of the flood (F008, position 8, 9 and 10) or the ambulance siren sound represents the feeling of urgency (F008, position 11); the host uses a husky voice to highlight the specific keywords (F008, position 3 and 4); or the host uses an orotund voice to represent the surprised at the rain disaster has caused considerable damage (F008, position 13).






Finally, the gesture elements appear in the video frequently to emphasise the meaning of the key point, for example, the host uses a rotate hands gesture which shows that the flooding happens round after round (F008, position 6), or uses an emphasised gesture which shows the length of the time period (F008, position 2). Besides, the code-switching element is not used at all in this video.





The multimodal analysis of the video F008

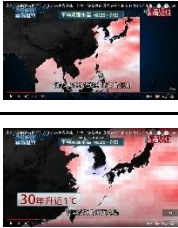

Position	time	Image	Speeches and title bars	The use of footage via symbols, editing techniques and montage	The use of number and data	Gestures	Sounds	Code switching	Other
1	0:20		<p>An enhanced title bar, “Forty six torrential rain (暴雨 46 天)’.</p> <p>An enhanced speech, ‘It’s been a month of the abnormal weather. The summer we felt in Taiwan is pretty hot. The temperature got higher and higher, and there’s not even a typhoon at the end of July.’ (過去一個多月，天氣狀況真是反常，我們在台灣感受到異常酷熱的夏天。高溫每天都在打破紀錄，七月快結束了卻一個颱風都沒有形成)</p>	<p>Montage: mixing up six images which show the heavy flood in China.</p>		<p>An emphasised gesture means ‘feeling’ and ‘unusually hot summer’.</p>	<p>The host said, ‘really abnormal’ and ‘unusually hot summer’ with a husky voice.</p>		
2	0:36		<p>A complementary speech, ‘In the past month, about forty days, continues raining in Yangtze River basin in China. Even the rainfall in the past six months has all been over in one month.’ (過去一個多月，長達 40 天的時間，中國長江地區下雨幾乎不間斷，甚至過去半年雨量，全部都在一個月下完了)</p>			<p>An emphasised gesture which shows the length of the period.</p>	<p>The host said, ‘up to 40 days long’ and ‘even the rainfall in the past six months has all been over in one month’ with a husky voice.</p>		

3	0:51		An enhanced speech, 'Actually, these extreme climate in the world is definitely not accidental (其實這些發生在各地的極端氣候變化絕非偶然)'.			The host said 'definitely not accidental' with a husky voice.
4	0:57		A complementary speech, 'The main reason that cause the extreme weather is the pacific high pressure has been exceptionally strong this year, and it is very abnormal. So, the weather around Taiwan were always scorching.' (今年造成氣候反常的主因就是熱帶太平洋的高壓今年異常的強勁，且非常反常。因而造成台灣周邊的天氣一直處於酷熱的狀態)	A weather chart shows the reason for the weird climate change.	An emphasised gesture which shows the keyword of the speech.	The host said 'The pacific high pressure has been exceptionally strong this year' and 'very abnormal' with a loud voice.
5	1:25		A complementary speech, 'The extreme weather cause the continuously rain in Yangtze River basin in China (天氣異常造成中國長江流域出現不斷的降雨)'.		An emphasised gesture which shows continuous rain and the movement.	
6	1:33		A complementary speech, 'And it has North-south movement that cause the flooding happens round after round (並且此相遇帶不斷的南北移動，造成當地水患一輪接著一輪發生)'.		A rotate hands gesture which shows that the flooding happens round after round.	The host said 'the flooding happens round after round' with a husky voice.

7	1:44		An enhanced speech, 'I remind the world again that extreme weather is happening constantly and frequently (再次提醒世人·極端氣候正在不斷且頻繁發生)'.		An emphasised gesture which shows the keyword of the speech.	The host said 'extreme weather is happening constantly and frequently' with a husky voice.
8	1:47		An enhanced title bar, 'The warming up cause the biggest flood peak since seventy-one years, the Yangtze River is deplorable (71年來最大洪峰·暖化加劇·長江淹慘)'.	Montage: mixing up footage which shows the heavy flood in China.		sounds: a background music which shapes the tense and warning feeling.
9	1:50			An aerial shot. Montage: rolling footage which shows the heavy flood in China.		sounds: a background music which shapes the tense and warning feeling.
10	1:53		A complementary speech, 'The extreme flood including muds flushes the bridge and then hits the houses ahead (驚人洪澇夾帶滾滾泥沙·沖刷橋墩後·直衝前方民宅)'.	A close-up shot shows the heavy flood. Montage: mixing up and vibrating footage which show the heavy flood in China.		sounds: a background music which shapes the tense and warning feeling. The host said 'the flood hits the houses ahead' with an orotund voice.
11	2:03			A close-up shot shows the houses destroyed by the flood.		sounds: the ambulance siren sound which represents the feeling of urgency.

12	2:59		A complementary speech, 'The main reason that cause the severe disaster is the one and a half month rainstorm since June second in China (造成這麼嚴重的災情，主因為中國 6 月 2 日起，一連下了一個半月的暴雨)'.	Montage: mixing up and zoom-in footage which show the village after being hit by heavy rain.		sounds: a background music which shapes the tense and warning feeling.
13	3:04		An enhanced speech, 'This rain disaster has caused considerable damage (這場數十年來罕見的雨災，已經造成為數可觀的傷害)'.	A close-up shot of a half-flooded store.		The host said 'the rain disaster has caused considerable damage' with an orotund voice.
14	3:06		A complementary speech, Guo-Guang, Zheng, the Vice Minister of the Ministry of Emergency Management of People's Republic of China, '(洪澇災害已經造成了全國 27 個省區，一共 3873 萬人受災)'.	Using an interview video with a 'close-up' shot.	A complementary speech with a round number.	The interviewee said 'a total of 38.73 million people were affected by the flood' with an orotund voice.
15	3:21			A close-up shot shows the footage that the house is collapsing.		sounds: a background sound of people screaming.
16	3:26			A close-up shot and an aerial shot of the landslide. Montage: rolling footage which		

				shows the serious landslide.	
17	3:32		An enhanced speech, 'The Phoenix Ancient Town which located in Hunan Xiangqi was known as the most beautiful city, but the wretched look after the floods (未在湖南湘西的鳳凰古城曾被稱為中國最美的小城·卻在洪水後成為這副模樣)'.	Montage: mixing up footage which shows the obvious contrast of the historic cities in China after the flood.	sounds: a background music of Chinese classical music which shapes the historic cities in China.
18	4:02		An enhanced speech, 'The extinct beauty city becomes flooded city (絕美古城儼然成為惡水肆虐之城)'.	Montage: zoom-out footage which shows the flooded street. A close-up shot of the flooded street.	
19	4:19		A complementary speech, 'The road was covered by water in only four days in Wuhan area (武漢地區也同樣遭受水患·不過4天時間·原本可見的路面已經被水淹沒)'.	Montage: mixing up footage which shows the obvious contrast of the historic cities in China after the flood.	
20	4:48		A complementary speech, 'The water peak level at Changjiang Hankou has made the fourth highest record since 1865 on July twelve, 2020 (2020年7月12日·'.	Montage: mixing up and rolling footage which shows that the Hankou section of Yangtze River	sounds: a background music which shapes the oppressive feeling.

			中國長江漢口段的洪峰水位創下 1865 年以來第四高紀錄'.	discharges water because of the heavy flood.			
21	8:10		An enhanced speech, 'According to flood incident since 1981 to 2010 in China, the sea surface temperature is nearly 1 degree higher (根據中國 1981 年到 2010 年的汛期·中國沿海的海面溫度就多了近 1 度)'.	Montage: mixing up and zoom-in footage of the heatmap.	A heatmap.	The host said 'the sea surface temperature is nearly 1 degree higher' with an orotund voice.	Source from NHK. Highlight
22	8:16		An enhanced speech, 'The extreme high temperature not only cause heavy rain, the glacier from Changjiang has shrunk 1,200 meters in 40 years (異常高溫不僅釀成大雨·長江源頭冰川 40 年內已經退縮 1200 公尺)'.	Montage: mixing up footage of melting ice. A close-up shot of the melting ice.	An enhanced speech with a round number.	sounds: a background music which shapes the tense and warning feeling. The host said 'the glacier has shrunk 1,200 meters in 40 years' with an orotund voice.	

