Peer feedback in online writing activities: Comparing the impact of Google Docs and Wikis on individual writing performance

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Abstract

This thesis explores the impact of inline vs. non-inline commenting on learners' individual writing performance. This is done through exploring whether peer feedback exchanged on Google Docs and Wiki, two widely used Web 2.0 platforms in L2 writing classes, brings about a differential impact on students' individual writing performance. The study included an intervention with 40 (20 dyads) upper-intermediate level Saudi EFL students in a Saudi University. Following a split-class design, half of the class was randomly assigned to the first experimental condition (Google Docs) and the other half of the class was assigned to the other experimental condition (Wiki). In both conditions, the learners exchanged peer feedback and peer edits, took pre-, post- and delayed- post-tests. Half of the participants in the intervention then participated in one-on-one semi-structured interviews to elicit their perceptions of their learning experience in the two modalities as well as to help explain the participants' performance in the quantitative data (tests and online interactions).

Students in both groups improved overall, with the Wiki group improving more than the Google Docs group. Examining data in more depth, the students in the Google Docs group improved more than the Wiki group in terms of form. These results might be explained by the fact that Google Docs group provided more feedback focusing on form as well as the value that Google Docs group saw in a number of functions that promote narrowly-focused feedback on language such as *automated update commenting*, *visual connection between feedback mode and the texts*, and *in-line commenting*. On the other hand, the Wiki group improved more in terms of content. These results might be due to the fact that Wiki group participants provided more feedback focusing on content and their use of online tools for mediating their content-based feedback. As the two groups showed differences in writing accuracy, teachers should carefully consider the features of technological tools before implementing them in writing classes. In addition, significant differences in feedback focus and reactions to it in both groups imply that Google Docs is more suitable for editing and accuracy, whereas Wiki seems to be better option for drafting purposes with focus on content. Therefore, teachers must do extra work to offset these platform's limitations.

Table of Contents

List of tables

Dedication

This thesis is dedicated to my beloved parents and wife for their unlimited support and encouragement.

Author's declaration

I hereby declare that this thesis is the result of my own work and I am the sole author. This work has

not been previously submitted by the author for an award at this, or any other, university or institution.

All sources are acknowledged as References.

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Chapter1 Introduction

1.1.   Introduction

Pair writing and peer review, two forms of peer collaboration during which students jointly develop a piece of writing, mutually evaluate their writing performance, or jointly revise their written texts, have been widely adopted in L1 and L2 composition classrooms in recent decades (Hyland & Hyland, 2006). Peer review in the context of pair writing is based on the sociocultural theory (SCT) of learning (Hansen & Liu, 2005; Min, 2006; Shehadeh, 2011) which views peer feedback and writing as social processes (Hansen & Liu, 2005; Hyland, 2003; Hyland & Hyland, 2006; Yong; 2010). SCT also assumes that peers can reciprocally scaffold each other to improve their writing skills through interaction (Shehadeh, 2011; Storch, 2005; Storch, 2013). Different online platforms offer different ways of commenting. Inline commenting is believed to promote local comments, which have been shown to lead to higher development in writing accuracy (form—grammar, vocabulary, mechanics), whereas non-inline commenting is believed to promote global comments, which have been shown to lead to higher development in the writing content. This study therefore compares Google Docs, which promotes inline comments, with Wiki which lacks this feature and rather allows commenting at the bottom of the Wiki page in form of non-inline comments. The overarching aim of this thesis is to explore the extent to which Saudi English as a Foreign Language (EFL) learners' engagement in mutually scaffolded interactions (in the context of pair writing) in the form of Google Docs inline comments and Wiki non-inline comments (end-page comments), and subsequent revisions can help improve their individual writing.

In order for feedback to be successful, it needs to occur in interaction, as in the case of exchange of feedback during learner-learner interactions. However, successful feedback practices including learner-learner interaction are often confronted by the limitations of the traditional classroom setting, particularly time-space constraints that restrict chances for such interactions in writing class-

rooms (Bower & Richards 2006; Ebadi & Rahimi 2017). These time-space restrictions in the traditional environment can be neutralised through the integration of interactive technology in writing instruction (Jeong, 2016) including Web 2.0 technologies which can have a positive impact on writing learning and instruction (Ebadi & Rahimi, 2017; Slavkov, 2015). Web 2.0 technologies also could offer interactive learning settings for EFL pair writing where learners jointly compose writing tasks and engage in peer feedback and peer editing of these writing activities (Ebadi & Rahimi, 2017).

In the next sections, the rationale for performing this research will be discussed, the gaps in the current literature are identified, and the significance of the study is underlined. This will be followed by discussion of the objectives of the research and statement of the research questions. The chapter will end with an overview of the structure of the thesis.

1.2.   Rationale for the study

The rapid expansion of Web 2.0 technologies presents both teachers and learners with new ways of commenting. Inline commenting (promoted by Google Docs) and non-inline commenting (promoted by Wiki) features that made it possible to collaborate through these features might be beneficial for peer review. Rarely have the impacts of inline feedback and non-inline feedback and reactions to it on students' writing been compared in the same context and under the same circumstances. Therefore, looking into the value of Google Docs inline peer feedback and Wiki non-inline peer feedback exchanged through Google Docs and Wiki mediums (which allow users to jointly write text, mutually comment on it, and then edit it) in the context of pair writing would help bridge this gap.

Previous research concerning Google Docs and Wiki concentrated on:

- The focus of peer feedback (Alharbi, 2020; Bradley, 2014; Bradley & Thouesny, 2017; Elola & Oskoz, 2010; Hsu, 2019; Kessler, 2009; Kost, 2011; Lee, 2010; Oskoz & Elola, 2012; Song & Usaha, 2009; Thouesny & Bradley, 2014; Yim, Zheng & Warschauer, 2018; Zheng, Lawrence & Lin, 2014).

- The peer revisions made on the platforms (Cha & Park, 2010; Guardado & Shi, 2007; Hsu, 2019; Liang, 2010; Song & Usaha, 2009; Arnold, Ducate, & Kost, 2009; Aydin & Yilduz, 2014; Bui, 2015; Kessler, 2009; Kost, 2011; Kessler, Bikowski & Boggs, 2012; Lee, 2010; Mak & Coniam, 2008; Semeraro & Moore, 2017).

- The effectiveness of peer feedback on students' writing performance (Alshumaimeri, 2011; Akbari & Erfani, 2018; Castañeda & Cho, 2013; Castañeda & Cho, 2012; Chin, Gong, & Tay, 2015; Ebadi & Rahimi, 2017; Lee, 2010; Lee, Cheung, Wong, & Lee, 2013; Pham, Lin, Trinh, & Bui, 2020; Semeraro & Moore, 2017; Wang, 2014; Woo, Chu, and Li, 2013; Zheng, Lawrence, Warschauer, & Lin, 2014).

- Students' attitudes towards peer feedback exchanged on these platforms and its impact on their writing (Franco, 2018; Froldova, 2016; Pham, Lin, Trinh, & Bui, 2020).

Even though some of the research strands on these platforms in second language (SL)/ foreign language (FL) teaching and writing have explored the educational value (language learning potential) of computer-assisted language learning (CALL) activities on both platforms, they have not attempted to compare the impact of feedback exchanged on these two Web 2.0 tools, namely Google Docs (which promotes inline commenting) and Wiki (which promotes non-inline commenting at the bottom of the page), on the participants' writing in the same context. In addition, previous studies on peer feedback and the Google Docs and Wiki platforms either explored the writing process (i.e., peer revisions and peer feedback) or the writing product after engagement in peer feedback activities on these forums. Looking into both process and product of writing in CALL vs. CALL environment, which is a design with engineering power (equating a medium with a medium) which can assist in having CALL results which "go beyond the specific environment being examined" (Handley, 2017, p.49), seems to remain an untouched issue.

Therefore, the present study adopts a CALL vs. CALL comparison design for identifying the value of the inline commenting feature for numerous reasons. First, it helps provide stronger evidence for the language learning potential of the task (Chapelle, 2001) because it equates a medium with a medium and avoids "falling into the trap of equating medium with method" (Handley, 2014, p. 47) as in case of studies adopting CALL vs. non-CALL design. In addition, this CALL vs. CALL comparison design has an explanatory power assisting in determining which features are responsible for any observed differences (Handley, 2014) in the participants' writing performance working on the Google Docs and Wiki mediums. Following this comparison design, the present study will look into not only the writing process but also to the writing product, as well as the participants' views in order to explore the effectiveness of peer feedback and peer edits made on Google Docs (which promotes inline commenting) and Wiki (which promotes non-inline commenting) platforms on the participants' individual writing performance. This issue (effectiveness of peer feedback and reactions to it on students' writing performance) is explored in the present study by adopting a mixed methods approach which helps provide a broad understanding of the participants' writing performance and online interactions by collecting the quantitative data and then using a qualitative method (i.e., interview) to explain the results by discovering the views of participants, as recommended by Creswell, et al. (2003).

1.3.   Aims and research questions

The overarching aim of this thesis is to explore the impact on Saudi EFL learners' individual writing performance of inline peer feedback (promoted by Google Docs) in comparison with that of non-inline peer feedback (promoted by Wiki), exchanged in the context of pair writing. To achieve the main overarching aim, four research questions were proposed, as follows:

Q1: What is the differential impact of Google Docs and Wiki-enhanced peer review on writing performance?

Q2: How do Saudi EFL college students working in pairs on the Google Docs platform provide peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q3: How do Saudi EFL college students working in pairs on the Google Docs platform respond/react to peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q4: What are Saudi EFL college students' reported perceptions of peer written feedback provided via Google Docs and Wiki?

1.4.   Structure of the thesis

The thesis is organised into chapters and the remainder of the thesis is organised as follows:

Chapter 2 presents a review of the relevant research as well as the theoretical underpinning of the current research. It starts by presenting sociocultural theory and how this theory offers an ideal framework for the study of peer review (section 2.2). Then, the definition of peer feedback, value of corrective feedback in L2 writing, issues concerning peer feedback in in L2 writing, including the levels of writing on which feedback is given, and features of peer feedback that promote incorporation of peer feedback are identified (sections 2.3, 2.4, 2.5, 2.6, & 2.7). In addition, previous research concerning the focus of the feedback (section 2.8) and the revisions (section 2.9) made on the Google Docs and Wiki platforms is reviewed. Results of previous research on the effectiveness of face-to-face peer feedback and peer revisions (sections 2.10 & 2.11) as well as the effectiveness of Google Docs and Wiki-enhanced peer feedback (section 2.12) are also presented. In addition, the findings of previous research exploring perceptions towards technology-enhanced peer review are reviewed (section 2.13). The chapter is concluded by identifying the gaps in the line of research related to the Google Docs and Wiki-enhanced peer feedback as well as discussing the objectives of the research (section 2.14).

Chapter 3 presents the research methodology employed to answer the research questions and to achieve the aim of this research. It starts by presenting details about the context of the study, including the participants and the setting (section 3.3). The chapter also discusses the design of the study

(i.e., the paradigmatic stance, research strategies and the experiment design) and explains the apparatus and instruments as well as the materials used for collecting the data (sections 3.4 and 3.5). Section 3.6 presents reports and discusses the lessons learnt from the pilot studies. The data collection procedures followed are also discussed (section 3.7). Data analysis and pre-analysis procedures are addressed in section 3.8. Ethical considerations are also considered in section 3.10. The chapter is concluded by provision of a brief summary of the whole chapter (3.11).

Chapter 4 presents the results obtained from the background questionnaire, the writing tests, online interactional data, and the semi-structured interviews. Therefore, in addition to the background information section (section 4.2), the chapter is mainly comprised of three other parts/sections. The first part presents the results of the participants' overall writing performance and their performance in the areas of form and content (section 4.3). The second part presents the results related to the peer feedback foci and reactions to it (section 4.4) and the third part of the chapter presents the participants' attitudes towards their learning experiences on the two platforms (section 4.5).

Chapter 5 discusses the main findings presented in Chapter 4 in relation to the effectiveness of the peer feedback and reactions to it. The discussion of results related to the effectiveness of Google Docs-enhanced peer feedback and reactions to it in comparison to that of Wiki-enhanced peer feedback are presented in section 5.2. Then, findings related to the effectiveness of peer feedback exchanged on each platform are discussed in more detail in separate sections (sections 5.3 & 5.4). The chapter ends with a brief conclusion (section 5.5).

Finally, Chapter 6 summarises the study's main findings and highlights the contributions of the study (section 6.2). Limitations are presented in section 6.3. Also, the chapter is concluded by presenting the implications and contributions of the study to language learning research (section 6.4).

Chapter 2. Literature review

2.1. Overview

This chapter begins with a discussion of the theoretical underpinning of the current study (section 2.2). Then, it presents a discussion of peer feedback in general, shining light on the importance of peer feedback in L2 writing and the value of corrective feedback in L2 writing (sections 2.3 & 2.4) and on issues concerning peer feedback in L2 writing, including the levels of writing that peer feedback tends to address and features of peer feedback that promote its incorporation (sections 2.5, 2.6, & 2.7). Afterwards, existing research on language learning contexts that include Wiki and Google Docs are classified into research strands related to peer feedback focus (section 2.8), and research concerning the peer revisions made on these platforms or other similar platforms (2.9). This includes research looking into revisions made as a result of the comments received (sections 2.9.1.1 & 2.9.1.2.) and research looking comprehensively into revisions and contributions made on the platforms without association of feedback comments to revisions (sections 2.9.2.1 & 2.9.2.2). In addition, research on the effectiveness of face-to-face peer feedback on students' writing performance is also reviewed (sections 2.10 & 2.11). Following this, previous research concerning the effectiveness of Google Docs and Wiki-enhanced peer feedback on students' writing performance is reviewed (section 2.12). The chapter also presents a review of previous research on perceptions towards peer feedback exchanged on the Google Docs and Wiki platforms (section 2.13). The chapter will end by summarising the relevant previous research reviewed in this chapter and identifying gaps in the literature related to Wiki and Google Docs (section 2.14).

2.2. Sociocultural theory of development

Sociocultural theory (SCT) focuses on the relationship between social interaction and the cognitive development of individuals (Donato, 2000). Particularly, it proposes that learning is a social activity and all cognitive activities learnt are mediated (Lantolf, 2000). Mediation is as a central concept in SCT and is defined as "the process through which humans deploy culturally constructed artifacts, concepts, and activities to regulate the material world or their own and each other's social and mental activity" (Lantolf

& Thorne, 2006, p. 79). Mediation is exemplified by humans' relationship with the physical world that is facilitated by "concrete material tools" (Lantolf & Thorne, 2007, p. 199). A specific example of mediation is that instead of depending on their hands to dig a hole to plant a tree, modern humans (who rarely engage in such non-mediated activity) mediate the digging process through the use of tools (e.g., a shovel), which enable them to be more precise and spend less physical energy while digging the hole (Lantolf & Thorne, 2007).

In SCT, mediation is not only limited to humans' use of concrete materials for mediating the physical world, but also includes humans' use of symbolic artifacts (e.g., language) to mediate their own or another's higher mental activities, such as logical thought or problem solving (Lantolf & Thorne, 2006). Within this theory, human cognitive development is learnt in specific cultural, historical, and institutional contexts through the medium of language and other semiotic tools (Frawley & Lantolf, 1985). In school and university contexts, mediation can occur between a teacher and students or amongst students through language or technology. In this vein, Vygotsky argued that a child can perform any task beyond his/her current cognitive ability if they receive assistance from external mediation, such as interactions with parents, caregivers, and older peers, (McCafferty, 1994).

Any higher mental ability or learning process is initially social, emerging first between individuals as intermental activities and later becoming intramental activities (Lantolf & Pavlenko, 1995). To Vygotsky, the development or learning process could happen only if the mediation or assistance takes place in what is called the Zone of Proximal Development (ZPD), where learning and development come together. It refers to the distance between the actual developmental level and the potential development level (Vygotsky, 1978). In ZPD, the actual developmental level refers to mental functions demonstrated by the novice independently (Palincsar, 1998) and potential or proximal level of development refers to activities that cannot be accomplished alone but rather with the assistance of a more competent peer (Vygotsky, 1978). The assistance given by an expert to a novice has been referred to metaphorically in the literature as scaffolding (Weissberg, 2006), which aims to facilitate the development of the novice

and to support him/her to become independent and to perform tasks (which are learnt in interactions) beyond their level of what they can do alone. The theory hypothesises that the child's capability to transfer what is learnt in interaction with others through the process of internalisation could be applied to other situations. In other words, the hypothesised role of the child in SCT, with respect to the internalisation of knowledge during interactions, can be applied and used in other situations (Lantolf & Thorne, 2007). The next sub-section will specifically address how SCT offers an ideal framework for the study of peer feedback in the current study and how peer feedback is situated in the SCT context.

2.2.1.   Peer feedback and SCT

Vygotsky's (1978) sociocultural theory offers an ideal framework for the study of peer review. It also supports the exploration of the changes brought about by the introduction of technologies into language learning and teaching (Li & Li, 2020). As previously mentioned, deeply rooted in Vygotsky's (1978) ZPD, is the belief that social interaction facilitates the learning process by bridging the gap between learners' actual and potential levels of development. This development can be achieved through mediated interactions, interactions between an expert and novice or even between a more capable individual and a less capable individual. SCT in EFL writing usually calls these interactions scaffolding (Bradley & Thouësny, 2017; Hamidi & Bagherzadeh, 2018). Scaffolding is not limited to the assistance offered by experts, such as tutors, but also involves the assistance given by peers or equal status learners, thus indicating the potential role of peer feedback in mediating EFL learners' writing (Ebadi & Rahimi, 2017; Hamidi & Bagherzadeh, 2018).

For scaffolding to take place, learners need settings where they can easily interact with peers and exchange ideas and insights to be able to control the process of their own learning (McLoughlin & Lee, 2007). As suggested by Twu (2009), "any positive interaction requires deep rich social contexts to be presented before any learning occurs" (p. 16). The participatory nature of Web 2.0 technologies, namely social software including Wikis and Google Docs platforms, turns them into appropriate mediums for achieving these aims (Kessler & Bikowski, 2010; Li, 2012). The potential of social software for learning

through interaction and scaffolding lies in its capacity to bring different users together in a participatory space (Gee, 2005) where learners can contribute and share knowledge. Therefore, with the support of peer-to-peer scaffolding, Google Docs and Wiki are conceptualised as tools for mediated actions that engender meaningful interaction. Google Docs and Wiki, in the current study, are introduced as spaces for the exchange of peer feedback and provision of peer revisions. In other words, pursuing a common or joint endeavour or interest (Gee, 2005) is what gathers learners in the two platforms. In brief, on the basis of the SCT and the fact that the participants in the current study interact with each other when providing feedback, a Sociocultural Theory approach was adopted. Therefore, the SCT approach is relevant to investigation of EFL writing instructional practices, including peer feedback and peer editing of writing. The next section presents a brief discussion of feedback and its importance before embarking on discussion about the levels of writing on which peer feedback can be provided and the overall feedback features which may promote feedback incorporation.

2.3. Feedback

Feedback is an essential feature of effective teaching and learning and can be one of the most powerful ways to enhance and reinforce student learning (Hattie & Timperley, 2007; Hyland & Hyland, 2006; Sadler, 2010). It is commonly used within ESL/EFL contexts because of the positive impact it has on the learning process (Hyland & Hyland, 2006). The purpose of feedback in an educational context is broadly seen as consolidating and encouraging learning, a view that is being adopted by an increasing number of researchers in the field of second language writing (Hyland & Hyland, 2006). Askew and Lodge (2000), for example, explain that feedback is "…a crucial feature of teaching and learning processes and one element in a repertoire of connected strategies to support learning" (p. 1). Learning that includes the provision of feedback on performance is much appreciated by learners because of the support provided by the feedback (Askew & Lodge, 2000), and because the best teaching and learning mainly depends on good feedback (Brown et al., 2006).

The importance of feedback has been acknowledged by many researchers and experts, who recognise its central role in increasing learners' achievements and writing development. This idea has been backed up with research showing feedback provides potential value in motivating students to revise their drafts (e.g., Leki, 1991; Saito, 1994) and in improving their writing (e.g., Fathman & Whalley, 1990; Ferris, 2002; Hyland & Hyland, 2001). In addition, the importance and value of feedback is demonstrated by its benefits for both beginners and advanced writers in making them evaluate their writing, notice possible points of weakness, and motivating them to do something different in the next piece of writing (Ashwell, 2000; Ferris, 2002; Hyland & Hyland, 2001). Further, feedback enables writers to diagnose and assess the problematic issues in their writing and helps them to build a facilitative and supportive learning environment (Hyland & Hyland, 2001; Yang, Badger, & Yu, 2006). Without comments from their teachers, readers, or peers, student writers would assume that their writing was clear, and therefore they would see no need to revise their written products (Sommers, 1982).

Since feedback can be provided by peers, teachers, and oneself (Nicol & Macfarlan-Dick, 2006), it can be classified based on who provides the feedback into categories of peer feedback, teacher feedback, and self-assessment. Among these three sources of feedback, peer feedback (exchanged on Google Docs and Wiki platforms) will be the focus of the current research, since it is a novel concept in the Saudi educational context. In the next four sections (sections 2.4, 2.5, 2.6 & 2.7), different issues concerning peer feedback are discussed. More specifically, debate about the value of corrective feedback is presented. Then, a discussion of peer feedback, focusing on its definition, history of its adoption in L2 writing classes, and its importance, is presented. Afterwards, the writing levels (i.e., local and global) at which peer feedback is provided, as well as the features of promoting peer feedback incorporation, are discussed.

2.4. Value of feedback on form (corrective feedback debate)

Written corrective feedback has been a controversial issue, and a strong debate has been on-going about its efficacy in improving the written accuracy of learners. The debate on the effectiveness of corrective

24

feedback in L2 writing was initiated by Truscott (1996) who emphasised that grammar should not be corrected and claimed that written corrective feedback should be avoided due to its potential harmful effects. He claimed that the nature of learning is slow, gradual, and complex, rather than a transfer of information, as correction implies. Truscott further argued against the feasibility of providing written corrective feedback at a time when the learner is not yet ready to acquire a particular structure. However, other researchers (e.g., Bitchener & Ferris, 2012) see that this argument fails to consider situations in which the learner is ready to acquire a new linguistic form/structure.

In addition to the theoretical claims presented above, Truscott (1996) presented some empirical evidence to support his stance against error correction in L2 writing by reviewing early studies on written corrective feedback (e.g., Kepner, 1991; Robb, Ross, & Shortreed, 1986; Semke, 1984; Sheppard, 1992) and concluded that the findings of these studies provided no persuasive evidence of the effectiveness of written corrective feedback in improving the accuracy of L2 learners. The opposing position for error correction was also developed and maintained in later studies (e.g., Truscott, 1999, 2004, 2007). In these studies, Truscott doubted the efficacy of written corrective feedback for L2 learning, arguing that corrective feedback on L2 learners' written is unnecessary, ineffective, and counterproductive.

Despite Truscott's continuous calls for the abandonment of error correction, there is a large body of research (e.g., Ashwell, 2000; Bitchener, 2008; Bitchener & Knoch 2008; Chandler, 2003; Fathman & Whalley, 1990; Ferris, 1999; Ferris & Roberts, 2001; Lalande, 1982; Sheen 2007; Storch & Wigglesworth, 2010; Suzuki, 2012; Van Beuningen 2010) which revealed that written corrective feedback is beneficial for the development of students' writing. Further to this, in her response to Truscott's (1996) claims, Ferris (1999) argued that Truscott's conclusion calling for abandonment of grammar correction is premature. She believed that the absence of corrective feedback may mean that learners will not take correcting their errors seriously. She further argued that Truscott's review of the previous research was "either under or overstated to suit his own generalisations" (Ferris, 1999, p.4). Moreover, she pointed

out that Truscott overlooked studies (i.e., Fathman & Whalley, 1990; Lalande, 1982) that contradicted him.

Regardless of whether or not researchers think error feedback should be given, a number of studies conducted in L2 contexts (e.g., Ferris, 2004; Grami, 2005; Hedgcock & Lefkowitz, 1994; Lee, 2009; Leki, 1991) have reported the students' desire to receive written corrective feedback and found that they perceived written corrective feedback as extremely important in their success. Therefore, it seems that the majority of the studies in the literature are in favour of error correction and this notion is even acknowledged by Truscott (2007) himself, who is the main opponent of written corrective feedback. Therefore, the value of error correction cannot be denied, and the current study's exploration of the impact of corrective written peer feedback exchanged through Google Docs and Wiki mediums seeks to add to this line of research.

2.5. Peer feedback in L2 writing

Peer feedback has been adopted in L2 writing classes since the mid-1980s when it became an accepted method (Villamil & Guerrero, 1996). It involves learners providing feedback on written drafts either orally, in written form, or using a mixture of both oral and written feedback (Canham, 2017). It is referred to in the literature as 'peer review' (Mangelsdorf, 1992), 'peer editing' (Daniels & Zemelman, 1985; Keh, 1990; Lundstrom & Baker, 2009), 'peer evaluation' (Keh, 1990; Lundstrom & Baker, 2009), 'peer critique' (Keh, 1990), 'peer commentary' (Connor & Asenavage, 1994), and 'peer response' (DiPardo & Freedman, 1988; Ferris & Hedgcock, 2005; Keh, 1990; Liu & Hansen, 2013; Lundstrom & Baker, 2009; Nelson & Murphy, 1993), and has been defined as the process of learners commenting on and critiquing each other's written products in written and/or oral formats (Liu & Hansen, 2002). It is, therefore, a collaborative process by which peers evaluate and respond to one another's work to improve it (Alharbi & Alhoori, 2020; Topping, 1998). In what follows, the two main writing levels that peer feedback target and which determine the focus of peer feedback are discussed. The levels of writing and focus of feedback are reviewed because one of the main goals of the current study is to check if the

feedback focus exchanged on Google Docs and Wiki influences the participants' overall writing perfor-mance as well as their writing performance in the areas of form and content.

2.6. Focus of peer feedback: Writing levels targeted by feedback

Peer feedback can be provided on macro (Min, 2005) and global (Lundstrom & Baker, 2009) aspects of writing, and in this case peer feedback addresses the quality of writing from the content and organisation perspectives. Feedback can also focus on micro (Min, 2005) and local (Lundstorm & Baker, 2009) as-pects of writing, also known as sentence-level features (Berg, 1999), mechanical features (Ruecker, 2011), or surface-level features (Paulson, Alexander & Armstrong, 2007). Peer feedback on this micro or local level typically targets grammar, vocabulary, and mechanical issues such as spelling and punctu-ation. Therefore, peer feedback can be given on local issues, as above, (Zaman & Azad, 2012) and/or global issues such as meaning/ideas and organisation (Sharples, 1999). Nelson and Schunn (2009) de-fined a more local level as the use of a narrow focus during evaluation (e.g., focusing on surface features) while a more global level is a holistic examination of the performance or product.

The feedback on the global and local levels of writing includes a narrowly-focused classification of peer feedback known as form-focused and content-based peer feedback. Feedback addressing the form of writing is referred to it as form-focused feedback while feedback addressing the content or or-ganisation is described as content-based peer feedback. Zaman & Azad (2012) indicated that "feedback on form includes grammar and mechanics, i.e., spelling, punctuation, vocabulary" (p. 140). Likewise, Tee and Cheah (2016) referred to form-based feedback as feedback that addresses "issues of grammar, punctuation, grammar usage, and sentence structure" (p. 96). Contrary to form-focused written feedback, "content-based written feedback focuses more on ideas and organizational features … and …overall comments are provided on where it does not make sense … without pointing out specific grammatical errors" (Park, 2006, p. 6). Examples of content-based and form-focused commenting are presented in Table 2.1.

Table 2.1 Example of peer feedback foci

Feedback level	Examples
Form-focused	You used the incorrect form of 'there' in the sentence 2. You need to use 'their.'
Content-based	All of your arguments need more support

Peer feedback can take various forms, such as the "form of written comments provided via…computer-mediated (CM) interaction" (Storch, 2017, p. 37) including Google Docs and Wiki-enhanced peer feedback. The feedback exchanged on these two widely used online forums has been of interest to several researchers. In what follows (sections 2.7 & 2.8), the features of commenting that might contribute to increasing chances of feedback incorporation as well as empirical research on technology-enhanced peer review on these platforms and/or on other platforms with similar features will be reviewed. The discussion of the incorporation of peer feedback and the inclusion of review of related research concerning focus of peer feedback in this chapter is necessary because the present study aims to explain any differences in the writing performance of participants related to feedback exchanged and what might promote its incorporation.

2.7. Features of feedback promoting its incorporation

Several commenting features related to feedback specificity were assumed to promote the incorporation of that feedback. These features are in a continuum, starting with general descriptions of the outcome to highly specific feedback that includes explicit identification of errors or problems, their location in the text and solutions (Nelson & Schunn, 2009). Feedback specificity includes several components including identification of the problem, explanation of feedback, solution, and localisation or pinpointing the source or location of the problem and/or solution (Nelson & Schunn, 2009). These features increase the chances of implementation of local and global feedback (Nelson & Schunn, 2009). All the features are related to the feedback specificity scope, which is described by Nelson and Schunn, (2009) as "the details included in the feedback" (p. 378). They stated that the feedback continuum begins with the description of the feedback in terms of its correctness (right or wrong) and moves to highly specific feedback that

includes the explicit identification of errors or problems, their location and solutions. Feedback that includes explanation is expected to be implemented (Nelson & Schunn, 2009). These features seem to be promoted in different ways by the Google Docs and Wiki platforms, where Google Docs seems to be superior in promoting language-focused feedback since it allows for pinpointing the source or location of the problem, offering solutions, giving explanations of feedback and identifying the problem. The next section presents a review of previous research related to Google Docs- and Wiki-enhanced peer feedback and reactions to it, since the present study aims to check whether they have an impact on the participants' writing performance.

2.8. Google Docs and Wiki-enhanced peer review

There is growing interest in the application of Wikis and Google Docs in peer feedback and CALL and this in turn motivated several researchers to explore this feedback in the field of L2 writing. This line of research addressing these two technological tools (which support collaborative and pair writing as well as collaborative and peer editing and commenting) has sought to explore the nature and focus of peer feedback comments. It particularly explores the types of peer feedback given with the use of these two technological tools (Alharbi, 2020; Bradley, 2014; Bradley & Thouesny, 2017; Elola & Oskoz, 2010; Hsu, 2019; Kessler, 2009; Kost, 2011; Lee, 2010; Oskoz & Elola, 2012; Song & Usaha, 2009; Thouesny & Bradley, 2014; Yim, Zheng & Warschauer, 2018; Zheng, Lawrence & Lin, 2015). However, little research looked into peer feedback given on both mediums comparatively. The following sub-sections will focus on reviewing research on the Google Docs and Wiki-enhanced peer review. This research can be divided into four strands. The first strand explores the focus of learners' peer feedback on Google Docs. The second line of research looks into the focus of peer interactions in the discussion spaces of Wikis. The third line of research compared the focus of feedback given on the two platforms. An additional relevant line of research, which involves comparison between peer

feedback given on various platforms similar to the Google Docs and Wiki platforms, was also re-
viewed. The results of the research reviewed in this section give insights about whether these two
online settings differ in terms of their support for form-focused and/or content-based feedback.

2.8.1. Focus of Google Docs-enhanced peer feedback in form of commentary

Several studies on Google Docs in the language learning context have examined peer comments students
provided whilst composing text (Alharbi, 2020; Bradley & Thouesny, 2017; Thouesny & Bradley, 2014;
Yim, Zheng & Warschauer, 2018; Zheng, Lawrence & Lin, 2015). Some of these studies were conducted
in the university context with EFL Saudi learners (Alharbi, 2020) and EFL Swedish students (Bradley
& Thouësny, 2017; Thouësny & Bradley, 2014), whereas other studies have been conducted in a middle
school context with sixth-grade students in a suburban Colorado school district (e.g., Yim, Zheng, &
Warschauer, 2018; Zheng, Lawrence, Warschauer, & Lin, 2015). The findings of these studies conducted
in different contexts seem to agree upon the prevalence of local feedback, including language-focused
feedback, over global feedback, including that on content.

Some studies exploring the focus of peer comments exchanged on the Google Docs platform that
were conducted in school contexts revealed a higher number of comments focusing on local issues, in-
cluding form and language, than those addressing global issues. Zheng, Lawrence, Warschauer, and Lin
(2015), for instance, explored the content of feedback 257 sixth-grade middle schoolers in a suburban
Colorado school district received on individually written tasks through Google Docs to find how they
exchanged feedback. The teachers also intervened in the feedback process, providing feedback mainly
on language-related issues. Google Docs was used in the classrooms for almost one-school year to sup-
port students' authentic writing. The results showed that most Google Docs-enhanced peer feedback
(80.4%) emphasised students' errors in form-related issues such as mechanics, grammar and word
choice. The other 19.6 % of peer feedback covered various global-related issues, including content and
organisation. It should be noted, however, that the reported results showing participants' main focus on
form could be a result of teachers' commenting on language-related issues. Similarly, in another study

conducted to explore the institutional use of Google Docs at four middle schools in a Colorado school district, Yim, Zheng, and Warschauer (2018) looked into any differences in the students' feedback and revision patterns by analysing 435 individually written documents (writing tasks—argumentative, narrative, report) from 145 sixth-grade students. The results showed that most peer feedback (67.1%) focused on form (mechanics and conventions) with 1.2% of peer feedback focused on content. This echoes the findings from Zheng, Lawrence, Warschauer, and Lin's (2015) study that revealed a general lack of macro-level (content-based) peer comments. In the above-reviewed studies, the participants' low educational level might have influenced their engagement in feedback activities. The participants were sixth-grade middle school students and thus they might not be mature enough to provide effective feedback on various writing aspects. Therefore, this might be an alternative explanation for the students' main focus on form and avoidance of commenting on ideas and more complex issues.

Other studies conducted in university contexts have revealed similar results. Alharbi (2020), for example, explored the potential role of Google Docs in facilitating and supporting the pedagogical practices of 10 EFL learners (five pairs) who mutually exchanged feedback on jointly written reports in a writing course at a Saudi university. The instructor also instructed the participants on various elements of the reports. The instructor and the learners then had two-hour weekly sessions that included instructor feedback and peer editing. The findings revealed that the learners posted more feedback concerning local issues (306, 37%) than global ones (185, 22%). Since peers were not the only source of feedback, these results could also be a result of the teacher's intervention in the peer feedback process. Similarly, Thouësny and Bradley (2014) investigated peer feedback using Google Docs with Swedish students in an English language course. 22 groups jointly wrote technical reports on a chosen topic and then took part in a peer response activity that lasted for a period of less than two weeks. More specifically, each group's joint report was shared with a responding peer group for discussing the form and content of the reports. Three out of these 22 groups were investigated in-depth, since they were particularly active with 129 inserted comments by the text owners and 36 peer group comments. The findings revealed that most

31

peer group comments were local (form-focused) and revision orientated in nature. In other words, out of 36 peer comment turns, a majority were local. Likewise, Bradley and Thouësny (2017) analysed 31 learners' mechanisms of peer reviewing online and found similar results to those reported by Alharbi (2020) and Thouësny and Bradley (2014). The participants (five female students & 26 male students) were Swedish first-year undergraduate computer engineering students in an advanced English for Specific Purposes (ESP) course in technical writing. They worked in small writing groups with 2-3 students in each group. The peer response activities took place within a brief period of time of less than two weeks. Out of the 333 comment initiations observed on the Google Docs platform, 106 were global (concerning text development) and 227 were local (concerning sentences or words, and language use).

The evidence from studies reviewed thus far suggested that peer feedback exchanged on Google Docs concentrates mainly on local-related issues. However, the low educational level of participants in some of the above studies (Yim, Zheng, & Warschauer, 2018; Zheng, Lawrence, Warschauer, & Lin, 2015) could make their outcomes incomparable to feedback given by EFL university students in the current study, who might be capable of providing more effective feedback. The other studies carried out in EFL university contexts (Alharbi, 2020; Bradley & Thouësny, 2017; Thouësny & Bradley, 2014) also had limitations (e.g., sample size and time span for completion of feedback activities) that could weaken generalisation of their outcomes beyond the studies. Further to this, of the above-reviewed studies carried out in EFL contexts, Alharbi (2020) is the only study looking into focus of Google Docs-enhanced peer feedback in Saudi EFL university context. However, it should be noted that this study's results could be a result of the teacher's intervention in the peer feedback process, making the study's outcomes incomparable to those of the current study which mainly looks into peer feedback process with a complete prevention of any intervention from teacher in the feedback process. Therefore, a dearth of research targeting university EFL learners peer feedback process with complete intervention from the teacher in the feedback process indicates that there is still further research needs to be done in the Saudi EFL context to explore the value of Google Docs-enhanced feedback (i.e., value of inline commenting) which

is widely used in L2 writing classrooms. Further to this, previous research primarily focused on exploring the focus of peer feedback given on a single Google Docs platform in the context of individual or collaborative writing, overlooking the exploration of Google Docs-enhanced peer feedback in the context of pair writing which would help bring about better evidence due to the potential role of pair writing in increasing a sense of responsibility and commitment towards online activities (Storch, 2013). Given all these limitations, the exploration of peer feedback on Google Docs in Saudi university context, following CALL vs. CALL design with a complete prevention from teacher's intervention, would add to the line of research on Google Docs-enhanced peer feedback.

2.8.2. Focus of peer feedback in the Wiki discussion forum

This section reviews previous research exploring the focus of peer feedback in the form of negotiations and chats in the Wiki discussion forum. Contrary to studies on Google Docs-enhanced peer feedback, almost all studies in this research strand were carried out in university contexts [with the exception of Woo, Chu, and Li (2013) which was conducted in a school context], with EFL students (pre-service learners) at a Mexican university (Kessler, 2009), with EFL Chinese learners from Chinese (Song & Usaha, 2009) and Taiwanese universities (Hsu, 2019), with EFL Iranian students (Nami & Marandi, 2014), with L2 Spanish learners (Elola & Oskoz, 2010; Oskoz & Elola, 2012; Lee, 2010), and with native-English speaking students from an American University and non-native-English-speaking students at a Swedish university (Bradley, 2014). Research findings in this regard are inconclusive, with some studies suggesting that feedback on meaning, content and organisation were predominant over the feedback on language, whilst others report contradictory findings.

Some studies of L2 Spanish university students and of university students from different EFL contexts, and of students from school contexts found that most peer feedback exchanged on Wiki focused on meaning and content. Elola and Oskoz (2010), for instance, explored the focus of feedback given by eight L2 Spanish university-level students on two argumentative essays composed individually and collaboratively on the Wiki platform. The learners were asked to discuss any issues related to essay content,

organisation and form. The learners interacted and exchanged peer feedback through the Wiki text-based chat and the results showed that learners focused mainly on content-related issues rather than language-related ones. More specifically, most of the negotiations (text chats) in the Wiki discussion forums paid attention to content-related issues, with only 10% of the negotiations addressing language use (grammar, vocabulary, and editing). Likewise, Oskoz and Elola (2012) examined the interactions in the Wiki discussion pages (text-based chats) in the university context with L2 Spanish learners and reported that learners chatted mainly about content issues rather than about language.

Other studies conducted in EFL contexts found similar results (in terms of the prevalence of content-based feedback over form-focused) to those reported in previously reviewed studies which were run in the L2 Spanish context. In a Chinese EFL context, Song and Usaha (2009), for instance, examined the functions and types of peer comments given by 20 Chinese EFL university students (16 females and 4 males, aged 19-21) to individually written argumentative writing drafts on Wiki in the Moodle asynchronous platform and during face-to-face learning. The participants were randomly assigned to face-to-face and electronic peer response groups. They provided feedback in small groups of five in which they commented on each other's drafts and then revised their writings based on the feedback received online. The electronic peer response group's results revealed that 60.4% of 356 comments were related to the content level of writing. However, in the face-to-face peer response group, 52.90% of the 507 comments were related to language (i.e., vocabulary and grammar) compared with 27.20% on content. It should be noted, however, that this comparative research (comparing CALL with face-to-face) has been questioned because it matches the CALL condition against traditional face-to-face learning, "falling into the trap of equating a medium with a method" (Handley, 2014, p. 47). In another EFL context, Kessler (2009) examined the focus of peer feedback given by 40 EFL students (pre-service teachers) from a Mexican university via a single class Wiki collectively constructed as a reflection on what was learned in the class over a course of a sixteen-week semester. The findings revealed that the participants chatted mainly about meaning rather than form. These results are similar to those reported by Elola and

Oskoz (2010), Oskoz and Elola (2012) and Song and Usaha (2009). In a school context, Woo, Chu, and Li (2013) explored the use of Wiki for collaborative writing with 119 EFL Chinese primary school students in Hong Kong and found similar findings, with more content-based than form-focused feedback. Both quantitative and qualitative data obtained from posted edits and comments, student group writings and student interviews were analysed. It was found that in two out of the three classes of students who engaged in three-months of English language writing and peer feedback on a Wiki platform the content/meaning level comments were dominant.

Compared to the previously reviewed studies which were conducted in single context (i.e., either in L2 or EFL contexts), another study by Bradley (2014) explored the focus of intercultural peer feedback between 16 native-English-speaking undergraduate students at a US university and 26 non-native-English-speaking masters' students at a Swedish university. The peer feedback comments given by six Swedish students on three American students' writing assignments (performed individually and jointly, either in pairs or three) and the comments they received from the American students on their own assignments (performed individually) were analysed. In total, 314 comments were provided; most of them (80%) were global (including content-based) in area. These findings are similar to those reported in studies run in L2 Spanish contexts (Elola & Oskoz, 2010; Oskoz & Elola, 2012), in Chinese and Mexican EFL university contexts (Song & Usaha, 2009; Kessler, 2009), and in Chinese EFL school contexts (Woo, Chu, & Li, 2013).

A few other studies conducted in L2 Spanish contexts as well as in EFL Chinese and Iranian contexts found contrasting results to those reported previously. Lee (2010), for example, conducted a case study of 35 university students who contributed to wiki pages over a period of 14 weeks in a Spanish L2 context. The students jointly wrote drafts and edited each other's contributions with the instructor playing a facilitating role in directing students' attention to language-related issues. The Wiki activities constituted 15% of the course grade. The results showed that more than 50% of the participants focused on form (e.g., specific grammar structured and lexical items). Similar results were reported in other

studies conducted in EFL contexts. Hsu (2019), for instance, conducted a study with 26 EFL Chinese university students (7 males and 19 females) in a Taiwanese university context to explore the frequency of occurrence of content-, organisation- and language-related episodes on a writing task completed collaboratively via Wikis. The instructor also contributed to the feedback process by providing comments on unclear and ungrammatical sentences without providing direct correction. The participants worked in a total of 12 groups with 2-3 students each. The Wiki project constituted 20% of the course grade. The findings showed that language-related episodes occurred more frequently than content- and organisation-related ones. More specifically, out of the 341 learner-learner collaborative dialogues, 91 (27%) episodes were related to content, 14 (4%) were related to organisation and 236 (69%) episodes were related to language. The teacher's provision of feedback on language might have drawn the learners' attention to language and triggered a change in peers' online behaviours. Therefore, the teacher's intervention could be an alternative explanation for why the students' comments to focus primarily on language. In another EFL context, Nami and Marandi (2014) explored the type and degree of contributions made by 20 Iranian female EFL learners on their Wiki assigned platform (single class Wiki) while engaging in out-of-class discussions (with no structured task to be collectively constructed) regarding English writing during a 9-week course and found similar results to those reported in Hsu's (2019) study. A total of 50 Wiki posts were analysed, with the use of both quantitative and qualitative measures, and the results revealed that students focused mainly on the form of their posts with respect to grammar, spelling, and punctuation. The findings of Nami and Marandi (2014) and Hsu's (2019) studies are in contrast to those reported by Elola and Oskoz (2010) and Oskoz and Elola (2012) in L2 Spanish contexts as well as with those reported in some studies which were conducted in different EFL contexts (Kessler, 2009; Song & Usaha, 2009; Woo, Chu, & Li, 2013).

Overall, some of the above-reviewed studies looking into focus of Wiki-enhanced peer feedback (Bradley, 2014; Elola & Oskoz, 2010; Kessler, 2009; Song & Usaha, 2009) found that most of the feedback focused on content-related issues whereas other studies (Hsu, 2019; Lee, 2010; Nami & Marandi,

2014) found more feedback on language. The discrepancy in the results could be due to the differences in the participants' educational level, language context, sample size, way of construction of the online tasks, and peer response group size. Therefore, the previous studies' outcomes reviewed above should be understood in light of these factors as they could limit generalisation of the results. The same discrepancy in the results remains salient even among the studies exploring peer feedback in EFL contexts, with some studies (Kessler, 2009; Song & Usaha, 2009; Woo, Chu, & Li, 2013) showing more frequent content-based comments than language-related ones and other two studies (Hsu, 2019; Nami & Marandi, 2014) reporting contrasting results. This discrepancy in the results of studies carried out in EFL contexts could be due presence of the teachers' intervention by providing feedback on language-related issues in some studies (Hsu, 2019; Nami & Marandi, 2014) and absence of such intervention in the remaining studies (Kessler, 2009; Song & Usaha, 2009; Woo, Chu, & Li, 2013). The present study will ensure a complete prevention of teacher's intervention to eliminate any possible influence on the participants' online commenting behaviours and to obtain less confusing and more conclusive results about the value of peer feedback. Further to this, the feedback in the reviewed studies was exclusively given on individually written tasks (i.e., Bradley, 2014; Elola & Oskoz, 2010; Kessler, 2009; Nami & Marandi, 2014; Song & Usaha, 2009) or collaboratively written tasks (Hsu, 2019; Lee, 2010; Nami & Marandi, 2014). Therefore, further research on focus of Wiki-enhanced peer feedback still needs to be carried out in the context of pair writing (where a higher level of commitment towards peer feedback provision can be ensured) with a complete prevention from teacher's intervention in the topics of discussion and this issue will be explored in Saudi EFL context that lacks research concerning Wiki-enhanced peer feedback.

2.8.3. Focus of Google Docs vs. Wiki-enhanced peer feedback

Whilst the previous two research strands reviewed research related to feedback exchanged on Google Docs and Wiki individually, this section addresses research which compared feedback exchanged by students on both platforms. This strand of research is rarely explored since most previous research on Google Docs and Wiki addressed the types of peer feedback given on each platform separately, looking

into the use of one platform at a time. Canham's (2017) study, which employed a repeated-measures design, seems to be the only study attempting to explore the practicalities and peer review experiences of multiple applications including Google Docs and Wiki. Over a ten-week period, 78 EFL students (53 females & 25 males) from an Austrian university collaboratively drafted two essays with the use of Google Docs and Wiki platforms and exchanged peer feedback on their own drafts in groups using the two applications. The focus of comments was coded based on Liu and Sadler's (2003) comment taxonomy, and then the types of comments were statistically analysed. By comparing the mean percentage of local to global comments on each platform, the findings revealed that the participants on both platforms produced a higher mean percentage of local comments (71.28% in Google Docs and 60.59% in Wiki) than global comments (28.72% in Google Docs and 39.41% in Wiki). In addition, by comparing the mean percentages of feedback focus (local and global comments) in both applications, the findings showed that the participants working on Google Docs generated a higher mean percentage of local comments (including form-focused ones) and lower mean percentage of global comments (including content-based ones) than their Wiki counterparts.

The above study has a number of limitations that would weaken the generalisation of the study's outcomes to other research on the topic. The first limitation is that peer feedback in the above-reviewed study was explored in the context of individual writing (where the peer feedback providers are not the text owners) and thus the peer feedback providers may lack a sense of ownership towards the task that they commented on, and this could influence the level of their commitment towards provision of peer feedback (Storch, 2013). The other limitation noted has to do with exclusive emphasis on exploration of focus of Google Docs and Wiki-mediated peer feedback and overlooking the peer feedback incorporation rates. Unlike Canham's (2017) study, the present study looks into both focus of peer feedback and peer feedback incorporation rate in the context of pair writing to get a complete picture about the value of peer feedback exchanged through Google Docs (which promotes inline commenting), and Wiki (which promotes non-inline commenting).

Due to the dearth of research comparing peer feedback exchanged on Google Docs and Wiki platforms, the next section will attempt to review research comparing the focus of peer feedback exchanged on other synchronous and asynchronous platforms with similar features to those of Google Docs and Wiki. This review aims to give a more comprehensive picture of the results of previous research related peer feedback exchanged on technological tools.

2.8.4. Studies comparing feedback given on different feedback platforms

Since the main distinction (with respect to feedback exchange) between Google Docs and Wiki is that "wikis are asynchronous, whereas Google Docs are synchronous" (Nassaji & Kartchava, 2017, p. 69), previous research exploring the focus of peer feedback exchanged through text chats in different synchronous and asynchronous forums (other than Google Docs and Wiki platforms) are reviewed. This review will provide further insight into previous research comparing the focus of synchronous and asynchronous peer feedback exchanged on online technological tools with peer feedback exchanged in face-to-face settings. It also can give a more comprehensive conclusion of previous research exploring whether the synchronous feedback promotes more or less emphasis on form-focused and content-based feedback in comparison with the asynchronous feedback. The findings of the studies in this line of research have shown that the peer feedback exchanged on synchronous platforms like *OnlineMeeting* and text chat in MSN messenger focuses more on local issues compared to peer feedback exchanged in face-to-face settings or on Microsoft Word. However, the peer feedback on asynchronous platforms like the Bulletin Board System (BBS) promote more local feedback and less global feedback than that exchanged in face-to-face settings.

In the Taiwanese EFL university context, Ho (2015) explored feedback exchanged with the help of *OnlineMeeting* software featuring a split screen protocol, which enabled participants to view Microsoft Word annotation features and an *OnlineMeeting* chat at the same time. He found more local alteration comments and fewer global comments compared to face-to-face asynchronous interactions. It has also been found that learners frequently focused on commenting on form rather than on content, even

in face-to-face settings. In another EFL university context, So and Lee (2012) explored peer feedback exchanged by three Korean EFL university students (2 males and one female) through the tag-line function in the asynchronous Bulletin Board System (BBS) as well as face-to-face in offline sessions in the classroom and found similar results to Ho (2015). More specifically, the findings revealed that the three participants exchanged 140 comments on mechanics and structure (63.92%) compared to 79 comments (36.08%) on content and organisation. In the offline sessions (face-to-face in the classroom), 76 comments addressed mechanics and structure (42.46%) whereas 96 comments (57.54%) were concerned with content and organisation. By comparing the peer comments in online asynchronous BBS with offline (face-to-face) peer feedback sessions, the total comments focusing on mechanics and structure in online sessions were higher than their counterparts given in offline sessions. However, the comments on organisation and content in offline sessions were more numerous than those in the asynchronous BBS peer feedback sessions.

Chang (2009) explored the feedback focus on three different feedback modes (i.e., face-to-face, asynchronous posting, and MSN chat) in a Taiwanese EFL university context and yielded similar results to those reported by Ho (2015) and So and Lee (2012). It was found that the synchronous feedback (via text chat on MSN Messenger) focused more on local problems than asynchronous written peer-feedback (via MS Word) and face-to-face discussion.

2.8.5. Summary

Research evidence presented in sub-sections 2.8.1, 2.8.2, 2.8.3, and 2.8.4 suggested that the peer feedback exchanged on Google Docs and on other synchronous platforms with similar features to those of Google Docs (e.g., Alharbi, 2020; Bradley & Thouesny, 2017; Canham, 2017; Chang, 2009; Ho, 2015; Thouesny & Bradley, 2014; Yim, Zheng & Warschauer, 2018; Zheng, Lawrence & Lin, 2015) concentrated mainly on local-related issues. However, the feedback exchanged on Wiki and on other asynchronous platforms with similar features to those of Wiki (e.g., Elola & Oskoz, 2010; Oskoz & Elola, 2012; Song & Usaha, 2009; Woo, Chu, & Li, 2013; Bradley, 2014) concentrated predominantly on global-

related issues including content and organization with the exception of a few studies (e.g., Hsu, 2019; Lee, 2010) which found that most of the feedback focused on local-related issues. The discrepancy in the wiki studies' outcomes could be due to the teacher's involvement in the peer feedback process by providing feedback on language-related issues in some studies and absence of this sort of intervention in others. Regarding the discrepancy in the results of Google Docs studies and those of majority of Wiki studies, that could be a result of the potential differential impact of both mediums on peer feedback provision.

Most previous research explored Google Docs and Wiki-enhanced peer feedback following a single CALL design (Alharbi, 2020; Bradley, 2014; Bradley & Thouesny, 2017; Elola & Oskoz, 2010; Hsu, 2019; Lee, 2010; Oskoz & Elola, 2012; Song & Usaha, 2009; Thouesny & Bradley, 2014; Woo, Chu, & Li, 2013; Yim, Zheng & Warschauer, 2018; Zheng, Lawrence & Lin, 2015) or CALL vs. non-CALL design (Chang, 2009; Ho, 2015; So & Lee, 2012), which was questioned because it matches a medium with a method. It was also noted that the majority of studies limited exploration of Google Docs and Wiki-enhanced peer feedback to the context of individual writing (where the peer feedback providers are not the text owners) or collaborative writing where group of learners provide feedback on a shared piece of work. Google Docs and Wiki-enhanced peer feedback comparatively in the context of pair writing has not yet been explored. In response to such lack of comparative research on focus of Google Docs and Wiki-enhanced peer feedback in the context of pair writing and, in pursuit of achieving the overarching aim of the present study related to exploring the value of inline commenting vs. non-inline commenting on improving students' individual writing performance following a CALL vs. CALL design, the present study will look into peer feedback given on these platforms (i.e., writing process) comparatively in Saudi EFL university context.

In the following section, research on revisions made on Google Docs and Wiki platforms as well as research on revisions made on other forums with similar synchronous and asynchronous features are reviewed to back up the focus of the present study.

2.9. Revision process on online collaborative platforms

A good deal of research has already explored the text revisions made on Google Docs and Wiki platforms (e.g., Arnold, Ducate, & Kost, 2009; Aydin & Yildiz, 2014; Kessler, 2009; Kessler, Bikowski & Boggs, 2012; Lee, 2010; Mak & Coniam, 2008) in language learning contexts. However, these studies limited exploration of the peer revisions to a single CALL design and thus no previous research managed to compare peer revisions made on Google Docs and Wiki platforms in the same context following a CALL vs. CALL design. Further to this, the majority of the studies examining peer revisions on the Google Docs and Wiki platforms did not link peer revisions to peer feedback and did not consult participants' views, which may leave uncertainty about the reported peer revision results and the actual reasons that triggered the revisions. The studies addressing learners' revisions on Wikis (e.g., Arnold, Ducate, & Kost, 2009; Aydin & Yilduz, 2014; Kessler, 2009; Kost, 2011; Lee, 2010; Mak & Coniam, 2008) and Google Docs (e.g., Kessler, Bikowski & Boggs, 2012) compared meaning-related changes and formal changes in L2 English, L2 German, and L2 Spanish contexts. More specifically, the majority of studies in this line of research were conducted in university contexts with EFL learners from Mexico (Kessler, 2009) and Turkey (Aydin & Yldiz, 2014), with L2 Spanish (Lee, 2010) and L2 German learners (Arnold, Ducate, & Kost, 2009; Kost, 2009), and with ESL learners from a Midwestern university in the United States (Kessler, Bikowski & Boggs, 2012). A few studies also have been conducted in a school context with ESL secondary school students in Hong Kong (Mak & Coniam, 2008), and with sixth-grade students in a public school in the United States (Semeraro & Moore, 2017). This line of research can be broken into two main categories. The first category (section 2.9.1) reviews research exploring the focus of the revisions or changes made on the online platforms in response to the feedback received on the platforms. The other line of research (section 2.9.2) reviews research examining the revisions made on the platforms with no link to the peer feedback comments received on the mediums.

2.9.1. Research on responses to feedback

There is limited research exploring the resolution of feedback exchanged on Google Docs (a platform promoting synchronous interactions) and Wiki (a platform promoting asynchronous interactions). Therefore, the review in this section is not limited to resolution of feedback exchanged on these two platforms, but also involves research related to the resolution of peer feedback exchanged on various online platforms (e.g., MSN messenger, Wiki, Blackboard, Moodle's Forum) promoting synchronous and asynchronous communication, which is a major distinction between Google Docs and Wiki platforms (Nassaji & Kartchava, 2017). Based on this, the review here is presented in two sections; the first (section 2.9.1.1) is related to the resolution (peer revisions/changes) of online synchronous peer feedback (Cha & Park, 2010; Liang, 2010) and the other (section 2.9.1.2) is related to research addressing the resolution of the asynchronous peer feedback, including the resolution of peer feedback exchanged through the Wiki platform (Hsu, 2019; Song & Usaha, 2009; Guardado & Shi, 2007). Most of the studies in this regard have been conducted with tertiary students.

2.9.1.1. Research on the resolution/incorporation of synchronous online peer feedback

A few studies have explored the changes made on writing in response to peer feedback received on platforms promoting synchronous interactions. The studies in this line of research were conducted in a university context with EFL Korean learners on an unidentified platform (Cha & Park, 2010) and with Vietnamese EFL learners on MSN messenger (Liang, 2010). The participants in both studies engaged in individual writing and exchanged feedback synchronously online.

Cha and Park (2010) investigated the revisions made by 14 pairs of EFL Korean students from a large university in Korea in response to peer feedback received during online synchronous chat sessions on the subsequent drafts of their writing through an unidentified platform. The essays were explanatory and written individually. The results showed that the amount or percentage of interactional exchanges incorporated in their text revisions varied. More specifically, the quantitative analysis showed that most

pairs incorporated most of the content discussion into their revisions, but detailed analysis or specific percentages of the focus of the peer changes made by pairs was not given.

In another EFL context, Liang (2010) presented the analysis of students' online discourse on two writing tasks; namely, a book review and research paper. Liang used textual analysis to determine the extent to which 12 EFL undergraduate students (10 females and 2 males, working in three small groups) at a Taiwanese university incorporated synchronous online peer feedback (exchanged through MSN Messenger on these two tasks) while revising their texts. The findings revealed that synchronous interactions facilitated EFL learners' text revisions in which the learners integrated most synchronous interactions into their text revisions. However, the rate of synchronous comments integrated into learners' text revisions differed among the groups of learners according to the tasks.

The outcomes of the studies reviewed above (Cha & Park, 2010; Liang, 2010), which looked into peer revisions made in response to comments exchanged through synchronous chats, are not clear. In both studies, neither the types nor the percentages of peer revisions were reported. Further to this, the small sample sizes as well as the exploration of peer revisions made on individually composed essays through technological tools (Blackboard and MSN Messenger) which do not promote collaborative writing and collective editing would limit the generalisation of the studies' outcomes beyond the studies' participants. Therefore, the current study's exploration of peer revisions made in response to peer feedback given on Google Docs synchronous platform (which promotes not only synchronous interactions, but also synchronous editing and synchronous incorporation of peer feedback) in the context of pair writing seeks to add this line of research. In the following sub-section, the previous research addressing the resolution of the peer comments received on Wiki and other asynchronous platforms is reviewed.

2.9.1.2. Research on the resolution/incorporation of asynchronous online peer feedback

A few studies have examined the resolution of peer feedback exchanged on Wiki (Hsu, 2019) or on other asynchronous networking software, such as Moodle's Forum (Song & Usaha, 2009) and Blackboard's discussion board (Guardado & Shi, 2007). These studies were conducted in a university context

with Chinese EFL learners (Hsu, 2019; Song & Usaha, 2009) and with Japanese EFL learners (Guardado & Shi, 2007). The studies conducted in the Chinese EFL context compared the resolution of the asynchronous peer feedback with that of the face-to-face peer feedback, while the study conducted in the Japanese EFL context explored the resolution of peer feedback in one asynchronous online setting.

In a recent study, Hsu (2019) collected data from 26 Chinese EFL students from a Taiwanese university on the resolution of content-, organisation- and language-related episodes of a writing task completed collaboratively in groups via Wikis. The Wiki project in this study constituted 20% of the course grade and the teacher gave comments on language-related issues without providing correction. The findings revealed that 85% (77 out of 91) of the content-related episodes were resolved whereas only 15% (14 out of 91) remained unresolved. Of the 236 language-related episodes (LREs), 62% (146 out of 236) were correctly resolved, 12% (28 out of 236) incorrectly resolved, 1% (3 out of 236) unresolved, and 25% (59 out of 236) neglected. By comparing these results to those of the organisation- and content-related episodes, the number of the resolved LREs was higher. It should be noted, however, that teacher's intervention by providing comments on language and the use of the Wiki activity as a requirement for the course may challenge the results as they may have contributed to determining the participants' revision behaviours. In a similar EFL context, Song and Usaha (2009) examined how 20 Chinese EFL university students (16 females and 4 males, aged 19-21) used comments received in a face-to-face setting or through Moodle's asynchronous forum to revise their writing that had been composed individually but commented on collaboratively. The students were randomly allocated to an electronic peer response experimental group and face-to-face peer response control group with 10 participants assigned to each condition, working in small groups of 5 students each. The findings revealed that the primary changes made within the electronic peer response experimental group was in content and organisation (74.3%) with only 25.7% of changes made in grammar, mechanics and vocabulary whereas the primary changes made by the face-to-face group were in vocabulary, grammar and mechanics (57.9%), followed by content and organisation (42.1%). By comparison, the findings of peer feedback resolution showed that the face-to-face peer response group made more revision in vocabulary, grammar, and mechanics

(i.e., 169 out of 296 revisions, totalling 57.9%) than their counterparts working on the Moodle forum (66 out of 257, representing 25.67%). However, the revisions in the content and organisation made by the electronic peer response experimental group (191 out of 257, totalling 74.3%%) were higher than those made by their counterparts in the face-to-face control group (123 out of 292, totalling 42.1%). These findings showing dominance of content- and organisation-related revisions, over revisions in vocabulary, mechanics and grammar in the electronic peer response group are contrary to the findings reported by Hsu (2019). It should be noted, however, that this comparative research (comparing CALL with face-to-face) followed by Song and Usaha (2009) has been questioned because it matches a medium with a method (Handley, 2014).

In another Asian EFL university context, Guardado and Shi (2007) explored the incorporation of the feedback received on the asynchronous Blackboard electronic discussion board. 60 male and female EFL Japanese students took part in the online peer feedback but the discussions and revisions of only 22 students were analysed. 13 out of 22 students revised their writing based on the online discussions carried out with the use of the electronic discussion board. Of the 13 students who revised their writing, four made major corrections whereas three made minor corrections. Most of the corrections were revisions in response to the peer comments. Comparisons of the first and revised drafts also showed that nine out of the 22 students ignored peer comments and made no revisions in response to the comments, and those who did revise their writing only incorporated some of the peer comments (27 out of 60). However, the focus of the revisions made in response to the peer comments, as well as the ignored comments, were not explored.

In brief, the results in this line of research are mixed. The primary changes made in response to peer feedback in Song and Usaha's (2009) Moodle focused study were in content and organisation, whereas more language-related episodes than content- and organisational episodes were resolved by participants in Hsu's (2019) Wiki study. However, the findings from Guardado and Shi (2007) showed

most participants revised their drafts in response to the comments while some ignored the peer comments, though specific and exact percentages and the focus of the revisions made were not revealed. Therefore, all these results are not conclusive, thus the results related to the resolution of comments related to Wiki-enhanced peer feedback in the current study would help weigh one side of the contradictory results and contribute to reaching a clearer conclusion with respect to the focus of peer comments resolved through Wiki asynchronous forums. It should also be noted that Hsu's (2019) study, carried out in a Chinese EFL context, is the only study exploring peer revisions on a platform (i.e., Wiki) that promotes mutual editing in EFL context. However, its outcomes cannot be generalised beyond the study's participants due to the small sample size and teacher's intervention in the peer feedback process. Therefore, further research looking specifically into peer changes, given in response to feedback on Wiki in Saudi EFL context with larger sample size and complete prevention of teacher's intervention in peer feedback process, would add to this line of research.

2.9.2. Research on the contributions (peer edits) without link to the comments

From a review of studies that analysed the text revisions made on either Google Docs or Wiki text mode by tracking edits on the page history, it has been noted that researchers have tended to extensively explore the contributions (edits) made in the language-learning context. The line of research reviewed in this section did not explore the effects of feedback on the revision process (i.e., resolution of peer feedback) but rather comprehensively explored the Google Docs and Wiki-mediated revisions made without linking the revisions to comments. The section begins by reviewing studies exploring the focus of contributions on the Wiki text mode (section 2.9.2.1) and follows with studies on contributions made on the Google Docs page (section 2.9.2.2).

2.9.2.1. Research on text peer revisions made on Wiki

Several studies have explored text peer revisions made on Wiki (without linking revisions to comments) in language learning contexts and specifically the peer revision contributions made on the platform whist composing writing text collaboratively (Arnold, Ducate, & Kost, 2009; Aydin & Yilduz, 2014; Kessler,

2009; Mak & Coniam, 2008). Most of these studies were conducted in the university context, either with EFL Mexican learners (Kessler, 2009), with EFL Turkish learners (Aydin & Yldiz, 2014), or in a university context with L2 German learners (Arnold, Ducate, & Kost, 2009). However, a study by Mak and Coniam (2008) was conducted with ESL learners in a secondary school in Hong Kong. All of these studies found that the content-related contributions made on the Wiki platform were more prevalent than language-related ones.

Studies conducted in EFL contexts with adult learners found that content-related contributions made on Wiki were dominant. Kessler (2009), for example, analysed the nature of Wiki-based peer revisions in an attempt to distinguish between revisions that focused on content and on form. The study was carried out over a 16-week online course with 40 advanced EFL learners in their final year of a BA in English Language Teaching in Mexico who worked together to create one Wiki on a topic related to their class. The single class wiki was mainly created as a reflection of what the participants learned in class and thus there was no structured task on which peer revisions were made. Among the 169 text peer revisions made by the participants on Wiki, only 17% (twenty nine revisions) dealt with language-related issues (i.e., errors on word choice, spelling errors, coordination and subject verb agreement errors) compared to 54% (ninety-two revisions) that dealt with content/meaning. Therefore, upon revising the text, the participants were mainly inclined to focus on meaning rather than form. Follow-up interviews indicated that learners felt that the lack of peer editing (form-focused feedback/corrective feedback) was not due to ignorance of grammatical rules, but because they viewed the Wiki task as a more meaning-based than language-focused activity. Therefore, students tolerated errors, especially when they believed that they would not hinder understanding. Similar findings were reported by Aydin and Yldiz (2014) who explored the use of Wikis in collaborative writing projects in EFL classrooms in Turkey. Over a period of seven weeks, 34 intermediate level university EFL students completed three different wiki-based collaborative writing tasks (argumentative, informative and decision making), constituting 5% of the total course grade, in groups of four. The results revealed that regardless of the type of task, students paid

more attention to meaning than to form. Even though the study did not show the integration of peer comments in relation to the focus of feedback points, these results still show that the most frequent revision changes were related to the area of content. It should however be noted that the peer revision results could be influenced by the course requirements and course assessment criteria, as the peer revisions were made on projects constituting a part of the total course grade.

Two studies conducted in the L2 German language context (Arnold, Ducate, & Kost, 2009) and ESL school context (Mak & Coniam, 2008) explored the changes and contributions made on Wiki and the analysis of the text peer revisions in both studies found similar results. Arnold, Ducate, and Kost (2009) analysed revisions on the dimension of form (e.g., grammatical and lexical revisions, changes to formatting) and revisions on meaning/content (e.g., minor additions, deletions, substitutions, reordering, significant content additions and deletions) that 54 undergraduate learners in three L2 German classes at three universities made on Wiki projects jointly completed in small groups. They found that most of the peer revisions were content/meaning-related. Similarly, Mak and Coniam (2008) explored the contributions on Wiki by 24 young (Year 7) ESL learners in a secondary school in Hong Kong. The students (10 boys and 14 girls) worked in six groups of four and each group was asked to collectively describe a particular facility or aspect about their school. Of the six groups, only the work of one group was examined in depth depending on the nomination of both teachers and students as the best piece of work on Wiki. The findings revealed that the students paid very little attention to the grammatical accuracy of the collaboratively produced Wiki and were more willing to add ideas to peers' contributions than to make edits on their peers' contributions for language errors and thus content/meaning changes prevailed. These results however could be challenged by prejudiced data selection and analysis which may weaken generalisation of the results beyond the study. Mak and Coniam's (2008) study findings are similar to those of studies conducted in EFL university contexts (Aydin & Yldiz, 2014; Kessler, 2009) and with those reported by Arnold, Ducate, and Kost (2009).

The above-reviewed studies looking into Wiki-enhanced peer changes in the context of collaborative writing (e.g., Arnold, Ducate, & Kost, 2009; Aydin & Yildiz, 2014; Kessler, 2009; Mak & Coniam, 2008) revealed predominant focus on content. However, the evidence from these studies should be understood in light of the differences in the language context, the time span, and construction of online tasks on which peer revisions were made. Two of the above-reviewed studies (i.e., Arnold, Ducate, & Kost, 2009; Mak & Coniam, 2008) were conducted in language contexts other than English whereas the other two studies (Aydin and Yldiz, 2014; Kessler, 2009) were carried out in EFL Turkish and Mexican contexts with no research looking into Wiki-enhanced peer revisions in the Saudi EFL context. Both studies conducted in EFL contexts had shortcomings, including a short time span, as evidenced in Arnold, Ducate, and Kost's (2009) study, and the absence of structured task on which feedback and revisions can be made, as in Aydin and Yldiz's (2014) study, that could weaken the generalisation of results on peer revisions (made on structured tasks for a longer period of time) in the current study carried out in a different EFL context (Saudi context) and in the context of pair writing. Further to this, the peer revisions made on Wiki in the above-reviewed research were not linked to peer feedback and thus a complete picture about what triggered the peer revisions in previous research could not be obtained. Therefore, the present study's comparative examination of not only the peer feedback comments but also the peer revisions made in response to them would add to this line of research.

2.9.2.2. Research on contributions/peer revisions made on the Google Docs platform

Whilst the previous section discussed the contributions and revisions made on the Wiki platform when the students engaged in discussions of their texts, this section presents the findings in relation to those made on the Google Docs platform. Similar to the Wiki studies on peer text contributions and revisions, there is research on Google Docs at the university level (Kessler, Bikowski & Boggs (2012) and school level (Semeraro & Moore, 2017). This line of research explores the changes, contributions or revisions made on the platform with no reference to whether such changes were made in response to the feedback received on the platform or not. They mainly explored the nature of the changes made on the platform.

The results of this line of research revealed that participants paid more attention to content than form and these findings are similar to those from the previously reviewed studies in section 2.9.2.1.

Kessler, Bikowski, and Boggs (2012) investigated the peer revisions made by 38 advanced ESL learners (from a Midwestern university in the United States) who worked on collaborative writing tasks (research projects) using Google Docs in small groups of 3-4 members for three weeks. Out of the 38 ESL learners, three groups of participants (n= 9 students) were selected for more detailed investigation. The topics of the selected groups' projects were the "Integration of graduate Fulbright students into a university community," "Changes in human behaviour/thinking after becoming a parent: The influence of gender," and "The use of digital library databases by graduate students." Ten percent of the saved versions in each of the group's Google Docs texts was randomly chosen for analysis. 474 iterations were coded, and the results showed that the main revisions addressed peers' contributions for meaning rather than form. In other words, the most common peer revisions across all groups focused on meaning, representing 57% of all contributions, suggesting the students focused on meaning more than on form. The researchers believed that students' avoidance of accuracy corrections (language-related revisions) was not because of a lack of grammatical knowledge.

On the same platform but with participants in a school context, Semeraro and Moore (2017) investigated seven (3 females and 4 males) sixth-grade students' use of Google Docs to support peer revisions on informational writing over the course of an eight-week period. Each participant wrote a unit of informational writing individually and then shared this on Google Docs with one partner. The participants then received instruction about two peer revision strategies to identify content-related issues. The findings indicate that the students' revisions focused on adding informational elements to support the organisation of their writing and revisions were mostly made at the sentence level. Therefore, these findings suggest that the major focus was centred on the content and organisation and such findings concur with those reported in Kessler, Bikowski, and Boggs's (2012) study.

The above-reviewed studies exploring peer revisions on Google Docs revealed a main focus on revising content and organisation. In both studies reviewed above, the activities were completed during a short period of time with a small sample size and thus the generalisation of the results cannot be obtained, indicating the need for further research of Google Docs-enhanced peer feedback. It should also be noted that both studies did not link peer edits to peer comments and limited exploration of peer revisions to a single Google Docs platform, leaving a gap. Therefore, the current study's comparison of the peer changes made in response to peer comments on both Google Docs and Wiki platforms would add to this line of research.

2.9.3. Summary

The majority of research in sections 2.9.1 and 2.9.2 concerning peer revisions made through a variety of synchronous and asynchronous platforms (e.g., Arnold, Ducate & Kost, 2009; Aydin & Yldiz, 2014; Hsu, 2019; Kessler, 2009; Kessler, Bikowski & Boggs, 2012; Liang, 2010; Mak & Coniam, 2008; Semeraro & Moore, 2017; Song & Usaha, 2009) suggested a focus on editing the content of writing. The studies in this research strand looked into peer edits either in CALL vs. non-CALL activity or in a single CALL activity with no research looking into the Google Docs and Wiki-enhanced peer revisions comparatively in the same EFL context. Also, some studies in this line of research did not clearly report the areas of peer edits made (e.g., Aydin & Yldiz, 2014; Cha & Park, 2010; Guardo & Shi, 2007; Liang, 2010) and others (Arnold, Ducate & Kost, 2009; Aydin & Yldiz, 2014; Kessler, 2009; Kessler, Bikowski & Boggs, 2012; Mak & Coniam, 2008; Semeraro & Moore, 2017) did not link the peer edits to the peer comments. Therefore, checking participants' revisions made in response to peer feedback received on Google Docs and Wiki mediums and whether the implementation rate of peer feedback received on both platforms influenced students' writing performance is still a promising area to be examined. Further to this, the Google Docs and Wiki peer revision outcomes of studies carried out across different EFL Mexican, Taiwanese, and Turkish contexts (e.g., Aydin & Yldiz, 2014; Hsu, 2019; Kessler, 2009) had various

limitations related to time span, context, and sample sizes, indicating that the outcomes cannot be generalised beyond the studies.

In response to the lack of comparative research looking into peer revisions (made in response to peer comments) on Google Docs and Wiki, and in attempt to explore the value of inline commenting vs. non-inline commenting, the present study will look into peer revisions made in response to peer feedback on Google Docs and Wiki comparatively in the context of pair writing where a higher level of commitment towards revising texts can be ensured. The participants' views will also be checked to identify the exact reasons behind the participants' online editing behaviours.

A review of the empirical research exploring the effectiveness of face-to-face peer feedback is presented in the next section. Reviewing research in this regard aims to give insight into the effectiveness of this peer feedback as well as to back up the focus of the present study exploring the effectiveness of feedback exchanged through two forms of CALL (i.e., Google Docs and Wiki) on writing performance.

2.10. Insights from research on effectiveness of face-to-face peer feedback

Studies have explored the effectiveness of face-to-face peer feedback on L2 writing development with EFL Saudi students (Alnasser & Alyousef, 2015; Grami 2010), with EFL Chinese students (Yang, Badger, & Yu, 2006), with EFL Japanese students (Ruegg, 2014) and with EFL Lebanese students (Diab 2010; Diab 2011). Some of these compared the effectiveness of peer feedback with teacher feedback in EFL writing contexts (Alnasser & Alyousef, 2015; Grami, 2010; Ruegg, 2014) while others compared the effectiveness of peer feedback with self-feedback (Diab 2010; Diab 2011). The results of these studies were similar in that they all have shown improvement in students' writing as a result of their engagement in peer feedback activities.

Grami (2010) explored the effects of face-to-face peer feedback on a group of Saudi ESL university students who were assigned into two groups; one experimental group jointly receiving teacher-written and peer feedback; and a control group receiving only teacher-written feedback. Pre- and post-

test results found that students who received peer feedback outperformed the other group in both local and global aspects of writing. The pre- and post-tests used for checking the progress of students' writing showed that the texts were evaluated and given the overall score based on various local and global issues with the use of holistic grading rubric. Even though the results showed that the students in both experimental and control groups did better at the post-test, the experimental group outperformed the control group in all local and global aspects of writing. In the same Saudi EFL context with 41 Saudi EFL undergraduate students, Alnasser and Alyousef (2015) examined the impact of two forms of face-to-face peer feedback, exclusively focusing on macro features (leaving the provision of micro feedback to the teacher) of students' overall writing, and on macro and micro writing-level features. In this two-phase study, two forms of peer feedback were introduced; namely, a conventional form of feedback (i.e., provision of both micro and macro feedback) was introduced in the first phase whereas the new feedback technique/form exclusively focusing on macro features (leaving the provision of micro feedback to the teacher) was introduced in the second phase. The peer feedback was exchanged on a total of 10 argumentative essays. The findings showed that both forms of face-to-face feedback introduced had significant impact on the participants' writing, with the new peer feedback technique focusing exclusively on macro features having even greater and more positive impact at the macro level than the conventional form.

In East Asian EFL contexts, a few studies (Yang, Badger, & Yu, 2006; Ruegg, 2014) explored the effectiveness of the peer feedback by comparing it with teacher feedback and found similar results to those reported by Grami (2010) and Alnasser and Alyousef (2015) in the Saudi EFL context. Yang, Badger, and Yu (2006), for example, compared the effectiveness of peer and teacher feedback carried out in the Chinese EFL writing context in which one group of students received teacher feedback and the other group received peer feedback. The textual, questionnaire, observational, and individual interview data have shown that the students used both teacher and peer feedback to improve their writing, with teacher feedback being more likely to be implemented and leading to greater improvements in

writing. In addition, over 90% of the students in the teacher feedback class reported usefulness of the feedback, compared with over 60% of the students in the peer feedback group class reporting peer feedback as useful. In another East Asian EFL context, Ruegg (2014) compared the changes in L2 writing self-efficacy between two groups of Japanese EFL university students who received different forms of feedback. One group received teacher feedback while the other group received peer feedback. The results showed that both feedback forms increased L2 writing self-efficacy. However, the teacher feedback group had more significant increase in L2 writing self-efficacy than their counterparts in the peer feedback group.

Studies in EFL contexts have studied the influence of peer feedback delivered face-to-face on writing by comparing peer and self-feedback and have found similar results to previously reviewed studies concerning the positive impact of peer feedback on students' writing performance. For example, Diab (2010) explored the impact of both peer and self-feedback in reducing language-related errors in the writing of EFL university students in Lebanon. Students in the peer feedback group succeeded in reducing their grammar-based errors (e.g., errors in subject/verb agreement, pronoun agreement) in revised essays more than their counterparts in the self-feedback group. In a follow up study, Diab (2011) found that peer feedback can help EFL university students improve their writing significantly more than self-feedback and attributed these differences to the use of language learning strategies, peer interaction, and engagement with language during peer feedback.

From a review of the studies exploring the effectiveness of peer feedback in face-to-face contexts, it has been noted that it seems to positively and significantly increase the students' writing performance, as does most of the research carried out in technology-enhanced peer feedback contexts. The next section reviews research findings in relation to peer edits and peer revisions made in face-to-face contexts. Reviewing research in this regard aims to give insights about how students reacted to peer feedback given in face-to-face context, as well as to back up the findings of the present study.

2.11.   Insights from research on face-to-face peer edits/revisions

Some studies carried out with ESL students in different ESL contexts (Deni & Zainal, 2011; Paulus, 1999; Villamil & Guerrero, 1998) have explored the peer edits exchanged face-to-face as well as their impact on the writing performance of participants. The results revealed that most of the edits focused mainly on local-related aspects. Deni and Zainal (2011) conducted a study with 15 ESL Malaysian university students to explore the usefulness of peer-editing practice in enhancing their writing skills. Analysis of the students' revisions revealed that the edits made addressed both local and global aspects, but the local ones were more prevalent than the global.

Villamil and Guerrero (1998) investigated the effectiveness of peer revision on final essay drafts of 14 Spanish ESL college students. More specifically, the study explored how the suggestions made in peer sessions were incorporated by writers in their final revisions. It also explored to what extent the writers revised their essays based on different local and global writing aspects (i.e., content, organisation, vocabulary, grammar and mechanics). The analysis of peer interactions, which focused predominantly on grammar, revealed that most revisions (i.e., 74%) suggested in the peer sessions were incorporated. These findings are similar to those reported by Deni and Zainal (2011). In another ESL context, Paulus (1999) explored the face-to-face peer feedback on 11 student essays exchanged by undergraduate international students at an American university. More specifically, the revision types and sources made were analysed based on Faigley and Witte's (1981) taxonomy of revisions. The findings revealed that the majority of revisions students made were at the surface level, including changes in language and mechanics. However, the changes the participants made in response to peer feedback were more often meaning-level changes than those changes initiated and made by the writers themselves. The findings also revealed an overall essay improvement as a result of engagement in peer edits and writing multiple drafts.

The research evidence in sections 2.10 and 2.11 suggests a positive impact of face-to-face peer feedback and peer editing on students' writing performance. However, it should be noted that the feedback exchanged in face-to-face settings has limitations such as space and time restrictions for engagement in peer feedback activities, which might affect student writing growth. These limitations can be overcome by looking into the effectiveness of peer feedback in a CALL environment where the participants can have the chance to engage in language learning activities 'anytime, anywhere' through the use of mobile and computer technologies. Therefore, the peer feedback exchanged in online approaches can offer an added value to the language learning in general and peer feedback exchange in particular. The studies in the research strands in the following section address the effectiveness of Google Docs and Wiki-enhanced peer feedback on the participants' writing performance. More specifically, the findings of studies in this line of research give insight into whether Google Docs and Wiki-enhanced peer feedback influences students' writing performance in the overall scores and the dimensions of form and content. In other words, presenting the evidence of this line of research aims to back up the focus of the present study which explores the impact of Google Docs and Wiki-enhanced peer feedback on students' individual writing performance.

2.12. Effectiveness of Google Docs- and Wiki-enhanced peer feedback on writing progress

A number of CALL researchers have explored the impact of Google Docs (Ebadi & Rahimi, 2017; Pham, Lin, Trinh, & Bui, 2020; Semeraro & Moore, 2017; Zheng, Lawrence, Warschauer, & Lin, 2014) and Wiki-enhanced peer feedback (Akbari & Erfani, 2018; Alshumaimeri, 2011; Castañeda & Cho, 2013; Chin, Gong, & Tay, 2015; Lee, 2010; Woo, Chu, & Li, 2013) on students' individual writing performance in language learning contexts. These studies, however, overlooked the comparative exploration of the value of peer feedback exchanged on Google Docs (which promotes inline commenting) and Wiki (which promotes non-inline commenting) platforms in the context of pair writing. They rather focused on exploration of the value of peer feedback exchanged on a single platform or value of feedback exchanged through Google Docs and Wiki in comparison with feedback exchanged through face-to-face

learning, a comparative design that was questioned because it assumes that the CALL condition is matched against face-to-face learning (Handley, 2014). The majority of the studies in this line of research were conducted in university contexts with EFL learners from Saudi Arabia, Iran, and Vietnam (Alshu-maimeri, 2011; Ebadi & Rahimi, 2017; Hsu, 2019; Nami & Marandi, 2014; Pham, Lin, Trinh, & Bui, 2020), as well as with L2 Spanish learners (Castañeda & Cho, 2013; Lee, 2010). A few studies also have been carried out in a school context with EFL Iranian learners (Akbari & Erfani, 2018), L1 (Woo, Chu, & Li, 2013) and L2 (Chin, Gong, & Tay, 2015) Chinese learners, and school students in the United States (Semeraro & Moore, 2017; Zheng, Lawrence, Warschauer, & Lin, 2014).

2.12.1. Effectiveness of Google Docs-enhanced peer feedback on writing progress

Research has explored the impact of Google Docs-enhanced peer feedback on the students' individual writing performance. This has been conducted in university contexts with EFL Iranian learners (Ebadi & Rahimi, 2017) and Vietnamese EFL learners (Pham, Lin, Trinh, & Bui, 2020), and in school contexts with sixth-grade students from one middle school in a suburban Colorado school district (Zheng, Lawrence, Warschauer, & Lin, 2014) and in a public school located elsewhere in the United States (Semeraro & Moore, 2017).

The studies carried out in university contexts with EFL learners (i.e., Ebadi & Rahimi, 2017; Pham, Lin, Trinh, & Bui, 2020) found that peer feedback received on Google Docs seems to play a role in improving writing in aspects related to form. Ebadi and Rahimi (2017), for instance, explored the effectiveness of Google Docs-enhanced peer editing and peer commenting versus the face-to-face peer editing and commenting (exchanged on individually composed writing tasks in pairs) on academic writing skills (the total academic writing, as well as academic writing in areas of task achievement, coherence and cohesion, lexicon, and grammatical accuracy) of 20 male EFL learners. The results revealed that there was significant development in academic writing at both post- and delayed post-tests in overall writing scores, as well as in the different academic writing areas in both contexts. By comparison, the experimental group outperformed the control group in overall academic writing as well as in writing

performance in the five areas of task achievement, coherence, cohesion, lexicon, and grammatical accuracy at both tests. This gives an indication that online peer-editing and commenting using Google Docs was a more effective instructional procedure in developing EFL learners' academic writing than peer-editing in the face-to-face classroom, not only in the short term but also in the long term. Similar findings were reported by Pham, Lin, Trinh, and Bui (2020) from a Vietnamese EFL university context. Pham, Lin, Trinh, and Bui (2020) explored the impact of Google Docs-enhanced peer feedback, exchanged by 40 EFL Vietnamese university students (19 male and 21 female students), on their local and global features of EFL academic writing during a blended 15-week IELTS course at an English language centre in Vietnam. The participants individually constructed and submitted a weekly journal/essay after the completion of each online lesson, posted it on Google Docs and gave peer feedback to three peers. The participants' writing performance, especially in the local and global writing aspects, was checked before and after their engagement in e-peer feedback through pre- and post-tests. The pre- and post- writing tests included both IELTS task 1 (a task related to analysing and reporting data related to graphs, process diagrams and maps) and IELTS task 2 (essay writing). The test results revealed that the students' scores in global aspects in the two data sets (two tests) were statistically different, indicating that the post-test performances of global aspects in tasks 1 and 2 were higher than those of the pre-test. On the other hand, the scores students achieved in tasks 1 and 2 of pre- and post-writing tasks related to local aspects showed that there were significant differences in the two mentioned pairs of data (pre- and post-test). These quantitative results suggest that Google Docs feedback improved the quality of global and local writing.

In another university context, Hewett (2006) explored the focus of the 52 online interactions made by 23 undergraduate students in first year English classes at Pennsylvania State University and the effectiveness of online interactions on the learners' performances. The participants' writing performance was checked through textual analysis alongside all the essay drafts as well as through checking students' performance in subsequent writing drafts from assignments placed within final students' portfolios. The linguistic analysis revealed that the interactions were either idea-development focused or task oriented.

It was also found that the online peer feedback exchanged on synchronous whiteboards (which have collaborative synchronous functions similar to Google Docs) helped students have intense awareness of global features, including organisation, task management, and idea development. These findings are similar to those previously reported in the above-reviewed studies which found significant influence from Google Docs synchronous interactions on global writing aspects.

In a school context, Zheng, Lawrence, Warschauer, and Lin (2015) examined the impact of Google Docs-enhanced peer feedback on attainment in writing. With the use of three mediums (i.e., Google Docs, Word-processing software, and paper), 257 six-grade students drafted and revised their writing. The results revealed that feedback did not have any significant effects on students' writing or writing achievement change. In another school context, Semeraro and Moore (2017) investigated the use of Google Docs to facilitate peer revision for informational writing as well as the impact of peer feedback and peer revisions on seven sixth-grade students' overall writing. The students received instruction about the informational genre and were asked to individually compose informational genres on Google Docs. Afterwards, two peer revision strategies were introduced to the participants during instruction; namely identifying informational elements in a partner's writing and asking questions when more information was needed. The results of peer revisions were already presented in section (2.9.2.2), which reviewed research on revisions made on Google Docs. The results related to the impact of Google Docs-enhanced peer feedback on overall writing have shown that students made improvements in overall writing quality. Therefore, after peer revision, the students performed better on the post on-demand piece than on the pre on-demand writing piece in three factors (lengthier essays, more closely followed the format of informational writing, and elaborated more by adding details to their writing) contributing to the student's ability to write higher quality essays.

Of the above-reviewed studies that explored the effectiveness of Google Docs-enhanced peer feedback on students' writing performance and that revealed significant improvement in writing, only two studies (Ebadi & Rahimi, 2017; Pham, Lin, Trinh, & Bui, 2020) were carried out in university EFL

contexts. However, the outcomes of these studies are incomparable to those of the present study due to limitations related to received instruction during the feedback process and the teacher's intervention in the peer editing process, as evidenced in Pham, Lin, Trinh, and Bui's (2020) study as well as the small sample size in Ebadi and Rahimi's (2017) study. Therefore, the outcomes of previously reviewed studies should be understood in light of sample size, and received instruction, as these could limit the generalisation of the results. Further to this, the studies in this line of research only looked into effectiveness of peer feedback (exchanged on individually written essays) on participants' overall writing performance or writing performance in both global and local aspects without comparing the participants' performance on local and global writing aspects, leaving uncertainty about which writing aspect the participants did best on. Therefore, it seems there is a need for further research to explore in more detail the effectiveness of Google Docs-enhanced peer feedback on students' writing performance in a context of pair writing (where participants share a sense of responsibility towards the task being edited and have a higher level of commitment towards editing).

2.12.2. Effectiveness of Wiki-enhanced peer feedback on writing performance

A number of CALL researchers have explored the role of asynchronous Wiki-enhanced peer feedback in promoting writing skills in the university context with Saudi EFL learners (Alshumaimeri, 2011), with Iranian EFL learners (Akbari & Erfani, 2018; Nami & Marandi, 2014), with L2 Spanish learners (Castañeda & Cho, 2013; Lee, 2010), and with L1 Chinese learners (Chin, Gong, & Tay, 2015; Woo, Chu, and Li, 2013). These studies, focusing on the effectiveness of Wiki-enhanced peer feedback in collaborative writing, showed the positive effects of drawing learners' attention to form during writing tasks on L2 development. The results have shown that the Wiki-enhanced peer feedback seems to lead to higher levels of progress in writing skills compared to peer feedback received either in a conventional way or on other technological tools such as e-portfolio.

Two studies exploring the effectiveness of Wiki feedback on students' writing performance (Alshumaimeri, 2011; Gharehbagh, Stapa & Darus, 2019) compared it to feedback received in a traditional method. Alshumaimeri (2011) explored the use of wikis in improving writing skills (writing quality and accuracy) in 42 male students at the same proficiency level in writing (22 students in the experimental group and 20 students in a control group) at the Preparatory Year in King Saud University in Saudi Arabia. The students collaboratively completed the writing and revision activities in groups and then edited their collaborative work to produce a piece of writing free from errors. The results showed a significant increase in the two groups' writing performance from pre- to post-tests in the total writing scores as well as in both accuracy and quality. However, the experimental group significantly outperformed the control group in both accuracy and quality of writing in the post-test. These results indicate that Wikis can benefit students by improving their writing skills in accuracy and quality in a collaborative environment. Another study by Gharehbagh, Stapa and Darus (2019) examined the effectiveness of feedback exchanged by 18 EFL students (8 male and 10 females) through Wiki as opposed to traditional feedback on writing performance. In the treatment group, the students posted their individually written essays and then read their peers' essays and provided feedback on them, whereas the participants in the control group did that face-to-face. Feedback was given by adult EFL students from a language school in Malaysia on the written accuracy and quality, and the results were similar to those of Alshumaimeri's (2011) study. More specifically, the statistical analyses of students' pre- and post-test scores showed a significant improvement in Jacob's (1981) ESL components of content, organisation, language use and vocabulary except for the students' punctuation use. In addition, the experimental group performed better than the control group in all these writing aspects. The qualitative analysis of peer comments also showed that the comments made on peers' essays played a positive role in improving the students' writing from the pre- to post-tests. Therefore, the feedback received on Wiki helped the participants write more accurately and this in turn increased the overall quality of their writing. These findings are similar, showing significant increase in the writing performance in accuracy and quality from the pre- to post-test, with

greater writing performance noticed in the experimental group compared to that of the control group which engaged in peer feedback in a face-to-face medium.

Other studies carried out in EFL university contexts (Hsu, 2019; Nami & Marandi, 2014) looked mainly into the impact of Wiki-enhanced peer feedback on EFL students' writing accuracy and found significant increase in the participants' writing accuracy after engaging in peer feedback activities. With 26 EFL Chinese students from a Taiwanese university, Hsu (2019) explored the frequency of peer feedback on language-, organisation- and content-related episodes and its impacts on students' writing accuracy. The students worked collaboratively in a total of 12 small groups and each group turned in one joint essay with comments and discussions. The teacher also gave comments on language-related issues without providing corrections. The results of frequency of peer feedback focus (i.e., language-related episodes generated on the platform were prevalent) were presented in section 2.8.2 whereas results related to the impact of the Wiki-enhanced peer feedback on writing accuracy revealed that there was improvement in the students' writing accuracy. The participants' improvement in accuracy could however be due to the teacher's provision of comments on language-related issues. Similarly, with 20 Iranian female EFL university learners, Nami and Marandi (2014) explored peer feedback given during a nine-week writing course and its impact on language accuracy. The Wiki platform was used as an out-of-class discussion forum for exchanging ideas and discussing issues concerning English essay writing, so there was no structured writing task to be completed or collectively constructed on Wiki. A total of 50 Wiki posts were analysed with both quantitative and qualitative measures with the aim of exploring the types of peer feedback and their impact on writing accuracy. The results revealed that students mainly focused on form in aspects of grammar, spelling, and punctuation and this in turn led to significant improvement in accuracy.

With EFL students from the high school level, Akbari and Erfani (2018) compared the effects of online feedback exchanged through two forms of CALL (i.e., Wiki and e-portfolio) on the writing performance of 81 Iranian secondary school EFL students/learners, engaging in two experimental and one

control group. The students in the two experimental groups used Wiki as a medium for the submission of individually written assignments and for the exchange of peer feedback online in small groups. The statistical analysis showed that the participants' engagement in peer feedback in the two forms of CALL (Wiki and e-portfolio) was significantly more influential for learners' writing than the conventional face-to-face feedback. By comparison, Wiki-enhanced peer feedback led to higher levels of progress in writing skill in comparison to using e-portfolio peer feedback. These findings are similar to those reported by Gharehbagh, Stapa and Darus (2019) and Alshumaimeri's (2011) studies which compared two forms of feedback exchanged by EFL university students; namely, Wiki-enhanced and face-to-face peer feedback.

In L2 Spanish university contexts studies (e.g., Castañeda & Cho, 2013; Lee, 2010) explored the effectiveness of Wiki-mediated peer feedback on writing performance and found that it was effective for improving students' writing performance. Castañeda and Cho (2013), for example, investigated the extent to which Wiki-enhanced peer feedback on aspects of organisation, coherence and structure influenced the individual writing performance of 53 students (38 females and 12 males) in an elementary Spanish course in a U.S university. The participants worked in small groups of 3-4 students each. Each group wrote 4 essays collaboratively based on four different YouTube videos, and then commented on and edited the texts as a group. The teacher also joined the Wiki page of each group as a member to monitor students' progress and provide feedback. The statistical analysis showed that Wiki-enhanced feedback was mainly helpful in improving students' grammatical knowledge, since there was significant improvement there. In a similar L2 Spanish context, Lee (2010) explored the effectiveness of engagement in collaborative learning activities, including the exchange of Wiki-enhanced peer feedback, on the writing performance of 35 university students (who had similar linguistic backgrounds and internet technology skills) taking elementary Spanish language classes. Over a period of 14 weeks, the participants contributed to Wiki pages to collectively write drafts, read, provide feedback to each other using the discussion page, and edit each other's contributions as well as track the history log for saved changes.

The Wiki activities represented 15% of the course grade. The instructor's role focused on bringing students' attention to language problems during the revision process, but such assistance was kept to a minimum for the sake of encouraging peer scaffolding. The results showed that Wiki-enhanced peer feedback had a positive impact on the students' writing skills. It should however be noted that the study's outcomes might be a result of the teacher's provision of feedback on language-related issues. The reported results are similar to those reported in Castañeda and Cho's (2013) study that was carried out in a similar L2 context.

Some other studies in L2 Chinese (Chin, Gong, & Tay, 2015) and L1 Chinese contexts (Woo, Chu, & Li, 2013) explored the effectiveness of Wiki-enhanced peer feedback on writing and found similar results showing a positive impact from Wiki-enhanced peer feedback on writing performance. In an L2 Chinese context in Singapore, Chin, Gong, and Tay (2015) looked into whether Wiki-enhanced comments contribute to the overall performance of 32 seventh-grade students. The participants collaboratively composed Chinese narrative essays using Wiki-enhanced peer revisions and peer feedback exchange. Statistical analysis showed that the students' scores at pre-, mid- and post-writing tests showed writing performance improved as a result of the peer review segment when the students engaged in joint efforts for solving problems and raising questions. In addition, the results showed a statistically significant association between the peer comments and post-test results. With 119 L1 Chinese primary school students in Hong Kong, Woo, Chu, and Li (2013) similarly investigated the impact of the Wiki-enhanced feedback and edits on collaborative writing composed on Wiki. Both student writings and interviews were analysed, and the results showed an improvement over time in the students' writing performance as a result of engagement in peer revision and peer feedback processes.

The evidence from the above studies revealed the significant influence of Wiki-enhanced peer feedback on students' writing. However, this outcome should be understood in light of language context, sample size, short time span, detailedness of writing evaluation, and design of CALL activities, as these could limit generalisation of results. Some of the studies (e.g., Castañeda & Cho, 2013; Chin, Gong, &

Tay, 2015; Lee, 2010; Woo, Chu, & Li, 2013) were carried out in language contexts other than English and thus their outcomes cannot be generalised to those of studies carried out in EFL contexts, as in the current study. The previous studies carried out in EFL contexts (e.g., Akbari & Erfani, 2018; Alshumaimeri, 2011; Gharehbagh, Stapa & Darus, 2019; Hsu, 2019; Nami & Marandi, 2014) also had shortcomings (e.g., small sample size, short time span, lack of detailed and comprehensive evaluation of participants' writing progress) that weaken generalisation of their results to other EFL contexts. Some studies looked at and reported progress in both accuracy and quality of writing aspects without specifically reporting on which writing aspect the participants did best (Akbari & Erfani, 2018; Alshumaimeri, 2011; Castañeda & Cho, 2013), and other studies limited exploration of the effectiveness of peer feedback on writing either to accuracy (Hsu, 2019; Nami & Marandi, 2014) or overall writing (Chin, Gong, & Tay, 2015; Lee, 2010; Woo, Chu, & Li, 2013). They also limited exploration of the effectiveness of peer feedback to the context of individual (Akbari & Erfani, 2018; Alshumaimeri, 2011; Gharehbagh, Stapa & Darus, 2019) or collaborative writing (Hsu, 2019), overlooking the context of pair writing that could ensure more equal participant engagement and participation in the feedback activities and thus would help bring about more conclusive results. All these limitations observed in previous research exploring the value of Wiki-enhanced peer feedback suggest that further research is still needed to look into the value of Wiki-enhanced peer feedback, especially in the context of pair writing.

2.12.3. Summary

The evidence from most studies in the research strands in sections 2.12.1 and 2.12.2 (concerning the effectiveness of Google Docs and Wiki-enhanced peer feedback on writing performance) suggests that the peer feedback exchanged through Google Docs and Wiki platforms or through platforms with similar features brought about significant improvement in numerous aspects of students' writing (Akbari & Erfani, 2018; Alshumaimeri, 2011; Castañeda & Cho, 2013; Chin, Gong, & Tay, 2015; Ebadi & Rahimi, 2017; Gharehbagh, Stapa & Darus, 2019; Hewett, 2006; Hsu, 2019; Lee, 2010; Nami & Marandi, 2014; Pham, Lin, Trinh & Bui, 2020; Semeraro & Moore, 2017; Woo, Chu, & Li, 2013). Specifically, the

majority of the studies on Google Docs (Ebadi & Rahimi, 2017; Pham, Lin, Trinh, & Bui, 2020; Semeraro & Moore, 2017) and all studies on Wiki (e.g., Akbari & Erfani, 2018; Alshumaimeri, 2011; Castañeda & Cho, 2013; Chin, Gong, & Tay, 2015; Lee, 2010; Nami & Marandi, 2014; Woo, Chu, & Li, 2013) found significant improvement in writing performance. However, the majority of these studies looked into the effectiveness of peer feedback on a single platform, leaving a gap to the comparative exploration of the effectiveness of Google Docs and Wiki-enhanced peer feedback on students' writing in the same context and under the same circumstances. Further to this, some of the studies (e.g., Akbari & Erfani, 2018; Alshumaimeri, 2011; Castañeda & Cho, 2013; Ebadi & Rahimi, 2017) explored the effectiveness of Google Docs and Wiki-enhanced peer feedback on students' writing in accuracy and quality but did not report which writing aspect they did best on, whereas other studies exclusively examined the impact of Google Docs and Wiki-enhanced peer feedback on the participants' writing performance in accuracy (e.g., Hsu, 2019; Nami & Marandi, 2014) or in overall writing (Chin, Gong, & Tay, 2015; Lee, 2010; Semeraro & Moore, 2017; Woo, Chu, & Li, 2013). These limitations indicate that the exploration of effectiveness of Google Docs and Wiki-enhanced peer feedback on students' writing performance comparatively, with detailed examination of the writing performance in both local and global aspects, would add to this research strand.

In response to the lack of comparative research on the effectiveness of Google Docs and Wiki-enhanced peer feedback on students' writing performance and in pursuit of identifying the value of inline commenting vs. non-inline commenting, the present study will do this comparison in the context of pair writing. The present study will look into overall writing progress and progress in various aspects of writing, as well as identify the area the participants performed best on to come up with more conclusive results about the value of Google Docs and Wiki-enhanced peer feedback. Therefore, this study will help to add to previous relevant research by bringing about results that assist in achieving fuller picture regarding the value of Google Docs and Wiki-enhanced peer feedback on students' individual writing performance.

The following section presents evidence of previous research exploring views on technology-enhanced peer review, particularly the Google Docs- and Wiki-enhanced peer review. Reviewing research in this regard aims to back up the part of the present study which looks into the participants' perceptions of Google Docs and Wiki-enhanced to understand why or why not the peer feedback exchanged on the two platforms was effective and thus to overcome limitations in test results, and to help explain the participants' online behaviours (i.e., peer feedback and reactions to it).

2.13. Perceptions of technology-enhanced peer review

A few studies have explored participants' perceptions of Google Docs and Wiki-enhanced peer feedback as well as its influence on writing. Pham, Lin, Trinh, and Bui (2020), for instance, looked into the perceptions of 40 Vietnamese university students towards peer feedback on local and global-related writing aspects through administration of pre- and post-questionnaires. The results found significant differences in participants' perceptions of four global-related aspects of writing—flow, organisation, and transitions; idea development; introduction and conclusion developments; and richer examples—before and after the incorporation of Google Docs-enhanced peer feedback. In addition, the results showed significant differences in participants' perceptions of the effectiveness of Google Docs-enhanced peer feedback in addressing local aspects (including grammar, structure, and vocabulary) before and after the peer feedback process. The participants indicated that peer feedback helped them to improve their writing in local aspects (e.g., grammar, structure and vocabulary) as well as to organise essays, develop topics and ideas, and to enhance the introduction and conclusion and to incorporate richer examples to support their arguments. The results also indicated that students' perceptions of their improvement in local aspects were much more positive compared to those of their improvement in global aspects. More specifically, they stated that they realised continuous development of grammar accuracy, flexibility in the use of different syntactic structures, and expansion in the use of academic words.

In terms of perceptions of peer feedback on the Wiki platform, a few studies (e.g., Franco, 2008; Froldova, 2016) have found similar results, revealing the positive impact of Wiki-enhanced peer feedback on writing performance. Franco (2008), for example, examined the perceptions of the impact of Wiki-enhanced peer interactions on the writing skill of 18 Brazilian EFL students at a private language school in Brazil. Results of a survey, as well as the writing and comments posted on the Wiki medium, suggest that the Wiki-enhanced peer feedback was useful for improving the participants' writing skills, though there was no reporting on the participants' specific views on the effectiveness of peer feedback on writing performance in the local and global writing aspects. In another EFL context, Froldova (2016) compared the attitudes of 74 EFL higher secondary school students in Prague during English lessons and CLIL (Content and Language Integrated Learning) Social Science lessons. The questionnaire data revealed that the students' attitudes towards peer correction and peer editing were positive in both pen and paper based feedback and Wiki-based cases.

2.14.   Current study

Evidence presented suggested that Google Docs mainly supports commenting on language-related issues whereas the Wiki platform primarily supports commenting on meaning or content. Regarding research on peer edits on both mediums, evidence suggested that the peer edits on both platforms mainly support editing the content of writing. In terms of findings of research exploring the effectiveness of Google Docs- and Wiki-enhanced peer feedback on writing, significant improvement was observed in different areas of participants' academic writing (including language and content) after engagement in peer feedback activities through these two platforms. The studies looking into the effectiveness of Google Docs and Wiki-enhanced peer feedback either focused on exploring impact of feedback on local and global writing aspects without reporting which writing aspect the participants did best on or limited exploration of impact of feedback on accuracy or overall writing performance. Further to this, most research on peer feedback and peer edits made on Google Docs and Wiki were explored either in a single CALL activity or in a CALL vs. non-CALL activity. It was also noted that

previous research on Google Docs and Wiki primarily looked into writing product (i.e., effectiveness of peer feedback and peer revisions on these platforms on writing performance) and writing process (i.e., feedback focus and revisions made on the platforms) separately. In addition, previous research on Google Docs and Wiki-enhanced peer feedback focused on exploring peer feedback in the context of individual or collaborative writing, overlooking the context of pair writing which could promote more equal engagement in the peer feedback process (Storch, 2013).

Google Docs and Wiki literature lacks research adopting the CALL vs. CALL design for exploring the effectiveness of Wiki-enhanced vs. Google Docs-enhanced peer feedback and students' reactions to it on students' individual writing performance in the context of pair writing. The current study will bridge this gap by investigating the effectiveness of peer feedback exchanged on the Google Docs and Wiki platforms and looking into exact percentages of peer feedback and reactions to it (i.e., its incorporation rate) to check whether the peer feedback focus and reactions to it influenced the participants' individual writing performance. In other words, this study bridges the gap by comparing the impact of inline peer feedback (promoted by Google Docs) and non-inline peer feedback (promoted by Wiki) on writing by looking into both the writing product and writing process through test results as well as through peer feedback and revisions.

Chapter 3: Methodology

3.1. Overview

This chapter presents an overview of the research methodology and the methods employed in this study. In addition, the questions and hypothesis guiding the project are outlined (section 3.2), details of the context of the study, including the participants, are presented (section 3.3), the design of the study is discussed (section 3.4), and the research instruments employed are described (section 3.5). Then, an account of data collection procedures and data analysis processes (sections 3.7 & 3.8) are presented. The chapter also ensures that trustworthiness criteria are met (section 3.9) and addresses ethical precautions taken into consideration for ensuring that this research is ethical (section 3.10). Finally, the chapter concludes with a brief summary (see section 3.11).

3.2. Aim, research questions and hypothesis

The overarching aim of the present study is to identify the value of inline and non-inline commenting features through exploring the differential impact of Google Docs inline peer comments and Wiki non-inline peer comments and reactions to them on the overall writing performance and writing performance in the dimensions of form and content of two experimental groups of Saudi university level learners of English. To achieve a fuller picture about the value of inline and non-inline commenting, the Google Docs inline peer comments and Wiki non-inline peer comments as well as participants' reactions to them were also explored. In addition, the students' attitudes towards their experiences of peer feedback on the two platforms (qualitative data) were checked to provide insights into this issue and to understand why or why not inline or non-inline peer comments were effective. To achieve the main aim in the present research, the following research questions were posed:

Q1: What is the differential impact of Wiki-enhanced and Google Docs peer review on writing performance?

Q2: How do Saudi EFL college students working in pairs on the Google Docs platform provide peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q3: How do Saudi EFL college students working in pairs on the Google Docs platform respond/react to peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q4: What are Saudi EFL college students' reported perceptions of peer written feedback provided via Google Docs and Wikis?

The premise on which the current study is based is that inline commenting (which is available in Google Docs) seems to enhance form-focused commenting and thus leads to further improvement in writing accuracy compared to the non-inline commenting (which is available in Wiki), and that the non-inline commenting enhances content-based comments and in turn promotes greater improvement in writing quality compared to inline commenting. More specifically, it is expected that inline commenting may improve students' individual writing greatly, especially in the dimension of form (i.e., accuracy) due to the potential role of the inline commenting feature in facilitating direct and specific commenting on local writing aspects, including form-focused and language-related issues. On the other hand, non-inline commenting is expected to improve students' individual writing in content because it seems to be associated with facilitating commenting on the global level of writing, which includes content and organisational writing aspects. Therefore, the hypothesis tested in the current study, and which leads the current research is:

> **Research hypothesis**: It is expected that inline commenting supports more feedback on accuracy (i.e., form-focused feedback) than non-inline commenting and therefore could promote higher development in the participants' writing accuracy (form—grammar, vocabulary, mechanics), whereas non-inline commenting is expected to support more global/general feedback (including content-based feedback) than inline commenting, and therefore could promote higher development in the writing content.

3.3. Research Context
3.3.1. Setting

The present research was conducted in the Department of English Language at King Khalid University in Saudi Arabia, where the researcher was employed as a lecturer, during the period from 2 September 2018 to 2 December 2018. Before embarking on this research, the researcher had taught English language writing courses for first, second and third-year students in the department for six years. This made the researcher aware of how writing is taught in the department and motivated him to conduct this research.

3.3.2. EFL in the Department of English Language, KKU

In Saudi Arabia's universities, including King Khalid University where the current study was conducted, English as a Foreign Language is taught in the undergraduate bachelor programme in English language. This program includes four years of study of a variety of courses and skills such as writing, speaking, reading, listening, linguistics, translation, and literature. Therefore, writing is one of the essential skills that students must develop during their study. The first and second-year students have almost the same proficiency level while students in the third and fourth years are classified under two different proficiency levels. In particular, the students in levels 1, 2, 3, and 4 (i.e., the first and second-year students) are considered beginners and they normally receive instruction on the basic language skills; namely, reading, writing, listening, speaking, and grammar. On the other hand, the students in the third year (i.e., students in levels 5 and 6) are classified as intermediate students and receive more advanced and comprehensive instruction on technical writing as well as on literature and linguistic science (i.e., phonetics and morphology). The final-year students represent upper-intermediate learners and receive instruction on applied linguistics and on writing academic essays for international tests such as TOEFL and IELTS.

In the Department of English Language at KKU, the English language is taught with traditional methods such as Grammar-Translation and Audio-Lingual methods, and with limited use of technology in the form of Blackboard assignments. As a cultural norm, the class is usually teacher-

centred, where teachers control the class and the learning process. Students, in turn, are negative listeners who do not communicate effectively, and do not learn much just by sitting in classes listening and memorizing verbatim. The students are not given significant time to write freely and receive feedback. Most writing instructors place emphasis on the final product of the essay (Al-Hozaimi, 1993) without giving much attention to the processes and strategies followed in teaching and learning writing, such as online peer feedback and editing. A typical writing class starts with a topic being introduced to the students, and then the instructor talks about the topic, providing the students with ready-made sentences and phrases to include in their writing (Al-Hozaimi, 1993). Immediately after that, students are required to write a full essay on the topic and are expected to complete the task by the end of the session. After this stage, the writing instructor reads the final product, makes corrections–mostly grammatical–and assigns a grade to the essay.

The Department of English at KKU requires all students to successfully complete a number of compulsory writing courses in order to be able to enrol in the Preparation for International Tests course, which includes an advanced writing section. This course enrolled 40 students during the fall 2018 semester, representing the participants in the present study (See section 3.3.3). Before enrolling in the course, students should have passed five writing courses as prerequisites. These courses are Writing I, Writing II, Writing III, Writing IV, and Writing for Specific Purposes.

Based on the KKU syllabus and course specification, the students in Writing I course should have mastered writing grammatically correct sentences, following basic punctuation rules and new vocabulary items and writing grammatically correct, descriptive paragraphs of about 80 to 100 words. In the Writing II course, students should have developed the ability to progress from sentence to paragraph level, acquired the skills required to organise sentences and paragraphs into logical sequence and focused on the skills of revision, editing and proofreading as well as written descriptive, process, opinion, and narrative paragraphs. In the Writing III course, the students participating in the current study should have learnt about the use of compound/complex sentences, hypothetical expressions, cohesion and idea formation techniques. According to the syllabus and course specification, at

the end of the course the students should be able to produce condensed and clear essays (of about 350 words) expressing their personal opinions and describing their relationships through descriptive and analytical writing techniques. In Writing IV, the goal is to recapitulate, reinforce and develop work done at levels 1-3, to select and apply pre-writing strategies to generate ideas and develop a plan, to organise drafts via paragraphing, outlining, adding and deleting as well as to use vocabulary, sentence structure, organisation, and rhetorical devices appropriate to audience and purpose. Furthermore, by the end of this course, the students should be able to write different types of five-paragraph essays, such as process analysis, cause and effect, argumentative, classification and reaction essays.

The fifth pre-requisite course for the 'Preparation for International Tests' course, 'Writing for Specific Purposes', introduced students to practical writing, especially business English, developed skills necessary for business proposals, and business letters, memos, autobiographies, and requests for information. Furthermore, this course emphasises development of students' academic writing skills acquired in Writing I-IV. Apart from reinforcing their skills of writing (the use of conventions and mechanics of written English, the appropriate and effective application of English structure, and the effective use of vocabulary), the course aims at the practical application of English language skills in the work environment.

Based on the KKU system, before taking the Preparation for International Tests' course, students must have already taken the pre-requisites mentioned above to have sufficient experience with writing skills that allow them to complete the advanced writing activities in the writing section of the course successfully. Therefore, all students taking part in the current study tend to have the same experience in writing. In the writing modules in the Department of English at KKU, the students normally engage in individual writing activities such as essay and paragraph writing. They also do individual writing homework assignments via the Blackboard e-learning system. In the current study, the students still engaged in writing activities, but they did such activities in pairs via Google Docs and Wiki platforms. Hence, they engaged in collaborative language learning, which is viewed by Donato (1994) as more effective for language learning compared to individual learning, since it provides opportunities for

interaction as well as a more comfortable environment for students. Therefore, there was not a big adjustment to the standard class experience that could impose a negative impact on the educational attainment of the students. Some further precautions taken for ensuring that the students' engagement in pair work rather than in individual work would not have negative impact on students' performance are discussed in detail in section 3.10.

3.3.3. Participants

Forty male EFL Saudi undergraduate students from King Khalid University (KKU), a public university in Saudi Arabia, who were enrolled in the 'Preparation for International Tests' course in the fall semester of 2018 (September-December) participated in the intervention phase of the main study during the entire 15-week semester. Half of these participants (i.e., 20 students; five pairs from both experimental groups) took part in the post-intervention individual semi-structured interviews. The participants represented naturally occurring groups and were in their final year in the Department of English (Level 8 in the department) and their ages ranged between 22 and 24 years old. These students were chosen as participants because they had some basic knowledge about essay and paragraph writing in English, compared to the students who took part in the first pilot study who had lower language proficiency levels and poor technical knowledge. Every semester, there are one or two sections of 'Preparation for International Tests' offered by the institution. According to the university, 1200 EFL students attended classes in the Department of English during the spring semester of 2018.

As shown in the previous sub-section (3.3.2), the participants in the current study had taken the same prerequisite composition courses and thus were expected to have the same levels of experience in writing. In addition, they were generally familiar with the use of the Blackboard e-learning system, used at King Khalid University as a fundamental platform for completing individual writing assignments and engaging in group or pair discussions. Of importance to this study is that the Blackboard e-learning system has features similar to those of Wikis and Google Docs (e.g., discussion forum), which support pair and group discussions.

3.3.4. Provision of feedback in the Saudi EFL context

In Saudi EFL writing classes, "language instruction is teacher-centred; that is, teachers generally dominate the discussion and give instructions with very little learner participation in the learning process" (Aldossary, 2017, p. 6). Therefore, the provision of feedback in this particular context is viewed as part of the teacher's role and is given mainly on aspects related to language accuracy (i.e., language-related issues including grammar and mechanics) in the form of direct corrections (Al-Hazmi & Schofield, 2007; Alnasser, 2013; Al-Shahrani & Storch, 2014) on the final written product. Students in Saudi EFL context are "rarely given the opportunity to ask for clarifications on the feedback provided or rewrite the text following the feedback" (Aldossary, 2017, p. 5).

The learners in Saudi EFL context normally receive very little teacher feedback, if any, on their writing performance and that might be due to the limited class time (Aldossary, 2017; Alnasser, 2013; Rajab, Khan, & Elyas, 2016; Razak & Saeed, 2014), the large number of students in each class (Aldossary, 2017), and the nature of students' mistakes (Alnasser, 2013; Zheng, 2012). Therefore, the learners in the Saudi context usually tend to have very limited experience of feedback, although it is important for learning, as described in Chapter 2. As a result of the rare feedback coming only from one source (i.e., teacher) which is typical of the Saudi context, one side-effect is that learners may not be motivated to become involved or even active in the learning process.

Based on the above, conducting this study in this particular context would help improve the learning and teaching of English writing in the Saudi context where there is a need to engage learners in the learning process, to provide them with opportunities to communicate and practice the L2, and to reflect on and evaluate their own writing and that of their peers. Further to this, conducting this study would offer new ways for exchanging feedback via new technologies that facilitate the writing process and promote the exchange of mutual peer feedback in classes with a large number of participants as in the Saudi EFL classes. It also would provide results that are transferable to other similar

teacher-centred-EFL contexts which rarely engage students into the learning process and rarely use interactive technologies (e.g., Google Docs, Wiki) for exchange of peer feedback in writing classes.

3.4.   Research paradigm, research strategies, and experimental design

The current thesis adopts a pragmatic paradigm which called for a sequential mixed-method approach for answering the research questions. The quantitative methods (online peer-to-peer interactions and the test results) are combined with a qualitative method (i.e., semi-structured interviews), according to the strategy of complementarity. The experimental design employed is a between participants design with a pre-test, post-test, and delayed post-test (conducted six weeks after post-test) format. These methodological decisions are detailed below.

3.4.1.   Paradigm: Pragmatism

Pragmatism is the research paradigm that seems most appropriate in the present mixed methods study since it offers a balance between subjectivity and objectivity (Feilzer, 2010; Shannon-Baker, 2016) and paves the way for applying the most appropriate research methods for answering the research questions and serving the research purpose in the context given (Creswell, 2007; Johnson & Onwuegbuzie, 2004) whilst accepting the limitations of this positioning. This paradigm has often been identified in the mixed methods research literature as a suitable paradigm for conducting mixed-methods research (e.g. Creswell & Plano Clark, 2011; Johnson & Gray, 2010; Morgan, 2007; Scott & Briggs, 2009; Teddlie & Tashakkori, 2009) and is sometimes described as "the philosophic partner of mixed methods research" (Johnson & Onwuegbuzie, 2004, p. 17). Therefore, it provides a rationale and feasible solution for combining the methods from diverse paradigms (Betzner, 2008; Johnson & Onwuegbuzie, 2004), as is the case in the present study. To appropriately apply the mixed methods research in pragmatism, it was ensured that the questions can be answered by integrating the results from both quantitative and qualitative methods (Creswell & Plano Clark, 2011; Tashakkori & Teddlie, 1998) through the use of qualitative data (interview data) to explain the quantitative data (online interactional data and the test results). Therefore, in this paradigm, instead of focusing on a particular

philosophy or epistemology, researchers focus their attention on the research question itself (Creswell, 2003) and on a "what works" approach (Onwuegbuzie & Johnson, 2006; Patton, 1990) to answer the research question (Creswell, 2003). Rather than making a choice between the positivist/postpositivist or constructivist paradigms, this offers the researcher more flexibility to adopt the most practicable approach for addressing and answering their research questions (Brierley, 2017).

An experiment alone cannot fully achieve the aims of the current study which explores the value of the inline vs. non-inline comments exchanged through Google Docs and Wiki mediums and reactions to them on improving the learners' writing performance, and thus a combination of methods is used. A qualitative interview in the present study helps reveal the exact reasons for any change in students' writing and helps explain and elaborate on the online observational data. Particularly, it can give a fuller picture of the topic by looking at the participants' own personal views to help explain the trends in the quantitative results related to the existence of any potential differences in the online observational data and the extent to which it caused the change in writing. Therefore, the qualitative data are used to elaborate on the researcher's interpretations of participants' online behaviours related to the influence of frequency of peer feedback focus provided via Google Docs and Wiki, and reactions to it on the students' writing performance. Therefore, investigating the effectiveness of Google Docs and Wiki-enhanced peer feedback on participants' writing performance required a combination of quantitative and qualitative methods for a pragmatic perspective in which each method is used for answering a particular question. Hence, the present study adopted a mixed methodological pragmatic approach.

3.4.2.   Research strategies: Mixed methods

A mixed methods approach is defined as "procedures for collecting, analysing, and mixing both quantitative and qualitative data in a single study" (Creswell, 2008, p. 62). The mixed methods designs can be of two main types; namely, the *convergent*, also called parallel, *design* (when both quantitative and qualitative components are implemented concurrently), as well as the *sequential mixed design*

(when the quantitative and qualitative components are implemented one after the other) including the explanatory sequential design (when the quantitative methods occur first and have greater attention, and the qualitative methods come after them to help explain the quantitative results) and the exploratory sequential design (when the qualitative methods occur first and have greater attention) (Creswell & Plano Clark, 2017). To determine the type of mixed methods study adopted, certain criteria were applied by answering four questions by Creswell (2012, p. 539-540):

- What priority or weight does the researcher give to the quantitative and qualitative data collection?
- What is the sequence of collecting the quantitative and qualitative data?
- How does the researcher actually analyse the data?
- Where in the study does the researcher mix the data?

Therefore, an explanatory sequential core design within an overarching experimental design framework was implemented in the present study, since the quantitative data (test results and online interactional data) were collected first and received the fundamental emphasis, followed by the qualitative data to further explain the quantitative data. Priority was given to the quantitative methods while the qualitative method was used secondly to explain the primary quantitative results, and then the data produced by these two methods were mixed while discussing the findings. This approach was chosen in order to gain a broad understanding of the participants' writing performance and online interactions by collecting the quantitative data and then using the qualitative method to explain the results by discovering the views of participants, as recommended by Creswell et al. (2003).

In the current study, two quantitative methods (i.e., pre-, post- and delayed post-tests and online observation) were used as essential tools to gather data from the targeted sample (40 university students) and then followed by one qualitative method of interviewing a sub-sample of the participants (20 students), representing a second stage. The combination of quantitative and qualitative methods can enhance the researcher's understanding of a phenomenon more than a single method alone (Bryman, 2004). Using this approach can increase confidence in the findings, ensure validity and reliability

80

(Johnson & Christensen, 2016), and maximise the strength of the research results (Bryman, 2007). Therefore, a quantitative-dominant mixed methods design, mainly an explanatory sequential strategy, was used in the present study to collect both quantitative and qualitative data and achieve the research aims.

The mixed methods approach was used to achieve complementarity, which is a rationale associated with various designs including sequential explanatory design (Plano Clark & Creswell, 2008). Complementarity is one of various possible justifications for the use of a mixed methods approach promoted by Greene et al.'s (1989) framework, which focuses on five distinct purposes for mixed methods evaluations: triangulation (corroboration of results), complementarity (clarification of results of one method through another), development (the results of one method inform another), initiation (discovering new perspectives), and expansion (of one method through the components of another). In the present study, the first quantitative method (pre-, post- and delayed post-tests) was used to measure the participants' individual writing performance before and after engagement in the intervention while the other quantitative method (online observation) explored the feedback focus and reactions to it on each platform in an attempt to achieve a more comprehensive picture of the topic by checking whether the peer feedback focus and reactions to it influenced writing performance. In other words, online observation was used to achieve a more comprehensive picture through checking whether or not the writing performance results were influenced by the Google Docs and Wiki-enhanced peer feedback. The qualitative method (semi-structured interview) was used to supplement and elaborate on the online interaction data. It helps shine light on the things that cannot be observed and thus provides a comprehensive picture of the online behaviours (Ware & Rivas, 2012). Therefore, to achieve a more comprehensive picture and elaborate on the interpretations of feedback focus and reactions to feedback, the interviews were aligned with the online observational data (online peer feedback). Undertaking this integration in the current study through aligning these data together was intended to achieve a better understanding of the research topic and to give more detailed answers to

the research questions (Creswell & Plano Clark, 2011). The resulting mixture or combination of data findings can provide a great deal of detail as a means of achieving an elaborate and comprehensive understanding of the complex phenomenon by illustrating, clarifying, or elaborating certain aspects (Johnson & Turner 2003; Sandelowski, 2003).

3.4.3. Experimental design

The experiment had a between participants design with a pre-test, post-test, and delayed post-test (conducted six weeks after post-test) format. The independent variable was peer written feedback under the conditions of Google Docs- and Wiki-based writing. The dependent variables were form (vocabulary, grammar, mechanics) and the content of students' individual writing. The dependent variables were operationalised using a modified composition-grading scale (ESL Composition Profile) that is analytic, assigning individual scores to areas like content/organisation as well as form including grammar, vocabulary, and mechanics (Polio, 2012). Particularly, the individual writing quality dependent variables (individual writing performance in form and content) are operationalised as the analytical scores, with 50 as the highest score and 11 as the lowest score. More specifically, each component/dependent variable (form and content) was operationalised with a range of scores from 42-50 if performance ranged from excellent to very good, with 41-36 if performance ranged from good to average, 21-35 if performance was described from fair to poor, and 11-20 if performance was very poor. Therefore, the "content/organisation" dependent variable, which is the basis for the first part of the hypothesis (and which tests whether Wiki-enhanced peer feedback leads to better writing performance in content compared to that of Google Docs), was measured on the rubric by checking the development of the thesis and relevance of ideas to the assigned topic, as well as the degree of clarity and support of ideas as well as logical sequencing and cohesion. Accuracy in form (grammar, vocabulary, mechanics), which is the essence of the second part of the research hypothesis related to the Google Docs' anticipated support of narrowly focused feedback on accuracy, was also measured on the same rubric. This depended on the effectiveness and sophistication of word choice

and word form mastery, the frequency of errors in language/grammar (i.e., frequency of errors in agreement/tense/number/word order/articles/pronouns/prepositions) as well as the degree of mastery of conventions and number of errors in spelling, punctuation, capitalisation, and paragraphing.

With the help of an online research randomiser (https://www.randomlists.com), half of the class was randomly allocated to the Google Docs-mediated writing experimental condition and the other half was allocated to the Wiki-mediated writing experimental condition (See Figure 3.1). This is called split-class design (Torgerson & Torgerson, 2003; Marsden, 2007) and the rationale for its use was to help counter sampling bias due to the "cluster effect or inter-group correlation" (Marsden, 2007, p. 568). By having the class split, potential confoundings like setting, composition, learning histories and regulations could be controlled (Marsden, 2007). This ensured that an equal proportion (n=20) of the intact class (i.e., section of Preparation for International Tests course) was randomly allocated to each condition (see Figure 3.1).
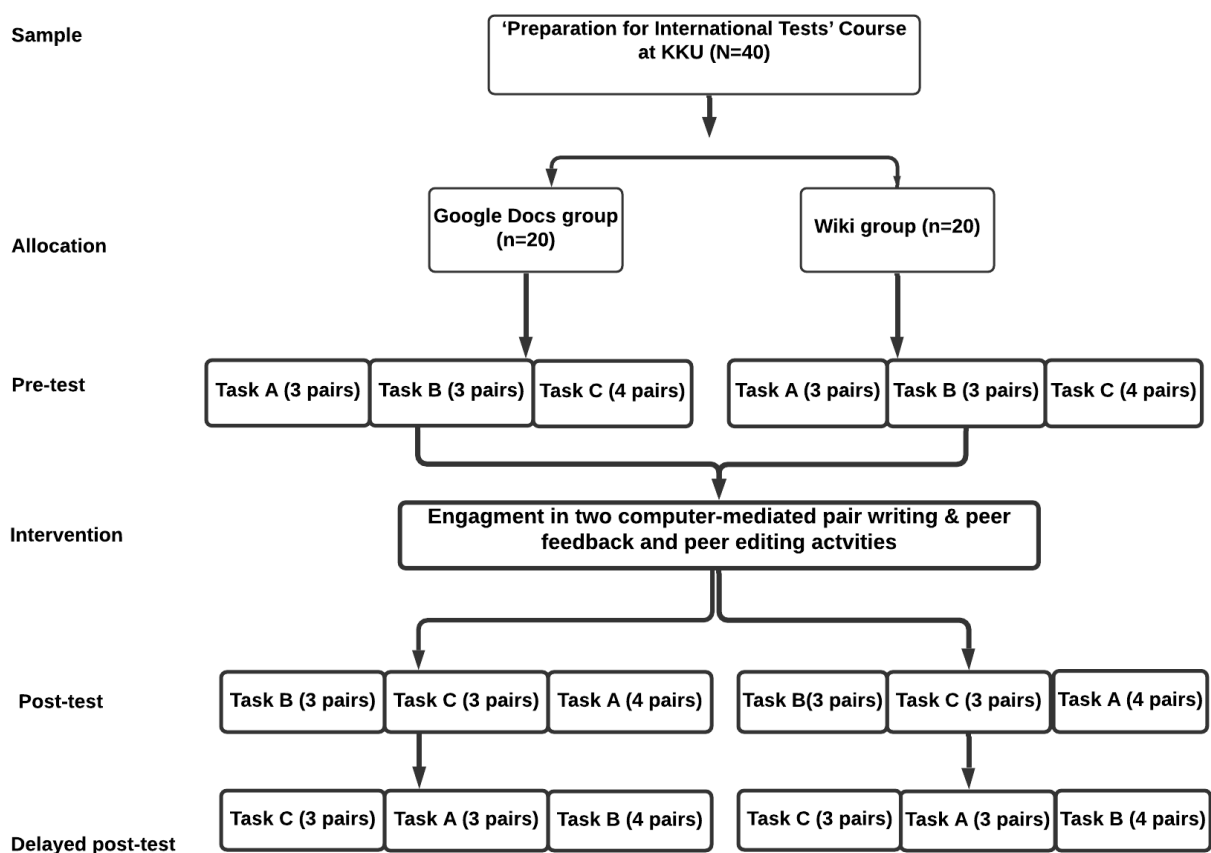
Figure 3.1 Design of the experiment

After the class was split and randomly allocated to the two experimental conditions, all the participants were pre-tested to measure their writing performance before the intervention. Then, the students assigned to each condition were randomly paired (with the same online research randomiser used for allocating participants to the conditions) to enable students to receive the treatments in pairs to encourage a sense of responsibility and participation (Storch, 2013), providing all students equal opportunities to receive and provide feedback, and maximising the chances for students to integrate the peer feedback provided. After the intervention, post-tests and delayed post-tests were administered.

The writing tasks used as pre-test, immediate post-test, and delayed post-test in the current research for measuring students' individual writing performance before and after their engagement in the conditions were counter-balanced (see Figure 3.1) for the sake of eliminating any potential effects of test sequence (Haslam & McGarty, 2014) as well as minimising issues with the comparability of tasks. As Figure 3.1 shows, counterbalancing the tests was achieved by dividing the students assigned to each condition into 10 pairs and then dividing the pairs of students in each condition into three major groups of pairs in order for them to take the tests in a counterbalanced order. The first group (three pairs) took test version A as the pre-test, test version B as the immediate post-test and test version C as delayed post-test. The other group (three pairs of students) took the test versions in a different order in which they took test B as pre-test, test C as immediate post-test, and test A as delayed post-test. The final group (4 pairs of students) took test B as the pre-test, test C as immediate post-test, and test A as delayed post-test.

3.5. Apparatus and instruments

As discussed in the mixed methods strategy sub-section 3.4.2, multiple methods are included in the current study; namely, pre-test, immediate post-test and delayed post-test, observation/tracking of the posts/comments made to the discussion forums and edits made on Google Docs and Wikis, and semi-

structured interviews. The interview and online observation instruments were piloted, and modifications were made. The platforms used for the writing component for the exchange of peer feedback as well as the instruments used in the current study are discussed and then the pilot study is presented.

3.5.1. Platforms

Two different online mediums are used for the writing and online exchange of peer feedback and peer edits in the current study: PBwiki (http://pbworks.com/academic.wiki) and Google Docs. Both platforms are free for teachers and students and have the key features that fulfil the goal of the current research (i.e., peer editing, composing and commenting). These two platforms are discussed below.

3.5.1.1. PBwiki platform

The PBwiki medium (http://pbworks.com/academic.wiki) was used to collect data on online interactions for various reasons. Firstly, it has sophisticated editing and tracking features (Alghasab, 2016; Alghasab & Handley, 2017), allowing for a comparison of the different versions of the students' contributions on the platforms before and after the changes made. Therefore, the PBwiki platform gives students the ability to view and restore the document history of each page (West & West, 2009). Secondly, despite the platform's lack of simultaneous editing and automatic text updates, it still allows the collaborators (except for the one who edits the page) to interact on the discussion space, and thus facilitates constant exchange of feedback and suggestions. Thirdly, PBwiki facilitates commenting and enables each student to reply to any comment. Fourthly, it presents comments chronologically and allows for replies to be shown in a hierarchical view, which can facilitate the process of coding the comments and replies to them. Fifthly, in PBwiki, the discussion space used for commenting is located at the bottom of the wiki writing page, thus facilitating the process of reading the Wiki text and commenting on it (Alghasab & Handley, 2017) and making the peer feedback more effective. This platform allows students to see both discussion and Wiki pages at the same time, especially if the threaded discussions are not that long, thus making the collaborative writing and peer feedback activities much easier. Furthermore, in PBwiki, the Wiki creator is the only person who could delete

pages or files (West & West, 2009), helping avoid any mistakes which might be made to impede the work on the online platform. In addition, in PBwiki, the Wiki creator is the only one who has the right to permit edits (Alghasab, 2015), ensuring workspace security. The above features of the PBwiki platform represent the rationale behind its selection for the current study over other Wiki platforms.

3.5.1.2. Google Docs

Google Docs was another platform used for the collection of online interactions (peer feedback & peer edits) and for the completion of pair writing activities. It was chosen for several reasons. Firstly, similar to the other platform, this platform has sophisticated editing and tracking features through which edits and posts could be tracked through the revision history. Second, it also enables students to make contributions and changes on the Google Docs text whilst simultaneously taking part in synchronous interactions about the text via the in-line commenting feature on the right-side of the document, simplifying the process of commenting. Third, this platform allows for specific commenting because of this in-line commenting, a feature not available on the Wiki platform. Fourth, compared to Wiki, which requires manual saving of the revisions, Google Docs facilitates automatic updates of the changes, making the process of feedback provision and response much easier. This platform automatically saves and shows the development of the edits and changes made to the document in chronological order, especially in the revision history, facilitating the process of coding the comments.

3.5.2. Writing activities on platforms

In the Department of English at KKU the writing activities in the 'Preparation for International Tests' course are adapted from the writing activities in the Writing IV course. Therefore, the Wiki-based and Google Docs writing activities in the present study were selected from the students' Writing IV textbook to ensure that the activities were aligned with the KKU syllabus (See Appendix A). The students in the class were asked to write one descriptive essay and one process essay in pairs; one essay was about a place both participants had visited, and the other was a process essay about how to celebrate

and receive the Ramadan festival. These two essays were chosen because they are linked to the syllabus and were the students' focus for the writing section of the course during the semester.

3.5.3. Essays for testing writing performance

Pre-test, immediate post-test and delayed post-test writing tasks (See Appendix B) were used to check participants' writing attainment before and after their engagement in online peer feedback and peer editing activities. These tests were used to measure the influence of the intervention on students' individual writing from the pre-test to both the post-tests and delayed post-test. The writing tasks were adapted from 'Affective Academic Writing 3' by Davis and Liss (2006), a textbook used in the Department of English at KKU for the Writing IV course. In other words, from this textbook, three parallel essays on festivals (one on the stages of Eid al-Adha, one on the stages of the wedding celebration in Saudi Arabia and another on the stages of Eid al-Fitr festival) were adapted as pre-essay, immediate post-essay, and delayed post-essay. The administration of these three writing tasks was also counter-balanced in order to control for the effects of order (Harris, 2013) while taking the tests in which the students assigned to each condition were divided into three groups of pairs and then each group of pairs took the tests in a different sequence (See Figure 3.1).

All three were process analysis essay topics, describing habits and requiring the same verb tense (simple present tense). Also, the range of vocabulary required for completing all three writing tasks was of a similar difficulty level, as shown in the second pilot study results (see section 3.7). The major vocabulary in the three essays on 'festival' is about clothes, foods, and events. In addition, since all three topics were process essays, the sequence of ideas was simple in all topics, using sequence of connectors (e.g., first, second, next, finally, etc.). The writers also needed to describe the steps of a process in order of their occurrence. Sequence connectors can be used to establish a logical order. They include words like first, next, then, before, after, and finally.

3.5.4. Observation of the platforms

Observations of the peer feedback and reactions to it were used to explain any change noticed in students' individual writing performance in the test results. Particularly, to help explain the writing test results, the researcher looked at how students provided peer feedback on the Wiki-based writing activities compared to those on Google Docs, as well as how students working in pairs on Wiki responded to peer feedback compared to those working on Google Docs. This observational data was collected by looking at the interactions and discussions in the history logs, discussion and commenting forums of the platforms. Therefore, the online observational data was collected for two main goals: the investigation of the types of peer feedback provided via Google Docs compared to those provided on the Wiki platform as well as the investigation of students' revisions made in response to the peer feedback provided via the two platforms. Tracking and observing online interactions is viewed as a useful method for collecting online data (Ware & Rivas, 2012). Tracking and on-going systematic observation of the changes and edits made to the Wiki and Google Docs pages make it easy for contributions to be tracked and to maintain a record of all changes and edits (West & West, 2009). On both platforms, it is easy to track each person's contributions and to maintain a record of all changes and edits (Waters, 2007).

To facilitate the process of collecting online observational data and to prepare the data for the analysis stage, an observation schedule was devised (See Table 3.1 below). The schedule helped organise the online observational data (online peer feedback comments and reactions to them) saved in the history logs and shown in discussion forums of the Google Docs and Wiki platforms.

Table 3.1: Observation schedule for collecting online interactions and edits

Forum	Pair	Online interactions	Area of feedback	Peer response	Feedback outcome	Edit
Google Docs/Wiki	XX	XX	Form/content	Accepted/rejected	Integrated/non-integrated	XX

In the table above, the platform on which the pairs completed the task (Google Docs or Wiki) was added. Then, the names of those (pseudonyms of the pair of participants) who engaged in online interactions were presented. The interactions and the edits made in response to them were presented in the schedule on a weekly basis and then the interactions of each pair of students were added in the 'online interactions' column while the changes and edits made in response to the comments were presented under the 'edit' column in chronological order. In addition, the focus of feedback was presented under the 'area of feedback' column and the reactions to it were presented in the columns of 'peer response' and 'feedback outcome'.

3.5.5. Semi-structured interviews

Semi-structured interviews were conducted upon the completion of the immediate post-tests with the aim of exploring students' perceptions of Google Docs and Wiki-based peer feedback on writing, their experience of and reflections on their online interactions, as well as their reflections on writing activities and peer feedback. Semi-structured interviews were conducted since they are one of the most effective ways of exploring people's opinions and ideas, allowing direct speech interaction between the interviewer and the interviewee (Kvale & Brinkmann, 2009) by means of which the interviewer can probe more deeply into a response given by an interviewee (Mackey & Gass, 2005).

Typically, a semi-structured interview covers a pre-determined list of questions or a series of topics and themes (Wellington, 2000), but there is flexibility in the interviewee's response and in the sequence of the questions (Lodico, Spaulding & Voegtle, 2006; Edwards & Holland, 2013). In other words, this form of interviewing "has some degree of predetermined order but still ensures flexibility in the way issues are addressed by the informant" (Dunn, 2005, p. 80). The topics and sub-topics, as well as the interview questions on those topics (See Appendix D), were structured based on previous studies (Alghasab, 2016; Alnasser, 2013; Grami, 2010; Loretto, DeMartino, & Godley, 2016; Dippold, 2009; Alkhatib, 2015; Jamoom, 2016; Tuomey, 2014). An open-ended format was chosen, providing more flexibility to the researcher to ask extra questions and to the participants to offer more

information (Kvale & Brinkmann, 2009). This allowed for elaboration and to prompt the interviewee to clarify their responses using two techniques. The first one is the use of a set of probes which are described by Bryan (2012) as questions asking for further information when the respondents have difficulty in understanding the question or when they do not provide a sufficiently complete answer. The second technique is prompting, which occurs "when the interviewer suggests a possible answer to a question to the respondent" (Bryan, 2012, p. 224) or uses alternative questions when the interviewee needs further guidance. Therefore, during the interviews, the researcher clarified questions and asked probing questions when needed, restated and summarised information and invited the interviewees to confirm what he understood about their perspectives. Both prompts and probes were used for the sake of enhancing the richness and depth of responses (Cohen, Manion & Morrison, 2011).

The broader topics in the interview schedule (See Appendix D & Table 3.2) are related to the participants' overall experience with Google Docs and Wiki-enhanced peer feedback and peer editing activities, strategies for providing peer feedback, the reactions to feedback received, participants' reported feedback foci and reactions to it, and participants' prior experiences with peer feedback and web-based writing. The questions related to perceptions were asked before those pertaining to experiences to get frank responses from the respondents about their perceptions and to avoid any potential change in the participants' perceptions for the sake of matching their reported experiences and behaviours (Alghasab, 2016).

Table 3.2: Topics and example questions in the semi-structured interviews

Topics	Example questions
Participants' overall experience with the activity	-How did you find this writing activity? -How did you find this experience of giving and receiving feedback on your writing? ➤ Tell me more about your experience of providing your partner feedback
Strategies of peer feedback	-How did you use Google Docs/Wiki to provide your partner feedback? Can you give an example? Why? ➤ Can you clearly mention which strategies you applied while providing written feedback to your peer? Why?

Focus of peer feedback	-What did you provide feedback on?
	   ➤ Do you provide feedback on anything else?
	   ➤ Can you tell me specifically what aspects of writing (language, organization, or content) did you focus on as you provide your feedback with written feedback?

Reactions to peer feedback	-What did you do with the feedback your partner gave you? Can you give an example? Why? ➤ Did you do this with all of the feedback?

Prior experiences with peer feedback and web-based writing	-Have you ever used tools like Google Docs and Wiki either for educational or private purposes?
	   ➤ If yes, please describe.
	   ➤ How did you find this experience

The semi-structured individual interviews were conducted in Arabic, the participants' first language, to ensure the depth of discussion and to enable the participants to clearly express their ideas. The interviews were conducted individually, recorded using iPhone 8 voice memos, and transcribed and translated from Arabic into English. Before starting each interview session, a rapport was developed by giving a brief introduction about the purpose of the interviews, acknowledging the value of the interviewees' contributions, confirmation of the length of the sessions, reassuring the respondents of the safeguarding of ethical issues, obtaining their consent for audio-recording their responses, and roughly explaining the plans for using the results of the interviews.

It was ensured that the prompts given to all respondents in the current study were the same, meeting the key prerequisite of prompting (Bryan, 2012). Therefore, the researcher clarified the interview questions, asked probing questions and gave prompts, when needed. In general, the interviewer in semi-structured interviews is interested in the context and content of the interview, how the

interviewee understands the topic(s) under discussion and what they want to convey to the interviewer (Edwards & Holland, 2013). The researcher also would rephrase and summarise information and ask the respondents to confirm what he understood about their perceptions.

3.5.6. Background questionnaire

As shown in the 'research context' section (see section 3.3), the learners in the current study tended to have similar levels of prior experience in individual writing. Participants' previous experience of writing on Google Docs, Wikis, and other similar tools as well as their experience of engaging in paper-based writing, was checked through a background questionnaire (see Appendix E), used to inspire the technical training sessions that are provided to students. The participants provided their prior experience with different platforms (e.g., such as Google Docs, Wikis, blogs, discussion forums, documents with real-time co-authoring) that promote collaborative and pair writing, collaborative/paired revisions, as well as their experience related to the use of paper for collaborative and paired writing and exchange of feedback in a background questionnaire before the training sessions. The findings obtained from the questionnaire helped inform the technical training on the use of the two platforms in the beginning of the semester with the help of one IT teacher. The questionnaire helped check the participants' familiarity with the use of Google Docs and Wikis, as well as other software and functions such as blogs, discussion forums, chat forums, et al., which share some features with Google Docs and Wikis. In addition, the participants' familiarity with face-to-face collaborative/paired writing or online collaborative/paired writing on paper was checked.

3.6. Pilot studies

Two pilot studies were conducted before the main study. Reports of these studies are presented in the following sub-sections.

3.6.1. Full pilot study

Before conducting the main study, a full pilot study was carried out with one EFL teacher and 14 students from the Writing IV course in the Department of English at KKU in Saudi Arabia, where the

main study was later conducted. It was conducted from November 15th 2017 to December 27th. The pilot study was conducted to achieve the following goals:

- Assessing the procedures of the research

- Checking the effectiveness of the training provided to the teacher and students

- Assessing the research instruments that will be used for collecting data

- Checking that the teacher and learners understood the instructions for the intervention tasks

- Ensuring reliability of the Google Docs and wiki platforms

- Checking the comparability of the pre-test and post-tests as well as delayed post-test

The participants in the full pilot study were at level 4 in the Department of English at KKU and were classified as beginners based on the departmental plan of study (See sub-section 3.3.2). These students were not able to complete computer-mediated writing and feedback activities, since they lacked essential linguistic and technical knowledge. It was also noticed that working in groups on Google Docs and Wiki platforms was overwhelming for some students. Therefore, refinements were made in the main study, related to the experiment design where the design was based on pair work rather than groups to ensure that students would not be overwhelmed by a high volume of computer-mediated feedback which cannot be implemented.

In coordination with the head of the English department, a teacher and students with good IT skills from a higher language level were selected to take part in the main study. This was to ensure that the teacher and students had the basic skills necessary to comprehend the Google Docs and Wiki training easily, and to ensure that participants were proficient enough in English to engage in peer feedback activities. Students from level 8 were selected to take part in the main study, as it was expected that they would not face much difficulty in participating and providing feedback online as graduating students who were more proficient in English and had the ability to participate and attend more regularly, compared to level 4 students.

It was also decided that the training sessions needed to be extended and split into two sessions over two consecutive days; one training session to familiarise the teacher with the Google Docs platform and the other on the Wiki platform. In addition, the teacher in the main study was asked to attend the students' training sessions to further help him understand the training. Furthermore, a limitation noticed in the pilot study was students asking for demonstration of each step explained in the Power-Point presentation. Therefore, it was better that the students and teacher practiced the instructions with the help of both handouts (user guide) and the researcher's explanation in the presentation. Therefore, in the main study it was important that each step was practiced and demonstrated, and then students and teachers were asked to log into the platforms to practice.

3.6.2. Second pilot study to check comparability of the writing tasks

Another pilot study was conducted to check whether the writing tasks used as assessments were of a similar difficulty level. Particularly, the comparability of the three versions of writing tasks (pre-, post- and delayed post-test) were checked with a group of 10 students from the same level as the participants in the main study (i.e., level 8 students).

Ten students from the Department of English at King Khalid University received the three versions of the writing tasks together in a three-hour session. All essays were graded by three different raters and the average was taken (see Appendix S). The results of the Shapiro-Wilk test for the three versions of the achievement assessment with regard to its normality of distributions are provided in Appendix T. The Shapiro-Wilk test results showed that the three versions of tests were all normally distributed. Due to the fact that the parametric assumption of normality was met, the parametric tests were appropriate for examining the comparability of the different versions of writing tests. As a result, three paired samples *t*-tests were performed. The findings revealed that there were no significant differences in the participants' overall writing performance in Task 1 and Task 2 (Task 1*: M*=-.50, *SD*=1.06; Task 2: *M*=-.03, *SD*=5.97; *t*(9)= -1.50, p> .01), Task 1 and Task 3 (Task 1: *M*=-.50, *SD*=1.06; Task 3: *M*=.47, *SD*=.91; *t*(9)=-.09, p>.05), and Task 2 and 3 (Task 2: *M*=-.03, *SD*=1.14;

Task 3:M=.47, SD=.91; t(9)=1.64, p>.05). These findings suggest that the three writing tasks are of similar difficulty levels and thus could be used to measure the writing performance before and after participation in the main study's intervention. Consequently, the results showed convincing evidence for the claim that any differences observed in these achievement assessments should not be ascribed to the use of different versions of the tests.

3.7. Data collection procedures

This study spanned a total of 15 weeks. It was carried out during the first academic term, from August to December 2018. Table 3.3 displays and summarises the main phases of the study (data collection procedures) in chronological order and these phases will be discussed in detail.

Table 3.3: Research procedures

Week	Activity
Week 1	Lecture 1: Informed consent form Lecture 2: Orientation & Wiki/Google Docs technical training sessions and engagement in Wiki/Google Docs activities
Week 2	Lecture 1: Training students in peer feedback provision
	Lecture 2: Pre-test Distributing students' and teachers' wiki personal login details & wiki activity sheets & creating Google Docs file and share it with the generated groups by online randomiser program
Week 3 --Week 8	Lecture 1 & 2: Half of class → 2 online wiki-based writing activities in pairs Lecture 1 & 2: The other half of class → 2 online Google Docs writing activities in pairs
Week 8	Lecture 1: One-hour post-test (essay) Lecture 2: Semi-structured interviews
Week 9	Lecture 1 & 2: Semi-structured interviews
Week 15	Lecture 1 & 2: Delayed post-test

The first week of the 15-week semester was an orientation week, in which the participants were introduced to the research and those who agreed to take part in the study were asked to sign a consent form (Appendices F1 & F2). During this week, the researcher also met with the teacher of the course to introduce him to the purpose of research, the research design, as well as the data collection procedures. At the end of Week 1 and the beginning of Week 2, training sessions were conducted for the teacher and students in a computer lab at the KKU E-learning Centre. The training sessions for the teacher (Appendix G) lasted two hours and included training in technology (particularly on

Wikis and Google Docs and their various functions such as comment, edit, save, et al.). Then, the researcher conducted the same two-phase training session for students (Appendix H) in the computer lab. The training sessions conducted for the students lasted four-hours over two consecutive training days. Similar to the training sessions provided to the teacher, the training sessions provided to the students focused on the technical training. In the training sessions, the handouts/user guides (Appendices I & J) designed by the researcher were used for conducting the sessions. A well-structured Wiki and Google Docs training session is essential for participants taking part in Wiki and Google Docs writing activities (Li, 2013; Li & Zhu, 2013), whether in small groups or pairs. The objectives of the training were to demonstrate the use of PBwiki (which is used due to its sophisticated features compared to the Wikispaces and Wikimedia) and Google Docs skills (e.g., writing, editing, posting comments, checking the history log) and to provide an opportunity to practice the skills and to engage in authentic Wiki and Google Docs collaborative/paired writing activities.

At the end of Week 2 and after the training sessions, all students in the 'Preparation for International Tests' class were given one hour to individually write one essay to be used as a baseline (pretest). Then, the participants were randomly allocated to the two experimental conditions with an online research randomiser (https://www.randomlists.com/) to "ensure… likelihood of equivalence" (Cohen, Manion & Morrison, 2011, p. 317). Then, the students assigned to each experimental condition were randomly divided into pairs by the same online research randomiser. The use of random design for the assignment of the participants into the conditions was suitable since the class size of 40 was of sufficient size. The group generation on the randomiser software was completed by adding the number of pairs that were required, the number two as indication for the number of students in each pair, and the number range depending on the number of students in class, and choosing the option 'keeping numbers in each group/pair unique.' Then, half of the pairs generated by the program were assigned the Wiki-based writing activities/projects while the other half were assigned Google Docs writing activities. These activities were completed both in class and out of class beginning from Week 3 and lasting until Week 7.

In the first half of Week 8, the participants took a post-test to compare their performance from the pre-test to post-test. Afterwards, they took part in semi-structured interviews in the second half of Week 8 and in Week 9 to elicit their perceptions of giving Google Docs and Wiki peer feedback on writing activities. Afterwards, for ethical considerations, the students in the class were given the opportunity to work on the other platform, though data were not collected at this stage. Finally, the students took a delayed post-test at the end of the semester (Week 15) to verify whether what they learnt from their participation in the treatment was retained.

3.8. Data analysis

As indicated earlier, the current study was mixed methods research and thus both quantitative and qualitative data analysis techniques were adopted. The techniques followed while analysing the data are briefly explained in the following sub-sections.

3.8.1. Analysis of writing performance obtained from pre-, post- and delayed post-test data

An analytic rubric was used to measure students' individual writing in the current study. Jacobs et al.'s (1981) analytic rubric, known as the ESL Composition Profile, was chosen to measure the dependent variables in the current study. This rubric was selected for several reasons. First, an analytic rubric for measuring students' individual writing is more reliable than a holistic rubric (Elbow, 2000; Gunning, 2006). It is also one of the most widely used analytic scales in ESL/EFL (Weigle, 2002) contexts, ensuring its reliability. It has been used by many college-level writing programs, and it comes with training materials and sample compositions so that users can easily apply the scale (Weigle, 2002). It was also widely used in studies carried out in both ESL and EFL contexts, either in its original form or modified for specific research purposes (e.g., Bosher, 1998; Cumming, 1989; Cumming, Rebuffot & Ledwell, 1989; Pennington & So, 1993; Sasaki, 2000; Sasaki & Hirose, 1996; Uzawa, 1996). In addition, it "provides teachers and students with a consistent framework and terminology for providing and processing feedback" (Ferris & Hedgcock, 2005, p. 196). It is also suitable to evaluate the individual writing products (i.e., dependent variables) in content/organisation as well

as form (vocabulary, language use, and mechanics) (Weigle, 2002) and is appropriate to test the hypothesis in the current study since it addresses both content/quality and the form/accuracy of students' writing in grammar, vocabulary and mechanics.

For the purposes of the current research, modifications have been made to the rubric. It was originally composed of five aspects; namely, content, organisation, vocabulary, language use, and mechanics. The five aspects in the original version of the rubric are differentially weighted to emphasise first content (30 points) and next language use (25 points), with organisation and vocabulary weighted equally (20 points) and mechanics receiving very little emphasis (5 points). However, in the current research two major modifications were made to the rubric (See Appendix C). Firstly, the components which address ideas (i.e., organisation and content) and that support the Wiki group hypothesis were combined under a category 'content', and the components that test the Google Docs hypothesis and assess accuracy (i.e., vocabulary, grammar, mechanics) were combined under another category named 'form'. Another modification made was weighting the components of content and form equally (50 points each) to give reliable results with respect to the measurement of students' individual writing. This combination of components has been done to facilitate the grading process (Weigle, 2002), and help the rubric capture and test the hypotheses. These criteria are in accordance with the categorisation of taxonomy features proposed by Knoch (2011), which represents the basis for (diagnostic writing assessment) deciding which aspects are testable for diagnostic writing assessment and which are not. This analytic scale is also helpful in a diagnostic context as it allows for the identification of the strengths and weaknesses of a learner's writing (Ferris & Hedgcock, 2005).

Each individual writing sample was evaluated by three different raters based on the modified version of Jacobs et al.'s (1981) analytic rubric (See Appendix C) for form (vocabulary, grammar and mechanics) and content (content/organisation). More specifically, both of these categories of rubric were operationalised with a range of scores from 50-42 if performance ranged from excellent to very good, 41-36 if performance ranged from good to average, 20-11 if performance was described from fair to poor, and 20-11 if performance was very poor. The averages were then calculated.

Due to the fact that the learners' writing at the three tests was scored by three different raters with difference in experience and age, the interrater reliability of the raters was checked. The inter-rater agreement score was calculated based on the average scores of the three raters by running intra-class correlation among the three raters at each test in overall writing and in the two dimensions of form and content.

To investigate the effects of Google Docs and Wiki-enhanced peer feedback on students' over-all writing performance, and their writing performance in the dimensions of form and content, the average scores at the pre-, post- and delayed post-tests were recorded on an Excel spreadsheet. The normality for overall writing performance and writing performance in the dimensions of form and content were then checked visually, through histograms, and numerically, through skewness and Kur-tosis as well as the Shapiro-Wilk tests. Then, the descriptive statistics were obtained using the Sta-tional Package for the Social Sciences (SPSS). Independent samples t-tests were then run to check whether the two experimental groups were matched at the baseline with measurement of the effect size based on the general benchmarks for interpreting d effect sizes in L2 research reported by Polonsky (2015) in Table 3.5.

Table 3.4: General benchmarks for interpreting d effect sizes in L2 research

Effect size /Mean difference (d)	Small	Medium	Large
Between-groups	0.40	0.70	1.00
Within-groups	0.60	1.00	1.40

Then, the difference between the two experimental groups at the post-test and delayed post-test in overall writing performance and in writing performance in the two dimensions of form and content was measured by separate ANCOVAs conducted on the post-test with the pre-test as a co-variate and another ANCOVAs run on delayed post-test with the pre-test as a covariate. The effect size was measured with partial eta square values based on benchmarks suggested by Cohen (1988). The same analysis process was also followed to analyse the writing performance in the dimensions of form and content.

3.8.2. Analysis of Google Docs and Wiki-based peer feedback and reactions to it

Google Docs and Wiki-enhanced peer feedback comments were analysed by generating the frequency counts of the form-focused and content-based feedback of each pair of participants and then averaging across the pairs in each platform. All feedback comments were coded on Microsoft Word and manually quantified. During coding, the areas of comments were coded with either: *content*, if comments were related to idea development, organisation, audience, and content, or *form*, if comments were related to language and mechanics. These two codes used for coding the areas of feedback comments match writing aspects in the analytic rubric used for evaluating the students' writing performance for the sake of facilitating the process of bringing the different quantitative data together.

The quantitative data obtained from the codes were then analysed statistically using SPSS. The data were first grouped according to the two experimental conditions (two applications and two groups). The normality of the total number of comments was assessed by the Shapiro Wilk's test of normality. Then, two ANOVAs were run to compare the frequency counts of form-focused and content-based feedback in the two platforms and to find whether the Google Docs participants produced a significantly higher or lower number of form-focused and content-based comments than their counterparts working on the Wiki platform.

As with the analysis of the feedback focus on the two platforms, the reactions to both form-focused and content-based feedback comments were analysed by generating the frequency counts of the participants' reactions. The reactions to peer feedback were coded with two reaction codes related to the outcome of the feedback; namely, integrated/resolved and unintegrated/unresolved. The normality of the total number of reactions to feedback was assessed by Shapiro Wilk's test of normality. The quantitative data from the codes were then further analysed statistically using SPSS. Particularly, to determine whether the differences in the "integration" and "non-integration" reactions to form-focused and content-based feedback between the participants on the two platforms were statistically significant, 4 independent *t*-tests were run.

3.8.3. Analysing interviews

The qualitative analysis method for the interview data is 'thematic analysis', which is defined by Braun and Clarke (2006) as "a method for identifying, analysing and reporting patterns (themes) within data" (p. 79). This approach was found to be suitable for analysing interview data for several reasons mentioned by Braun and Clarke (2006). Firstly, it does not need to follow complicated rules or professional skills and thus it is easily applied, even by early researchers with no sophisticated theoretical and technical knowledge (Braun & Clarke, 2006). Secondly, it is a "…theoretically flexible approach to analysing qualitative data" (Braun & Clarke, 2006, p. 79) and thus is not bound by theory and/or epistemological positioning, suiting the pragmatic approach adopted in the present study. Thirdly, it is useful for researchers undertaking a study with participants as collaborators, suiting the sociocultural theory. It also has the ability to show both similarities and differences as well as to condense large data sets and offer a thick description.

The researcher's duty in thematic analysis is to identify, select and report themes through creating links between their thinking and the data (Braun & Clarke, 2006). In addition, the researcher must ensure that what considered a theme captures something important in the data related to the research questions. Other considerations were taken into account when analysing the interview data, including Braun and Clarke's (2006) warning for the researcher to avoid the use of questions as themes, to get involved and undertake an analytic approach to define the themes, and to understand that frequent occurrence of a theme in the data set does not necessarily mean that it is more crucial, as well as to ensure that the themes are not generic. In addition, an inductive approach was followed to identify 'latent themes', which have been described as examining "underlying ideas, assumptions and conceptualizations…shaping or informing semantic content of the data" (Braun & Clarke, 2006, p. 84). To identify the patterns within the data, Braun and Clarke (2006) suggest a six-stage process that novice researchers can follow in an effort to make sense of their data. Table 3.4 below summarises the six stages and the application of these stages in the present study.

Table 3.5: Braun and Clarke's (2006) six stages of thematic analysis

Phase	Description	Application of process in the current study
1. Familiarise yourself with your data	Data were transcribed, read and reread, and initial ideas were noted.	Each interview was transcribed verbatim and then translated from Arabic into English. Then, notes were made, and early impressions were jotted down. This stage increased the researcher's confidence with the data analysis and helped him understand the nature of data.
2. Generation of initial codes	Interesting features of the data were coded in a systematic way, collating data relevant to each code.	The translated version of the transcript of each interview was copied and pasted into one single Microsoft Word document. Initial and open coding techniques were followed. Following a constant comparison, the interview data set was regularly checked for consistency of initial codes and new codes that might emerge. In this phase, the researcher started to make a clear distinction and to combine the data and reflections made (Miles & Huberman, 1994).
3. Searching for themes	Codes were collated into potential themes, gathering all data relevant to each potential theme.	At this stage, potential groupings of codes were considered, and initial themes were grouped. In other words, at this stage, various codes were sorted into themes.
4. Review of themes	The themes were checked in terms of the coded extracts and the entire data set, generating a thematic map of the analysis.	Different themes identified in stage 3 were reviewed for ensuring their linkage to relevant extracts. All data associated with each theme was colour-coded and then gathered using the 'cut' and 'paste' function in Microsoft Word. Therefore, in this stage the themes are linked to relevant extracts of data (Braun and Clarke, 2006). At this stage, the preliminary themes identified in step 3 were reviewed, modified and developed.
5. Defining and naming themes	A label was given to the themes which aimed to accurately reflect the content of the codes.	This stage is the final refinement of the themes which aims to "...identify the essence of what each theme is about." (Braun & Clarke, 2006, p.92). In this stage, the researcher began to name themes after developing a satisfactory thematic map with the use of clear and understandable concepts (Boyatzis, 1998) in previous stage.
6. Reporting findings	The themes were described within a report.	Quotes illuminating the key findings were selected and inserted into the thesis. At this point, the researcher produced the last report which contains vivid extracts and related them to the relevant study questions and literature (Braun and Clarke, 2006). The researcher selected the significant extract examples and made an interpretation of the meaning they have and linking them to my research questions and literature.

To illustrate how each step of Braun and Clarke's (2006) six-step framework was applied in the current study, a worked example from the current research data is provided. The codes used for coding the texts were mainly based on the text itself. In the first stage (familiarise yourself with your data), notes and early impressions were written on each extract. Below is an example of some early notes made on two selected extracts.

Table 3.6: Example of early notes given on selected transcripts

Extract	Early notes
I generally addressed mistakes. If there is a mistake in the spelling or even in grammar, [the] software gives me [an] underline in red colour so I know there is a mistake in grammar or spelling was committed and then I immediately either comment on it or modify it and correct it. This underline of errors is a chance for me to see my mistake. I provided feedback on grammar and spelling. I also provided feedback on content and organization.	The student benefited from the software to identify and correct the errors.
What I liked the most about commenting on the Wiki platform is that it allows us to exchange detailed comments on our writing and this increases the success of implementation of comments. The language-related comments were detailed, as if [my partner] talking about a particular thing and if it has a particular thing, he copies and then pastes it in the commenting space and starts commenting on it in detail. Therefore, the integration and acceptance of language-related comments was easy, and I accepted most of the form-focused comments.	The students used commenting space for giving detailed comments and it was easy process for them

In the second stage (generation of initial codes), the interview extracts were copied in a single Microsoft Word document and chunks of meaningful texts were coded as shown in the example in the following table:

Table 3.7: Example for initial coding

Profile	Data item	Initial codes
1	I generally addressed mistakes. If there is a mistake in the spelling or even in grammar, [the] software gives me [an] underline in red colour so I know there is a mistake in grammar or spelling was committed and then I immediately either comment on it or modify it and correct it. This underline of errors is a chance for me to see my mistake. I provided feedback on grammar and spelling. I also provided feedback on content and organisation.	-Commenting on mistakes -Role of spelling/grammar checker in facilitating commenting on grammar and spelling errors -Commenting on/correcting underlined errors -Observing errors
2	The software is user friendly, and the good thing about it is that if I make any mistake, there is somebody else helping me. I mostly gave comments on spelling and grammar since the Google Docs has a feature which alerts me if there were mistakes in spelling or grammar or other aspects of writing through underlining that part in red colour so, I know that there is a mistake and I…then go and comment on it.	-Commenting on mistakes -Role of spelling/grammar checker in facilitating commenting on grammar and spelling errors -Commenting on underlined errors
3	I provided feedback on form because my partner made mistakes in form. The Google Docs platform's spelling and grammar checker assisted me to focus on language and to resolve the language-focused feedback through alternative options that it offers for spelling and grammar.	- Commenting on mistakes - Role of spelling/grammar checker in facilitating commenting on language -Alternative options to resolve errors
4	-What I liked the most about commenting on the Wiki platform is that it allows us to exchange detailed comments on our writing and this increases the success of implementation of comments. The language-related comments were detailed, as if [my partner] talking about a particular thing and if it has a particular thing, he copies and then pastes it in the commenting space and starts commenting on it in detail. Therefore, the integration and acceptance of language-related comments was easy, and I accepted most of the form-focused comments.	-Detailed feedback - Feedback incorporation -Use of commenting space for copying comments -Acceptance of form-focused feedback
5	-It was a nice experience and we exchanged feedback easily. [My partner] gave comments on the mistakes in spelling, grammar, and punctuation. I accepted most of these comments because he describes the errors. So, the detailed and error description of errors in a clear way facilitated fixing the errors and knowing the location of the errors so I don't need to go and look for the rule and thus description helped and encouraged me to accept the suggested modification right away.	-Acceptance and incorporation of feedback -Detailed feedback -Easy exchange of feedback -Commenting on mistakes
6	Responding to one another's online feedback was easy. I had no chance to reject or ignore the form-focused feedback that I received on Google Docs because my partner always explains the rule. When he gives feedback, he explains the error in a detailed way and after he explains the correction to me, he gives me the suggestion for correction.	-Detailed feedback -Explanation of the rule -Acceptance of form-focused feedback

In the third stage (searching for themes), the codes fitting together were collated into themes. In example presented in Table 3.8, several codes related to grammar and spelling checker and its role in facilitating feedback as well as codes related to the role of detailed feedback in promoting feedback incorporation were collated into initial themes called "spelling and grammar checker advantages" and "detailed feedback advantages". Therefore, this stage focused on sorting the different codes into potential themes. At the end of this stage, a collection of themes was obtained.

Table 3.8: Example of preliminary themes

Preliminary themes	Codes
Spelling and grammar checker advantages	• Commenting on mistakes (3) • Role of grammar/spelling checker in commenting on grammar and spelling errors (3) • Observing errors (2) • Commenting on/correcting underlined errors (2) • Alternative options to resolve errors (1)
Detailed feedback advantages	• Detailed feedback (3) • Use of commenting space for copying comments (1) • Acceptance and incorporation of form-focused feedback (3) • Easy exchange of feedback (1) • Explanation of the rule (1)

During the 'review of themes' phase, it was ensured that all data relevant to each theme were gathered together and the preliminary themes identified in step 3 were reviewed, modified and developed as shown in the worked example in Table 3.9.

Table 3.9: Some themes and their relevant excerpts at the end of step four

Themes	Relevant excerpts
Spelling and grammar checker and language-focused feedback	• If there is a mistake in the spelling or even in grammar, [the] software gives me [an] underline in red colour so I know there is a mistake in grammar or spelling was committed and then I immediately either comment on it or modify it and correct it. • I mostly gave comments on spelling and grammar since the Google Docs has a feature which alerts me if there were mistakes in spelling or grammar…through underlining that part in red colour so, I know that there is a mistake and I…then go and comment on it. • The Google Docs platform's spelling and grammar checker assisted me to focus on language and to resolve the language-focused feedback through alternative options that it offers for spelling and grammar.
Detailed feedback and acceptance/incorporation of feedback	• The language-related comments were detailed, as if [my partner] talking about a particular thing and if it has a particular thing, he copies and then pastes it in the commenting space and starts commenting on it in detail. Therefore, the integration and acceptance of language-related comments was easy, and I accepted most of the form-focused comments. • I had no chance to reject or ignore the form-focused feedback that I received on Google Docs because my partner always explains the rule. When he gives feedback, he explains the error in a detailed way and after he explains the correction to me, he gives me the suggestion for correction. • [My partner] gave comments on the mistakes in spelling, grammar, and punctuation. I accepted most of these comments because he describes the errors. So, the detailed and error description of errors…facilitated fixing the errors and knowing the location of the errors so I don't need to go and look for the rule and thus description helped and encouraged me to accept the suggested modification right away.

During the 'defining and naming themes' stage, final refinement of the themes took place. In this stage, it was realised that the themes needed to be made clear and specific. Below are examples of final versions of two selected themes revised at this stage to clearly articulate the advantages of spelling and grammar checkers and detailedness of feedback in promoting the feedback incorporation and commenting on language:

Theme 1: Spelling and grammar checker promotes language-focused feedback

Theme 2: Detailed feedback promotes acceptance

The 'reporting findings' stage represented the end-point of the thematic analysis that involves the write-up of the report. Table 3.10 contains an excerpt of the write-up of "detailed feedback promotes acceptance" theme to show the illustrative use of data extracts in the present study. The text presented in the table as an example for the final stage of thematic analysis was taken from the results chapter.

Table 3.10: Excerpt from the write-up of the 'detailed feedback' theme showing use of data extracts

Theme: Detailed feedback promotes acceptance

Some Google Docs participants reported that the detailed feedback they received on their assigned platform encouraged them to accept and integrate the language-related feedback. Therefore, they reported that they did not have any excuse for not accepting, resolving, and integrating such detailed comments. For example, some of the participants expressed their opinions as such:

> *I had no chance to reject or ignore the form-focused feedback that I received on Google Docs because my partner always explains the rule. When he gives feedback, he explains the error in a detailed way and after he explains the correction to me, he gives me the suggestion for correction.* (Basil, Google Docs group, semi-structured interview)

> *I dealt with the all comments on errors in language and resolved them all comprehensively and I couldn't ignore anything because ... the feedback received on the software about language-related errors was detailed one which made the process of resolving language-related errors easy.* (Eyad, Google Docs group, semi-structured interview)

3.9.   Trustworthiness

In pursuit of ensuring the trustworthiness of the current study, the criteria of credibility and dependability were met. Lincoln and Guba (1985) argued that credibility is a factor of a greater importance for establishing trustworthiness in research. Credibility can be defined as "…the methodological procedures and sources used to establish a high level of harmony between the participants' expressions and the researcher's interpretations of them" (Jensen, 2008, p. 138). Credibility can be established through strategies such as data and method triangulation by the use of multiple sources of data and/or methods (Padgett, 2008) and member checking through asking the participants to decide to what extent the findings reflect their own experiences (Padgett, 2008). The participants were consulted to make sure that the data analysis was accurate and consistent with their beliefs and their perceptions of the context being studied. Triangulation of the sources (interview data and online observational data) for complementarity (completeness purposes) enhances the credibility of the research as a result of the multiple sources of data and the use of the multiple data-gathering techniques. Another technique followed for enhancing credibility in the current research was the constant and systematic observation of the online interactions. The other technique used for enhancing credibility was the use of interviews for checking accuracy of the interpretations of online interactions and online observational data.

The second criterion is dependability. Lincoln and Guba (1985) emphasise the close ties between credibility and dependability, arguing that a demonstration of the latter is sufficient enough to establish the former. Dependability is "how can one determine whether the findings of an inquiry would be consistently repeated if the inquiry were replicated with the same (or similar) subjects (respondents) in the same (or similar) context?" (Guba, 1981, p. 80). Dependability in the current research was achieved through being transparent while conducting the research and presenting the findings. Therefore, the procedures for data collection and analysis are documented in detail, as shown in

the previous sub-sections. Furthermore, another technique followed for ensuring dependability was having another colleague code 20 percent of the data to maintain inter-rater reliability and check the extent to which the same codes were used by the two raters.

Confirmability parallels objectivity, which is the extent to which the researcher allowed his/her values to intrude to a high degree (Bryan, 2012) and the extent to which the findings are grounded in the data (Lincoln & Guba, 1985). It is of greater importance for ensuring that the "findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher" (Shenton, 2004, p. 72). The confirmability (reliability) of the data in the current study is achieved by recording the interviews and presenting all online interactional data in a Microsoft Word table (see Table 3.1), which made it possible to obtain an accurate record of what the student said (Berg, 2007) and did. Therefore, this means that the researcher will be able to refer back whenever there is a need to re-check the data after coding. Therefore, the procedures for checking and rechecking the data will be documented throughout the study.

3.10. Ethical Considerations

To ensure that the research is ethical, several precautions were considered prior to, during, and after conducting the study. Gaining official permission is the first step when researching any particular phenomenon (Cohen, Manion & Morrison, 2011). Prior to conducting the research, official approval was granted from the educational body (University of York). Permission was also obtained from the Vice-Dean for Graduate Studies and Scientific Research at KKU and then formal consent was obtained from the English Department, KKU (See Appendix K & Appendix L). The researcher also gained approval from the sponsor, which went through similar formal bureaucratic procedures, in addition to lengthy correspondence before and while conducting the study. Therefore, formal approvals from both the educational bodies and the sponsor of the research were obtained.

Participation in the main study, as well as in the pilot studies, was voluntary and information sheets (See Appendix F1, M1 & Q1) were distributed to clarify the research process, the participants' rights, the length of the study, and any potential benefits prior to asking the participants to sign the informed consent agreement (See Appendix F2, M2 & Q2). Participants in the pilot and main studies were briefed about the stated goals of the research project, the purpose of the studies, and what the researcher expected them to do. Instructions on how to complete the study were also included. After reading the information sheets and before participating in the main and pilot studies, the participants gave formal written consent on consent forms (See Appendix F2, M2 & Q2) which are defined by Cohen, Manion and Morrison (2011) as "the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decisions" (p. 78). Limitations of access to participants' records were discussed with the participants, and assurances were given with regard to keeping their identities anonymous and their data confidential while reporting, and to preserve the research structure and the content accuracy (Gerring, 2007). Therefore, a strict policy regarding anonymity and privacy was assured. The participants' identities were protected as the PBwiki site and Google Docs were private and only visible to the class section, the data confidentiality was ensured by keeping signed consent forms, the students' individual writing and interview data on a password-protected laptop computer and bookcase. The transcriptions were anonymised with pseudonyms for the sake of making the reader feel data is real.

3.11. Summary

This chapter presented the research aims and questions, which focused on exploring the differential impact of technology-enhanced peer feedback activities on writing performance through Google Docs and Wiki platforms. The research questions were investigated by employing a mixed methods approach, which allowed for the use of qualitative data to achieve a better understanding for observed trends in the quantitative data. The design of the study, including the design of the experiments and

rationale for employing a split-class design, has been discussed. A counterbalancing strategy was followed for administration of pre-, post- and delayed post-test tasks to neutralise any order effects. This chapter also presented the procedures for data analysis. Finally, how trustworthiness criteria were met was explained, along with the ethical considerations. The following chapter presents the data analysis and the differential impact of Google Docs and Wiki-enhanced peer feedback and reactions to it.

Chapter 4 Results

4.1. Overview

The purpose of this study was to identify the value of inline and non-inline commenting features by comparing the potential effect of the use of Google Docs (which promotes inline commenting) and Wiki (which promotes non-inline commenting) on students' writing performance and to understand how students used these different platforms' affordances to provide peer feedback and make peer revisions. In addition to the background information presented, this chapter is comprised of three other main parts. The first part of the chapter reports the results related to the impact of the two platforms on writing performance in an attempt to address and answer the first research question, namely What is the differential impact of Wiki-mediated and Google Docs peer review on writing quality as measured by Jacobs et al.'s (1981) ESL Composition Profile? The second part of the chapter addresses the reactions to peer feedback given on the two platforms to give an answer to the second research question, How do Saudi EFL college students working in pairs on Google Docs platform provide peer feedback compared to their counterparts working in pairs on Wiki platform? The third part explores the attitudes towards the two platforms to address the third research question, which is What are Saudi EFL college students' reported perceptions of peer written feedback provided via Google Docs and Wikis?

4.2. Background information

In this section, analysis of background information obtained by the background survey (Appendix E) is presented. All participants completed a pre-survey prior to the study to gather background information regarding the participants' familiarity with online peer reviews on various online platform as well as paper-based commenting. The participants used five levels to indicate the level of familiarity on the 5-point Likert scale ranging from 1 (not familiar at all) to 5 (very familiar). The findings of the participants' responses with respect their familiarity with online commenting and writing on online platforms as well as on paper and pen are presented in Table 4.1.

Table 4. 1: Participants' prior peer feedback experience

	N	Google Docs	Wiki	Chat room	Discussion forum	Etherpad	Blog	Microsoft Word	Paper
Mean		1.90	1.98	1.78	1.90	1.0	1.80	1.0	3.88
SD		1.06	1.05	0.86	1.22	0	0.79	0	1.16
Min		1	1	1	1	1	1	1	1
Max		5	5	5	5	1	5	1	5
	40								

Note: Likert scales: 1. Not familiar at all; 2. Not familiar; 3. Somewhat familiar; 4. familiar; 5. Very familiar.

The results displayed in Table 4.1 showed that the participants (all male, aged between 22 and 24, with upper intermediate proficiency levels, as shown in section 3.3) were on average unfamiliar with the use of the online platforms Google Docs, Wiki, Chat room, Discussion forum, Etherpad, blog, and Microsoft Word with co-authoring function (M<2). However, the participants were, on average, familiar with peer commenting in traditional methods, using paper and pen (M>3).

4.3.   Part I. Impact of the two platforms on writing

This part of the chapter explores the impact of the two platforms on writing performance. The inter-rater reliability of the three raters (See section 4.3), who rated the performance of each participant on each test, was checked. Afterwards, the assumptions of normality were checked, and the inferential statistical results related to the impact of the two platforms on the overall writing (See section 4.3) and on the areas of form and content (See section 4.4) are presented.

4.3.1. Interrater reliability

The inter-rater reliability is measured to ensure the degree of agreement among the three raters who rated the participants' essays. It is calculated (based on the average scores of the three raters) by running the intraclass correlation (ICC) among the three raters at each test in overall writing, and in

the two dimensions of form and content. The ICCs for overall writing at the pre-, post, and delayed tests were .98, .96, and .97, respectively. Similarly, the ICCs at the dimension level were as follows: form (.97, .98, and .96, for pre-, post- and delayed tests, respectively) and content (.93, .96, and .93 for pre-, post- and delayed tests, respectively). These intraclass correlation results signal a strong agreement among the three raters (Koo & Li, 2016) in all three tests for overall writing as well as for the dimensions of form and content. In all subsequent analyses, the average ratings on each writing aspect (See Appendices V1, V2, Y1 & Y2) were averaged across the 20 participants in each condition and then used in all reported analyses.

4.3.2. Overall writing performance

The total scores on the participants' individual writing served to answer part of the first research question in the current study. This section starts by checking normality for overall writing performance both visually (histograms) and numerically (skewness and kurtosis; Shapiro-Wilk test). Then, the results of descriptive statistics and inferential statistical analyses are presented.

4.3.2.1. Normality testing for overall writing performance

The pre-, post- and delayed post-test scores of overall writing performance were tested for normality both visually through creating histograms, and statistically by looking at the skewness and kurtosis values in the descriptive statistics and then running Shapiro-Wilk test. The skewness and kurtosis values were checked to ensure they fall within the acceptable range of $\pm$ 2 standard deviation from the mean informed by George and Mallery (2019) whereas the Shapiro-Wilk test results were checked at the significance value of .05. The results of histograms (See Appendix U1), skewness and kurtosis (See Appendix U2), and the Shapiro-Wilk test (See Appendix U3) showed that the data (pre-test, post-test and delayed post-test scores of the overall writing) were normally distributed. Therefore, parametric tests were used to analyse the participants' overall scores on the three tests.

4.3.2.2. Results of analysis of overall writing performance

The figures in Table 4.2 below were calculated by averaging participants' overall writing scores across the three raters (See Appendices V1 & V2) and then averaging across the 20 participants in each condition. The descriptive statistics for the Google Docs and Wiki experimental groups on the overall writing performance (See Table 4.2) show that the mean scores for overall writing on both groups increased from the pre-test to the first post-test and the same upward trend continued in the second post-test.

Table 4.2: Overall writing performance scores of Wiki and Google Docs groups

	N		Pre-test	Post-test	Delayed test
Google	20	*M*	79.79	85.96	83.34
Docs		*SD*	4.07	4.88	5.97
Wiki	20	*M*	72.99	83.73	81.19
		SD	9.03	7.41	7.57

To check whether the two groups were matched at baseline, an independent samples *t*-test of the two groups' pre-test average scores was run. The results showed that the difference between the Google Docs group's overall writing performance (*M*= 79.79 out of 100, *SD*=4.07) and the Wiki group's (*M*=75.73, *SD*=7.9), at baseline, was statistically significant (*t*(38)=2.09, p< .01) with large effect size (d= 0.97; Plonsky, 2015). This statistical difference in overall writing performance between the two treatment groups at the pre-testing stage (before beginning the intervention) indicates that ANCOVA seems to be an appropriate test for comparing the two groups' scores in the immediate and delayed post-tests using the pre-test scores as covariate to control for such differences between the two groups at the pre-testing stage.

Two separate ANCOVAs were conducted, one on post-test with the pre-test as a covariate and the other on the delayed post-test with the pre-test as a covariate. The ANCOVA on the post-test showed a significant difference between the groups, $F (1, 37) = 5.54, p < .05, p = .024$) with a large effect size ($\eta p^2 = .14$; Cohen, 1988). The adjusted mean scores [marginal means (MM)] suggest larger

changes of overall writing performance in favour of the Wiki experimental group than the Google Docs group at post-test (overall writing: MM= 83.41 for Google Docs experimental group; MM= 86.28 for the Wiki experimental group).

The ANCOVA on the delayed post-test with the pre-test as a covariate also showed a significant between-subjects difference with a medium to large effect size, F (1, 37) = 4.67, p < .05, p = .04, ηp^2= .112. The adjusted mean scores [marginal means (MM)] suggest larger changes in overall writing performance in favour of the Wiki experimental group at delayed post-test (overall writing: MM= 80.70 for the Google Docs experimental group; MM= 83.85 for the Wiki experimental group).

To examine the change in the learners' overall writing mean scores from pre- to post-test and from pre-test to delayed test, a series of paired samples t-testes were run. The Google Docs students' overall writing achievement in post-test was better than their achievement in pre-test and the difference was statistically significant (pre-test: M=79.79, SD=4.07; post-test: M=85.96, SD=4.88; t[19]=-10.11, p< .05), with a large effect size (d=1.82). Likewise, their overall writing achievement in delayed post-test differed significantly from the pre-test (pre-test: M=79.79, SD=4.07; delayed test: M=83.34, SD=5.97; t(19)=4.13, p< .05), with a small to medium effect size (d=0.87). On the other hand, the comparison between the pre- and post-test overall writing performance in the Wiki platform revealed a significant increase from pre-test to post-test (pre-test: M=72.99, SD=9.03; post-test: M=83.73, SD=7.41; t(19)=-10.25, p< .05, p=.00), with a medium to large effect size (d=1.19). Likewise, there was a significant difference between the pre-test and delayed test in favour of the delayed test, (pre-test: M=72.99, SD=9.03; delayed test: M=81.19, SD=7.57; t(19)=-7.61, p< .05, p=.00), with a small to medium effect size (d=0.91).

4.3.3. Writing performance in the areas of form and content

Before running the inferential statistical analysis, normality was checked visually through histograms as well as numerically through skewness and kurtosis, and Shapiro-Wilk test. Afterwards, the inferential analyses were run, and the results of descriptive statistics and inferential statistical analyses in the areas of form and content are presented in two separate sub-sections.

4.3.3.1. Normality testing for scores in the areas of form and content

The pre-, post- and delayed post-test scores of writing performance were tested for normality in the same way as previously done in section 4.3.2.1. The results of histograms (See Appendix W1 & W2), skewness and kurtosis (See Appendix W3), and the Shapiro-Wilk test (See Appendix W4) showed that the data (pre-test, post-test and delayed post-test scores in the areas of form and content) were normally distributed. Therefore, parametric tests were used for analysing the participants' scores in the area of form and content on the three tests.

4.3.3.2. Analysis of the performance in form

In the same way followed in the analysis of overall writing, the figures in Table 4.3 were obtained by averaging the ratings on dimension of form across the three raters (See Appendices X1 & X2) and then averaging across 20 participants in each condition. The descriptive statistics for the writing scores of the Google Docs and Wiki experimental groups in the area of form (See Table 4.3) show that the mean scores of both groups increased from the pre-test to both first post-test and second post-test.

Table 4.3: Descriptive statistics of Wiki and Google Docs groups' performance in form

		Pre-test	Post-test	Delayed test
Google Docs form	*M*	38.85	44.81	43.58
	SD	2.44	1.77	2.52
Wiki form	*M*	36.08	40.20	39.03
	SD	4.11	4.33	4.37

To check whether the two groups were matched at baseline, an independent *t*-test of the two groups' pre-test average scores in the dimension of form was run. The results showed that the difference in writing performance in the area of form between the Google Docs group (*M*= 38.85 out of 50, *SD*=2.44) and the Wiki group (*M*=36.08, *SD*=4.11), at baseline, was statistically significant with large effect size (*t*(38)=2.59, *p*<. .05, *p*=.040, d= 0.82). This statistically significant difference in writing performance in the dimension of form between the two treatment groups at the pre-testing stage (before beginning the intervention) indicates that ANCOVA test seems to be the appropriate test for comparing the two groups' scores in the immediate and delayed post-tests using the pre-test scores as covariate to control for differences between the two groups at the pre-testing stage.

Two separate ANCOVAs were conducted, one on post-test with the pre-test as a covariate and the other on the delayed post-test with the pre-test as a covariate. The ANCOVA on the post-test showed a significant difference between the two experimental groups with large effect size, F (1, 37) = 11.44, p < .05 (p = .002, ηp^2 = .24). The adjusted mean scores [marginal means (MM)] suggest larger changes of writing performance in the dimension of form in favour of the Google Docs experimental group than the Wiki group at post-test (MM= 43.81 for Google Docs experimental group; MM= 41.20 for Wiki experimental group).

As in the post-test results, the ANCOVA on the delayed post-test with the pre-test as a covariate also showed a significant between-subjects difference with large effect size, F (1, 37) = 8.41, p = .006, ηp^2 = .19. The adjusted mean scores [marginal means (MM)] suggest larger changes in the dimension of form in favour of the Google Docs experimental group than the Google Docs group at post-test (MM= 42.46 for Google Docs experimental group; MM= 40.15 for Wiki experimental group).

To examine the change in the learners' writing performance mean scores in the dimension of form from pre- to post-test and from pre- to delayed test, paired samples t-tests were run. The Google

Docs students' writing achievement in this dimension in post-test was better than in pre-test and the difference was statistically significant (pre-test: *M*=38.85, *SD*=2.44*;* post-test: *M*=44.81, *SD*=1.77; *t*[19]=-13.59, p< .05, p=.005), with a large effect size (d=2.44). Likewise, their writing achievement in the same dimension in delayed post-test differed significantly from the pre-test (pre-test: *M*=38.85, *SD*=2.44; delayed test: *M*=43.58, *SD*=2.52; *t*(19)=-10, *p*< .05, *p*=.000), with a large effect size (d=1.94). In the other experimental group (Wiki), the comparison between the pre- and post-test writing performance in the dimension of form revealed a significant difference in favour of post-test (pre-test: *M*=36.08, *SD*=4.11; post-test: M=40.20, SD=4.33; *t*(19)=-6.58, *p*< .05, *p*=.000), with a medium effect size (d=1.00). In addition, there was a significant difference between the pre-test and delayed test in favour of the delayed test, (pre-test: *M*=36.08, *SD*=4.11; delayed test: *M*=39.03, *SD*=4.37; *t*(19)=-5.06, *p*< .05, *p*=.00), with a small to medium effect size (d=0.72).

4.3.3.3.   Analysis of writing performance in the area of content

In the same way followed in previous analyses, the figures in Table 4.4 were obtained by averaging the ratings on dimension of content across the three raters (See Appendices X1 & X2) and then averaging across 20 participants in each condition. The descriptive statistics for the writing scores of Google Docs and Wiki experimental groups in the area of content (See Table 4.4) show that the mean scores of both groups increased from the pre-test to both first post-test and second post-test.

Table 4.4: Descriptive statistics of Wiki and Google Docs groups' performance in content

		Pre-test	Post-test	Delayed test
Google Docs content	*M*	40.95	41.15	39.77
	SD	2.29	3.24	3.65
Wiki content	*M*	36.91	43.53	39.77
	SD	5.09	3.15	3.65

To check whether the two groups were matched at baseline, an independent t-test of the two groups' pre-test average scores in the dimension of content was run. The results showed that the difference in writing performance in the area of content between the Google Docs group (M= 40.95 out of 50, SD=2.29) and the Wiki group (M=36.91, SD=5.09), at baseline, was statistically significant with large effect size (t(38)=3.23, $p<..05$, p=.00, d= 1.02). This statistical difference in writing performance in the dimension of content between the two treatment groups at the pre-testing stage (before beginning the intervention) indicates that ANCOVA seems to be the appropriate test for comparing the two groups' scores in the immediate and delayed post-tests using the pre-test scores as a covariate to control for differences between the two groups at the pre-testing stage.

Two separate ANCOVAs were performed; one on the post-test scores in the area of content with the scores of the pre-test as a covariate and the other on the delayed post-test with the pre-test as a covariate. The ANCOVA on the post-test showed a significant difference between the groups with large effect size, F (1, 38) =31.29, $p<.05$, p=.00, ηp^2=.58. The adjusted mean scores [marginal means (MM)] suggest larger changes of writing performance in the dimension of content in favour of the Wiki experimental group than the Google Docs group at post-test (MM= 39.84 for Google Docs experimental group; MM= 44.83 for Wiki experimental group). This means the Wiki experimental group performed significantly better than the Google Docs group in the dimension of content at the post-test.

The ANCOVA on the delayed post-test with the pre-test as a covariate also showed a significant between-groups difference, F (1, 37) = 33.39, $p <.05$, p = .000, ηp^2 = .47. The adjusted mean scores [marginal means (MM)] suggest larger changes of writing performance in the dimension of content in favour of the Wiki experimental group than the Google Docs group at delayed post-test

(MM= 38.47 for Google Docs experimental group; MM= 43.46 for Wiki experimental group). There-
fore, as in the post-test, the Wiki experimental group performed significantly better than the Google
Docs experimental group in the dimension of content in delayed post-test.

To examine the change in the mean scores of the learners' writing performance in the dimen-
sion of content from pre- to post-test and to delayed test, a series of paired samples t-tests were run.
The Google Docs students' writing achievement in the area of content in post-test was better than in
pre-test but the difference was not statistically significant (pre-test: M=40.95, SD=2.29; post-test:
M=41.15, SD=3.24; t[19]=-0.44, $p > .05$, p=0.66), with a small effect size (d=0.09). In addition, their
writing achievement in the same dimension in delayed post-test did not differ significantly from the
pre-test (pre-test: M=40.95, SD=2.29; delayed test: M=39.77, SD=3.65; t(19)=2.02, $p > .05$, p=0.06),
with a small effect size (d=-0.52). In the other platform, the comparison between the pre- and post-
test writing performance in the dimension of content revealed a significant difference in favour of
post-test (pre-test: M=36.91, SD=5.09; post-test: M=43.53, SD=3.15; t(19)=-10.92, $p< .05$, p=.00),
with a medium to large effect size (d=1.30). Likewise, there was a significant difference between the
pre-test and delayed test in favour of the delayed test, (pre-test: M=36.91, SD=5.09; delayed test:
M=39.77, SD=3.65; t(19)=-8.06, $p< .05$, p=.00), with a small effect size (d=0.56).

4.3.4. Summary of findings on the impact of platforms on writing

The analysis of the impact of the two platforms on writing performance showed that both Google
Docs and Wiki experimental groups' overall scores improved significantly from the pre-test to post-
test and from post-test to delayed post-test. Likewise, the same upward trends from the pre- to post-
test and from pre- to delayed post-test were also noticed in the two groups' performance in the dimen-
sion of form. In the dimension of content, the Google Docs group did not improve significantly over
time (from pre- to post-test and from pre-test to delayed test) whereas their Wiki counterparts' per-
formance in this area improved overtime. In the between group differences in overall writing scores,

the Wiki group performed significantly better than the Google Docs group at both post- and delayed post-tests. However, in the area of form, the Google Docs group significantly outperformed their Wiki counterparts at the post- and delayed post-test whereas the Wiki group performed significantly better than their Google Docs counterparts at the same time points in the area of content. These findings are in support of the hypothesis outlined in section 3.2 that Google Docs is more supportive of narrowly-focused feedback on accuracy (form) than Wiki, and therefore could promote higher development in the participants' writing accuracy (grammar, vocabulary, mechanics), whereas Wiki is expected to be more supportive of global/general feedback on content than Google, and therefore could promote higher development in the writing content.

4.4.   Part II: Peer feedback foci and reactions to it

4.4.1.   Overview

This section presents analysis of the data obtained from the participants' interactions on the Google Docs and Wiki platforms. It explores the foci of feedback to address the part of the hypothesis related to whether Google Docs promotes the provision of more form-focused feedback and less content-based feedback than the Wiki platform. It also explores how participants reacted to peer feedback for addressing the other part of the hypothesis related to whether the Google Docs encourages the integration of more form-focused feedback than the Wiki platform, which is expected to facilitate incorporation of more content-based feedback. Therefore, to address both parts of the hypothesis, the areas of peer feedback noticed on the two platforms were classified into either form-focused or content-based (See section 4.2.2) and the reactions to feedback were categorised into two main types of reactions; namely, *integration* and *non-integration of feedback* (See section 4.2.3).

4.4.2. Focus of online peer feedback points

Table 4.5 presents the descriptive statistics for the frequency of the areas of peer feedback comments. The figures in the table were calculated by counting the frequency of the areas of feedback (form-focused and content-based peer feedback points) per pair (See Appendices Y1 & Y2) and then averaging across the pairs in every platform.

Table 4.5: Descriptive statistics of peer feedback focus by application

Platform	Descriptive stats	Form focused feedback	Content based feedback
Google Docs (N = 20)	M	45.10	4.20
	SD	23.07	3.68
Wikis (N = 20)	M	26.90	8.90
	SD	9.28	5.53

The data showed that the learners working on Google Docs produced a higher average number of form-focused comments (*M*=45.10) than their counterparts working on the Wiki platform (*M*=26.90), whereas the learners working on Wiki generated a higher average number of content-based comments (*M*=8.90) than their Google Docs counterparts (*M*=4.20).

To determine whether the differences in the areas of feedback between the participants in the two applications were statistically significant, two one-way ANOVAs were run; one ANOVA on the form-focused peer comments and the other ANOVA on the content-based peer comments. The one-way analysis of variance run on form-focused feedback found significant differences between the participants in both platforms in the number of peer comments on form with large effect size, $F(1, 18)=5.36$, $p<.05$, p=.033, $\eta p^2=.23$. Likewise, the one-way analysis of variance run on content-based peer feedback found significant differences between the participants on both platforms in the number of peer comments on content with large effect size, $F(1, 18)=5.01$, $p <.05$, p=.04, $\eta p^2=.22$. These findings indicate that the

Google Docs platform resulted in a statistically significantly higher mean number of form-focused comments and a statistically significantly lower mean number of content-based comments than those of Wiki.

4.4.3. Participants' responses to peer feedback points

This section aims to explore the participants' reactions to both form-focused and content-based peer feedback given on Google Docs and Wiki platforms. It particularly tries to explore whether Google Docs encourages acceptance and integration of more form-focused comments than Wiki and whether Wiki encourages acceptance of more content-based comments than Google Docs. The first sub-section addresses responses to form-focused peer feedback while the second tries to discover the peer responses to content-based peer feedback in the two platforms.

4.4.3.1. Responses to form-focused feedback

Table 4.6 presents the mean number (average frequency counts) of reactions to form-focused feedback points on each platform. The figures in the table were calculated by counting the frequency of reactions to form-focused feedback per pair (See Appendices Z1 & Z2) and then averaging across pairs.

Table 4.6: Frequency of reactions to form-focused feedback

Platform		Integrated	Unintegrated
Google Docs (N = 20)	M	40.40	6.70
	SD	18.25	2.46
Wikis (N = 20)	M	25.90	2.50
	SD	6.47	2.46

The results showed that the Google Docs pairs, as compared with their Wiki counterparts, integrated a higher mean number of form-focused comments (Google Docs: *M*=40.40, *SD*=18.25; Wiki: *M*=25.90, *SD*=6.47). Likewise, in the non-integration reaction to form-focused feedback, the

124

Google Docs pairs left unresolved a higher average number of form-focused comments (*M*=6.70, *SD*=11.18) than their Wiki counterparts (*M*=2.46, *SD*=2.46).

Two independent *t*-tests were run to check whether the differences between the two experimental groups in their reactions to form-focused feedback are statistically confirmed. These analyses, presented in Table 4.7, show that the differences between the participants in the two treatments in the integration and non-integration reactions were statistically significant (p<.05) with large effect sizes. These findings suggest that the participants on the Google Docs platform integrated and left unintegrated a statistically larger number of form-focused comments than their Google Docs counterparts.

Table 4.7: Results of t-tests

Reactions to form-focused feedback	N	T	P	d
Integrated	10	2.37	.03	1.06
Unintegrated	10	1.16	.02	1.71

4.4.3.2. Responses to content-based feedback

Table 4.8 presents the average frequency counts of the two reactions to content-based peer feedback points on each platform. The average numbers in the table were calculated by counting the frequency of reactions to content-based feedback per pair (See Appendixes Z3 & Z4) and then averaging across pairs.

Table 4.8: Frequency of reactions to content-based feedback

Platform		Integrated	Non-integrated
Google Docs (N = 20)	M	2.60	1.50
	SD	3.13	1.51
Wikis (N = 20)	M	6.40	0.80
	SD	4.74	1.03

The results revealed that the Wiki pairs, as compared with their Google Docs counterparts, integrated a higher mean number of content-based comments (Google Docs: *M*=2.60, *SD*=3.13; Wiki:

M=6.40, *SD*=4.74). However, the pairs of participants on the Google Docs platform, on average, un-integrated/unresolved (Google Docs: *M*=1.50, *SD*=1.51) a higher number of content-based comments than their Wiki counterparts (Wiki: *M*=0.80, *SD*=1.03).

To determine whether the differences in the integration and non-integration reactions to content-based feedback between the participants on the two platforms were statistically significant, two *t*-tests were run. These analyses, presented in Table 4.9, show that the differences between the participants in the two treatments in the integration and non-integration reactions to content-based feedback were not statistically significant (*p*>.05).

Table 4.9: Results of t-tests

Reactions to content-based feedback	N	T	P	d
Integrated	10	2.37	0.22	0.95
Unintegrated	10	1.16	2.29	0.54

4.4.4. Summary of the peer feedback results

In brief, the findings of the peer feedback analysis revealed that, on average, the Google Docs platform generated significantly higher form-focused peer feedback than the Wiki, while the Wiki platform generated significantly higher content-based feedback. In terms of reactions to feedback, the Google Docs platform was superior to the Wiki platform in the acceptance and integration of form-focused comments while the Wiki platform was superior to Google Docs in the acceptance and resolution of content-based feedback.

4.5. Part III: Attitudes towards the two platforms

This section presents the analysis of qualitative data collected from individual one-to-one semi-structured interviews (See interview table in Appendix D) with the aim of exploring students' perceptions of peer review activities completed on the Google Docs and Wiki platforms. More

specifically, it attempts to address and answer the fourth research question, namely what are Saudi EFL college students' reported perceptions of peer written feedback provided via Google Docs and Wikis? and to explain the peer feedback obtained from the online interaction data. Out of the 40 EFL students who participated in the online peer review activities, only half were interviewed with equal representation for each platform. The interview data were analysed thematically and the themes emerging from the interview data, to be discussed in this section, are summarised in Table 4.10.

The first six themes reported in sections 4.5.1 to 4.5.6 refer to the role of various features of Google Docs and Wiki platforms in facilitating commenting on language. The next two themes presented in sections 4.5.7 and 4.5.8 concentrated on the role of the two platforms in promoting clarity and specificity of the feedback. The themes reported in sections 4.5.9 and 4.5.10 focused on the role of the two platforms in facilitating interactions (i.e., its role in saving time of interactions and promoting online exchange of feedback). The last theme reported in section 4.5.11 refers to the Wiki participants' use of online sources to mediate their content-based feedback.

Table 4.10: Summary of themes obtained from the interview data

Themes
Spelling and grammar checker promotes language focused feedback
Commenting function promotes language-focused feedback
Synchronous/automated update of comments promotes frequent commenting on language
In-line/in-text commenting promotes specific feedback on language
Participants' use of external sources to mediate their commenting on language
Visual connection between feedback mode and text determines frequency of commenting on language
Highlighting clarifies feedback
Detailed feedback promotes acceptance
Platform encourages online exchange of feedback
Platform saves time of interactions
Wiki participants use of online tools for mediating content-based feedback

4.5.1. Spelling and grammar checker promotes language focused feedback

Students in Google Docs and Wiki groups referred to the effect of the two platforms' spelling and grammar checkers on language-focused feedback. Some of the Wiki participants specifically referred to the role of spelling and grammar checker in marking words and sentences with potential grammatical and spelling errors with coloured lines as facilitating the process of finding out the language-related errors and encouraging commenting on them. They believed that this technological affordance assisted them to identify the ill-formed sentences and phrases and to comment and fix them. Some of the participants reported their opinions as follows:

> *if there is a mistake in the spelling or even in grammar, [the] software gives me [an] underline in red colour so I know there is a mistake…and then I immediately either comment on it or modify it and correct it…* (Mansoor[1], Wiki group, semi-structured interview)

> *Wiki alerts me if there were mistakes in the spelling or grammar…the program underlines that part in red colour, so I know that there is mistake and then I go and comment on it* (Sami, Wiki group, semi-structured interview)

Similar to their Wiki counterparts, some Google Docs participants reported that the Google Docs spelling, and grammar checker promoted language-focused feedback and assisted in the process of finding language-related errors, since it marks these errors automatically. Some of these participants reported their opinions as follows:

> *I provided feedback on spelling mistakes and grammar because the program assists in focusing and paying attention to the errors in sentences through auto-alerting us to errors.* (Aziz, Google Docs group, semi-structured interview)

> *I mostly gave comments on spelling and grammar since the Google Docs…alerts me if there were mistakes in spelling or grammar…through underlining that part in red colour so, I know that there is a mistake and I…then go and comment on it* (Fahad, Google Doc group, semi-structured interview)

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[1] These are pseudonyms of the interviewees

The Google Docs platform's spelling and grammar checker assisted me to focus on language and to resolve the language-focused feedback through alternative options that it offers for spelling and grammar. (Noor, Google Docs group, semi-structured interview).

In brief, some participants on each platform shined light on the role of the spelling and grammar checker in promoting language-focused feedback. The participants on both platforms viewed this function as crucial in promoting the identification of language-related errors and fixing or commenting on them.

4.5.2. Commenting function promotes language focused feedback

Some Google Docs and Wiki participants reported that the commenting function in both platforms contributed to encouraging language-focused feedback. They particularly valued the role of the sufficient size of the commenting spaces in promoting language-focused feedback. Some of the Wiki participants believed that the large commenting space of Wiki gave them the chance to copy and paste any part of the text that contains linguistic errors and then comment on it freely. They reported their opinions by stating:

What I provided feedback on the most is language… because the Wiki program offers an enough space for copying and pasting the linguistic error in the comment section and… you can easily start commenting on it and suggest modification of a specific language-related aspect in a particular location of the text. (Muneer, Wiki group, semi-structured interview)

I provided feedback the most on punctuation, grammar, and anything related to the form. We provided feedback on these aspects… to benefit from this app which has sufficient discussion forum allowing us to…copy any wrong sentence and put it in the comment section and give comment on it. Commenting was highly promoted by the big discussion forum which allows for exchange of language-focused feedback. (Salah, Wiki group, semi-structured interview)

As their Wiki counterparts did, the Google Docs participants also referred to the role of the big size of commenting space in promoting engagement in thorough discussions about language-related issues. They believed that the Google Docs commenting space (right side automatically generated

space in the margins), which was described as large space, promoted comments on language and assisted them to add specific comments on any part of the text which has language-related errors. Some of the Google Docs participants expressed their views by stating:

> *Generally, I gave most feedback on form/language because it is easy to give feedback on the form on the software ....it appears that Google Docs was designed to give feedback only on form. There is a right side automatically generated space, a large space that assists you to add comments on any part of the text with language-related errors* (Basil, Google Docs group, semi-structured interview)

> *I provided feedback on simple grammatical issues, spelling, punctuation, prepositions ...because commenting space was big enough to address all these issues in the margins... I can easily highlight language-related errors and add comments on them ... on the right side of the document.* (Yunis, Google Docs group, semi-structured interview)

> *I gave comments on capitalisation and spelling mistakes or sentences that are incorrect or verbs because ...the program facilitates commenting on these aspects ...it really has large commenting space, so if I made mistakes, he sends to me comment exactly on the location of the error either in word, or letter or sentence...* (Hamed, Google Docs group, semi-structured interview)

Some of the participants on both platforms shared similar views of the role of the large size of their assigned platforms' commenting spaces in promoting the provision of language focused feedback. They believed that the big commenting space allowed them to copy and paste any particular text and comment on it as in Wiki and to add specific in-line comments on any language-related issues in the margin of the document as in Google Docs.

4.5.3. Synchronous/automated update of comments promotes frequent commenting on language

Some of the Google Docs participants indicated that their assigned platform encouraged them to comment frequently on language-related issues due to Google Docs support for the synchronous exchange of feedback and automated update of comments. They expressed their views by stating:

> *The platform assisted me to comment on language comprehensively because of the synchronous delivery of feedback and automated updating of comments function in the platform which motivated me to comment on any language-related errors encountered.* (Eyad, Google Docs group, semi-structured interview)

*I almost commented on all language-related errors because of the synchronous communication and automated update promoted by Google Docs which made communication and negotiations about language-related issues easier and faster. (*Basil, Google Docs group, semi-structured interview)

The synchronous interactions in Google Docs motivated me to address the language-related issues frequently since you do not need to wait for a long time to receive comments because of the platform's automated updating function for the changes made and comments given. (Noor, Google Docs group, semi-structured interview)

Most of the participants on the Wiki platform also referred to the positive role of the synchronous and automated update of comments and edits in promoting frequent commenting on language by emphasising how the lack of this feature in Wiki made them comment selectively on language-related issues. Some of the participants reported their opinions:

Wiki does not support simultaneous commenting and editing due to the fact that it only allows one person at a time to edit the page and blocks someone from seeing comments made on the platform before saving the edits and refreshing the page. All these barriers made me sometimes comment selectively on language-related issues. (Mansoor, Wiki group, semi-structured interview).

*...my partner cannot see the edits unless he refreshes the page, and this demotivated us from commenting comprehensively on errors (*Muneer*, Wiki group, semi-structured interview)*

Commenting on Wiki is complicated because when my partner edited the page, he sometimes forgot to save the page after commenting, and this prevented me from seeing the updates and delayed my access to the page and commenting on the updates. So, we both preferred not to extensively comment on errors and edit the page. (Salah, Wiki group, semi-structured interview)

"Sometimes I commented selectively on language-related errors because the platform was not supporting simultaneous editing and commenting. (Obaid, Wiki group, semi-structured interview)

In brief, the participants on both platforms either explicitly or implicitly appreciated the positive role of the automated update function in promoting comprehensive commenting on language-related issues. More specifically, the Google Docs participants directly applauded the positive role of the automated update of comments and edits in promoting comprehensive commenting on language. The

participants on the Wiki platform also gave some hints about the positive role of the automated up-dating of comments and edits in promoting language-focused feedback by attributing their selective commenting on language to the absence of automated update feature in their assigned platform. In other words, they attributed their selective commenting on language to the lack of this feature which they believed was responsible for delaying the exchange of comments and thus impeding extensive commenting on language-related errors.

4.5.4. In-line/in-text commenting promotes specific/narrowly-focused language feedback

Some of the Google Docs participants believed that in-line commenting played a role in promoting the specificity of feedback which in turn led to frequent commenting on language-related issues and incorporation of the given suggestion. Some of the participants adopting this view stated:

> *The in-line commenting assisted me to frequently address language-related feedback and to incorporate it due to its encouragement for locating the errors* (Eyad, Google Docs group, semi-structured interview)

> *What motivated me to frequently comment on language-related aspects is the Google Docs in-text feedback mode support for adding direct and specific comments easily in the text.* (Basil, Google Docs group, semi-structed interview)

Some of the participants on the Wiki platform emphasised the positive role of in-text feedback in supporting the provision of specific feedback by highlighting the absence of this feature in Wiki, expecting its presence to support frequent commenting on language and more incorporation of comments on language-related issues. Some students expressed their views as follows:

> *Wiki never promotes in-text feedback, so I avoided frequent commenting on language-related issues. I also was not happy with language-focused comments received on the Wiki discussion forum and I sometimes ignored some of them. They were not specific enough to be implemented since they were not given directly on the text.* (Hamad, Wiki group, semi-structured interview).

> *I sometimes chose not to address some of the language-related issues because it was hard to describe each mistake or comment on it as there is no chance for addition of in-text feedback as there is with other platforms I am aware of, like Microsoft Word. I am sure if the in-text feedback feature was available in Wiki, it could promote specific and language-focused feedback a lot. (*Yusef*, Wiki group, semi-structured interview)

In brief, some participants on both platforms either explicitly or implicitly emphasised the positive role of the in-line commenting in promoting specific feedback on language-related issues. Therefore, it seems that the presence of the in-text feedback mode on online collaborative platforms has a positive impact on the frequency of commenting on language-related issues and its incorporation.

4.5.5. Participants' use of external sources to mediate their commenting on language

Some of the participants on Wiki stated that they accessed online tools to mediate and help them provide language-focused feedback. Some of these participants reported their views by stating:

> *"I sometimes checked some tutorials to learn more about grammar rules and checked spelling of some words in an online dictionary before the provision of feedback on spelling or before incorporation of feedback related to spelling errors.* (Salah, Wiki group, semi-structured interview)

> *Before commenting on language, I usually accessed some grammatical rules and the spelling of words before commenting on language-related issues.* (Mansoor, Wiki group, semi-structured interview)

Some of the participants on the Google Docs platform also reported a similar dependence on online sources for assistance in providing language-focused feedback. They reported their views:

> *I checked the spelling of some words in online dictionaries and revised some grammatical rules based on some grammatical books available online. I did this whenever I wanted to comment on any language-related issue including mechanics, spelling, and grammar to increase my knowledge on these issues and to ensure that my comments are accurate and targeting the weaknesses and errors."* (Fahad, Google Docs group, semi-structured interview)

> *I accessed online tutorials about the use of mechanics and word choice before commenting on some language-related aspects to reassure myself that I only comment on errors and weaknesses and to increase my knowledge about grammatical rules and mechanics from a source other than peer assistance.* (Eyad, Google Docs group, semi-structured interview)

In brief, the participants on both platforms shared similar views on their use of the internet to access online tools to mediate their provision of language-focused feedback.

4.5.6. Visual connection between feedback mode and texts determines frequency of commenting on language

Some of the Google Docs participants reported that visual connection between the comments and the text (which is promoted by Google Docs in-line commenting) motivated them to frequently comment on language-related aspects. Some of the participants reported their views by stating:

> *I commented frequently on errors because in-line commenting in Google Docs allowed me to comment on the text directly with no need to move up and down the page to comment on language-related aspects. You can comment on any part of the document in an automatically-generated space on the right-hand side of the screen.* (Riyad, Google Docs group, semi-structured interview)

> *In-text commenting allowed me to frequently address errors in an easy way. You don't need to bother yourself by moving up and down the page to see and make the comments and edits. There is a visual connection between the feedback mode and the text which facilitates commenting on language.* (Noor, Google Docs group, semi-structured interview)

Some of the participants working on the other platform also acknowledged the positive role of visual connection feature in promoting frequent comments on language as they attributed their abandonment of commenting on some language-related issues to the lack of visual connection between the feedback mode (i.e., Wiki-end-page commenting space) and the text. Some of the participants adopting this view stated:

> *...sometimes I ignored some language-related issues because it was difficult to comprehensively address all language-related errors due to the visual disconnection between the commenting space and the Wiki page, especially with the increasing number of the threaded comments. We were forced to move up to see the text frequently before adding any comment on language-related issues. So, we sometimes ignored some language-related errors.* (Mansoor, Wiki group semi-structured interview)

> *Sometimes we faced difficulty in commenting in the discussion forum on Wiki because it is located at the end of the Wiki page and thus it was difficult for me to move up and down the page and thus I preferred not to comprehensively comment on language-related issues* (Muneer, Wiki group, semi-structured interview).

In sum, the participants on the Google Docs platform explicitly attributed their frequent commenting on language-related issues to a visual connection between feedback comments and the text

which is supported by the in-line commenting feature. Likewise, Wiki participants suggested a positive role of the visual connection when they reported the lack of visual connection between the feedback mode and text in the end-commenting feature of Wiki made them fail to comprehensively comment on language-related errors.

4.5.7. Highlighting clarifies feedback

Some of the Google Docs participants believed that highlighting the text that has errors (upon provision of feedback) contributed to clarifying the received feedback and facilitated its integration and acceptance. This highlighting feature assisted in clarifying the feedback through its support for the addition of clear instructions and corrections on the exact areas of weaknesses. For example, some of the participants adopting this view expressed their opinions:

> *I received comments on spelling and when dealing with these comments on Google Docs, everything was easy and clear, and there was no difficulty in accepting and integrating these comments, because my partner was highlighting the word for me and telling me in the margin to 'check the spelling' in a clear way.* (Fahad, Google Docs group, semi-structured interview).

> *I accepted all the comments on errors in language and I modified the text based on these clear comments that [my partner] gave me on my writing. He highlighted the place where there was an error and guided me in the comments that these words are ...incorrect or I did not understand its meaning or that they are in the wrong place.* (Eyad, Google Docs group, semi-structured interview)

Similar to their Google Docs counterparts, Wiki participants reported that their partners' highlighting of text while making comments contributed to the clarification of feedback and encouraged its acceptance and incorporation. Some of the participants adopting this opinion expressed their views:

> *I always accepted form-focused feedback ... because [my partner] explained the line number and said 'in this number 3 line this was should be replaced by so and so'... so, language-related feedback was easy to accept and implement on Wiki. (*Salah, Wiki group, semi-structured interview*)*

> *...we accepted most of the form-focused comments because we both explained and located the errors for each other by explaining the number of lines involving errors and we give*

suggestions like 'this should be replaced by so and so.' So, we give specific guidelines and descriptions of the suggestion for amendment/change ...so once either one of us sees the suggested amendment or the change, we will accept such edit/modification because we know exactly why we should do so since specific guidelines are given. (Saleh, Wiki group, semi-structured interview)

In conclusion, some of the participants on both platforms indicated that highlighting the location of the errors in the text while giving comments contributed to clarifying feedback and ended up with the participants' acceptance and integration of language-focused comments.

4.5.8. Detailed feedback promotes acceptance

Some Google Docs participants reported that the detailed feedback they received on their assigned platform encouraged them to accept and integrate the language-related feedback. Therefore, they reported that they did not have any excuse for not accepting, resolving, and integrating such detailed comments. For example, some of the participants expressed their opinions as such:

I had no chance to reject or ignore the form-focused feedback that I received on Google Docs because my partner always explains the rule. When he gives feedback, he explains the error in a detailed way and after he explains the correction to me, he gives me the suggestion for correction. (Basil, Google Docs group, semi-structured interview)

I dealt with the all comments on errors in language and resolved them all comprehensively and I couldn't ignore anything because ... the feedback received on the software about language-related errors was detailed one which made the process of resolving language-related errors easy. (Eyad, Google Docs group, semi-structured interview)

On the Wiki platform, some of the participants, as with some Google Docs counterparts, also reported that the detailed feedback they received encouraged their acceptance and integration of most of the language-related suggestions. For example, some of the Google Docs participants reported their opinions as:

The language-related comments were detailed, as if [my partner] talking about a particular thing and if it has a particular thing, he copies and then pastes it in the commenting space and starts commenting on it in detail. Therefore, the integration and acceptance of language-related comments was easy, and I accepted most of the form-focused comments. (Mansoor, Wiki group, semi-structured interview)

[My partner] *gave comments on the mistakes in spelling, grammar, and punctuation. I accepted most of these comments because he describes the errors. So, the detailed and clear description of errors ...facilitated fixing the errors and knowing the location of the error so I don't need to go and look for the rule and thus description helped and encouraged me to include and accept the suggested modification right away.* (Bari, Wiki group, semi-structured interview)

In sum, the participants on both platforms reported that the detailedness of the feedback that they received contributed to their acceptance of language-related feedback. These findings suggest both platforms have the same impact on the participants' tendency towards acceptance and integration of language-related comments. The findings also suggest that both platforms assist in presenting the language-related feedback in a detailed and specific way.

4.5.9. Platform facilitates exchange of feedback

Most of Wiki participants reported that their assigned platform promoted their exchange of feedback and attributed that to the potential role of the platform in enabling them to give comments online, without physical presence. Some of these participants explained their views on this facilitative role of Wiki by stating:

I like peer review on this platform because when I am sharing with somebody ..., these two guys must not be physically present somewhere, right ...; for example, I am writing from college and he is like responding to me from home, right. So of course, it gives you more freedom. (Sayaf, Wiki group, semi-structured interview)

...the experience is very nice and excellent because there are two people writing the essay online, so there is easiness in an exchange of ideas and cross-fertilization of ideas...and there is no need for physical presence. (Salah, Wiki group, semi-structured interview).

Similar to the participants on the Wiki platform, some Google Docs participants reported that their assigned platform facilitated their exchange of feedback and attributed that to the role of the platform in promoting online exchange of feedback without any need for physical presence. Some of the participants, who adopted this view, reported their opinions:

...I like peer review on Google Docs and one of its good things is that it is ok when your

partner is at a far distance in which it is not necessarily to be physically present with you and it is ok to be in another country and you can use this program and communicate/interact with him via it. (Rami, Google Docs group, semi-structured interview)

it gives us together the chance to exchange comments from two different places at the same time simultaneously and easily. (Noor, Google Docs group, semi-structured interview)

In brief, some participants on both platforms were in agreement in terms of the positive role of their assigned platforms in facilitating the exchange of peer comments, since they allowed them to comment online without physical presence.

4.5.10. Platform saves time of interactions

Most of Google Docs participants claimed that their assigned platform saved time in their interactions and attributed that to the platform's synchronicity feature, which allows participants to comment or reply to the comments at the same time. Some of the participants' views on this issue are:

Commenting on Google Docs saves time because the platform… gives us together the ability to work … at same time simultaneously. (Noor, Google Docs group, semi-structured interview)

Commenting on Google Docs saves time in interactions… due to the real time indication in the platform, which is one of its prominent features... (Rami, Google Docs group, semi-structured interview)

Some of the participants on the other platform emphasised the same view of the role of the Wiki platform in saving time on interactions and comments. They stated that the Wiki platform saved time in interactions since the participants can provide feedback online. They expressed their views by stating:

This software is successful, and it is software which is helpful for the student and …for all participants… this program can … save time since it allows for the online exchange of comments with your partner, in spite of its lack of real time indication… (Shahin, Wiki group, semi-structured interview)

This program saves time in interaction because interactions were exchanged online, even though this program facilitates asynchronous interactions, but still it is … certainly good

and speeds up the commenting process without doubt. (Sayed, Wiki group, semi-structured interview)

In brief, participants on both platforms agree on the role of their assigned platforms in saving time in online interactions. They also linked the platforms' role in saving time on reasons related to the speed of the exchange of comments (synchronously on Google Docs and asynchronously on the Wiki platform).

4.5.11. Wiki participants' use of online tools for mediating content-based feedback

Some of the Wiki participants reported using online tools to read about the content and organisation of academic essays to mediate their provision of content-based feedback. They expressed their views by stating:

> *While waiting time for edits to be made on the Wiki page, I sometimes read about the topic we were writing about and read about the guidelines related to how to organise and compose a well-written academic essay which helped me in terms of commenting on content and organisation*" (Salah, Wiki group, semi-structured interview).

> *I sometimes surfed the internet and checked discussions on online forums about academic writing and how essays can be organised and written, which assisted me to seek assistance to improve my writing in organisation and content as well as to comment on these aspects.* (Muneer, Wiki group, semi-structured interview)

> *While waiting for peer comments to be made on the asynchronous Wiki platform, I searched for topics related to the festivals and looked for the structure of the academic essay and how it could be organised.* (Saleh, Wiki group, semi-structured interview)

> *When I came back home, I watched some YouTube videos and tutorials about how the essays are organised and written.* (Mansoor, Wiki group, semi-structured interview)

As shown in the quotes above, the students sought assistance beyond their peer interactions, not only to improve their writing in the areas of content and organisation but also to mediate the provision of feedback on these aspects.

4.5.12. Summary of interview findings

The findings of the one-to-one semi-structured interviews revealed that the participants assigned to both platforms highly valued the role of the commenting function as well as spelling and grammar

checker in promoting language-focused feedback. They particularly valued the role of the large size of Google Docs and Wiki platforms' commenting spaces in enabling them to comment on any language-related issues as well as the role of the wavy lines in grammar and spelling checkers in assisting them to find out errors and comment on them. The interview data also indicated that the participants found the highlighting function to be supportive for the clarification of feedback that they received on their assigned platforms. The participants particularly referred to its role in clarifying the feedback by referring to its role in enabling them to highlight the exact location of the errors either by highlighting the part of the text that includes errors and directly commenting on it in the margin as in Google Docs platform or by adding a detailed description about the location and nature of errors with a reference to the line number as in Wiki discussion forum. In addition, the participants on both platforms appreciated the role of the detailed feedback (promoted by each platform) in encouraging the acceptance and integration of feedback. The interview data also revealed that both platforms facilitated the exchange of feedback since there was no need for physical presence while exchanging feedback on these platforms. The participants also reported that their assigned platforms saved them time in their interactions, due to the real time indication in Google Docs as well as the role of the Wiki in speeding up and facilitating interactions. Furthermore, some of the participants on both forums considered the visual connection between feedback mode and text (which is promoted by in-line commenting) and the synchronous automated update as promoting the provision of specific and frequent feedback on language, even though the Wiki participants only referred to how the lack of these features hindered comprehensive commenting on language. Some of the participants on the two platforms also reported their access to online tools like dictionaries and tutorials on grammatical rules for mediating feedback on language-related issues. In addition, some of the Wiki participants reported the use of the online tools for mediating content-based feedback.

Chapter 5 Discussion

5.1. Overview

There has been research in L2 contexts that either explored the focus of peer comments given on Google Docs (e.g., Alharbi, 2020; Bradley & Thouësny, 2017; Thouësny & Bradley, 2014; Yim, Zheng, & Warschauer, 2018; Zheng, Lawrence, Warschauer, & Lin, 2015) and Wiki (e.g., Bradley, 2014; Elola & Oskoz, 2010; Hsu, 2019; Kessler, 2009; Leo & Lee, 2012; Nami & Marandi, 2014; Oskoz & Elola, 2012; Song & Usaha, 2009; Woo, Chu, & Li, 2013), or that compared the feedback focus on both platforms (e.g., Canham, 2017) or compared the focus of synchronous peer feedback to asynchronous peer feedback (e.g., Chang, 2009; Ho, 2015; Lee, 2012; So & Lee, 2012). These findings revealed that most peer comments given on the Wiki platform focused on global issues, including content and organisation, while most of comments given on the Google Docs platform were on local issues around form. There have also been a number of studies that have investigated the impact of engaging in Google Docs-enhanced peer feedback activities (e.g., Ebadi & Rahimi, 2017; Hewett, 2006; Pham, Lin, Trinh, & Bui, 2020; Zheng, Lawrence, Warschauer, & Lin, 2014) and Wiki (Akbari & Erfani, 2018; Alshumaimeri, 2011; Chin, Gong, & Tay, 2015; Lee, Cheung, Wong, & Lee, 2013; Wang, 2014) and whether the provision and utilisation of feedback on these platforms could facilitate EFL learners' writing progress.

The above studies either looked at the writing process or product to demonstrate the language learning potential of a CALL activity. The current study aims to go a step further by looking at both the process (peer feedback and peer revisions) and the product (seen in this study in the tests), through the use of a mixed methods approach. In addition, previous research related to Google Docs and Wiki-enhanced peer feedback and its impact on writing performance either compared CALL vs. non-CALL, looked at one CALL activity at a time, looked at the feedback focus independently through the textual analysis of the contributions on these platforms without exploring their impact on writing performance, or looked at the writing performance, as well as the process of providing feedback in a few studies. To

add to the related literature, the current study adopts the CALL vs. CALL comparison design, because Pederson (1987) called for the abandonment of CALL versus non-CALL comparisons. Therefore, the current study is different from previous studies adopting CALL vs. non-CALL design, described by Handley (2017) as studies lacking "engineering power" due to their "falling into the trap of equating medium with method" (Handley, 2014, p. 47). Most of the previous research on CALL has examined either the process or product of writing, but has rarely addressed the two at the same time. In the current study, two experimental groups are compared with two different CALL platforms which is described by Chapelle (2001) as providing stronger evidence for the language learning potential of the task.

This thesis reports on an experimental study that is one of the first intervention studies that explores the differential impact of inline commenting (promoted by Google Docs) and non-inline commenting (promoted by Wiki) on writing performance among Saudi EFL students. It is also unique in comparing the impact of peer feedback enhanced by two platforms with different feedback modes (in-text feedback vs. end-of page feedback) in the same educational context. It is also one of the first studies to employ a split class design where participants are allocated to particular peer feedback experimental conditions. It is also one of the first studies which looked at how peer feedback could influence focus and how reactions to it on the two platforms could bring about similar or different impact on students' writing performance in the same educational context.

This chapter begins by discussing the main findings in relation to the CALL vs. CALL activity argument (namely the Google Docs group's writing performance results and the Wiki group's results, after engaging in the CALL activities). In other words, the comparative results of the writing performance (product) of the two groups are discussed and explained with the frequency of peer feedback (process-oriented-deign) and the interview data. The chapter then discusses the impact of the CALL activity on each group separately in more detail.

5.2. Google Docs vs. Wiki writing performance

The study first asked whether or not there would be a significant improvement in the students' performance in the post writing tests in terms of the accuracy and quality of their writing, and overall score (Table 5.1) to investigate the effects of engaging in Google Docs and Wiki-enhanced peer feedback and peer response activities. Comparing the Google Docs participants' writing performance with Wiki participants' after engaging in peer review and peer response activities in the same context adds to the previous literature since it has not been previously explored. Despite the improvement in both experimental groups, the differences between the mean scores of the two groups in the area of form at post-test and delayed post-test is higher in the Google Docs group than the Wiki group, suggesting that it is related to the treatment. However, the differences in mean scores between the two groups in the area of content is higher in the Wiki group than the Google Docs group. The two groups' comparative results suggest that there were significant differences in form (accuracy), content (quality), and in the total scores in the post-test (Table 5.1). These findings indicate that the Google Docs platform seems to be better in improving the form while the Wiki platform seems to be better in promoting the learners' performance in content.

Table 5.1: Summary of the Google Docs vs. Wiki post- and delayed-tests results

Dimensions	Post-test	Delayed post-test
Form	Sig diff in favour of Google Docs	Sig diff in favour of Google Docs
Content	Sig diff in favour of Wiki	Sig diff in favour of Wiki
Overall	Sig diff in favour of Wiki	Sig diff in favour of Wiki

This section discusses the comparative results related to this novel issue and interprets the findings obtained from the test scores with the assistance of the qualitative data. In other words, considering the full range of data collected in this study and drawing on the findings of previous studies, there are

a number of possible explanations for the significant differences in writing performance between the two experimental groups and such explanations are presented in the following sub-sections.

5.2.1. Difference in feedback frequency promotes difference in writing performance

Even though most of the existing research on feedback did not link the frequency of feedback to writing performance and has focused on dimensions other than frequency, it is generally assumed in the literature that more frequent feedback enhances individual learning and task performance (Lam, DeRue, Karam, & Hollenbeck, 2011; Salmoni, Schmidt & Walter, 1984; Theile, 2003). Based on this view, the difference in the frequency of feedback received by students could lead to differences in the student learning. Taking this view into consideration, the first possible explanation for the significant differences between the Google Docs and Wiki experimental groups in form and content, as well as overall writing score, might be due to the significant differences in the frequency of form-focused peer feedback exchanged on their assigned platforms. This is supported by the results of the frequency of language-focused feedback of the two experimental groups in the online interactional data (See section 4.2.2) which revealed significant differences between the two groups in the frequency of form-focused peer feedback (in favour of Google Docs group) and in the frequency of the content-based peer feedback (in favour of the Wiki group).

In order to ger a fuller picture of the reasons for the difference in the frequency of peer feedback in the two platforms, the interview data is looked at for understanding why the Google Docs group produced far more frequent language-focused feedback compared to their Wiki counterparts and whether the platforms' features have contributed to making such difference. Two possible explanations for the difference in the language-focused peer feedback frequency between the Google Docs and Wiki groups are presented in the next two sub-sections.

5.2.1.1. Inline commenting promotes language-focused feedback better than Wiki end-commenting

One possible explanation for the Google Docs group's more frequent focus on language compared to that of their Wiki counterparts is related to the difference in the location of displaying the language-focused feedback on the two platforms. More specifically, the Google Docs group's higher focus on language compared to that of the Wiki group can be attributed to Google Docs' in-line commenting. Google Docs allows for commenting on language-related issues directly in the text on the right-hand side of the screen while Wiki end-of-document commenting hinders direct commenting on the text but allows for adding the comments at the end (bottom) of the Wiki page.

It is not surprising that the Google Docs group performed significantly better than the Wiki group in accuracy because this direct commenting promotes a visual connection that is lacking in the Wiki and thus increases the chances for frequent feedback on language. This explanation is supported by participants' views shared in interviews. For example, Riyad stated that:

> I commented frequently on errors because in-line commenting in Google Docs allowed me to comment on the text directly with no need to move up and down the page to comment on language-related aspects. You can comment on any part of the document in an automatically-generated space on the right-hand side of the screen. (Riyad, Google Docs group, semi-structured interview)

Their Wiki counterparts expressed their avoidance of comprehensive commenting on language since they could not comment directly on the text but rather had to scroll up and down before adding comments in the space at the end of the Wiki page. For example, Mansoor stated:

> ...sometimes I ignored some language-related issues because it was difficult to comprehensively address all language-related errors due to visual disconnection between the commenting space and the Wiki page, especially with the increasing number of the threaded comments. We were forced to move up to see the text frequently before adding any comment on language-

related issues. So, we sometimes ignored some language-related errors. (Mansoor, semi-structured interview)

This explanation is supported by Canham's (2018) study which compared the feedback foci of EFL students who exchanged feedback on both Google Docs and Wiki, and found that each application supports the exchange of peer feedback and that the applications' feedback formats influence the reviewers' comment foci. The findings showed that right-hand in-line commenting led to increased focus on language, compared to the comments given on the Wiki platform.

5.2.1.2. Difference in the dependence on online tools for mediating content-based feedback

Another possible explanation for the significant difference in their writing performance in content between the two experimental groups' use and dependence on online sources to mediate the content-based feedback. Therefore, the significant differences in the frequency of feedback focus on the two platforms is possibly related to the difference in the participants' dependence on the online tools for assisting them to comment on content. The two experimental groups' significant differences in the writing performance in content is possibly related to the difference in the assistance obtained from the online environment.

The test results have shown that there were significant differences (in favour of the Wiki group) between experimental groups in content of writing performance. This significant difference seems to be related to the Wiki group's access to online sources assisting them to improve their writing in the content and organization of essays. Some of the Wiki participants clearly stated that they accessed online tutorials and read about how to improve the content and the organisation of academic essays. Salah, is one of the students who referred to that, stating, "while waiting for edits to be made on the Wiki page, I sometimes read about the topic we were writing about and read about the guidelines related to how to organise and compose a well-written academic essay..." (Salah, semi-structured interview). On the contrary, even though some of the Google Docs students reported that they

surfed the internet for further assistance in language-related issues, as explained in section 5.2.7, they never reported checking any external sources online related to how to improve the content and organization of their writing. Therefore, this difference in the participants' use of the internet might be the cause for this significant difference between the participants.

5.2.2. Difference in incorporation of feedback leads to difference in writing

Another possible explanation for the significant differences in the area of form and content between the two experimental groups might be the Google Docs group's more frequent incorporation of form-focused peer feedback and less frequent incorporation of content-based feedback compared to that of the Wiki group. Many researchers and instructors acknowledged that incorporating feedback and positive comments could assist students in improving their writing (Hamidun, Hashim, & Othman, 2012). Also, Glover and Brown (2006) indicated that peer feedback is effective if students act on it to improve their future work and learning. Therefore, it is expected that the difference in the frequency of incorporation of peer feedback may cause differences in writing performance. These views are confirmed in the current study. The Google Docs students who incorporated more language-focused feedback (See sub-section 4.4.3.1) had better writing in in the area of form at both post-test and delayed post-test (See section 4.1.5.2) than their Wiki counterparts. The Wiki learners who incorporated more content-based feedback (See sub-section 4.4.3.2) had better writing performance in the area of content at both post-test and delayed post-test (See sub-section 4.3.3.3) compared to their Google Docs counterparts. Therefore, the frequent feedback incorporation seems to have a positive impact on writing and thus it could be argued that greater incorporation of feedback on a particular language aspect could lead to better writing performance in that aspect. With the implementation of language-related feedback, students were able to have improved performance in local features of writing, as demonstrated in the comparison between the post-test and delayed post-test scores in the two groups.

In order to understand the reasons causing the differences in the frequency of peer feedback incorporation between the two experimental groups, the interview data were checked and two possible explanations for these significant differences between the two experimental groups are presented in the following sub-sections.

5.2.2.1.   Inline commenting promotes more specific feedback compared to Wiki commenting

One possible explanation for the significant difference between the two experimental groups in the incorporation of feedback (which is one of the possible explanations for the significant difference in writing accuracy and quality) is related to in-line commenting much more support for specific feedback in Google Docs compared to Wiki discussion forum. Google Docs in-line commenting feature seems to promote all three components of specificity suggested by Nelson and Schunn (2009)—problem identification, providing solutions, and indicating the location of the problem and/or solution—and thus the chances for language-focused feedback incorporation in Google Docs is higher than in Wiki. Nelson and Schunn (2009) also argued that "if the feedback includes the location of the problem and/or solution, the writer may be more likely to implement the feedback" (p. 379). The specificity of feedback promoted by in-line commenting allows for locating language-related errors, thus encouraging their correction and leading to better writing performance. Some of the Google Docs participants applauded the role of in-line commenting in enabling them to provide this specific feedback and locate the language-related errors. For example, Eyad stated, "the in-line commenting assisted me to frequently address language-related feedback and to incorporate it due to its encouragement for locating the errors" (Eyad, semi-structured interview). However, their Wiki counterparts expressed resentment of that platform's lack of specificity. Hamad, for instance, was not happy that Wiki did not support locating specific comments on the page, stating, "…I was not happy with language-focused comments received on the Wiki discussion forum and I sometimes ignored some of them. They were

not specific enough to be implemented since they were not given directly on the text" (Hamad, semi-structured interview).

5.2.2.2. Wiki group's more frequent access to online sources related to content compared to Google Docs

Another possible explanation for the significant differences between the two experimental groups in the frequency of content-based feedback incorporation is related to the participants' differences in seeking further assistance in content online. The test results have shown that there were significant differences (in favour of the Wiki group) between the Wiki and Google Docs experimental groups in the writing performance in the area of content. This significant difference seems to be related to the Wiki group's access to online sources assisting them to improve their writing in the content and organisation of the essays. Some of the Wiki participants clearly stated that they accessed online tutorials and read more about how to improve the content and the organisation of academic essays. Salah, is one of the students who referred to that, stating, "while waiting time for edits to be made on the Wiki page, I sometimes read about the topic we were writing about and read about the guidelines related to how to organise and compose a well-written academic essay" (Salah, semi-structured interview). Another participant, working on the same platform, also reported watching some YouTube videos on how academic essays could be organised and written, "when I came back home, I watched some tutorial YouTube videos about how academic essays are written and organised" (Mansoor, semi-structured interview). On the contrary, even though some of the Google Docs students reported that they surfed the internet for further assistance in language-related issues as explained in section 5.2.7, they never reported checking any external sources online related to how to improve the content and organisation of their writing. Therefore, this difference in the participants' dependence on the online environment to improve the content and organisation of their writing might be the cause of this significant difference between the participants engaging in the two platforms.

5.2.3. Different perceptions of interactivity of conversation and presence

Another possible explanation for the better writing performance of the Google Docs group in form is related to the participants' different perceptions of interactivity of conversation and presence (time and synchronicity of peer feedback). Some of Google Docs participants considered their platform's support for simultaneous commenting and editing (promoted by the automatic update feature) as encouragement for them to comment frequently and comprehensively on language-related aspects. For example, one student working on Google Docs stated, "the platform assisted me to comment on language comprehensively because of the synchronous delivery of feedback and automated updating of comments function in the platform which motivated me to comment on any language-related errors encountered" (Eyad, semi-structured interview). On the other hand, some of their Wiki counterparts described their platform as a forum that lacks simultaneous communication because of the absence of this automatic update feature, causing a delay in receiving comments and edits which in turn caused discouragement in addressing language-related errors comprehensively. Mansoor, who worked on Wiki, talked about the delay, stating:

> Wiki does not support simultaneous commenting and editing due to the fact that it only allows one person at a time to edit the page and blocks someone from seeing comments made on the platform before saving the edits and refreshing the page. All these barriers made me sometimes comment selectively on language-related issues (Mansoor, semi-structured interview).

Another participant expressed his resentment at the delay in noticing edits by reporting, "…my partner cannot see the edits unless he refreshes the page, and this demotivates us from commenting comprehensively on errors" (Muneer, semi-structured interview). Another participant also expressed resentment at forgetting to save the page and thus delaying the process of commenting on recently added changes:

> Commenting on Wiki is complicated because when my partner edited the page, he sometimes forgot to save the page after commenting, and this prevented me from seeing the updates and

delayed my access to the page and commenting on the updates. So, we both preferred not to extensively comment on errors and edit the page (Salah, semi-structured interview).

Therefore, the significant differences in writing performance in the area of form might be a result of different perceptions of interactivity of conversation and presence, as well as the difference in the speed of feedback delivery and reception of peer feedback in the two platforms. This explanation is supported by the results reported by Ho (2015) and Chang (2009), who compared synchronous and asynchronous written e-feedback exchanged by Taiwanese EFL university level students, and found that synchronous feedback (via text chat on MSN messenger or via *OnlineMeeting* chat) facilitated local comments on mechanics and structure and lower global comments compared to asynchronous written feedback (via MS Word and face-to-face). Therefore, it can be concluded that the Google Docs platform's "simultaneous editing and automated updating feature" (Kessler, Bikowski, & Boggs, 2012, p. 94) is the feature facilitating more frequent commenting on language.

5.2.4. Summary

To conclude, the significant differences between the Google Docs participants and their Wiki counterparts in writing performance have a number of explanations. The first possible explanation is related to the differences in feedback frequency (See section 4.4.2) which could be attributed to the difference in the two platforms' support for the provision of specific and in-line commenting. Another explanation has to do with the difference in the incorporation rate of peer feedback between the two groups (See section 4.4.3). The last possible explanation is related to the difference in the participants' perceptions of the conversation and presence of peer feedback received on their assigned platforms.

5.3. Google Docs group's writing performance

The Google Docs post-test and delayed post-test results revealed a statistically significant improvement in the overall writing score and in the area of form after learners engaged in peer feedback activities. These results suggest that the Google Docs-enhanced feedback is effective for developing

the learners' overall writing and writing performance in the area of form (See Table 5.2). They are expected since the in-line commenting function on the Google Docs platform seems to encourage greater emphasis on form, which in turn would lead to better writing performance in this dimension. The results of peer feedback foci revealing frequent focus on language while commenting on the Google Docs platform (as revealed in section 4.4.2) as well as post- and delayed post-test results support this expectancy.

Table 5.2: Summary of the Google Docs post- and delayed-tests results

Dimensions	Post-test	Delayed post-test
Form	Sig	Sig
Content	Not sig	Not sig
Overall	Sig	Sig

These results (with the exception of content) support results reported in previous studies in EFL contexts in countries such as Iran (e.g., Ebadi & Rahimi, 2017) and Vietnam (e.g., Pham, Lin, Trinh, & Bui, 2020). Pham, Lin, Trinh, and Bui (2020) explored the effects of Google Docs-enhanced peer feedback on Vietnamese EFL university students' academic writing competence. Ebadi and Rahimi (2017) explored the impact of Google Docs-enhanced feedback on Iranian EFL university students' writing performance. Both studies found a significant improvement in the quality of overall writing as well as in the global (content) and local (form) writing aspects. The Google Docs group's test results are also broadly consistent with previous studies (Alnasser & Alyousef, 2015; Diab, 2010; Diab, 2011; Grami, 2010; Ruegg, 2014; Yang, Badger, & Yu, 2006) that have explored the impact of peer feedback on writing under conventional pencil-and-paper conditions. The present results also confirmed the consensus from previous research that Google Docs-enhanced peer feedback can assist

students to become better writers in a foreign language by improving their writing in the dimension of form.

However, the findings of administered tests related to improvement in the writing performance of the students working on Google Docs did not correspond with those reported by Zheng, Lawrence, Warschauer, and Lin (2015), who found that feedback received by Colorado middle school fifth-grade students on the Google Docs platform did not have any significant effect on writing and writing achievement changes. The results also disagreed with those reported from Hewett (2006), who explored the online interactions of undergraduate students enrolled in first English year classes at Pennsylvania State University and found that the online peer feedback on synchronous whiteboards (which have collaborative synchronous functions similar to those in Google Docs) helps students have intense awareness of global features (e.g., organisation, task achievement and idea development).

This discrepancy between the current study's findings and those reported by Hewett (2006) might be due to the latter's participants' intention to focus on global features before taking part in the study. It might also be a result of the difference in contexts with the students studying English in a native speaking country in Hewett's (2006) study. These students would have been influenced by various factors other than the platform including the everyday interactions in English, compared to the participants in the current study who were EFL students in a Saudi EFL context. However, the discrepancy between the performances revealed in the overall writing results of the Google Docs group in the current study and those reported in Zheng, Lawrence, Warschauer, and Lin's (2014) work might be due to differences in the level of participants. Their fifth-grade students might lack some technical skills evidenced by the more advanced adult learners in the current study, as well as those in other studies by Pham, Lin, Trinh, and Bui (2020) and Ebadi and Rahimi (2017) which had similar results to those reported in the current study. The discrepancy might also be due to the difference in contexts. It seems, based on these results, that the feedback given on Google Docs, or any synchronous

systems with similar functionalities, would help adult EFL students improve their overall writing performance and performance in form specifically. This is especially true if they engage in peer feedback on synchronous platforms without having prior objectives or specific instructions to follow, which might affect decisions related to their feedback focus and reactions. The empirical results of the current study not only reaffirm the benefits of peer feedback in general, and Google Docs-enhanced peer feedback in particular, on EFL students' writing, but also offer explanations for such significant improvements in the area of form and overall writing performance. These explanations are presented in the following sections.

5.3.1. Frequent use of peer feedback in Google Docs improves writing (accuracy and overall)

One possible explanation for the Google Docs group's significant improvement in overall writing performance and in the area of form is related to the frequent accurate incorporation of language-focused feedback received on the platform. This explanation is supported by the peer revision results (see section 4.4.3), which revealed that the students received frequent language focused feedback and were more likely to use that feedback in the Google Docs condition. The evidence showing frequent use of language-focused feedback is not surprising, given that even in face-to-face peer review studies it has been found that L2 learners focus on editing grammar more than content (e.g., Deni & Zainal, 2011; Paulus, 1990; Villamil & De Guerrero, 1998).

The current study's findings related to the frequent use of language-focused feedback are consistent with the peer revisions made by Korean university EFL students who participated in essay writing and peer review sessions on an unidentified synchronous platform (e.g., Cha & Park, 2010). Likewise, the Google Docs group's frequent use of language-focused feedback is consistent with that reported in Liang (2010) that explored the extent to which 12 EFL undergraduate students at a Taiwanese university incorporated synchronous online peer feedback exchanged through MSN Messenger and found that most of the synchronous peer interactions including language-related ones were

incorporated. Therefore, it seems that these findings could be either a result of the positive role of online platforms with synchronous features, regardless of the writing task, or it could be a result of the participants' inclination to focus on form, as evidenced in face-to-face conditions.

However, the Google Docs group's peer feedback incorporation results did not align with those of Hewett's (2006) study which explored various peer feedback issues, including L2 students' integration of comments exchanged on online synchronous whiteboards while working in small groups to complete a research project. It was found that most comments incorporated (revisions made) were related to content and idea development and that the participants attributed these changes to their prior objective to focus on these areas. Likewise, Google Docs group's peer feedback incorporation results of the present study are also in contrast with those reported in Kessler, Bikowski, and Boggs's (2012) study, which explored the Google Docs text-based changes made by L2 learners from an American university while writing research project, and found that the main revisions across groups addressed peers' contributions for meaning rather than form. Therefore, this discrepancy in the findings might be attributed to the difference in the participants' prior intentions, as students engaging in peer feedback activities in the current study, and in the study by Cha and Park (2010) did not have prior intentions to focus on a particular writing aspect nor did they receive to focus on specific areas. The discrepancy could also be due to the genre of writing of the peer response activity, which is described by Edwards and Liu (2018) as one of many factors affecting the types of comments students make and reactions to it. Therefore, it seems that the frequent use of language-focused feedback is a factor leading to significant improvement in form, as long as the participants did not have specific goals otherwise.

The interview data assisted in giving a fuller picture of the reasons behind the frequent use of language-focused feedback and in understanding whether that has anything to do with the Google

155

Docs platform and its functions. It is argued that the highlighting feature could make linguistic features "salient in CALL activities" (Chappelle, 2001, p. 174) and thus it could increase the chances for the incorporation of feedback connected to language-related aspects. Therefore, the positive role of this feature, in presenting linguistic features in a clear way on the screen (Chappelle, 2001), might be one of the main reasons for frequent incorporation of language-focused feedback. This interpretation of the reason for the frequent use of language-focused feedback is supported by the interview results (See section 4.5), in which some of the Google Docs participants attributed their frequent acceptance and incorporation of form-focused comments to the highlighting function on the Google Docs platform. More specifically, the "Highlighting clarifies feedback" theme (See section 4.5.7) explained how highlighting the text facilitated the incorporation of language-related comments. Fahad, for example, is a participant from the Google Docs group who gave a clear example of how the highlighting function was used and how it encouraged and facilitated the incorporation of the language-related feedback by stating, "…there was no difficulty in accepting and integrating comments because my partner was highlighting the word for me and telling me in the margin to 'check the spelling' in a clear way" (Fahad, semi-structured interview).

Another possible factor that may have contributed to encouraging the incorporation of the language-focused feedback is the *detailedness of the feedback* promoted by the Google Docs platform. This is supported by the interview data where some participants attributed their frequent incorporation of language-focused feedback to the detailed feedback that they received. Basil, for example, spoke positively about this issue and described the level of detailed feedback promoted by the Google Docs platform, stating "I had no chance to reject or ignore the form-focused feedback that I received on Google Docs because my partner always explains the rule …" (Basil, semi-structured interview). This finding, attributing the frequent incorporation of language-focused feedback to the detailedness of feedback on Google Docs, is different from the reasons reported by the participants in Hewett's (2006)

study. Therefore, the discrepancy in the current study results and those reported by Hewett (2006), with respect to the reasons prompting the frequent incorporation of feedback, might be due to reasons other than the platform's features and affordances. The cause could be the difference in the difficulty of task type (engaging in writing a research project is more complicated than essay writing) or the difference in the participants' prior intentions.

The participants' frequent incorporation of language-related feedback might also be related to the *spelling and grammar checker* which seems to promote feedback focused on language-related aspects and their incorporation. It is argued that "the use of the grammar checker … should be expected to focus learners' attention on grammatical form and prompt them to modify their linguistic output" (Chappelle, 2001, p. 62). In addition, this explanation is based on an argument by several researchers (i.e., Bloch & Brutt-Griffler, 2001; Cote, 2014; Lin & Yang, 2011; Liu & Sadler, 2003; Shih, 2011) who have argued that "online spell-checker and grammar tools in programs such as Microsoft Word and CommonSpace, as well as other online platforms, may encourage a greater focus on grammar during revision" (Edwards & Liu, 2002, p. 60). The participants' views support this explanation as some said they frequently incorporated language-related feedback because the spelling and grammar checkers promoted their integration by providing them options for correct forms and structure. One participant highlighted the positive role of the spelling and grammar checker, "the Google Docs platform's spelling and grammar checker assisted me to focus on language and to resolve the language-focused feedback through alternative options that it offers for spelling and grammar" (Noor, semi-structured interview).

This explanation is supported by Liou (1993), who described the use of a grammar checking program in a first-year writing and grammar course for EFL majors at a university in Taiwan. The writing class followed a process-oriented approach in which learners engaging in writing, participated in peer editing, received comments, and revised their work. The students were given a topic for their

writing assignment to be completed at home, individually. Then, the first draft was used by students for discussion during a peer editing session in class. The findings showed that the students were able to use input from their peers when they went to the computer lab to complete their first draft to submit. The teachers also made further general comments on content and organisation and identified grammatical problems without specifying necessary corrections. The findings revealed that the grammar and spelling checker offered the participants another opportunity to revise their writing. Therefore, the spelling and grammar checker seems to be another factor playing a role in focusing the writer's attention on language-related aspects and in the frequent incorporation of feedback handled on a computer.

Putting all the explanations presented above aside, an alternative explanation for the frequent incorporation of language-focused comments on the Google Docs platform could be simply the participants' engagement in online interactions. It is argued that interactions and engaging in peer response activities cooperatively seems to impact "the extent to which comments and suggestions are incorporated into revisions" (Liu & Edwards, 2018, p. 45). Therefore, it appears that once participants work cooperatively, there is more negotiated interaction and incorporations of peer suggestions into revision (Nelson & Murphy, 1993), and once these interactions occur synchronously on Google Docs the incorporation rate of language-focused feedback is higher.

5.3.2. Frequent commenting on language improves writing performance in form

Another possible explanation for the significant improvement in the area of form at the post-test and delayed post-test is related to the participants' over emphasis on language while providing feedback in the Google Docs condition. Analyses of student interactions, for instance, demonstrate that students working on the Google Docs platform frequently served as proof-readers for each other, discussing more micro level issues, such as grammar and mechanics, rather than meaning and content. The par-

ticipants' focus on this aspect was expected, as the Google Docs platform's functions facilitate addressing language-related feedback. The peer feedback frequency results (See section 4.2), which showed a higher frequency of form-focused feedback compared to that of content-based feedback, support this explanation. There seems to be a relationship between the writing results showing significant improvement in writing at post-test and delayed post-test in the area of form and peer feedback frequency. Therefore, it seems that the comprehensive comments on language-related issues exchanged on Google Docs have a role in improving the learners' writing performance in this dimension.

These peer feedback results, on which this explanation is based, are consistent with peer feedback findings reported in previous studies (e.g., Alharbi, 2020; Bradley & Thouesny, 2017; Canham, 2017; Woodard & Babcock, 2014) that explored this in various EFL contexts. The results are also similar to those reported by Ho (2015), who investigated the use of computer-mediated peer review in EFL writing courses by Taiwanese university students who engaged in synchronous feedback with the help of *OnlineMeeting* software. This featured a split screen protocol, which enabled students to view Microsoft Word annotation features and an *OnlineMeeting* chat at the same time, found more local comments on alterations and lower global comments, compared to face-to-face. The findings of the current study are expected, since it has been found that learners frequently comment on form rather than content, even in face-to-face peer review studies (e.g., Grami, 2010). Results are also supported by previous research on face-to-face and pen and paper methods by Grami (2010), who examined Saudi English as a Foreign Language (EFL) students who engaged in peer review and collaborative revision activities.

5.3.3. Influence of feedback mode on focus of students' feedback

Although it is argued that L2 writers "are able to pick out content and rhetorical problems as well as grammar and style issues and that research" indicates that students can "focus on a wide range of

issues when commenting on their peers' papers" (Edwards & Liu, 2018, p. 58), the focus of feedback is influenced by various factors, including the key factor of feedback mode. Therefore, a feedback mode such as Google Docs, which allows for in-line comments and is supported by a grammar and spelling checker, may encourage participants to focus on language-focused feedback. This might support the argument related to the influence of feedback mode on type of comments students make. In what follows, two explanations for the frequent focus on language on Google Docs are presented. Both explanations are related to the feedback mode.

Concluding that the frequent use of the feedback is the cause of the significant improvement in accuracy would not be appropriate if the reasons leading to participants' focus on language are not checked. Therefore, to understand the results of the peer feedback the interview data analysed in the previous chapter were checked to see whether the Google Docs environment plays a role in encouraging this focus. As evidenced by the interview results in section 4.2, the Google Docs students' focus on language was a result of two features; namely, in-line commenting as well as the spelling and grammar checker. Some of the participants reported that the Google Docs *in-line commenting* function enabled them to focus their feedback on language-related aspects. Yunis, for example, attributed the majority of feedback being on language to the positive role of this feature. He stated:

> I provided feedback on simple grammatical issues, spelling, punctuation, prepositions …because… commenting space was big enough to address all these issues and… I can easily highlight language-related errors and add comments on them…on the right side of the document (Yunis, semi-structured interview).

Another participant attributed his major commenting on language to exactly the same commenting feature by stating:

> Generally, I gave most feedback on form/language because it is easy on the software to give feedback on the form…it appears that Google Docs was designed to give feedback only on form. There is an automatically generated space, a large space that assists you to

add comments on any part of the text with language-related errors (Basil, semi-structured interview).

These interview findings related to the potential positive role of in-line commenting in focusing feedback on form are consistent with a previous study by Canham (2017) which reported similar positive role of the Google Docs platform's in-line commenting in encouraging participants to focus their feedback on form.

5.3.4. Highlighting and spelling and grammar checker promote focus on form

Another factor which might explain the participants' frequent focus on language is the Google Docs *spelling and grammar checker* function. This explanation is based on an argument by several researchers (Bloch & Brutt-Griffler, 2001; Cote, 2014; Lin & Yang, 2011; Liu & Sadler, 2003; Shih, 2011) who have argued that "online spell-check and grammar tools in programs such as Microsoft Word and CommonSpace may encourage a greater focus on grammar during revision" (Liu & Edwards, 2018, p. 60). In other words, the learners' use of a grammar and spelling checker "should be expected to focus learners' attention to grammatical form and prompt them to modify their linguistic output" (Chapelle, 2001, p. 62). This explanation is supported by some of the Google Docs participants who considered this function as assisting them in commenting on language-related issues through its provision of auto-alerts to grammatical and spelling errors. Aziz clearly linked his frequent commenting on spelling and grammar to the role of this function by stating, "I provided feedback on spelling mistakes and grammar because the program assists in focusing and paying attention to the errors in sentences through auto-alerting us to errors" (Aziz, semi-structured interview). Fahad is another participant who described how it assisted him with red marks indicating errors in the text, "I mostly gave comments on spelling and grammar since the Google Docs…alerts me if there were mistakes in spelling or grammar…through underlining that part in red colour …" (Fahad, semi-structured interview). Therefore, it could be argued that the significant improvement in accuracy (form) at

the post-test and delayed post-test results could be a result of the auto-alerts to errors in spelling and grammar. Therefore, the spelling and grammar checker function might have played a role in the significant improvement in accuracy since it assisted some of the participants to focus on language extensively while engaging in peer review activities. These findings are consistent with findings reported by Liou's (1993) study which revealed that when the students revised their writing on a computer, they used the grammar checker for another opportunity to revise their writing.

An alternative explanation for the participants' focus on language while commenting could be the teaching and learning style in each context. A number of previous studies in L2 contexts have also shown that when students are asked to evaluate a paper, they tend to focus on writing as a product, rather than as a process, and try to edit the text (Liu & Edwards, 2018). This indicates that L2 students are often preoccupied with surface level concerns and pay more attention to errors at the sentence and word level, failing to address macro textual problems such as issues of content and organisation.

5.3.5. Access to online language resources influences writing performance

The significant improvement in the writing accuracy and overall writing might be a result of the positive impact of the Google Docs online environment. According to Adas and Bakir (2013), the online environment has a role in improving students' writing abilities in general. Some of the participants in the present study reported that they managed to check the spelling of words online through dictionaries and revised grammatical rules using grammatical books. For example, Fahad stated:

> I checked the spelling of some words in online dictionaries and revised some grammatical rules in some grammar books available online. I did this whenever I wanted to comment on any language-related issues including mechanics, spelling, and grammar to increase my knowledge on these issues and to ensure that my comments are accurate and targeting the weaknesses and errors. (Fahad, semi-structured interview).

Others stated that they managed to access tutorials about the use of mechanics and word choice. For example, Eyad stated, "I accessed online tutorials about the use of mechanics and word choice before commenting on some language-related aspects to reassure myself that I only comment on errors and weaknesses and to increase my knowledge about grammatical rules and mechanics …" (Eyad, semi-structured interview). Therefore, it seems the Google Docs platform's connection to the internet gave participants a chance to ensure that the feedback given addressed real problems in language and to seek knowledge beyond the peer assistance, encouraging and allowing them to check for other resources for improving their writing. The requirement for an internet connection to work on the Google Docs platform added value to improving the learning and thus the significant improvement might have been a result of not only peer assistance but also students' efforts in searching the internet for additional information.

5.3.6. Synchronicity influences writing accuracy

Another possible explanation for the Google Docs group's significant improvement in accuracy is related to synchronous communication. This explanation is supported by the participants' views in the interview data. For example, Noor stated that:

> The synchronous interactions in Google Docs motivated me to address the language-related issues frequently since you do not need to wait a long time to receive comments because of the platform's automated updating function for the changes made and comments given. (Noor, semi-structured interview)

The explanation is also supported by the views of other two Google Docs participants in the interview data. They stated:

> The platform assisted me to comment on language comprehensively because of the synchronous delivery of feedback and automated updating of comments function in the platform which motivated me to comment on almost all language-related errors encountered. (Eyad, semi-structured interview)

163

> I almost commented on all language-related errors because of the synchronous communication and automated update promoted by Google Docs which made communication and negotiations about language-related issues easier and faster. (Basil, semi-structured interview)

This explanation is supported by previous empirical research which has demonstrated that synchronous computer-mediated communication and synchronous feedback exchange may encourage learners to focus on form (Alharbi, 2020; Ho, 2015; Lee, 2002; Thouësny & Bradley, 2014; Yim, Zheng, & Warschauer, 2018; Zheng, Lawrence, & Lin, 2015). Ebadi and Rahimi's (2017) finding that e-feedback promoted learners' writing skills and Chong's (2019) that synchronous feedback can be beneficial to students' writing also support this.

5.3.7. Summary

In conclusion, it seems that the Google Docs participants' significant improvement in writing performance in form could be due to the participants' frequent focus on commenting on language and acceptance and incorporation of form-focused feedback. In addition, the Google Docs friendly features of the spelling and grammar checker and highlighting seemed to have played a role in encouraging participants to implement and focus on language while commenting on the platform. Further to this, the participants' use of the Google Docs online environments to access online language resources and seeking assistance from the internet beyond their partners' interaction seems to have influenced the participants' writing performance in accuracy and overall writing performance. Moreover, the positive effect of synchronous communication was viewed as another reason playing a positive role in improving the participants' writing accuracy.

5.4. Wiki group's writing performance

The post-test and delayed post-test results (See Table 5.3) revealed that the Wiki participants' overall writing performance and performance in form and content improved significantly after engaging in Wiki-enhanced peer review and peer response activities. The significant improvement in the area of

content was predictable, since the Wiki platform seems to encourage participants to address content-related issues through the discussion forum at the end of the Wiki page. However, the significant improvement in the area of form was not expected, since it was anticipated that the indirect commenting and editing features might not encourage addressing language-related issues. The significant improvement in EFL students' writing quality and accuracy indicate that Wiki-enhanced peer feedback has positive impact on writing performance, which leads to an increase in the overall quality of writing.

Table 5.3: Summary of the Wiki post- and delayed-tests results

Dimensions	Post-test	Delayed post-test
Form	Sig	Sig
Content	Sig	Sig
Overall	Sig	Sig

These results are consistent with those reported in Alshumaimeri's (2011) study, conducted in the same EFL Saudi context and following similar assessment measures of pre- and post-tests on essay topics related to descriptive writing with adult male participants working in two large groups. The results also support those reported in other studies on high school and university-level students of both genders in countries including Malaysia and Iran (e.g., Akbari & Erfani, 2018; Gharehbagh, Stapa & Darus, 2019) where the participants individually wrote essays and then uploaded them on Wikis and exchanged peer feedback collaboratively in small groups. Therefore, the present study's finding related to the effectiveness of Wiki-enhanced peer feedback on students writing was confirmed.

The current results also align with those reported in other studies conducted with seventh grade students and university-level students in contexts other than English, such as L2 Spanish and

L1 Chinese in Singapore (e.g., Chin, Gong, & Tay, 2015; Lee, 2010). The current study adds to the previous research an exploration of the frequency of peer feedback for checking whether there is a relationship between this frequency and writing performance. It also looks at the participants' views for explanation of the observed improvement in the quality and accuracy of writing on the test.

5.4.1. Significant improvement in form

Considering the full range of data collected in this study and drawing on the findings of previous studies, there are a number of possible explanations for the significant improvement in the writing performance in the area of form. These explanations are presented in the following sub-sections.

5.4.1.1. Frequent focus on language while commenting on Wiki promotes accuracy

One possible explanation for the significant improvement in accuracy (form) at the post-test and delayed post-test might be the frequent language-focused feedback received on the platform (See section 4.4.2). This explanation is supported by the findings of previous research conducted in different contexts in countries, such as Iran and China on EFL students which reported similar results. Examples include Hsu's (2019) work as well as research on EFL female Iranian students by Nami and Marandi (2014). The results also agreed with those reported in another study on L2 learners of Spanish by Lee (2010). However, it should be noted that, compared to the current study where the teacher did not intervene to influence the students' decisions related to their feedback focus, the teacher in Lee's (2010) study intervened to bring students' attention to language problems, though such assistance was kept to a minimum. Therefore, the similar findings on the role of the frequency of peer feedback in Lee's (2010) study and the current study might not be due to the same causes, since the teacher's assistance might have played a role in the students' decision to focus on language in Lee's (2010) study.

The feedback frequency results in the current study are, however, in disagreement with some other research conducted on Wiki with adult EFL students at the university level (e.g., Bradley, 2014; Elola & Oskoz, 2010; Kessler, 2009; Oskoz & Elola, 2012; Song & Usaha, 2009). There is also disagreement with studies on EFL Chinese primary school students (e.g., Woo, Chu & Li, 2013). All of these studies found evidence of students' tendency towards focusing on meaning more than form. The discrepancy between the results reported in studies by Bradley (2014) and Song and Usaha (2009) and those of the current study might be due to the difference in the Wiki activities that the participants engaged in. More specifically, in Bradley (2014) and Song and Usaha's (2009) studies, the learners did not co-construct the writing on Wiki, but rather composed the writing assignments individually and then posted them online for feedback from peers.

Regarding the difference in results of Elola & Oskoz's (2010) study and those of the current study, it seems that the teacher's intervention impacts results. The difference in results compared to Woo, Chu and Li's (2013) study might be the difference in the students' grade level, as the primary school students who engaged might not be able to comment on language due to their low proficiency levels.

5.4.1.2. Access to online tools mediate feedback

Another possible explanation for the significant improvement in accuracy might be the Wiki's connection with the Internet and the participants' access to other online tools to mediate their feedback. Some of the participants reported in the interview that they surfed the internet while working on the Wiki platform to look for further assistance beyond that received from peer interactions. Salah, for instance, expressed:

> I sometimes checked some tutorials to learn more about grammar rules and checked spelling of some words in an online dictionary before the provision of feedback on spelling or before incorporation of feedback related to spelling errors. (Salah, semi-structured interview).

Therefore, it is possible that the connection with the Internet exerted influence on learners' writing accuracy and encouraged them to visit online resources to look for additional information about grammatical rules. This explanation is supported by findings reported in Woo, Chu, Ho and Li's (2011) study, which found students perceived there to be various educational affordances with the opportunity to use an online dictionary.

5.4.1.3. Wiki user-friendly features promote language-focused feedback

Another possible explanation for the significant improvement in writing accuracy might be related to the Wiki platform's support for commenting on language-related issues through its user-friendly comment space. More specifically, the use of discussion space in the Wiki forum seems to have a role in encouraging the participants to focus on language (form) and to contribute to the participants' writing accuracy. In the interview data, some of the participants considered the functions of the spelling and grammar checker as well as the Wiki commenting space as assisting them to focus on form. More specifically, they considered the size of the Wiki commenting space as encouraging them to focus on language. Muneer, for example, described how the large space assisted him by stating, "What I provided feedback on the most is language… because the Wiki program offers an enough space for copying and pasting the linguistic error in the comment section and… you can easily start commenting on it…" (Muneer, semi-structured interview).

5.4.1.4. Grammar and spelling checker promote language-focused feedback

Another factor explaining the participants' frequent focus on language is the role of PBworks' functions in providing writers with spell checkers to reduce their cognitive loads (MacArthur 2009) and thus to frequently address language-related errors. Similar to their Google Docs counterparts, some of the participants also viewed the spelling and grammar checker as facilitating peer commenting on language. It is argued that the learners' use of grammar and spelling resources "should be expected to focus learners' attention to grammatical form and promote them to modify their linguistic output"

(Chappelle, 2001, p. 62). It is also argued that the online spell-checker in online platforms may encourage greater focus on language and grammar (Bloch & Brutt-Griffler, 2001; Cote, 2014; Lin & Yang, 2011; Liu & Sadler, 2003; Shih, 2011). Therefore, the participants' frequent focus on language was expected. This explanation is supported by the findings of Liou's (1993) study, which were also used to support the interview findings that showed the possible role of the Google Docs spelling and grammar checker. Therefore, the improvement in accuracy might not be only be attributed to the participants' access to online tools, as they reported in section 5.4.1 above, but also to the Wiki platform's spelling and grammar checker function.

5.4.1.5. Frequent incorporation of feedback promotes writing accuracy

Another probable explanation for the participants' significant improvement in writing after the Wiki-enhanced peer feedback and peer response intervention is related to the frequency of this feedback. With the frequent incorporation of language-focused feedback on the Wiki platform (as revealed in section 4.4.3), students had better performance in form, as demonstrated in the post-test and delayed post-test results (See section 4.3.3.2). The interview data gave a fuller picture of this issue by introducing the reasons for learners' incorporation of most form-focused and content-based feedback. Some of the participants attributed this to the Wiki highlighting function. Salah linked his acceptance of language-related feedback to the highlighting function and gave an example, "I always accepted form-focused feedback … because [my partner] explained the line number and said 'in this number 3 line this was should be replaced by so and so'…" (Salah, semi-structured interview). Some of the participants also attributed their frequent incorporation of language-related feedback to the detailedness of Wiki-enhanced feedback on grammatical rules. One of the participants stated, "the detailed and clear descriptions of errors… facilitated fixing the errors and knowing the location of the

error…" (Bari, semi-structured interview). By looking at both the peer response results and the interview data, it seems that not only the frequency but also the facilitative features of the platform that are responsible for the significant improvement in writing.

5.4.2. Explanations for the results of writing performance in content

The significant improvement in content might be a result of the positive impact of the Wiki online learning environment, which provides access to a wide range of online sources of information. Therefore, browsing the internet while working on the Wiki may lead to significant improvement in writing content. This is supported by the interview data where some of the participants reported that asynchronous communication in Wiki motivated them to read more about similar topics on the internet while waiting for their peers to edit and provide comments. They considered this another channel leading to the significant improvement in their writing quality. Saleh stated that, "…while waiting for peer comments to be made on asynchronous Wiki platform, I searched for topics related to the festivals and looked for the structure of the academic essay and how it could be organised." Another participant stated that *"when I came back home, I watched some YouTube videos and tutorials about how the essays are organised..."* (Mansoor, semi-structured interview). Therefore, the low number of content-based comments could be a result of students' decision to look for additional assistance about content and organisation from other online sources. Another alternative explanation for the significant improvement in content might be related to the implementation of most content-based feedback received on the platform (See section 4.4.3), regardless of infrequent feedback. Therefore, the frequent incorporation of content-based peer feedback (as revealed in section 4.4.3) might explain the possible influence of implementation rate of high-quality Wiki-enhanced content-based feedback on writing performance.

5.4.3. Summary

In conclusion, it seems that the Wiki participants' significant improvement in writing performance in form could be due to the participants' frequent focus on commenting on language and acceptance and incorporation of form-focused feedback. In addition, the Wiki friendly features of the spelling and grammar checker seemed to have played a role in encouraging participants to implement and focus on language while commenting on the platform. In addition, the Wiki online environment seems to encourage the participants to search the internet while waiting for edits to be made on the platform. Therefore, the participants seemed to seek assistance from the internet beyond their partners' interaction.

5.5. Conclusion

This chapter explained the significant differences between the Google Docs and Wiki experimental groups' writing performance drawing on interview data, feedback data, and previous research. One possible reason for the significant differences between the Google Docs participants and their Wiki counterparts in writing performance in form was the difference in the feedback frequency, which was believed to be triggered by both inline commenting (which is available in Google Docs but not in Wiki) and the difference in the presence of comments (i.e., difference in feedback synchronicity) between the two groups. This interpretation is based on assumption in literature that more frequent feedback enhances individual learning and task performance (Lam, DeRue, Karam & Hollenbeck, 2011; Salomni, Schmidt & Walter, 1984; Theile, 2003). The difference in the participants' use and dependence on online sources to mediate the content-based feedback was viewed as another reason for the two groups' significant differences in writing, especially in the area of content. The difference in the incorporation rate of peer feedback between the two groups was another explanation for the two groups' significant differences in writing performance. This explanation is based on previous researchers' acknowledgement (Glover & Brown, 2006; Hamidun, Hashim & Othman, 2012) of the

role of feedback incorporation in improving students' writing performance and improving their future work and learning. Inline commenting (which is only available in Google Docs) as well as the Google Docs group's more frequent access to online sources than Wiki group were the two potential reasons encouraging Google Docs group's more incorporation of feedback than the Wiki group. The last possible explanation of the two groups' differences in writing was attributed to the difference in the participants' perceptions of the conversation and presence of peer feedback received on their assigned platforms.

The Google Docs and Wiki participants' significant improvement in writing performance in form was linked to the participants' frequent focus on commenting on language, which was believed to be promoted by the feedback mode and spelling and grammar checkers. The Google Docs participants' frequent commenting on language echoed previous research results that explored peer feedback on various synchronous platforms including Google Docs (Alharbi, 2020; Bradley & Thouesny, 2017; Canham, 2017; Woodard & Babcock, 2014; Cha & Park, 2010; Liang, 2010). However, the Wiki group's more frequent commenting on language than content contradicted results of the majority of previous studies which looked into peer feedback exchanged through Wiki (Bradley, 2014; Elola & Oskoz, 2010; Kessler, 2009; Oskoz & Elola, 2012; Song & Usaha, 2009; Woo, Chu & Li, 2013) and found evidence of students' tendency towards more emphasis on meaning than form. The frequent incorporation of form-focused feedback (which was believed to be promoted by features of highlighting, detailedness of feedback, and spelling and grammar checkers) was viewed as another reason for the improvement in accuracy in both Google Docs and Wiki groups. This finding of frequent incorporation of language-related feedback echoed results of face-to-face peer review in previous studies (Deni & Zainal, 2011; Paulus, 1990; Villamil & De Guerrero, 1998) and the results of previous studies looking into peer feedback exchanged through synchronous platforms (Cha & Park, 2010; Liang, 2010) which found that L2 learners focused on editing grammar more than content. The progress in

the participants' writing performance in accuracy and online writing performance was also believed to be attributed to the influence of the participants' use of the Google Docs and Wiki online environments to access online language resources to seek further assistance from the internet beyond their partners' interaction.

Chapter 6 Conclusion

6.1. Overview

This study set out to identify the value of inline commenting feature by comparing the effect of Google Docs- and Wiki-mediated peer feedback (exchanged in the context of pair writing) and reactions to it on students' individual writing performance. More specifically, the current study aimed to explore whether inline comments (exchanged through Google Docs) are more or less effective than non-inline comments (exchanged through Wiki) in terms of developing the learners' overall writing performance, as well as their writing performance in the dimensions of form and content. A mixed methods research strategy was followed in order to answer the research questions. The participants were 40 male Saudi EFL learners from an English writing course in the department of English at King Khalid University. Initially, the participants were randomly allocated to the two experimental conditions (Google Docs condition, Wiki condition) and the participants assigned to each experimental condition were then randomly divided into pairs. The development of writing was measured through three tests with the use of three comparable writing tasks (see section 3.6). In other words, the participants were tested at three time points throughout the study; pre-test (week 2), post-test (week 8), and delayed post-test (week 15). Online interactions as well as semi-structured interviews were also used to further check for any possible role of the inline and non-inline comments exchanged through the two applications and reactions to them in improving the learners' writing performance.

Previous research on Google Docs- and Wiki-enhanced peer feedback either focused on the product, by exploring the language learning potential of the CALL activity, or on the process, by looking into peer feedback focus and reactions to it. Therefore, looking into the process (focus of peer feedback and reactions to it) and the product (language learning potential) through comparing the impact of Google Docs and Wiki-enhanced peer feedback in the same context had been missing from

the technology-enhanced peer feedback literature. To explore this, four research questions were pro-posed:

Q1: What is the differential impact of Google Docs and Wiki-enhanced peer review on writing perfor-mance?

Q2: How do Saudi EFL college students working in pairs on the Google Docs platform provide peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q3: How do Saudi EFL college students working in pairs on the Google Docs platform respond or react to peer feedback compared to their counterparts working in pairs on the Wiki platform?

Q4: What are Saudi EFL college students' reported perceptions of peer written feedback provided via Google Docs or Wikis?

In this chapter, a summary of findings is provided in section 6.2. In addition, limitations and pedagogical implications are discussed and presented in sections 6.3 and 6.4.

6.2. Summary of findings

The test results revealed that both Google Docs and Wiki experimental groups' overall scores and writing performance in the dimension of form improved significantly from the pre-test to post-test and from post-test to delayed post-test. In the dimension of content, the Google Docs group did not improve significantly over time (from pre- to post-test and from pre-test to delayed test) whereas their Wiki counterparts' performance in this area did improve overtime. In the between group differences in overall writing scores and in the scores in area of content, the Wiki group performed significantly better than the Google Docs group at both post- and delayed post-tests. However, in the area of form, the Google Docs group significantly outperformed their Wiki counterparts at the post- and delayed

post-test. The findings of the peer feedback analysis revealed that, on average, the Google Docs participants generated significantly greater form-focused peer feedback and lower content-based peer feedback than their counterparts working on Wiki. In terms of reactions to feedback, the Google Docs participants outperformed their counterparts on the Wiki platform in the acceptance and integration of form-focused comments. However, the participants on Wiki outperformed their Google Docs counterparts in the acceptance and integration of the content-based feedback.

The interview results showed the positive roles of both platforms' "comment feature" and the "spelling and grammar checker" in facilitating commenting on language. Moreover, some participants working on the two forums praised the role of the "highlighting" function in clarifying the comments received, as well as the role of the two platforms in supporting the detailed commentary, which encouraged the acceptance and integration of comments. Some participants working on both platforms also believed that the platforms play a role in facilitating the exchange of comments (due to the absence of the need for a physical presence) as well as in speeding up and facilitating the exchange. Furthermore, visual connection between texts and comments, as well as the synchronous automatic update function were viewed by some of the participants on both platforms as promoting the exchange of specific and comprehensive commenting on language. In addition, the automatic update of comments and edits promoted by the Google Docs platform was believed to be responsible for frequent commenting on language, whereas the lack of this feature on the Wiki led to selective commenting on language. Some of the participants on the two platforms also reported surfing the internet to access online sources to expand their knowledge of language-related issues before commenting on them. Finally, some Wiki students disclosed their use of online tools to seek further assistance upon commenting on content-related aspects.

6.3. Limitations

There are several limitations in this study that should be acknowledged and addressed in future research. First, all the participants in the present study were male, due to cultural and religious issues in the Saudi educational system which is gender-segregated. Having a mixed gender sample could have provided valuable insights for research regarding the effect of gender on the students' Google Docs- and Wiki-enhanced peer feedback and peer editing behaviours. Evidence of previous research (e.g., Leung, Chan, Maxwell, & Poon, 2010) showed that male and female students displayed differences in commenting in a Wiki-supported class where male students tended to be more ready to offer specific suggestions than female students, where women were more able to locate problems than men. Further to this, outcomes of other previous research (e.g., Brodahl & Hansen, 2014) showed different male and female perceptions of collaborative writing using Google Docs and EtherPad (which share many features with Google Docs and Wiki). Evidence of other research (Peled, Bar-Shalom, & Sharon, 2014) also showed that females were less willing to exchange feedback on the Wiki environment than male students. Therefore, both genders seem to have different views and different commenting behaviours on online platforms. Thus, having both genders in the present study would have helped in looking into effects of gender on the commenting behaviours on both Google Docs and Wiki platforms and thus would add to the relevant line of research.

Furthermore, having gender-balanced groups/pairs would help achieve better results due to its potential positive role in promoting interactions as shown in previous research. Evidence of previous research (e.g., Takeda & Homberg, 2014) revealed that gender-balanced sampling displayed more enhanced collaboration in collaborative and group work processes than single-gender groups or gender exception groups (i.e., groups in which all members are one gender except one of the opposite gender). Therefore, exploring the peer feedback process in mixed and balanced-gender groups would further enhance collaboration and thus lead to better results. This limitation was also observed in most

previous research in which previous research exploring peer feedback exchanged through Google Docs and Wiki either involved single-sex samples (e.g., Alharbi, 2020; Nami & Marandi, 2014) or mixed-sex samples with a large difference in the number of participants of both genders (e.g., Canham, 2017; Hsu, 2019; Liang, 2010; Song & Usaha, 2009). Therefore, previous research, as in the current study, did not manage to explore peer feedback in gender-balanced pairs or groups.

Another limitation is related to the participation of only one writing class, which suggests that the results are not generalisable to the writing groups in the advanced, beginner and lower-intermediate levels. In addition, only two types of writing tasks were assigned—descriptive and process essays. It might be useful to explore diverse types of writing tasks to compare the participants' approaches to feedback provision as well as revisions and reactions to it. A further limitation is that the learners at KKU had a relatively low English proficiency level, compared to learners in other Saudi universities located in multicultural cities on the east and west coasts such as Jeddah and Dammam where students are exposed to native speakers of English and communicate with tourists on an almost daily basis. It is thus difficult to generalise these findings to learners at higher proficiency levels who may provide more effective peer feedback or be more critical in their evaluation and use of the feedback they receive.

Even though there is a saved record (i.e., history records of Wikis and Google Docs) of students' discussions, interactions, and edits related to error correction and peer feedback and peer editing, it would be helpful if the records were supported with observation (either video or face-to-face observation) data and think aloud protocols. These tools can be useful in terms of observing and documenting what students actually do during feedback sessions. These were not utilised here because students were not only working in classroom settings but also from outside the classroom, making this hard to control. Inclusion of this sort of data would have been helpful in tracking the participants' pre-decision-making actions, which would clarify their actual motives for the frequent provision or

incorporation of a particular type of feedback over other types of feedback through additional objective sources which could also help triangulate the participants' reported views and experiences in the interviews.

Another limitation is related to the difficulty in fully controlling and preventing any external assistance students might have received outside of the classroom. Even though this study was planned in a way that resulted in limiting the feedback a student received on their assigned platforms to a single source (peers), almost all composition and revisions happened outside of class time meaning that in practice students may have had help from other sources, such as proficient users of English or from other online sources. Therefore, running the study fully inside the class with observation of the participants' sources of assistance (e.g., dictionary, etc.) would provide better and more conclusive conclusions regarding the effectiveness of the feedback received on the two platforms and reactions to it. Therefore, the potential to have received help outside the classroom is another limitation of the present study.

In the current study, the tutor's role was limited to only ensuring the participation of all students in the collaborative writing and peer feedback and peer editing activities, as well as ensuring that all pairs of participants were interacting through their assigned platforms (rather than face-to-face) while inside the classroom. Therefore, it would also be convenient to study tutor feedback and its impact on writing, since it is the most widely used format of feedback in Saudi EFL context. As Lee (2010) suggests, the tutor's role is crucial in providing students' guidance for effective feedback. Thus, it would be useful if the tutor had more role to play in the peer feedback process in the present study. Exploring tutor peer feedback in this regard would have illuminated more issues related to the effectiveness of tutor guidance on the feedback quality and language learning potential.

In the present study, the analysis of the feedback comments is solely quantitative and based on the frequency of occurrence of feedback comments and reactions to them. In addition, there is no assessment of the quality of the feedback. Exploring this would have illuminated more issues related to whether the two platforms promote feedback of different quality. A further limitation is related to the exploration of the online behaviours and contributions (e.g., adding ideas, deletion of ideas, adding words, etc.) which is overlooked in the current study. Exploring online behaviours on the two platforms would have illuminated more issues about the use of the two platforms for peer editing and peer feedback provision.

6.4. Implications

Based on the discussion of findings in Chapter 5, several suggestions presented here need to be taken into consideration by teachers and policy makers. Firstly, the significant differences in language learning potential (e.g., in writing accuracy) of participants engaging in Wiki- and Google Docs-enhanced peer feedback and peer editing suggest differential impact of peer feedback exchanged on these two platforms on students' writing performance. More specifically, these findings suggest that the peer feedback exchanged on Google Docs exerts greater influence on participants' writing accuracy than Wiki-enhanced peer feedback. The interview data specifically attributed the differences in writing accuracy to reasons related to the different functions of the two platforms, including the difference in synchronicity promoted by the automated update of comments in Google Docs and the specificity of feedback and visual connection between feedback mode and text which are promoted by in-line commenting. Based on these results, course designers and teachers should carefully choose technological tools for writing classes based on the consideration of the functions and features of the technological tools, the objective of the peer response activity and the students (interactions) themselves. If the objective of the course is to improve accuracy, the Google Docs platform seems to be better than Wiki since it promotes synchronous interactions and provision of more specific feedback promoting the

multiple features of too specific feedback reported by Nelson and Schunn, (2009) such as locating the problem and offering a solution. Therefore, it is recommended that platform functions be explored before adopting any technology-enhanced platform in writing classes.

The online interaction data showing significant differences in the feedback focus and reactions to it on Google Docs and Wiki could assist teachers to make more informed decisions about the suitability of these two Web 2.0 applications for their inclusion in providing feedback and making edits in the classroom. More specifically, based on online interaction data (the feedback focus results and reactions to it in the present study), Google Docs seems to be more suitable for revising and commenting on language than Wiki; however, Wiki seems to be a better option when it comes to commenting and suggesting revisions on content. Therefore, the online interactional findings give a consideration that both applications investigated in this study can be used in a purposeful manner where a teacher could choose to use one application (Wiki) for peer feedback during the drafting stage with a focus on content, and then use the other (Google Docs) when the focus is on editing and accuracy. However, for the use of either one of the two platforms for addressing form and content, the teacher should intervene and do additional work to further promote the content-based feedback on Google Docs platform and the form-focused feedback on the Wiki platform.

References

Adas, D., & Bakir, A. (2013). Writing difficulties and new solutions: Blended learning as an approach to improve writing abilities. *International Journal of Humanities and Social Science*, *3*(9), 254-266.

Akbari, F., & Erfani, S. S. (2018). The effect of wiki and e-portfolio on writing skill of Iranian intermediate EFL learners. *International Journal of Applied Linguistics and English Literature*, 7(3), 170-180.

Aldossary, K. S. M. (2017). *Peer feedback and the L2 writing of givers and receivers: A quantitative and qualitative longitudinal study involving Saudi students* (Doctoral dissertation, University of Melbourne).

Alghasab, M. (2016). The impact of EFL teachers' mediation in wiki-mediated collaborative writing activities on student-student collaboration. *Short papers from EUROCALL*, 2016, 1-6.

Alghasab, M., & Handley, Z. (2017). Capturing (non-) collaboration in wiki-mediated collaborative writing activities: The need to examine discussion posts and editing acts in tandem. *Computer Assisted Language Learning*, *30*(7), 664-691.

Alghasab, M. (2015). *Student-Student collaboration in wiki mediated collaborative writing activities: Exploring EFL teachers' roles in the collaborative process* (Doctoral dissertation, University of York).

Alharbi, M. A. (2020). Exploring the potential of Google Doc in facilitating innovative teaching and learning practices in an EFL writing course. *Innovation in Language Learning and Teaching*, *14*(3), 227-242.

Alharbi, M. A., & Al-Hoorie, A. H. (2020). Turnitin peer feedback: controversial vs. non-controversial essays. *International Journal of Educational Technology in Higher Education*, *17*(1), 1-17.

Al-Hazmi, S., & Scholfield, P. (2007). Enforced revision with checklist and peer feedback in EFL writing: The example of Saudi university students. *Scientific Journal of King Faisal University (Humanities and Management Sciences)*, *8*(2), 237-267.

Al-Hozaimi, A. (1993). *Attitudes and perceptions of teachers, principals and supervisors toward*

teaching written composition in the fifth and sixth grades in boys' public schools in Riyadh district, Saudi Arabia. (Doctoral dissertation, University of Oregon).

Al-Huneini, H. A. (2017). *Exploring the Impact of Introducing Tablets in Omani Primary Schools* (Doctoral dissertation, University of Leeds).

Alkhatib, N. (2015). *Written corrective feedback at a Saudi university: English language teachers' beliefs, students' preferences, and teachers' practices* (Doctoral dissertation, University of Essex).

Alnasser, S. M. N. (2013). *A new form of peer feedback technique: An investigation into the impact of focusing Saudi ESL learners on macro level writing features* (Doctoral dissertation, Newcastle University).

Alnasser, S. M. & Alyousef, H. S. (2015). Improving the effectiveness of the peer Feedback technique: The impact of focusing EFL student-writers on macro level features. International *Journal of English language Education*, *3*(1) 92-112.

Alshahrani, A., & Storch, N. (2014). Investigating teachers' written corrective feedback practices in a Saudi EFL context: How do they align with their beliefs, institutional guidelines, and students' preferences? *Australian Review of Applied Linguistics*, *37*(2), 101-122.

Alshumaimeri, Y. (2011). The effects of wikis on foreign language students writing performance. *Procedia-Social and Behavioral Sciences*, *28*, 755-763.

Alyousef, H. S., & Alnasser, S. M. (2015). A study of cohesion in international postgraduate Business students' multimodal written texts: An SF-MDA of a key topic in finance. *The Buckingham Journal of Language and Linguistics*, *8*, 56-78.

Arnold, N., Ducate, L., & Kost, C. (2009). Collaborative writing in wikis: Insights from culture projects in German classes. In L. Lomicka & G. Lord (Eds.), *The next generation: Social networking and online collaboration in foreign language learning* (pp. 115-144). San Marcos, TX: CALICO.

Ashwell, T. (2000). Patterns of teacher response to student writing in a multiple-draft composition classroom: Is content feedback followed by form feedback the best method?. *Journal of Second Language Writing*, *9*(3), 227-257.

Askew, S., & Lodge, C. (2000). Gifts, ping-pong and loops-linking feedback and learning. *Feedback for learning*, 1-17.

Aydin, Z., & Yildiz, S. (2014). Use of wikis to promote collaborative EFL writing. *Language Learning & Technology*, *18*(1), 160-180.

Berg, C. (1999). The effect of trained peer response on ESL students' revision types and writing quality. *Journal of Second Language Writing, 8*, 215-241.

Berg, B. L. (2007). *Qualitative research methods for the social sciences*. London: Pearson.

Betzner, A. E. (2008). *Pragmatic and dialectic mixed method Approaches: An empirical comparison*. (Doctoral dissertation).

Bitchener, J. (2008). Evidence in support of written corrective feedback. *Journal of second language writing*, *17*(2), 102-118.

Bitchener, J. & Ferris, D. (2012). *Written corrective feedback in second language acquisition and writing*. New York: Taylor and Francis.

Bitchener, J., & Knoch, U. (2008). The value of written corrective feedback for migrant and international students. *Language Teaching Research*, *12*(3), 409-431.

Bloch, J., & Brutt-Griffler, J. (2001). Implementing CommonSpace in the ESL composition classroom. *Linking literacies: Perspectives on L2 reading-writing connections*, 309-334.

Bosher, S. (1998). The composing processes of three Southeast Asian writers at the post-secondary level: An exploratory study. *Journal of second language writing*, *7*(2), 205-241.

Bower, M. & Richards, D. (2006). Collaborative learning: some possibilities and limitations for students and teachers. *In Proceedings of the Conference for the Australasian Society for Computers in Learning in Tertiary* Education (*ASCILITE 06*), 79-89.

Bradley, L. (2014). Peer-reviewing in an intercultural wiki environment-student interaction and reflections. *Computers and Composition*, *34*, 80-95.

Bradley, L., & Thouësny, S. (2017). Students' collaborative peer reviewing in an online writing environment. *Themes in Science and Technology Education*, *10*(2), 69-83.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Brierley, J. A. (2017). The role of a pragmatist paradigm when adopting mixed methods in behavioural accounting research. *International Journal of Behavioural Accounting and Finance*, *6*(2), 140-154.

Brodahl, C., & Hansen, N. K. (2014). Education students' use of collaborative writing tools in collectively reflective essay papers. *Journal of Information Technology Education: Research*, 13, 91-120.

Brown,W. E., Lovett, M., Bajzek, D. M., & Burnette, J. M. (2006). Improving the feedback cycle to improve earning in introductory biology using the digital dashboard. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006* (pp. 1030-1035). Chesapeake, VA: AACE.

Bryman, A. (2012). *Social research methods Bryman*. Oxford University Press.

Bryman, A. (2004). *Social research methods* (2nd ed.). Oxford: Oxford University Press.

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford; New York: Oxford University Press.

Canham, N. (2017). Comparing Web 2.0 applications for peer feedback in language teaching: Google Docs, the Sakai VLE, and the Sakai Wiki. *Writing & Pedagogy*, *9*(3), 429-456.

Castañeda, D. A., & Cho, M. H. (2013). The role of wiki writing in learning Spanish grammar. *Computer Assisted Language Learning*, *26*(4), 334-349.

Cha, Y. (2009). Effects of online peer feedback using CMC instrument. *English Teaching*, *64*(4), 1-24.

Cha, Y., & Park, L. (2010). An analysis of synchronous interaction and its influence on EFL writers' revisions. *Multimedia-Assisted Language Learning, 13*, 9-36.

Chandler, J. (2003). The efficacy of various kinds of error feedback for improvement in the accuracy and fluency of L2 student writing. *Journal of Second Language Writing*, *12*(3), 267-296.

Chang, C. F. (2009). Peer review through synchronous and asynchronous modes: A case study in a Taiwanese college English writing course. *JALTCALL Journal, 5*(1), 45-64.

Chapelle, C. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing and research*. Cambridge: Cambridge University Press.

Chin, C. K., Gong, C., & Tay, B. P. (2015). The effects of wiki-based recursive process writing on Chinese narrative essays for Chinese as a second language (CSL) students in Singapore. *IAFOR Journal of Education*, *3*(1), 45-59.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). London: Routledge.

Cohen, L., Manion, L., & Morrison, K. (2017). *Research methods in education* (7th ed.). Routledge.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Connor, U., & Asenavage, K. (1994). Peer response groups in ESL writing classes: How much impact on revision?. *Journal of second language writing*, *3*(3), 257-276.

Cote, R. A. (2014). Peer feedback in anonymous peer review in an EFL writing class in Spain. *Gist—Education and Learning Research Journal*, *9*, 67–87.

Creswell, J. W. (2003*). Research design: Qualitative, quantitative, and mixed method approaches*. London: Sage Publications, Inc.

Creswell, J. W. (2008). *Educational research: planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, New Jersey: Pearson/Merrill Prentice Hall.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston: Pearson.

Creswell, J. W., & Plano Clark, V. L. (2011). Choosing a mixed methods design. *Designing and Conducting Mixed Methods Research*, *2*, 53-106.

Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.

Creswell, J.W, Plano Clark, V., Gutmann, M., and Hanson, W (2003). Advanced mixed methods research designs. In A. Tashakkori and C Teddle (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209-240*).* Thousand Oaks, CA: Sage.

Cumming, A. (1989). Writing expertise and second-language proficiency. *Language Learning*, *39*(1), 81-135.

Cumming, A., Rebuffot, J., & Ledwell, M. (1989). Reading and summarizing challenging texts in first and second languages. *Reading and Writing*, *1*(3), 201-219.

Daniels, H., & Zemelman, S. (1985). *A writing project: Training teachers of composition from kindergarten to college*. Portsmouth, NH: Heinemann.

Davis. J & Liss. R (2006). *Affective academic writing 3*. Oxford University Press.

Deni, A. R., & Zainal, I. Z. (2011). Peer-editing practice in the writing classroom: Benefits and drawbacks. *Advances in Language and Literacy Studies*, *2*(1), 92-107.

Diab, N. M. (2010). Effects of peer-versus self-editing on students' revision of language errors in revised drafts. *System*, *38*(1), 85-95.

Diab, N. M. (2011). Assessing the relationship between different types of student feedback and the quality of revised writing. *Assessing writing*, *16*(4), 274-292.

DiPardo, A., & Freedman, S. W. (1988). Peer response groups in the writing classroom: Theoretic foundations and new directions. *Review of educational research*, *58*(2), 119-149.

Dippold, D. (2009). Peer feedback through blogs: Student and tutor perceptions in an advanced German class. *ReCALL*, *21*(1), 18-36.

Donato, R. (1994). Collective scaffolding in second language learning. *Vygotskian Approaches to Second Language Research*, *33456*.

Donato, R. (2000). Sociocultural contributions to understanding the foreign and second language classroom. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 27-50)*. Oxford University Press.

Dunn, K. (2005). Interviewing. In I. Hay (Ed.), *Qualitative research methods in human geography* (2nd ed., pp. 79-105). Melbourne: Oxford University Press.

Ebadi, S., & Rahimi, M. (2017). Exploring the impact of online peer-editing using Google Docs on EFL learners' academic writing skills: A mixed methods study. *Computer Assisted Language Learning*, *30*(8), 787-815.

Edwards, R., & Holland, J. (2013). *What is qualitative interviewing?* A & C Black.

Elbow, P. (2000). *Everyone can write essays toward a hopeful theory of writing and teaching writing*. New York: Oxford University Press.

Elola, I., & Oskoz, A. (2010). Collaborative writing: Fostering foreign language and writing conventions development. *Language Learning & Technology*, *14*(3), 51-71.

Faigley, L., & Witte, S. (1981). Analysing revision. *College composition and communication*, *32*(4), 400-414.

Fathman, A. K. & Whalley, E. (1990). Teacher response to student writing: focus on form versus content. In B. Kroll (Ed.), *Second language writing* (pp. 178-190). Cambridge: Cambridge University Press.

Feilzer, M.Y. (2010). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, *4*(1), 6-16.

Ferris, D. (1999). The case for grammar correction in L2 writing classes: A response to Truscott (1996). *Journal of Second Language Writing*, *8*(1), 1-10.

Ferris, D. (2002). *Treatment of error in second language writing*. Ann Arbor: The University of Michigan Press.

Ferris, D. (2004). The "grammar correction" debate in L2 writing: Where are we, and where do we go from here, and what do we do in the meantime? *Journal of Second Language Writing*, *13*(1), 49-62.

Ferris, D. R., & Hedgcock, J. S. (2005). Building a community of writers: Principles of peer response. In D. R. Ferris & J. S. Hedgcock (Eds.), *Teaching ESL composition: Purpose, process, and practice* (pp. 223–259). Mahwah, NJ: Lawrence Erlbaum Associates.

Ferris, D. R. & Hedgcock, J.S. (2005). *Teaching ESL composition: Purpose, process and practice* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Ferris, D., & Roberts, B. (2001). Error feedback in L2 writing classes: How explicit does it need to be? *Journal of Second Language Writing*, *10*(3), 161-184.

Franco, C. de Paiva (2008). Using wiki-based peer-correction to develop writing skills of Brazilian EFL learners. *Novitas-ROYAL*, *2*(1), 49-59.

Frawley, W., & Lantolf, J.P. (1985). Second language discourse: A Vygotskian perspective. *Applied Linguistics*, *6*, 19-44.

Froldova, V. (2016). pen peer-correction versus wiki-based peer-correction. *Journal of Language and Cultural Education*, *4*(1), 140-153.

Gee, J. P. (2005). Semiotic social spaces and affinity spaces: From the age of mythology to today's schools. In D. Barton & K. Tusting (Eds.), *Beyond communities of practice: Language, power and social context*. Cambridge: Cambridge University Press.

Gerring, J. (2007). The case study: What it is and what it does. In C. Boix, C. & S. C. Stokes (Eds.), *Oxford handbook of comparative politics* (pp. 90-122). New York, NY: Oxford University Press.

Gharehbagh, M. J., Stapa, S. H., & Darus, S. (2019). The effects of written corrective feedback using wikis among ESL learners. *3L: Language, Linguistics, Literature*, *25*(1).

Glover, C., & Brown, E. (2006). Written feedback for students: too much, too detailed or too incomprehensible to be effective? *Bioscience education*, *7*(1), 1-16.

Grami, M. (2005). The effect of teachers' written feedback on ESL students' perception: A study in a Saudi ESL university-level context. *Annual Review of Education, Communication and Language Sciences*, *2*(1), 10-13.

Grami, G. M. A. (2010). *The effects of integrating peer feedback into university-level ESL writing curriculum: A comparative study in a Saudi context* (Doctoral dissertation, Newcastle University).

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed method evaluation designs. *Educational Evaluation and Policy Analysis*, *11*, 255-274.

Guardado, M., & Shi, L. (2007). ESL students' experiences of online peer feedback. *Computers and Composition*, *24*(4), 443-461.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *ECTJ*, *29*(2), 75-91.

Gunning, T. G. (2006). *Assessing and correcting reading and writing difficulties* (3rd ed.). Boston: Pearson Education Inc.

Hamidi, E., & Bagherzadeh, R. (2018). The logical problem of scaffolding in second language acquisition. *Asian-Pacific Journal of Second and Foreign Language Education*, *3*(1), 1-14.

Hamidun, N., Hashim, S. H. M., & Othman, N. F. (2012). Enhancing students' motivation by providing feedback on writing: The case of international students from Thailand. *International Journal of Social Science and Humanity*, *2*(6), 591.

Hansen, J. G., & Liu, J. (2005). Guiding principles for effective peer response. *ELT Journal*, *59*(1), 31-38.

Handley, Z. (2014). Constructing an evidence-base for future CALL design with "engineering power": The need for more basic research and instrumental replication. *The EuroCALL Review*, *22*(2), 46-56.

Haslam, S. A., & McGarty, C. (2014). *Research methods and statistics in psychology* (2nd ed.). U.K.: Sage.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, *77*(1), 81-112.

Hedgcock, J., & Lefkowitz, N. (1994). Feedback on feedback: Assessing learner receptivity in second language writing. *Journal of Second Language Writing*, *3*(2), 141-163.

Hewett, B. L. (2006). Synchronous online conference-based instruction: A study of whiteboard interactions and student writing. *Computers and Composition*, *23*(1), 4-31.

Ho, M. C. (2015). The effects of face-to-face and computer-mediated peer review on EFL writers' comments and revisions. *Australasian Journal of Educational Technology*, *31*(1).

Hsu, H. C. (2019). Wiki-mediated collaboration and its association with L2 writing development: An exploratory study. *Computer Assisted Language Learning*, *32*(8), 945-967.

Hyland, K. (2003). *Second language writing*. Cambridge: Cambridge University Press.

Hyland, F., & Hyland, K. (2001). Sugaring the pill: Praise and criticism in written feedback. *Journal of Second Language Writing*, *10*(3), 185-212.

Hyland, K., & Hyland, F. (2006). Feedback on second language students' writing. *Language teaching*, *39*(2), 83-101.

Jacobs, H. L., Zinkgraf, S.A., Wormouth, D.R., Hartfiel, V. F., & Hughey, J. B. (1981). *Testing ESL composition: A practical approach*. Rowely, MA: Newbury House.

Jamoom, O. (2016). *Teachers' beliefs and practices of feedback and preferences of students for feedback in university level EFL writing classrooms* (Doctoral dissertation, University of Southampton).

Jensen, J. D. (2008). Scientific uncertainty in news coverage of cancer research: Effects of hedging on scientists' and journalists' credibility. *Human communication research*, *34*(3), 347-369.

Johnson, B. R., & Christensen, L. (2016). *Educational research: Quantitative, qualitative, and mixed approaches* (6th ed.). Thousand Oaks, California: Sage Publications.

Johnson, R. B., & Gray, R. (2010). A history of philosophical and theoretical issues for mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social & behavioral research* (2nd ed., pp. 69-94). Thousand Oaks, CA: Sage.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26.

Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 297-319). Thousand Oaks, CA: Sage Publications.

Keh, C. L. (1990). Feedback in the writing process: A model and methods for implementation. *ELT Journal, 44*(4), 294-304.

Kepner, C. G. (1991). An experiment in the relationship of types of written feedback to the development of second-language writing skills. *The Modern Language Journal*, *75*(3), 305-313.

Kessler, G. (2009). Student-initiated attention to form in wiki-based collaborative writing. *Language Learning & Technology*, *13*(1), 79-95.

Kessler, G. and Bikowski, D. (2010). Developing collaborative autonomous learning abilities in computer mediated language learning: Attention to meaning among students in wiki space. *Computer Assisted Language Learning*, *23*(1), 41-58.

Kessler, G., Bikowski, D., & Boggs, J. (2012). Collaborative writing among second language learners in academic web-based projects. *Language Learning & Technology*, *16*(1), 91-109.

Knoch, U. (2011). Rating scales for diagnostic assessment of writing: What should they look like and where should the criteria come from? *Assessing Writing*, *16*(2), 81-96.

Kost, C. (2011). Investigating writing strategies and revision behaviour in collaborative wiki projects. *CALICO Journal*, *28*(3), 606-620.

Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: Sage.

Lalande, J. F. (1982). Reducing composition errors: An experiment. *The Modern Language Journal*, *66*(2), 140-149.

Lantolf, J. P. (2000). Introducing sociocultural theory. *Sociocultural theory and second language learning*, *1*, 1-26.

Lantolf, J. P., & Pavlenko, A. (1995). Sociocultural theory and second language acquisition. *Annual Review of Applied Linguistics*, *15*, 108-124.

Lantolf, J. P., & Thorne, S. L. (2007). Sociocultural theory and second language learning. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition* (pp. 201-224). Mahwah, NJ: Lawrence Erlbaum.

Lantolf, J., & Thorne, S. (2006). *Sociocultural theory and the genesis of second language development*. Oxford: Oxford University Press.

Lee, I. (2009). Ten mismatches between teachers' beliefs and written feedback practice. *ELT journal*, *63*(1), 13-22.

Lee, L. (2010). Exploring wiki-mediated collaborative writing: A case study in an elementary Spanish course. *CALICO Journal*, *27*(2), 260-276.

Leki, I. (1991). The preferences of ESL students for error correction in college-level writing classes. *Foreign language annals*, *24*(3), 203-218.

Leung, K., Chan, M., Maxwell, G., & Poon, T. (2010). A qualitative analysis of subdegree students commentary styles and patterns in the context of gender and peer e-feedback. In P. Tsang, S. Cheung, V. Lee, & R. Huang (Eds.), *Third International Conference, ICHL 2010* (Vol. 6248 LNCS, pp. 149–159). Beijing, China: Springer-Verlag Berlin Heidelberg.

Li, M. (2012). Politeness strategies in wiki-mediated communication of EFL collaborative writing tasks. *IALLT Journal of Language Learning Technologies*, *42*(2), 1-26.

Li, M. (2013). Individual novices and collective experts: Collective scaffolding in wiki-based small group writing. *System*, *41*(3), 752-769.

Li, M., & Zhu, W. (2013). Patterns of computer-mediated interaction in small writing groups using wikis. *Computer Assisted Language Learning*, *26*(1), 61-82.

Liang, M. Y. (2010). Using synchronous online peer response groups in EFL writing: Revision-related discourse. *Language Learning & Technology*, *14*(1), 45-64.

Lincoln, Y. S., & Guba, E. G. (1985). Establishing trustworthiness. *Naturalistic inquiry*, *289*(331), 289-327.

Lin, W.-C., & Yang, S. C. (2011). Exploring students' perceptions of integrating wiki technology and peer feedback into English writing courses. *English Teaching: Practice and Critique*, *10* (2), 88–103.

Liou, H. C., & Peng, Z. Y. (2009). Training effects on computer-mediated peer review. *System*, *37*(3), 514-525.

Liu, J. & Hansen, J. (2002) *Peer response in second language writing classrooms*. The University of Michigan Press: Michigan.

Liu, J., & Hansen, J.G. (2013). *Peer response in second language writing classrooms.* Ann Arbor: University of Michigan Press.

Liu, J., & Sadler, R. W. (2003). The effect of peer review in electronic versus traditional modes on L2 writing. *Journal of English for academic Purposes*, *2*(3), 193-227.

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2006). *Methods in educational research: From theory to practice*. San Francisco: Jossey-Bass.

Loretto, A., DeMartino, S., & Godley, A. (2016). Secondary students' perceptions of peer review of writing. *Research in the Teaching of English*, *51*(2), 134-161.

Lundstrom, K., & Baker, W. (2009). To give is better than to receive: The benefits of peer review to the reviewer's own writing. *Journal of Second Language Writing*, *18*(1), 30-43.

Mackey, A., & Gass, S. M. (2005). *Second language research: Methodology and design*. Mahwah,

N.J.: Lawrence Erlbaum.

Mak, B., & Coniam, D. (2008). Using wikis to enhance and develop writing skills among secondary school students in Hong Kong. *System*, *36*(3), 437-455.

Marsden, E. (2007). Can educational experiments both test a theory and inform practice? *British Educational Research Journal*, *33*(4), 565-588.

McCafferty, S. G. (1994). The use of private speech by adult ESL learners at different levels of proficiency. In J. P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language research* (pp. 135-56). Norwood: Ablex.

McLoughlin, C. & Lee, M.J.W. (2007). Listen and learn: A systematic review of the evidence that podcasting supports learning in higher education. In C. Montgomerie & J. Seale (Eds), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2007* (pp. 1669- 1677). Chesapeake, VA: AACE.

Mertens, D. M. (2005). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (2nd ed.). Sage publications.

Min, H. T. (2005). Training students to become successful peer reviewers. *System*, *33*(2), 293-308.

Min, H. T. (2006). The effects of trained peer review on EFL students' revision types and writing quality. *Journal of Second Language Writing*, *15*, 118-141.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, *1*(1), 48-76.

Nami, F., & Marandi, S. S. (2014). Wikis as discussion forums: exploring students' contribution and their attention to form. *Computer Assisted Language Learning*, *27*(6), 483-508.

Nassaji, H & Kartchava, E. (2017). *Corrective feedback in second language teaching and learning: Research, theory, applications, implications*. London: Routledge.

Nelson, G. L., & Murphy, J. M. (1993). Peer response groups: Do L2 writers use peer comments in revising their drafts?. *TESOL quarterly*, *27*(1), 135-141.

Nelson, M. M., & Schunn, C. D. (2009). The nature of feedback: How different types of peer feedback affect writing performance. *Instructional Science*, *37*(4), 375-401.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, *31*(2), 199-218.

Onwuegbuzie, A. J., & Johnson, R. B. (2006). The validity issue in mixed research. *Research in the Schools*, *13*(1), 48-63.

Oskoz, A., & Elola, I. (2012). Understanding the impact of social tools in the FL writing classroom: Activity theory at work. In G. Kessler, A. Oskoz, & I. Elola (Eds.), *Teaching across writing contexts and tasks* (pp. 131-153). San Marcos, TX: CALICO Monograph Series.

Padgett, D. (2008). *Qualitative methods in social work research*. Los Angeles: Sage Publications.

Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual review of psychology*, *49*(1), 345-375.

Park, E. (2006). Review Article on "the effectiveness of teacher's written feedback on L2 Writing". *SNU Working Papers in English Linguistics and Language*, *5*, 61-73.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Thousasnd Oaks, CA: Sage.

Paulson, E. J., Alexander, J., & Armstrong, S. (2007). peer review re-viewed: investigating the juxta-position of composition students' eye movements and peer-review process. *Research in the Teaching of English*, *41*(3), 304-335.

Paulus, T. M. (1999). The effect of peer and teacher feedback on student writing. *Journal of Second Language Writing*, *8*, 265-89.

Peled, Y., Bar-Shalom, O. & Sharon, R. (2014). Characterisation of pre-service teachers' attitude to feedback in a wiki-environment framework. *Interactive Learning Environments, 22*(5), 578-593.

Pennington, M. C., & So, S. (1993). Comparing writing process and product across two languages: A study of 6 Singaporean university student writers. *Journal of Second Language Writing*, *2*(1), 41-63.

Pham, T. N., Lin, M., Trinh, V. Q., & Bui, L. T. P. (2020). Electronic peer feedback, EFL academic writing and reflective thinking: Evidence from a Confucian context. *SAGE Open*, *10*(1), 2158244020914554.

Plano Clark, V. L., & Creswell, J. W. (2008). *The Mixed methods reader*. Sage Publications, Thousand Oaks.

Plonsky, L. (2015). *Statistical power, p values, descriptive statistics, and effect sizes: A" back-to-basics" approach to advancing quantitative methods in L2 research*. Routledge.

Polio, C. (2012). How to research second language writing. In Gass, S. & Mackey, A., (Eds.), *Second language research methods* (pp. 139-157). New York: Routledge.

Robb, T., Ross, S. & Shortreed, I. (1986). Salience of feedback on error and its effect on EFL writing quality. *TESOL Quarterly*, *20*(1), 83-96.

Robson, C. (1993). *Real world research: A resource for social scientists and practitioners-researchers*. Massachusetts: Blackwell Pushers.

Ruecker, T. (2011). The potential of dual-language cross-cultural peer review. *ELT Journal*, *65*(4), 398-407.

Ruegg, R. (2014). The effect of assessment of peer feedback on the quantity and quality of feedback given. *Papers in Language Testing and Assessment*, *3*(1), 24-43.

Saito, H. (1994). Teachers' practices and students' preferences for feedback on second language writing: A case study of adult ESL learners. *TESL Canada Journal*, *11*(2), 46-70.

Sandelowski, M. (2003). Tables or tableaux? The challenges of writing and reading mixed methods studies. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 321–350). Thousand Oaks: Sage.

Sasaki, M. (2000). Toward an empirical model of EFL writing processes: An exploratory study. *Journal of Second Language Writing*, *9*(3), 259-291.

Sasaki, M., & Hirose, K. (1996). Explanatory variables for EFL students' expository writing. *Language Learning*, *46*(1), 137-168.

Scott, P. J., & Briggs, J. S. (2009). A pragmatist argument for mixed methodology in medical informatics. *Journal of Mixed Methods Research*, *3*(3), 223-241.

Semeraro, J., & Moore, N. S. (2016). The use of Google docs technology to support peer revision.

In *Writing instruction to support literacy success* (pp. 203-220). Emerald Group publishing limited.

Semke, H. D. (1984). Effects of the red pen. *Foreign Language Annals*, *17*(3), 195-202.

Shannon-Baker, P. (2016). Making paradigms meaningful in mixed methods research. *Journal of Mixed Methods Research*, *10*(4), 319-334.

Sharples, M. (1999). *How we write: Writing as creative design*. Psychology Press.

Sheen, Y. (2007). The effect of focused written corrective feedback and language aptitude on ESL learners' acquisition of articles. *TESOL Quarterly*, *41*(2), 255-283.

Shehadeh, A. (2011). Effects and student perceptions of collaborative writing in L2. *Journal of Second Language Writing*, *20*, 286-305.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63-75.

Sheppard, K. (1992). Two feedback types: Do they make a difference? *RELC Journal, 23*(1), 103-110.

Shih, R.-C. (2011). Can Web 2.0 technology assist college students in learning English writing? Integrating Facebook and peer assessment with blended learning. *Australasian Journal of Educational Technology*, *27* (5), 829-845.

Slavkov, N. (2015). Sociocultural theory, the L2 writing process, and Google Drive: Strange bedfellows?. *TESL Canada Journal*, *32*(2), 80-94.

So, L., & Lee, C. H. (2012). Peer feedback using blended learning in L2 writing at the university level. *English Teaching*, *67*(3), 307-337.

Sommers, N. (1982). Responding to student writing. *College Composition and Communication*, *33*, 148-156.

Song, W., & Usaha, S. (2009). How EFL university students use electronic peer response into revisions. *Suranaree Journal of Science and Technology*, *16*(3), 263-275.

Storch, N. (2005). Collaborative writing: product, process, and students' reflections. *Journal of Second Language Writing*, *14*, 153-173.

Storch, N. (2017). Peer corrective feedback in computer-mediated collaborative writing. In H. Nassaji & E. Kartchava (Eds.), *Corrective feedback in second language teaching and learning: Research, theory, applications, implications* (pp. 66-79). Routledge.

Storch, N. (2013). *Collaborative writing in L2 classrooms*. Multilingual Matters.

Storch, N., & Wigglesworth, G. (2010). Learners' processing, uptake and retention of corrective feedback on writing: Case studies. *Studies in Second Language Acquisition*, *32*(2), 303-334.

Suzuki, W. (2012). Written languaging, direct correction, and second language writing revision. *Language Learning*, *62*(4), 1110-1133.

Takeda, S., & Homberg, F. (2014). The effects of gender on group work process and achievement: an analysis through self-and peer-assessment. *British Educational Research Journal*, *40*(2), 373-396.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Applied Social Research Methods Series (Vol. 46). Thousand Oaks, CA: Sage.

Teddlie, C. & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approached in the social and behavioral sciences*. London: SAGE.

Tee, K. P. L., & Cheah, J. K. S. (2016). Effectiveness of written feedback in ESL writing. *Pertanika Journal of Scholarly Research Reviews*, *2*(2), 94-102.

Thouësny, S., & Bradley, L. (2014). Applying dynamic assessment principles to online peer revisions in written English for specific purposes. In S. Jager, L. Bradley, E. J. Meima, & S. Thouësny (Eds.), *CALL design: Principles and practice; Proceedings of the 2014 EUROCALL Conference, Groningen*, *The Netherlands* (pp. 368–373). Dublin, Ireland: Research-publishing. net. doi:10.14705/rpnet.2014.000247.

Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of educational Research*, *68*(3), 249-276.

Torgerson, D. J., & Torgerson, C. J. (2003). Avoiding bias in randomised controlled trials in educational research. *British Journal of Educational Studies*, *51*(1), 36-45.

Truscott, J. (1996). The case against grammar correction in L2 writing classes. *Language learning*, *46*(2), 327-369.

Truscott, J. (1999). The case for "The case against grammar correction in L2 writing classes": A response to Ferris. *Journal of Second Language Writing*, *8*(2), 111-122.

Truscott, J. (2004). Evidence and conjecture on the effects of correction: A response to Chandler. *Journal of Second Language Writing*, *13*(4), 337-343.

Truscott, J. (2007). The effect of error correction on learners' ability to write accurately. *Journal of Second Language Writing*, *16*(4), 255-272.

Tuomey, E. (2014). *Discussing writing: Peer feedback on writing essays in an online forum for learners of English* (Doctoral dissertation, Lancaster University).

Twu, H. L. (2009). Effective wiki strategies to support high-context culture learners. *TechTrends*, *53*, 16–21.

Uzawa, K. (1996). Second language learners' processes of L1 writing, L2 writing, and translation from L1 into L2. *Journal of Second Language Writing*, *5*(3), 271-294.

Van Beuningen, C. (2010). Corrective feedback in L2 writing: Theoretical perspectives, empirical insights, and future directions. *International Journal of English Studies*, *10*(2), 1-27.

Villamil, O. S., & Guerrero, M. C. D. (1996). Peer revision in the L2 classroom: Social-cognitive activities, mediating strategies, and aspects of social behavior. *Journal of Second Language Writing*, *5*(1), 51–75.

Villamil, O. S., & Guerrero, M. C. D. (1998). Assessing the impact of peer revision on L2 writing. *Applied linguistics*, *19*(4), 491-514.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Ware, P. & Rivas, B. (2012). Researching classroom integration of online language learning projects: Mixed methods approaches. In M. Dooly & R. O'Dowd (Eds.), *Researching online foreign language interaction and exchange* (pp. 107-131). Bern: Peter Lang.

Waters, J. K. (2007). Online collaboration: Curriculum unbound! *THE Journal*, *34*(3), 40-48.

Weigle, S. C. (2002). *Assessing Writing*. Cambridge University Press.

Weissberg, R. (2006). Scaffolded feedback: Tutorial conversations with advanced L2 writers. In K.

Hyland & F. Hyland (Eds.), *Feedback in second language writing* (pp. 246-265). Cambridge: Cambridge University Press.

Wellington, J. (2000). Educational research: Contemporary issues and practical approaches. In *Educational research: Contemporary issues and practical approaches* (1st ed.). A & C Black.

West, J. A., & West, M. L. (2009). *Using Wikis for online collaboration*. San Francisco, CA: JosseyBass.

Woo, M. M., Chu, S. K. W., & Li, X. (2013). Peer-feedback and revision process in a wiki mediated collaborative writing. *Educational Technology Research and Development*, *61*(2), 279-309.

Yang, M., Badger, R., & Yu, Z. (2006). A comparative study of peer and teacher feedback in a Chinese EFL writing class. *Journal of Second Language Writing*, *15*(3), 179-200.

Yim, S., Zheng, B., & Warschauer, M. (2018). Feedback and revision in cloud-based writing: Variations across feedback source and task type. *Writing & Pedagogy*, *9*(3), 517-553.

Yong, M. F. (2010). Collaborative writing features. *RELC Journal*, *41*(1), 18-30.

Zaman, M. M., & Azad, M. A. (2012). Feedback in EFL Writing at Tertiary Level: Teachers' and Learners' Perceptions. *ASA University Review*, *6*(1), 139-156.

Zheng, C. (2012). Understanding the learning process of peer feedback activity: An ethnographic study of exploratory practice. *Language Teaching Research*, *16*(1), 109-126.

Zheng, B., Lawrence, J., Warschauer, M., & Lin, C. H. (2015). Middle school students' writing and feedback in a cloud-based classroom environment. *Technology, Knowledge and Learning*, *20*(2), 201-229.

Appendices

Appendix A: the essays included in the course for online writing activities

Essay 1: Write a descriptive of a place you both visited on your assigned platform. The work should be completed in collaboration and should include exchange of feedback and mutual editing of writing and contributions.

Essay 2: Write a process essay about how to celebrate and receive Ramadan festival. The work should be completed in collaboration and should include exchange of feedback and mutual editing of writing and contributions.

Appendix B: Essays used for checking students' writing performance before and after the intervention

Student name: _____

Student ID: _____

Write a process essay about how to celebrate Eid al-Adha.

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Appendix B (continued)

Student name: _____

Student ID: _____

Write a process essay about how to celebrate Eid al-Fitr.

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Appendix B (continued)

Student name: _____

Student ID: _____

Write a process essay about how to celebrate a wedding in Saudi Arabia.

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Appendix C: Modified Version of ESL Profile Rubric

Student _____Date_____Topic_____

Category	Score	Criteria
Content & Organization	50-42	EXCELLENT TO VERY GOOD: knowledgeable • substantive •thorough development of thesis • relevant to assigned topic fluent expression • ideas clearly stated/ supported • succinct • well-organized • logical sequencing • cohesive
	41-36	GOOD TO AVERAGE: some knowledge of subject • adequate range • limited development of thesis • mostly relevant to topic, but lacks detail somewhat choppy • loosely organized but main ideas stand out • limited support • logical but incomplete sequencing
	35-21	FAIR TO POOR: limited knowledge of subject • little substance •inadequate development of topic non-fluent • ideas confused or disconnected • lacks logical sequencing and development
	20-11	VERY POOR: does not show knowledge of subject • non-substantive • non pertinent • OR not enough to evaluate does not communicate • no organization • OR not enough to evaluate
Language Use/Vocab/Mechanics	50-42	EXCELLENT TO VERY GOOD: effective complex constructions • few errors of agreement, tense, number, word order/function, article, pronouns, prepositions sophisticated range •effective word/idiom choice and usage • word for mastery • appropriate register demonstrates mastery of conventions • few errors of spelling, punctuation, capitalization, paragraphing
	41-36	GOOD TO AVERAGE: effective but simple constructions • minor problems in complex constructions • several errors of agreement, tense, number, word order/function, article, pronouns, prepositions but meaning seldom obscured adequate range • occasional errors of effective word/idiom form, choice, usage but meaning not obscured occasional errors of spelling, punctuation, capitalization, paragraphing but meaning not obscured
	35-21	FAIR TO POOR: major problems in simple/ complex constructions • frequent errors of negation, tense, number, word order/function, article, pronouns, prepositions and/ or fragments, run-ons, deletions • meaning confused or obscured limited range • frequent errors of effective word/idiom form, choice, usage • meaning confused or obscured frequent errors of spelling, punctuation, capitalization, paragraphing • poor handwriting • meaning confused or obscured
	20-11	VERY POOR: virtually no mastery of sentence construction rules • dominated by errors • does not communicate • OR not enough to evaluate essentially translation • little knowledge of English vocabulary, idioms, word form • OR not enough to evaluate no mastery of conventions • dominated by errors of spelling, punctuation, capitalization, paragraphing • handwriting illegible • OR not enough to evaluate

Appendix D: Interview guide

<table>
<tr><td colspan="2" align="center">Semi-structured interview schedule</td></tr>
<tr><td align="center">Themes</td><td align="center">Questions</td></tr>
<tr>
<td>Participants' overall experience towards the activity</td>
<td>

-How did you find this writing activity?

-How did you find this experience of giving and receiving feedback on your writing?

Follow-up questions:

- ➢ Is there anything else you <u>like</u>/dislike? Could you give an example? Why?
- ➢ Was there anything that you <u>disliked</u>/liked? Could you give an example? Why?
- ➢ Tell me more about your experience of providing your partner feedback.
- ➢ Tell me about your experience of <u>receiving and</u> responding to your partners' feedback.
- ➢ How did you find responding to one another's online feedback via Google Docs/Wikis?
- ➢ <u>Can you tell me in detail about such difficulties you encountered as you dealt with the peer written feedback?</u>
- ➢ <u>What type of difficulties do you face? Please specify?</u>
- ➢ <u>You have talked about the negative side/**opposite** of giving, receiving and responding to peer feedback, can you tell me about the positive side/**opposite** of it?</u>
- ➢ How did your experience of giving and receiving feedback in Google Docs/Wikis compare with your previous experiences of giving and receiving feedback on your writing?
- ➢ How did your experience of responding to feedback in Google Docs/Wikis compare with previous experience of responding to feedback?

-What type/form of <u>feedback do you prefer to receive/provide via Google Docs/Wiki? Why?</u>

-What type/form of <u>feedback do you prefer to provide via Google Docs/Wiki? Why?</u>

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</tr>
<tr>
<td>Strategies of peer written feedback</td>
<td>

How did you use Google Docs/Wiki to provide your partner feedback? Can you give an example? Why?

Follow up questions

- ➢ -Can you clearly mention which strategies you adopted/applied while providing written feedback to your peer? Why?
- ➢ -May you describe in detail these approaches/strategies to providing feedback you used? Can you give some specific examples of these strategies?
- ➢ -Which of these approaches/strategies you used the most? Why?
- ➢ -Which of these approaches/strategies you used the least? Why?

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</table>

	-How did your partner provide feedback? **Follow up questions** ➤ -Can you clearly mention which strategies he adopted/applied while providing written feedback on your writing? ➤ -May you describe in detail these approaches/strategies to providing feedback that he used for providing feedback on your writing? Can you give some specific examples of these strategies? ➤ -How do you feel about his ways of providing feedback? ➤ Which of these approaches/strategies he used the most? ➤ -Which of these approaches/strategies he used the least?
Focus of peer written feedback	- What do you provide feedback on? Why?" **Follow up questions** ➤ -"Do you provide feedback on anything else? Why?" ➤ -Can you tell me specifically what aspects of writing (language, organization, or content) did you focus on as you provide your peer with written feedback? Why? ➤ -Do you provide feedback on form (language)? Why?/why not? ➤ -Do you provide feedback on content? Why?/ why not? ➤ -Did you provide feedback on organization? Why?/ Why not? ➤ -What did you provide feedback on the most? Why? ➤ -What did you provide feedback on the least? Why? -- -What did your partner provide feedback on? **Follow up questions** ➤ -Did he provide feedback on anything else? Why? ➤ -Can you tell me specifically what aspects of writing (language, organization, or content) did your partner focuses on as he provides you with written feedback? ➤ -Did he provide feedback on form? ➤ -Did he provide feedback on content? ➤ -Did he provide feedback on organization? ➤ -What did your partner provide feedback on the most? ➤ -What did your partner provide feedback on the least? ➤ -How do you feel about his focus when providing feedback?
Reactions to peer feedback	-What did you do with the feedback your partner gave you? Can you give an example? Why? **Follow up questions** ➤ -Did you do this with all of the feedback? ➤ -Is there anything else you did with the feedback? Can you give an example? Why?"

Form of feedback	-Can you tell me what type of comments (form of comments) did you use/apply as you give written feedback on your peer's written work? Why?
	
	Follow-up questions
	
	    ➢ Can you give me some specific examples?
	    ➢ What type(s) of feedback did you use the most? Why?
	    ➢ What type(s) of feedback did you use the least? Why?
	
	-You have talked about the types of comments you used but can you tell me what kinds of peer feedback comments did you receive via your assigned platform?
	
	Follow-up questions:
	
	    ➢ Can you give me some specific examples of the types of comments that you received?
	    ➢ Among the types of your peer feedback you received online via Google Docs/Wikis, is there a kind of feedback that you don't like or find not useful?
	    ➢ <u>What kinds of feedback do you not like, or find either not or less useful? Why?</u>
	    ➢ <u>Are there kinds of feedback you liked or found useful?</u>
	    ➢ <u>If so, which kinds of such peer feedback did you like or find most useful and valuable? Why?</u>

Prior experiences with peer feedback and web-based writing	➢ -Have you ever used tools like Google Docs and Wiki either for educational or private purposes?
	Follow-up questions
	    ➢ If yes, please describe.
	    ➢ How did you find this experience?
	    ➢ ---
	    ➢ -Have you ever used tools like Google Docs and Wiki for providing peer feedback?
	Follow up question
	    ➢ How did you find this experience?
	    ➢ ---
	    ➢ -Have you ever received peer feedback through tools like Google Docs and Wikis?
	Follow up question
	    ➢ How did you find this experience?
	    ➢ ---
	    ➢ -Have you used the commenting function in word and Google Docs?
	    Follow up question
	    ➢ How did you find this experience?
	    ➢ ---
	    ➢ -Can you also tell me about your previous pen/paper experience?
	    ➢ -How did you find this experience?
	    ➢ -Have you had any training for commenting on another's writing?
	    Follow-up questions
	    ➢ If yes, what kind of training did you receive?
	    ➢ -How did you find it?

Closing	-Is there anything else you would like to add about anything?

Appendix E: Background questionnaire about Google Docs and Wiki experience

Please read the following questions carefully and then choose the appropriate answer that matches your technical experience and knowledge about the use of Google Docs and Wiki.

Name:_____

Student ID: _____

Experience writing using the software and functions listed below and tick the option that matches your current level of familiarity.					
Software and functions	*Not familiar at all* *1*	*Not familiar* *2*	*Somewhat familiar* *3*	*Familiar* *4*	*Very familiar* *5*
Google Docs					
Wikis					
Blogs					
Chat forums/rooms					
Discussion forums					
Etherpad					
Microsoft Word documents with real-time co-authoring					
Paper					

Appendix F: Informed consent and consent form for participation in main study (students)

Appendix F1: Informed consent for participation in research project (students)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: www.york.ac.uk/educ

Title of project: Computer-mediated peer feedback

Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear Students,

I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.

You are being invited to take part in my PhD project 'Computer-mediated peer feedback.'

It is important for you to read and understand why this project is being done and what it will involve. If you are happy to participate, you will be asked to sign a consent form.

I am particularly interested in exploring the role of peer feedback provided via Google Docs and Wikis in improving students' individual writing as well as students' perceptions of computer-mediated peer feedback. The study will last for 15 weeks and if you wish to participate in this research, you will be asked to:

- Complete a writing task
- Complete training in the use of wikis and Google Docs
- Participate in three computer-mediated writing activities in either a wiki or Google Docs
- Complete a second writing task
- Participate in an interview, which will last approximately 20 minutes
- Complete a third writing task

The information you provide will be used for research purposes and will remain confidential and any information that identifies you will be stored separately from the data. All data will be anonymised before it is communicated to anyone else, and within a week of the completion of the delayed post-test (the third writing task). Any information that could be used to identify participants will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase. All your Wiki and Google Docs electronic data will be password-protected. The anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications. The anonymous data will be kept for six years and then will be destroyed. As a participant, you have the right to check the audio-recording transcripts of the interviews, online Wiki and Google Docs transcripts, and the final report. After conducting the last interview, you will have one-week period to request the transcript of the interviews. This research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part.

Your participation is voluntary and confidential, and you will be free to withdraw yourself and your data from the study at any point during data collection. After the completion of the third writing task

(delayed post-test), you will also have one-week period to withdraw from this study by emailing Hassan Asiri at hama511@york.ac.uk. Please express your consent and take part in this research by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____

Please keep this information sheet for your own records.

Thank you for taking the time to read this information.

Yours sincerely

NAME
Hassan Asiri

Appendix F2: Consent Form
Computer-mediated peer feedback
Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the above named research project and I understand that this will involve me taking part as described above.

I understand that the purpose of the research is to investigate role of peer feedback provided via Google Docs and Wikis in improving students' writing as well as students' perceptions of computer-mediated peer feedback

I understand that only the researcher will have access to any identifiable data. I also understand that my identity will be protected.

I understand that the anonymous data will be kept for six years and then will be destroyed.

I understand that my participation is voluntary and I can withdraw myself and my data at any point during data collection and within one week after the completion of data collection, by emailing Hassan Asiri at hama511@york.ac.uk .

I understand that the transcript of the online interaction will be anonymised, and that I have the right to request to view it and comment on it.

I understand that all data will be anonymised before it is communicated to anyone else, and within a week of the completion of the delayed post-test.

I understand that the anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications

I understand that any information that could be used to identify me will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase.

I understand that I will have the opportunity to ask questions regarding the study and receive satisfactory answers.

I understand that this research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee.

I understand that after conducting the last interview, I will have one-week period to request the transcript of the interviews.

Name: _____ **Date:** _____

Appendix G: Teacher training session

One EFL teacher will meet with the researcher in one of the computer labs in the e-learning centre at King Khalid University to receive one-hour training in the use of Google Docs and Wikis.

Objectives:

At the end of this session, teacher should be able to:

➢ Write on the Wiki & Google Docs pages.

➢ Edit and save content in both platforms

➢ Check editing through the history log

➢ Engage in collaborative writing activity with each other via the two mediums

Procedures:

➢ Distribution of a handout (user guide) explaining the steps of using Wikis and Google Docs

➢ A Power Point presentation involving practising and demonstrating the Google Docs and Wiki platforms. This specifically included:

▪ Training teachers how to log into accounts in Wiki and Google Docs

▪ Use of comments space for communicating with the students

▪ The process of editing, adding, deleting, saving the wiki and Google Docs page and checking the history log

▪ Dividing the class Wiki and Google Docs into group pages

➢ Asking teachers to practise the previous steps using the PB wiki and Google Docs platforms.

➢ Asking teachers to engage in a Wiki and Google Docs collaborative writing projects discussing …

➢ Both the researcher and one IT teacher will be available to respond to teachers' technical problems and to answer their questions with regards to the technical use of wiki and Google Docs

Appendix H: Student Training session

The students in the two writing classes who agreed to take part in the current study will meet with the researcher in the computer lab in the e-learning centre at KKU to receive a technical Google Docs and Wiki training similar to that is provided to the teachers.

<u>Objectives:</u>

At the end of this session, teachers should be able to:

➢ Write on the Wiki & Google Docs pages.

➢ Edit and save content in both platforms

➢ Check editing through the history log

➢ Engage in collaborative writing activity with each other via the two mediums

<u>Procedures</u>:

➢ Distribution of a handout (user guide) explaining the steps of using Wikis and Google Docs

➢ A Power Point presentation involving practising and demonstrating the Google Docs and Wiki plat-forms. This specifically included:

▪ Training teachers how to log into accounts in Wiki and Google Docs

▪ Use of comments space for communicating with the students

▪ The process of editing, adding, deleting, saving the wiki and Google Docs page and checking the history log

▪ Dividing the class Wiki and Google Docs into group pages

➢ Ask students to practise the previous steps using the PB wiki and Google Docs platforms.

➢ Ask students to engage in a Wiki and Google Docs collaborative writing projects discussing …

➢ Both the researcher and one IT teacher will be available to respond to teachers' technical problems and to answer their questions with regards to the technical use of wiki and Google Docs

Appendix I: Google Docs Handout

Please follow these steps in order to start using Google Docs.
Step1: Log in
- ✓ Please sign in using your email and password and then click sign in
- ✓ The login page is shown in the screen shot below.

When you choose to share a document through Google Docs, you get to decide how much access that person has to your document. Typically you can choose up to three different options for the level of access you give. The access you choose will depend why you are sharing the document with the person.

Can edit - If you choose this option, then the other person is able to make changes to the document. This is good for group work, where several people are collaborating on the project. This can also be a good match when turning in an assignment to a teacher, if the teacher needs to be able to mark up the document in detail.
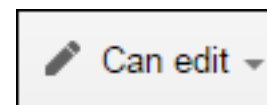
Can comment - If you choose this, then the other person will not be able to edit the document, but they will be able to leave comments in the document. These comments will not print out with the document, but will be visible on screen. This is useful for peer review, such as when a student needs another student to read their work and leave comments on it. This is also a good fit when turning in an assignment to a teacher, if the
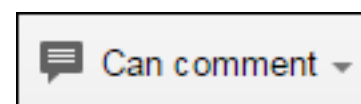
teacher just needs to leave feedback and grading information as comments.

Can view - If you choose this option, then the other person is only able to view the document. This is good for material that simply needs to be read (handouts, syllabi, sample work, etc.) or for documents that will serve as templates, where the user will make a copy of the document that they can modify as their own.
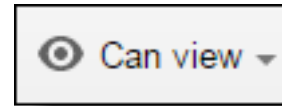
Step 2: Sharing a document with specific people

You can share a document with another person or group of people using the **big blue Share button** in the top right corner of a document. This is a good option to use if you are sharing the document with specific people or groups of people that can entered by email address.

1. With the document open, click the **Share** button in the top right corner
2. This will open the **Sharing settings** window

3. In the middle of the window there will be a box labeled People
4. Click in that box and type in the people or groups that you want to share the document with. This can include individual people or groups of people identified by a Google Group email address. The address book will find matches based on what you type.
5. Next click the 'Can edit' button to pick whether the users can edit or comment on or view the file
6. Optionally click in the 'Add a note' box to include directions or additional information for the recipients
7. Finally, click the 'Send' button
8. All of the recipients will now get an email message indicating that the document has been shared with them
9. For individuals, the document will also automatically show up in their Incoming folder in their Google Drive
10. For groups (Google Group email addresses), users will only get an email notification. Note: The document will not show up in their Docs list until they open it for the first time.

Step 3: Editing

Step 4: Adding a comment
➢ to add comments on Google Docs file.
1. Open a document.
   2. Highlight text you want to comment on
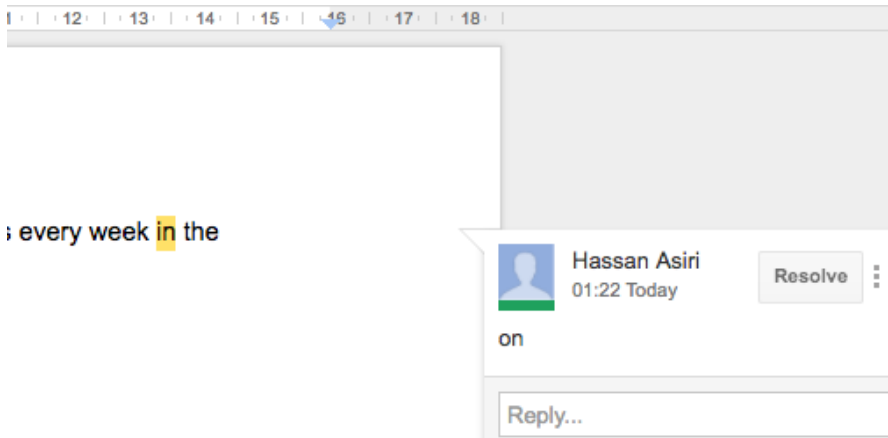
Step 5: How to use revision history

Google Docs allows you to see the full revision history for a document and revert back to any earlier version if needed.

1. Click File and then See revision history
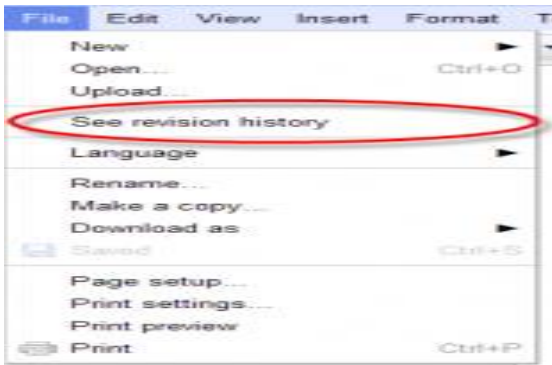
2. This will open a side bar on the right side of the screen where a history of changes will be listed by user

3. If you will changes click on any time stamp on the right, the document show what changes were made, highlighting the by color based on the user
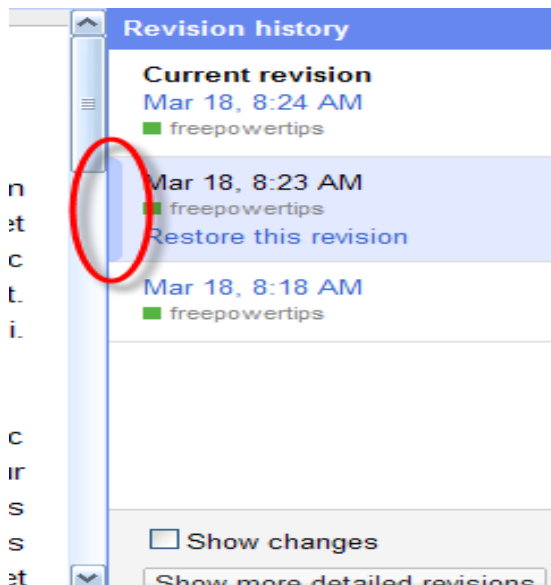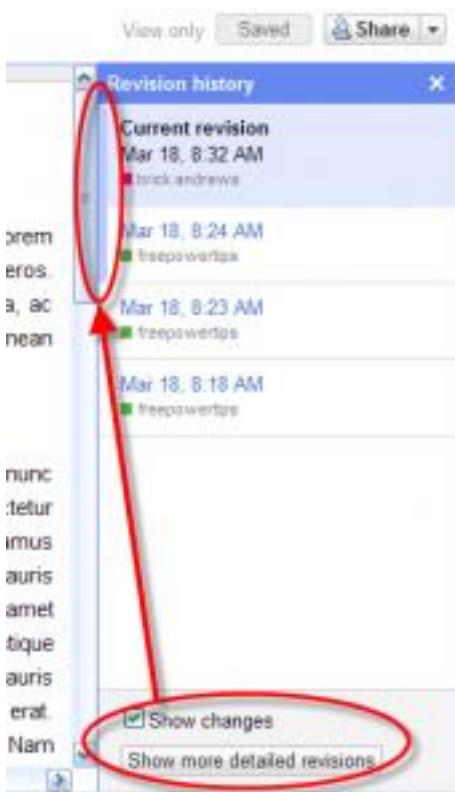
4. If you want to go back to an earlier version of the document, click Restore this revision on the time stamp for the version you want
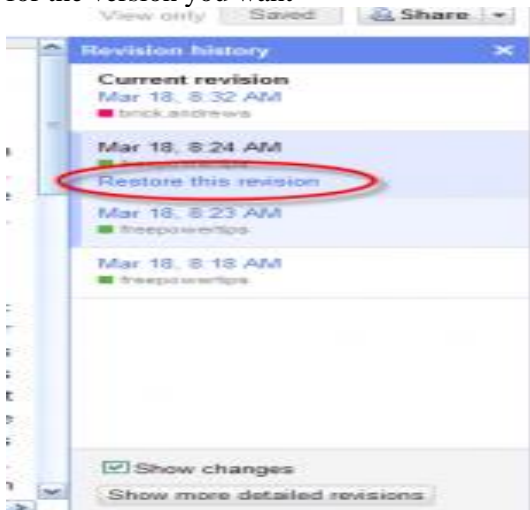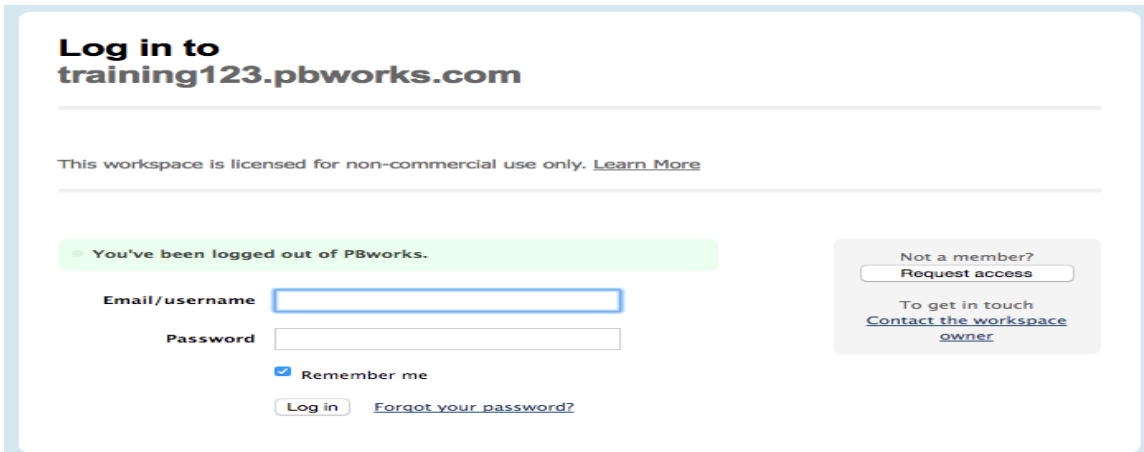
5. If you need to see smaller, more detailed changes, you can click the button at the bottom that says Show more detailed revisions
6. To exit the revision history mode, just click the X next to Document history at the top of the side bar

Appendix J: Handout for Wiki training session

1. Login

✓ Go to the following URL for the wiki we will use for practice during the workshop: http://train-ing123.pbworks.com/

✓ Log in your password and user name given to you by the researcher in the following login page
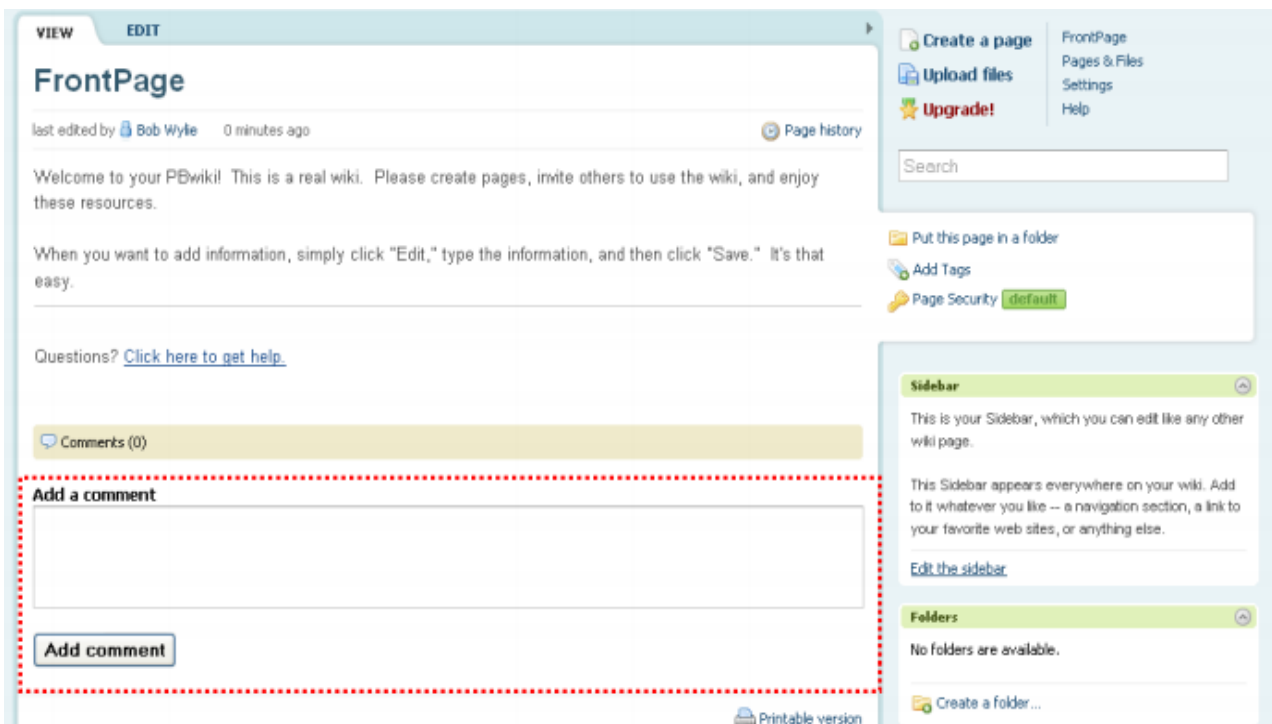
2. Adding comments about a page

To add a comment type into the text field at the bottom of a page and click the 'Add comment' button to submit it.

3. Edit a page

1. Click the Edit tab at the top of the page.

2. Now you can edit like you would in a word processor – add text, delete, bold, etc.
3. IMPORTANT!! Click the Save button at the bottom!

4. Using the History to Track Contributions

PBWorks have a few features which are useful for tracking contributions:

a) Last Edited By: at the top of each page PBWorks automatically displays the name of the most recent contributor, and the approximate time of contribution.

b) Page History: PBWorks tracks changes to every page and displays them in one list on a 'history' page (see Figure 14 (1)). If contributors enter a description each time they make a change, this description is listed along with the date and the contributor's name. Users can also compare revisions to get a detailed account of what was added and deleted (see Figure 14 (2)).

c) Recent Activity Bar: In the right sidebar, there is a bar which lists recent changes and who made them. The items are listed by Page name and contributor.

Appendix K: Pilot studies' letter of permission

Kingdom of Saudi Arabia
Ministry of Education
King Khalid University ,Tehamah Branch
College of Science and Arts

المملكة العربية السعودية
وزارة التعليم
جامعة الملك خالد – فرع تهامة
كلية العلوم و الآداب في محايل عسير

خطاب موافقة على جمع بيانات

المكرم الباحث / حسن أحمد عسيري   وفقه الله

السلام عليكم ورحمة الله وبركاته.. وبعد :

نريد ان نلفت انتباهكم بأنه لا مانع لدينا من اجراء الدراسة الميدانية المتعلقة بدراستكم لمرحلة الدكتوراه تحت عنوان:

(The impact of computer- mediated peer feedback on students' individual writing)

(أثر التغذية الراجعة من زملاء الفصل بإستخدام الكمبيوتر لتحسين أدائهم في الكتابة) وذلك على طلاب فرع الجامعة بتهامة

وحيث لا مانع لدينا من اجراء الدراسة حيث تمت التوصية بالموافقة على طلبكم في مجلس الكلية الثالث بتوصية رقم

١٤٣٨/٣/٤_١٤٣٩ بتاريخ ١٤٣٩/١/١٣ حسب خطتكم لذلك خلال الفترة ١٥ نوفمبر ٢٠١٧ إلى ٢٦ إبريل ٢٠١٨ على أن

لا تتحمل الجامعة أي اعباء إدارية او مالية في هذا الجانب ، وبناء على طلبكم تم تحريره .

وتقبلوا منا خالص الشكر و التحايا.....

عميد كلية العلوم والآداب بمحايل عسير

د./ إبراهيم بن علي آل قايد عسيري   الختم

223

Appendix L: Main study's permission letter

خطاب موافقة على جمع بيانات

المكرم الباحث / حسن أحمد عسيري   وفقه الله

السلام عليكم ورحمة الله وبركاته. . وبعد:

نريد ان نلفت انتباهكم بأنه لا مانع لدينا من اجراء الدراسة الميدانية المتعلقة بدراستكم لمرحلة الدكتوراه تحت عنوان:

(The impact of computer- mediated peer feedback on students' individual writing)

(أثر التغذية الراجعة من زملاء الفصل باستخدام الكمبيوتر لتحسين أدائهم في الكتابة) وذلك على طلاب فرع الجامعة بتهامة

وحيث لا مانع لدينا من اجراء الدراسة حيث تمت التوصية بالموافقة على طلبكم في مجلس الكلية الثالث بتوصية رقم

1439-1438/2/1 بتاريخ 1439/11/5 حسب خطتكم البحثية لذلك خلال الفترة من 2 سبتمبر 2018 إلى 14 ديسمبر

2018 على أن لا تتحمل الجامعة أي اعباء إدارية او مالية في هذا الجانب ، وبناء على طلبكم تم تحريره .

وتقبلوا منا خالص الشكر و التحيا.....

عميد كلية العلوم والآداب بمحايل عسير

1439/11/24

د./ إبراهيم بن علي آل قايد عسيري

224

Appendix M: Informed consent and consent form for participation in first pilot study (students)

Appendix M1: Informed consent for participation in first pilot study (students)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: www.york.ac.uk/educ

Title of project: Computer-mediated peer feedback

Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear Students,
I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.
You are being invited to take part in my pilot study for the PhD project 'Computer-mediated peer feedback.' It is important for you to read and understand why the pilot study is being done and what they will involve. If you are happy to participate, you will be asked to sign a consent form.
In this pilot study, I am particularly interested in exploring the role of peer feedback provided via Google Docs and Wikis in improving students' individual writing as well as students' perceptions of computer-mediated peer feedback. The study will last for two weeks and if you wish to participate in this research, you will be asked to:

- Complete training in the use of wiki and Google Docs
- Participate in a computer-mediated writing activity in either a wiki or Google Docs
- Participate in an interview, which will last approximately 20 minutes
  The information you provide will be used for research purposes and will remain confidential and any information that identifies you will be stored separately from the data. All data will be anonymised before it is communicated to anyone else, and within a week of the completion of the interviews. Any information that could be used to identify participants will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase. All your Wiki and Google Docs electronic data will be password protected. The anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications. The anonymous data will be kept for six years and then will be destroyed. As a participant, you have the right to check the audio-recording transcripts of the interviews, online Wiki and Google Docs transcripts, and the final report. Furthermore, you will have the right to ask questions about the study and receive satisfactory answers. After conducting the last interview, you will have one-week period to request the transcript of the interviews and to withdraw

from this study. This research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part.

Your participation is voluntary and confidential, and you will be free to withdraw yourself and your data from the study at any point during data collection. After the completion of data collection of each pilot study, you will also have one-week period to withdraw from the study by emailing Hassan Asiri at hama511@york.ac.uk. Please express your consent and take part in this research by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____

Please keep this information sheet for your own records.

Thank you for taking the time to read this information.

Yours sincerely

NAME

Hassan Asiri

Appendix M2: Consent Form
Computer-mediated peer feedback

Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the above named research project and I understand that this will involve me taking part as described above. ☐

I understand that the purpose of the research is to investigate role of peer feedback provided via Google Docs and Wikis in improving students' writing as well as students' perceptions of computer-mediated peer feedback. ☐

I understand that only the researcher will have access to any identifiable data. I also understand that my identity will be protected. ☐

I understand that the anonymous data will be kept for six years and then will be destroyed. ☐

I understand that my participation is voluntary and I can withdraw myself and my data at any point during data collection and within one week after the completion of data collection, by emailing Hassan Asiri at hama511@york.ac.uk ☐

I understand that the transcript of the online interaction will be anonymised, and that I have the right to request to view it and comment on it. ☐

I understand that all data will be anonymised before it is communicated to anyone else, and within a week of the completion of the interviews. ☐

I understand that the anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications. ☐

I understand that any information that could be used to identify me will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase.
I understand that I will have the opportunity to ask questions regarding the study and receive satisfactory answers I understand that this research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee. ☐

I understand that after conducting the last interview, I will have one-week period to request the transcript of the interviews. ☐

I understand that my participation is voluntary and confidential, and I will be free to withdraw my data and myself from the study at any point during data collection. ☐

I understand that after the completion of data collection of each pilot study, I will have one-week period to withdraw from the study by emailing Hassan Asiri at hama511@york.ac.uk ☐
Name: _____Date: _____ Signature: _____

227

Appendix N: Pilot study information sheet and consent form (teacher)

Appendix N1: Pilot study information sheet (teacher)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: www.york.ac.uk/educ

Title of project: Computer-mediated peer feedback

Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear teacher,

I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.

You are being invited to take part in my pilot study for the PhD project 'Computer-mediated peer feedback.' It is important for you to read and understand why they are being done and what they will involve. In the first pilot study, I am particularly interested in exploring the role of peer feedback provided via Google Docs and Wikis in improving students' individual writing as well as students' perceptions of computer-mediated peer feedback. The study will last for two weeks and students participating in this study will be asked to:

- Complete training in the use of wiki and Google Docs
- Participate in a computer-mediated writing activity in either a wiki or Google Docs
- Participate in an interview, which will last approximately 20 minutes

You will have the right to ask questions regarding the pilot study and receive satisfactory answers. This research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part. Please express your consent and take part in this research by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk or my Thesis Advisory Panel member sarah.olive@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____

Signature:_____

Please keep this information sheet for your own records.

Thank you for taking the time to read this information.

Yours sincerely

Hassan Asiri

Appendix N2: Consent Form

Computer-mediated peer feedback
Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the above named research project.

☐

I understand that the purpose of the first phase of pilot study is to investigate role of peer feedback provided via Google Docs and Wikis in improving students' writing as well as students' perceptions of computer-mediated peer feedback.

☐

I understand that the purpose of the second phase of pilot study is to check that the three writing tasks that will be used in the main study as pre-test and post-test, as well as delayed post-test are of a similar difficulty level.

☐

I agree to take part in the PhD project.

☐

I understand that this research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part.

☐

I understand that I will have the opportunity to ask questions regarding the study and receive satisfactory answers.

☐

Name: _____ **Date:** _____

Signature: _____

Appendix O: Pilot study information sheet and consent form (head of the department)

Appendix O1: Pilot study information sheet (head of the department)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: www.york.ac.uk/educ

Title of project: Computer-mediated peer feedback

Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear Mr. Chairman,

I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.

I am looking for your kind approval to allow me to conduct my pilot studies for the PhD project as entitled above in the Department of English at King Khalid University (KKU) and to give me access to students in the 'Writing IV' course.

In the first phase of the pilot study, I am particularly interested in exploring the role of peer feedback provided via Google Docs and Wikis in improving students' individual writing as well as students' perceptions of computer-mediated peer feedback. The study will last for two weeks and students participating in this research will be asked to:

- Complete training in the use of wiki and Google Docs
- Participate in a computer-mediated writing activity in either a wiki or Google Docs
- Participate in an interview, which will last approximately 20 minutes

In the second phase of the pilot study, I am interested in checking that the writing tasks that will be used in the main study as pre-test, post-test, as well as delayed post-test are of a similar difficulty level. The study will last for two weeks and students participating in this research will be asked to individually complete *three writing tasks*.

Please express your consent to give me the opportunity to conduct my pilot studies in the Department of English at KKU and give me access to students by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk or my Thesis Advisory Panel member sarah.olive@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____

Signature:_____

Please keep this information sheet for your own records.

Thank you for taking the time to read this information.

Yours sincerely

Hassan Asiri

Appendix O2: Consent Form
Computer-mediated peer feedback

Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the pilot studies of the above named research project and I understand that this will involve a sample of students from the Department of English at King Khalid University taking part as described above.

I understand that the purpose of the first phase of pilot study is to investigate role of peer feedback provided via Google Docs and Wikis in improving students' writing as well as students' perceptions of computer-mediated peer feedback.

I understand that the purpose of the second phase of pilot study is to check that the three writing tasks that will be used in the main study as pre-test and post-test, as well as delayed post-test are of a similar difficulty level.

I agree to give the researcher the chance to conduct his pilot study in the Department of English at KKU.
I agree to give the researcher access to students in the 'Writing IV' course in the Department of English at KKU in order to conduct his PhD project.

Name: _____   Date:_____
Signature: _____

Appendix P: Pilot study information sheet and consent form (teacher)

Appendix P1: Pilot study information sheet (teacher)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: www.york.ac.uk/educ

Title of project: Computer-mediated peer feedback

Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear teachers,

I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.

You are being invited to take part in this pilot study for the PhD project 'Computer-mediated peer feedback.' It is important for you to read and understand why they are being done and what they will involve. In the first pilot study, I am particularly interested in checking that the writing tasks that will be used in the main study as pre-test, post-test, as well as delayed post-test are of a similar difficulty level. The study will last for two weeks and your students participating in this research will be asked to individually complete *three writing tasks*.

You will have the right to ask questions regarding the pilot study and receive satisfactory answers. This research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part. Please express your consent and take part in this research by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk or my Thesis Advisory Panel member sarah.olive@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____
Signature:_____
Please keep this information sheet for your own records.

Thank you for taking the time to read this information.

Yours sincerely

Hassan Asiri

Appendix P2: Consent Form
Computer-mediated peer feedback

Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the above named research project.

I understand that the purpose of the first phase of pilot study is to investigate role of peer feedback provided via Google Docs and Wikis in improving students' writing as well as students' perceptions of computer-mediated peer feedback.

I understand that the purpose of the second phase of pilot study is to check that the three writing tasks that will be used in the main study as pre-test and post-test, as well as delayed post-test are of a similar difficulty level.

I agree to take part in the PhD project.

I understand that this research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part.

I understand that I will have the opportunity to ask questions regarding the study and receive satisfactory answers.

Name: _____ **Date:** _____

Signature: _____

Appendix Q: Informed consent and consent form for participation in second pilot study

(students)

Appendix Q1: Informed consent for participation in second pilot study (students)

THE UNIVERSITY *of York*

DEPARTMENT OF EDUCATION
Heslington, York, YO10 5DD
Direct Line: (01904) 322526
Fax: (01904) 323459
Email: poppy.nash@york.ac.uk
Web: *www.york.ac.uk/educ*

Title of project: Computer-mediated peer feedback
Researcher: Mr. Hassan Asiri, Department of Education, University of York

Dear Students,

I am a PhD student in the Department of Education at the University of York, in the UK. I am currently working on a PhD project, under the supervision of Dr. Zöe Handley, investigating the use of Wiki vs. Google Docs technology in English as a foreign language classes.

You are being invited to take part in my second pilot study for the PhD project 'Computer-mediated peer feedback.' It is important for you to read and understand why the pilot study is being done and what they will involve. If you are happy to participate, you will be asked to sign a consent form.

In this pilot study, I am particularly interested in checking that the writing tasks that will be used in the main study as pre-test, post-test, as well as delayed post-test are of a similar difficulty level. The study will last for two weeks and if you wish to participate in this pilot study, you will be asked to individually complete *three writing tasks*.

The information you provide will be used for research purposes and will remain confidential and any information that identifies you will be stored separately from the data. All data will be anonymised before it is communicated to anyone else, and within a week of the completion of the interviews. Any information that could be used to identify participants will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase. The anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications. The anonymous data will be kept for six years and then will be destroyed.

As a participant, you have the right to ask questions about the study and receive satisfactory answers. This research has been reviewed by,and received ethics clearance from the University of York Research Ethics Committee, and there are no risks associated with taking part.

Your participation is voluntary and confidential, and you will be free to withdraw yourself and your data from the study at any point during data collection. After the completion of data collection of this pilot study, you will also have one-week period to withdraw from the study by emailing Hassan Asiri at hama511@york.ac.uk. Please express your consent and take part in this research by completing the form enclosed/attached, then sign and date the form. Thank you.

More information about the project can be obtained from my supervisor zoe.handley@york.ac.uk. If you have any concerns about the project, please contact the Chair of the Ethics Committee on education-research-adminstrator@york.ac.uk.

Name:_____ Date:_____
Please keep this information sheet for your own records.
Thank you for taking the time to read this information.
Yours sincerely
 Hassan Asiri

Appendix Q2: Consent Form
Computer-mediated peer feedback

Please initial each box if you are happy to take part in this research.

I confirm that I have read and understood the information given to me about the above named research project and I understand that this will involve me taking part as described above. ☐

I understand that the purpose of the research is to check that the writing tasks that will be used in the main study as pre-test, post-test, as well as delayed post-test are of a similar difficulty level. ☐

I understand that only the researcher will have access to any identifiable data. I also understand that my identity will be protected. ☐

I understand that the anonymous data will be kept for six years and then will be destroyed. ☐

I understand that my participation is voluntary and I can withdraw myself and my data at any point during data collection and within one week after the completion of data collection, by emailing Hassan Asiri at hama511@york.ac.uk ☐

I understand that all data will be anonymised before it is communicated to anyone else, and within a week of the completion of the interviews. ☐

I understand that the anonymised data will be used exclusively for research purposes, and will be presented at conferences, in academic research journals and other academic publications. ☐

I understand that any information that could be used to identify me will not be kept longer than absolutely necessary and will be deleted and destroyed after the completion of the data collection phase. ☐

I understand that I will have the opportunity to ask questions regarding the study and receive satisfactory answers. ☐

I understand that this research has been reviewed by, and received ethics clearance from the University of York Research Ethics Committee. ☐

I understand that after conducting the last interview, I will have one-week period to request the transcript of the interviews.

I understand that my participation is voluntary and confidential, and I will be free to withdraw my data and myself from the study at any point during data collection.

I understand that after the completion of data collection of this pilot study, I will also have one-week period to withdraw from the study by emailing Hassan Asiri at hama511@york.ac.uk

Name: _____**Date**: _____

Signature: _____

Appendix R: Teacher's and students' training evaluation forms

Appendix R1: Teacher's Training Evaluation Interview

1- How was the training?

2- What did you like the most about this training?

3- Have you encountered any difficulties during the Wiki/Google Docs training activities? If yes, please specify?

4- To what extent you are confident about your use of Google Docs and Wikis functions such as editing, saving the changes, tracking the history of changes, posting, commenting and writing on the wiki and Google Docs platforms?

5- Do you feel that you require additional training? If yes, what kind of further training you require?

Appendix R2: Students' Training Evaluation Form

Please tick the category describing your level of confidence

Features	*Not confident at all* *1*	*Not confident* *2*	*Somewhat confident* *3*	*Confident* *4*	*Very confident* *5*
1. Logging into the platform					
2. Commenting					
3. Editing the page					
4. Saving the page					
5. Tracking the history of changes					
6. Comparing different versions of the wiki page					
7. Posting a wiki thread					
8. Replying to a wiki thread					
Google Docs Evaluation Form					
Features	*Not confident at all* *1*	*Not confident* *2*	*Somewhat confident* *3*	*Confident* *4*	*Very confident* *5*
1. Logging into the Google Docs					
2. Adding a comment					
3. Replying to comments					
4. Editing the document					
5. Tracking the history of changes					

Appendix S: Average ratings of second pilot study's overall writing performance

Test version 1	Test version 2	Test version 3
88.33	87.67	88.33
88.33	88.67	87.33
87	88.33	88.67
88.33	88.67	88.33
89	88.33	88
87.33	89.67	87.33
88.67	88	87
87	88.67	89
87.67	88.67	88
88.33	88.33	88.33

Appendix T: Results of Shapiro-Wilk test of normality

Task	Statistic	Df	Sig
Writing task 1	.02	10	.19
Writing task 2	.03	10	.18
Writing Task 3	.20	10	.56

Appendix U: Tests of normality for the overall writing test scores

This appendix includes results of Shapiro-Wilk test, Skewness and Kurtosis, and Histograms for testing the normal distribution of the overall writing data.

U1: Histograms and corresponding Q-Q plots of the overall writing data

Normality of the Google Docs and Wiki groups' average scores of overall writing in the pre-test, post-test, and delayed post-test was first tested visually by construction and examination of histograms. The graphs of histograms and their corresponding Q-Q plots revealed that the Google Docs group's data meets normality assumption. On the other hand, the histograms and Q-Q plots of the Wiki group's data similarly revealed that the data meets normality assumption.
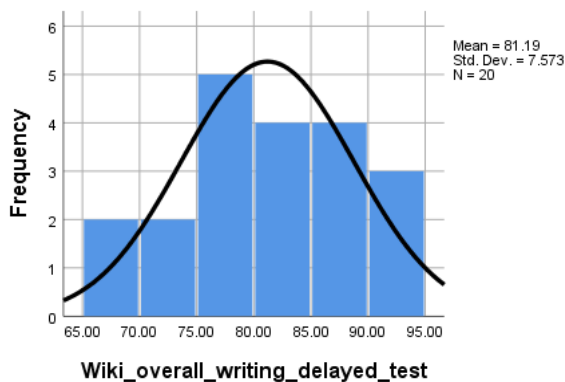
Google Docs experimental group

Google_Docs_overall_writing_
delayed_test

Mean = 83.34
Std. Dev. = 5.965
N = 20

Normal Q-Q Plot of
Wiki_overall_writing_delayed_test

Wiki experimental group:

Mean = 72.99
Std. Dev. = 9.032
N = 20

Wiki_overall_writing_pre_test

Normal Q-Q Plot of Wiki_overall_writing_pre_test

Mean = 83.73
Std. Dev. = 7.406
N = 20

Wiki_overall_writing_post_test

Normal Q-Q Plot of Wiki_overall_writing_post_test
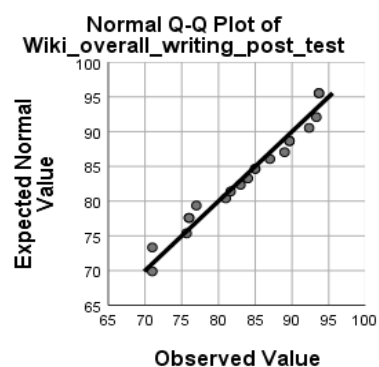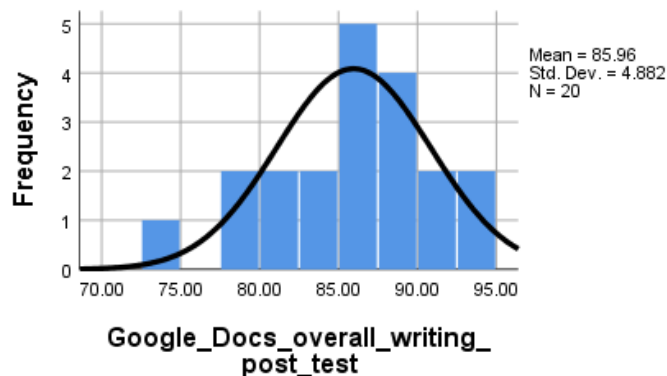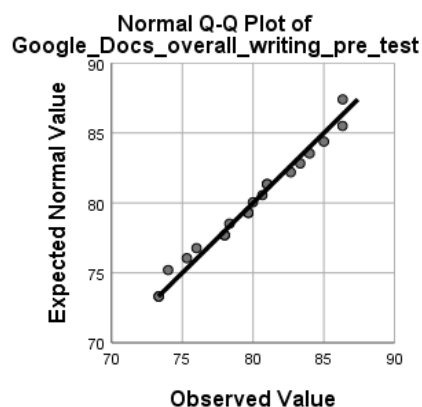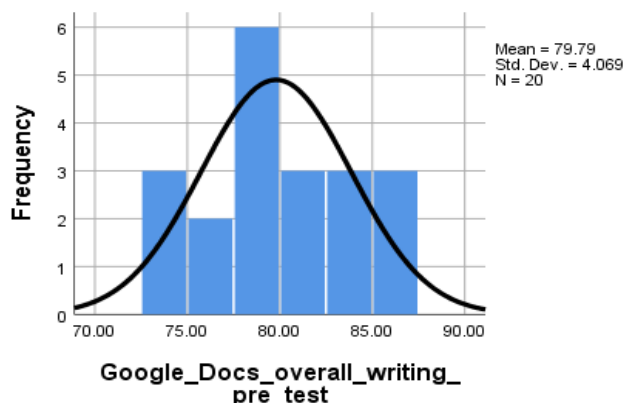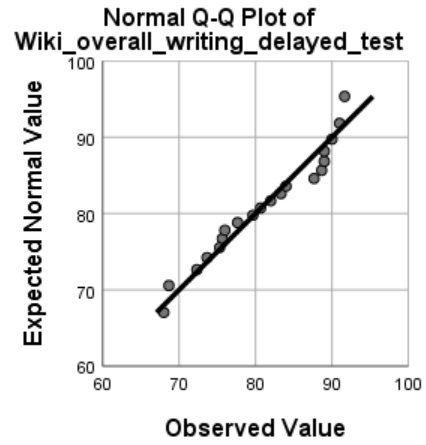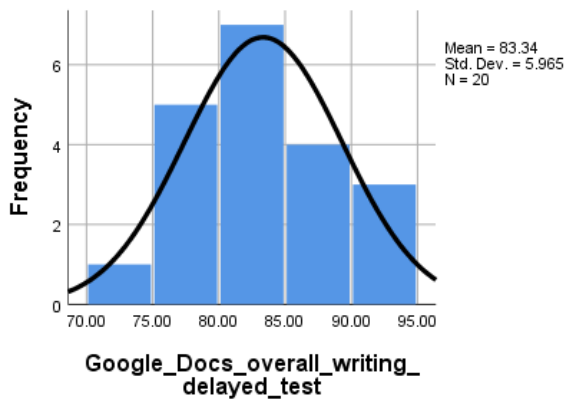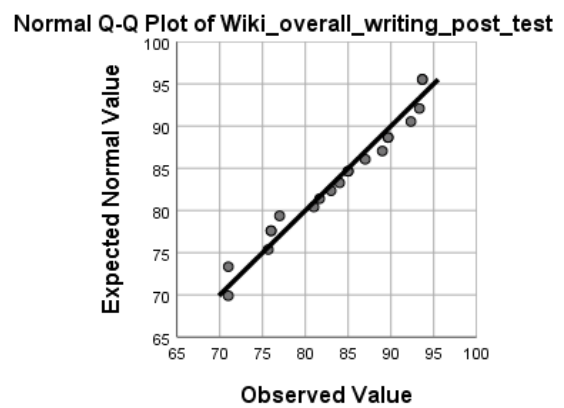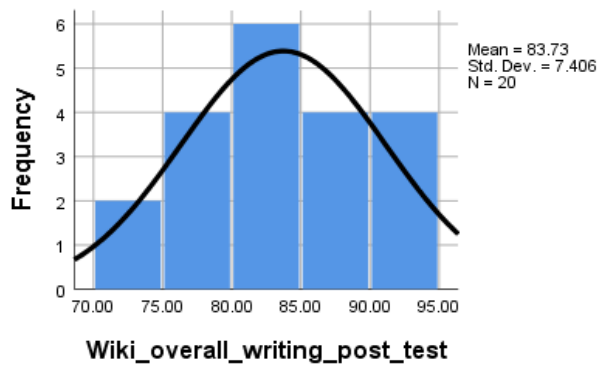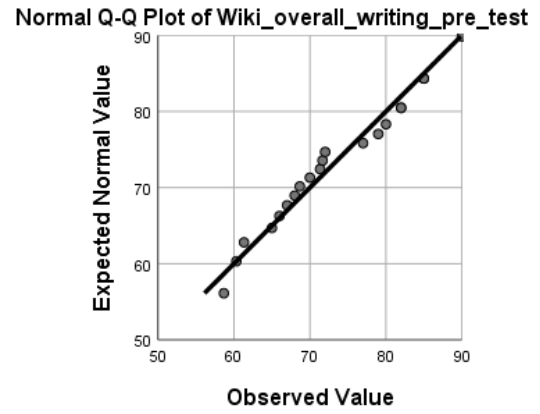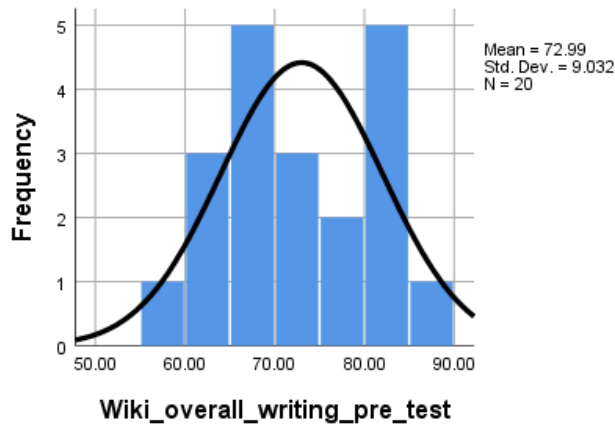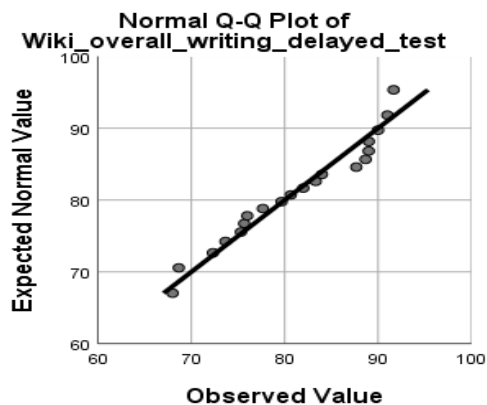
U2: Results of Kurtosis and skewness

The shape of distributions was quantified for further checking whether the distribution of scores is normal. The first way for quantifying the measures of shape was done by checking the values of kurtosis and skewness since looking at the histograms is "subjective and open to abuse" (Field, 2009, p. 136). The statistic for skewness indicates the amount and direction of the skew, while kurtosis indicates how tall and short the central peak is relative to a standard bell curve. As shown in Table 1 below, the values of skewness and Kurtosis indicate that the distribution for Google Docs and Wiki pre-tests, post-tests and delayed post-tests is fairly/acceptably symmetric regardless of the little positive skewness in pre-test and delayed post-test data and the little negative skewness in the immediate post-test data. Therefore, the skewness and Kurtosis values confirm the findings of histograms and their corresponding plots, which showed acceptable symmetry and normality of distribution of the Google Docs and Wiki groups' data (overall writing performance scores).

Table 1: Statistics (Skewness and Kurtosis values) of Google Docs and Wiki groups' scores

Test	**Skewness**		**Kurtosis**	
	Static	*Std. Error*	*Static*	*Std. Error*
Google Docs pre-test	-.04	.51	-.86	.99
Google Docs post-test	-.11	.51	.42	.99
Google Docs delayed post-test	-.11	.51	.42	.99
Wiki pre-test	.20	.51	-.96	.99
Wiki post-test	-.20	.51	-1.19	.99
Wiki delayed post-test	-.20	.51	-1.19	.99

As displayed in the Table 1 above, the skewness (-.20 to .20) and Kurtosis (-1.19 to .42) values of Google Docs and Wiki pre-test, post-test and delayed post-test data occurred within the range of 2 and -2, which is an acceptable range for normal distribution (George & Mallery, 2019). Therefore, the skewness and Kurtosis values confirm the visual examination of the histograms and allow for parametric tests to be run with Google Docs and Wiki groups' data (scores of overall writing performance). Both skewness and kurtosis values of the Google Docs and Wiki pre-test, post-test and delayed post-test data yield results, which confirm the previously reported visual distribution of the Google Docs and Wiki groups' data (histograms).

U3: Results of Shapiro-Wilk test with description of the results

The shape of distributions was also quantified through use of Shapiro-Wilk test to further verify the assumptions of normality. This test is used since the number of participants in each group is less than 50. The results of Shapiro-Wilk test were used to determine that the Google Docs and Wiki treatment groups did not violate assumptions of normality (Tabachnick & Fidell, 2013). The test was run with the standard alpha of .05. The results are shown in Table 2 below.

Table 2: Shapiro-Wilk test values of the Google Docs and Wiki groups

	Shapiro-Wilk		
Test	*Static*	*Df*	*Sig.*
Google Docs pre-test	0.96	20	0.49
Google Docs post-test	0.99	20	0.99
Google Docs delayed post-test	0.98	20	0.96
Wiki pre-test	0.96	20	0.57
Wiki post-test	0.94	20	0.20
Wiki delayed post-test	0.94	20	0.21

There were three issues that appeared in the Shapiro-Wilk test displayed in Table 2. The Google Docs pre-test level of variable was reported at p .49 level of significance, the Google Docs post-test was reported at p .99 level of significance and delayed post-test was reported at p .96 level of significance. On the other hand, the Wiki pre-test level of variable was reported at p

.57 level of significance, the Wiki post-test was reported at p.20 level of significance and de-layed post-test was reported at p.21 level of significance. All values were above the standard .05 level of significance, suggesting that such data for the writing performance variable is normal. In other words, a Shapiro-Wilk normality test showed that the Google Docs data (W = .49, .99, .96, p >05) and the Wiki data (W = .57, .20, .21, p >05) were normally distributed, meaning that parametric tests can be used for comparing the participants' performance from the pre-test to post-test and from post-test to delayed post-test as well as for comparing the Google Docs participants' performance with that of their counterparts in Wiki group at the pre-test, post-test and delayed post-test.

 The Shapiro-Wilk findings confirm the findings of the histograms as well as skewness and kurtosis values with respect to normal distribution of Google Docs and Wiki pre-, post- and delayed post-test scores of overall writing performance. They revealed that the Wiki group's overall writing performance data (0.57, 0.20, and 0.21 were greater than p= .05) and Google Docs group's overall writing performance data (0.49, 0.99, 0.96 > p = 0.05) did not violate the assumptions of normality. In other words, the Shapiro-Wilk findings confirm the findings of the histograms and the skewness and kurtosis values with respect to normal distribution of Google Docs and Wiki pre-test, post-test and delayed post-test scores of overall writing per-formance regardless of the reported slight skewness. Therefore, parametric tests were used to explore the data set.

Appendix V: Average ratings on overall writing across raters

V1: Google Docs group's average ratings on overall writing across the three raters

Participants	Pre	Post	delayed
1	78.33	86	83.99
2	73.33	74.99	80.66
3	86.33	92.66	93.66
4	85	81.99	79.66
5	76	84	82.66
6	86.32	94.66	94.66
7	79.66	85	78.99
8	77.99	85.99	82.33
9	83.99	90.99	87.99
10	83.33	89.99	85.66
11	80.99	88	83.66
12	73.33	79.66	70
13	80.99	87.32	86.32
14	79.99	87.99	87
15	80.66	88.66	84.66
16	77.99	82.33	75.66
17	74	78.99	76
18	79.66	85.32	83.66
19	82.66	90.99	90
20	75.32	83.66	79.66

V2: Wiki overall writing averaged across the three raters

Participants	Pre	Post	Delayed
1	78.99	88.99	88.66
2	65.99	75.99	73.66
3	64.99	75.66	75.32
4	71.66	86.99	88.99
5	72	89.66	83.99
6	71.33	84	81.99
7	67.99	80.99	79.66
8	76.99	84.99	77.66
9	84.99	89.66	91.66
10	69.99	76.99	75.66
11	80	92.33	90
12	58.66	70.99	68.66
13	61.32	71	67.99
14	82	93.66	87.66
15	66.99	84.99	75.99
16	68.66	83	83.32
17	89.99	93.32	89
18	60.32	75.99	72.32
19	84.99	93.66	90.99
20	82	81.66	80.66

Appendix W: Tests of normality for writing test scores in form and content

This appendix includes results of Histograms, Shapiro-Wilk test, and Skewness and Kurtosis for testing the normal distribution of the form-focused and content-based writing data.
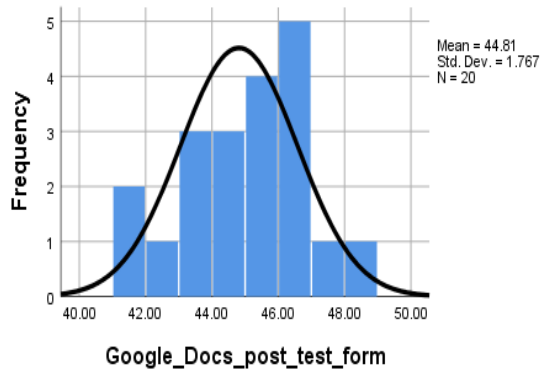
W-1: Results of histograms and corresponding Q-Q plots

A graphic representation of the data (Google Docs and Wiki groups' average scores in the dimensions of form and content) was created to provide a visual indication of the normality of the distribution. The generated graphic representation of data (histograms) and their corresponding Q-Q plots show that the data (Google Docs and Wiki students' average scores in the two dimensions of form and content in pre-test, post-test and delayed post-test) are normally distributed.
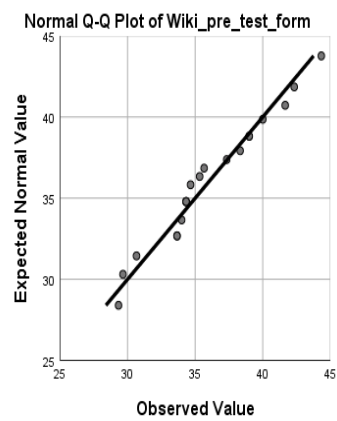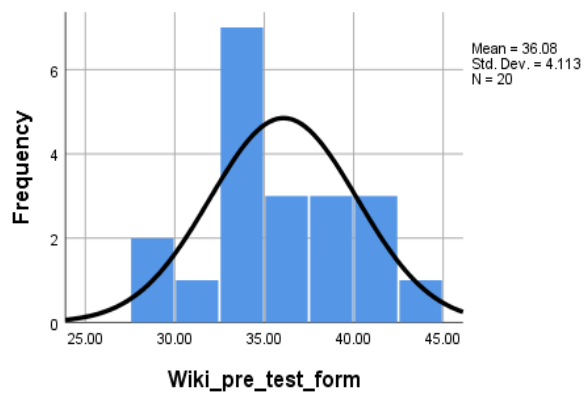
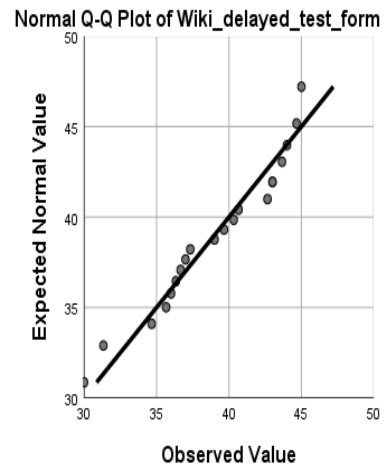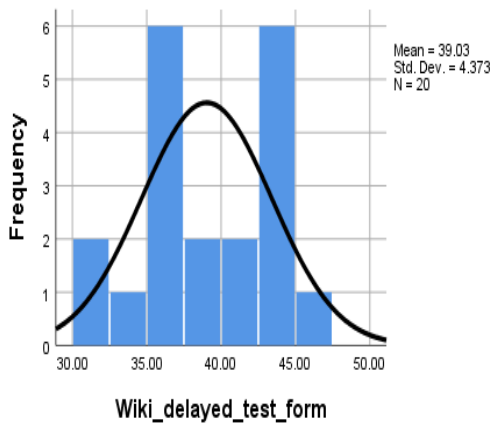**W-1: Histograms and corresponding Q-Q plots of form-based data**

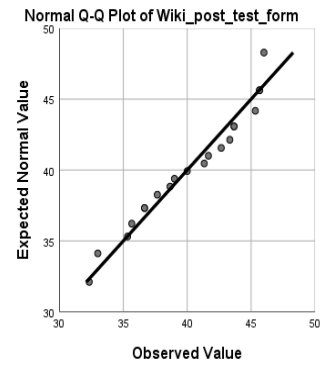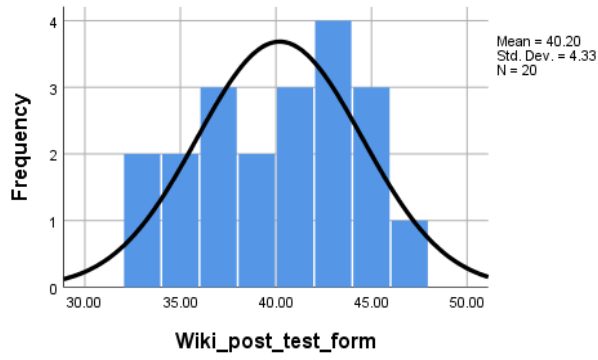**Google Docs experimental group**

Google_Docs_post_test_form

Normal Q-Q Plot of Google_Docs_post_test_form

Google_Docs_delayed_test_form

Normal Q-Q Plot of Google_Docs_delayed_test_form

Wiki experimental group:

Wiki_pre_test_form

Normal Q-Q Plot of Wiki_pre_test_form
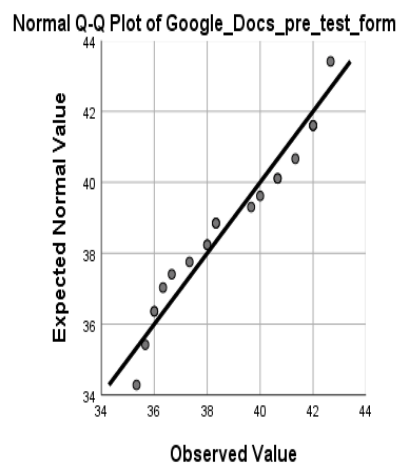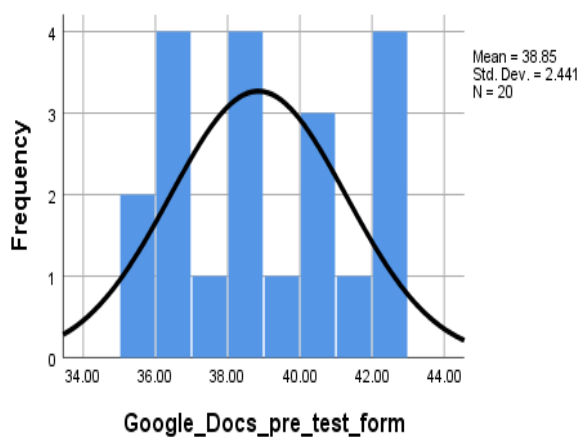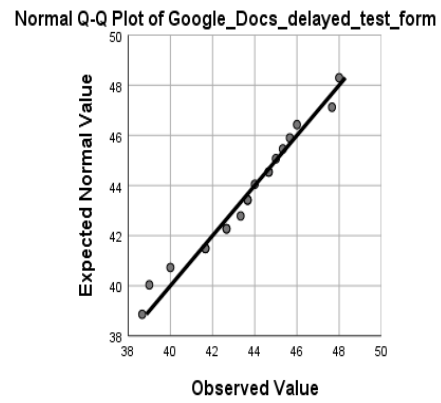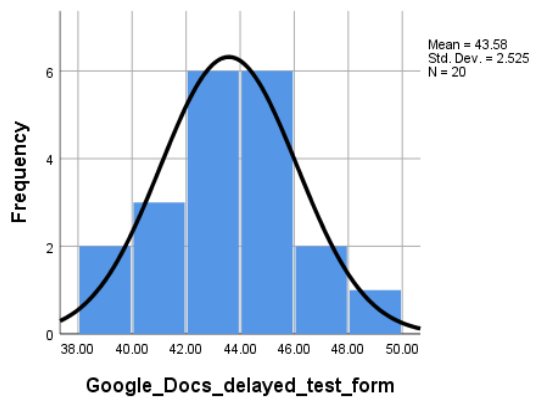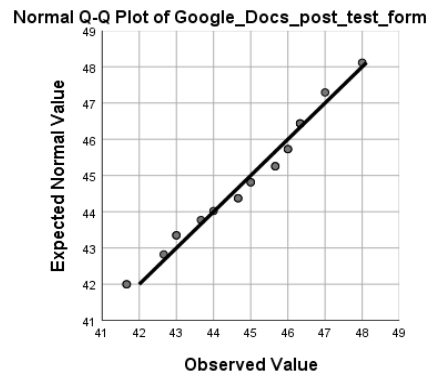
Appendix W: (continued)

W-2: Histograms and corresponding Q-Q plots of content-based data

Google Docs experimental group
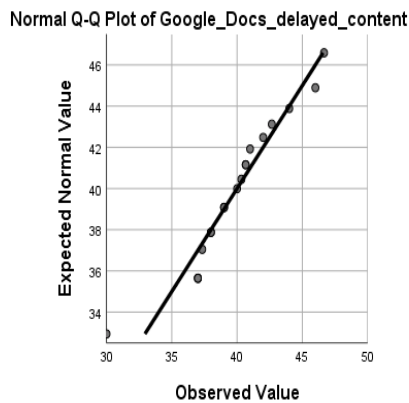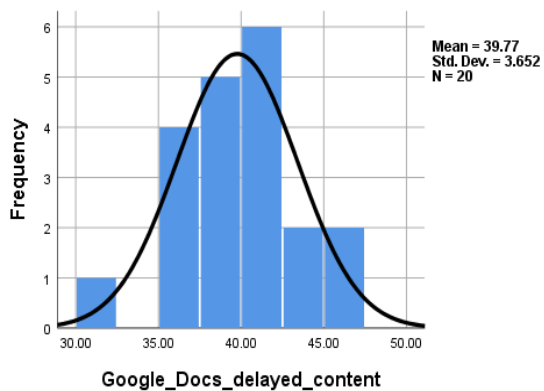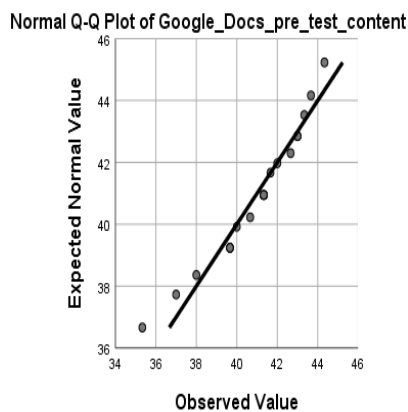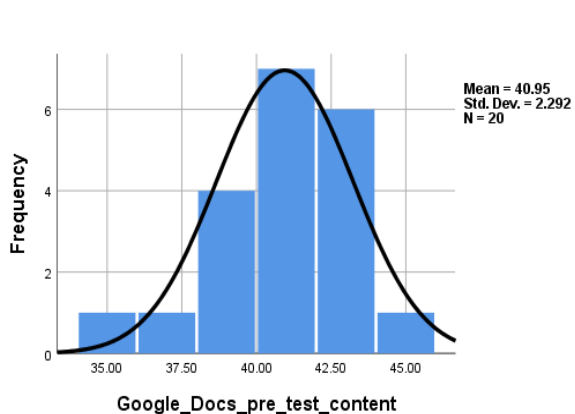
Google Docs experimental group

Wiki experimental group

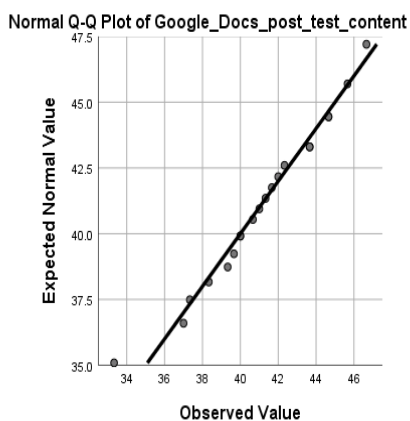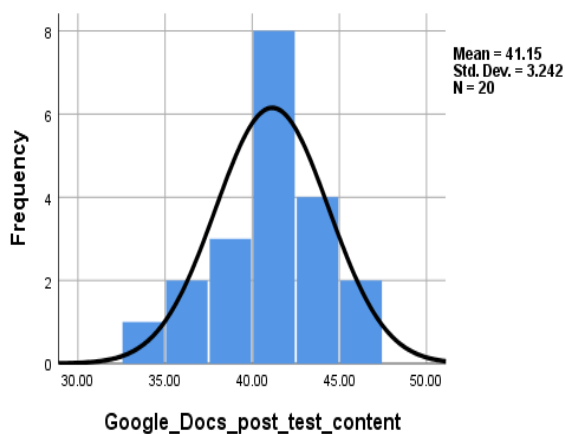Mean = 36.91
Std. Dev. = 5.088
N = 20

Mean = 43.53
Std. Dev. = 3.154
N = 20

Mean = 42.16
Std. Dev. = 3.309
N = 20
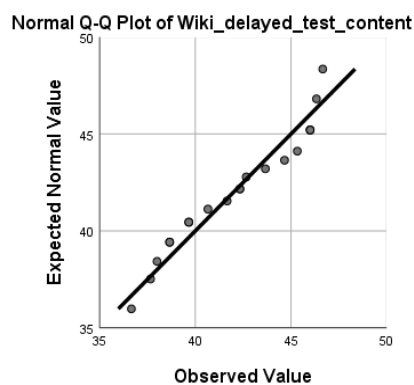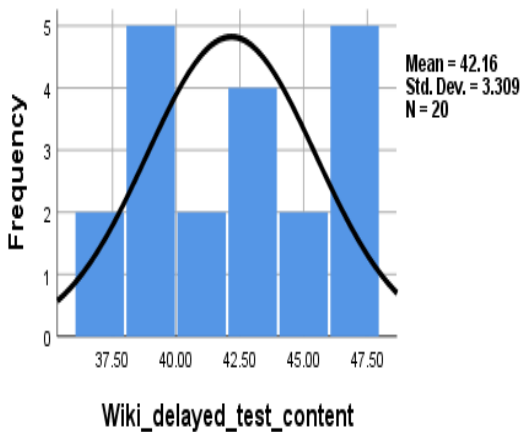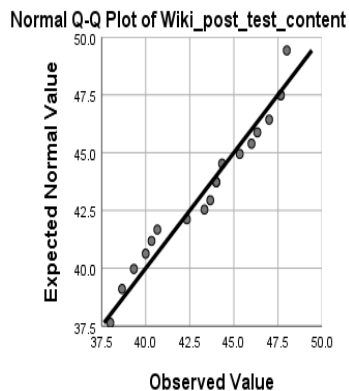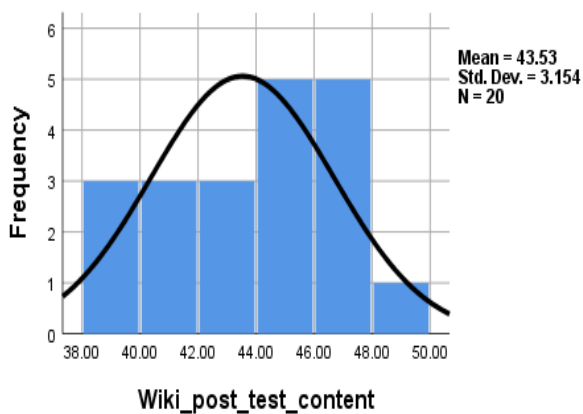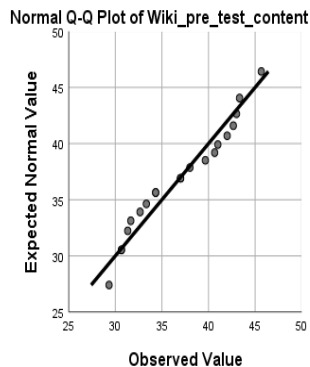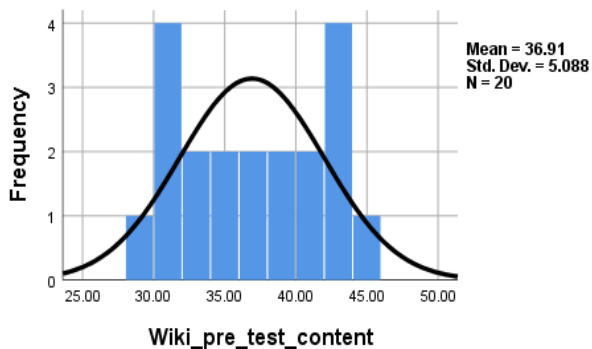
W3: Results of Kurtosis and skewness

The shape of the distributions was quantified (checked statistically) for further checking whether the distribution of scores is normal. This was done by checking the values of kurtosis and skewness since looking at the histograms is "subjective and open to abuse" (Field, 2009, p. 136). As shown in Table 3, the skewness (ranged from -0.85 to 0.99) and Kurtosis (ranged from -1.45 to 1.95) values of Google Docs and Wiki pre-test, post-test and delayed post-test data occurred within the range of 2 and -2, which is an acceptable range for normal distribution (George & Mallery, 2019). Therefore, the skewness and Kurtosis values confirm the visual examination of the histograms and allow for parametric tests to be run with Google Docs and Wiki groups' data (scores of overall writing performance). Therefore, the skewness and Kurtosis values confirm the findings of histograms and their corresponding plots, which showed acceptable symmetry and normality of distribution of the Google Docs and Wiki groups' data (Google Docs and Wiki students' average scores in the two dimensions of form and content in pre-test, post-test and delayed post-test).

Table 3: Statistics (Skewness and Kurtosis values) of Google Docs and Wiki groups' scores

		Pre-test	**Post-test**	**Delayed Test**
Google Docs (form)	Skew	0.10	-0.31	-0.32
	Kurtosis	-1.45	-0.65	-0.08
Wiki (form)	Skew	0.27	-0.28	-0.42
	Kurtosis	-0.44	-1.09	-0.60
Google Docs (content)	Skew	-0.85	-0.44	-0.40
	Kurtosis	0.61	0.42	1.95
Wiki (content)	Skew	0.99	-0.27	-0.11
	Kurtosis	-1.40	-1.08	-1.42

W4: Results of Shapiro-Wilk test with description of the results

Normality distribution of the two groups' test scores in the areas of form and content was also tested for through the use of Shapiro-Wilk test. The results from the Shapiro-Wilk test (see Table 4) indicated that the data for both the Google Docs and Wiki experimental groups were normally distributed in the pre-test, immediate post-test and delayed post-test.

Table 4: Shapiro-Wilk test values of two groups' performance in form and content

Test	*Static*	*Df*	*Sig.*
	Shapiro-Wilk		
Google Docs pre-test form	.92	20	.11
Google Docs pre-test content	.94	20	.27
Google Docs post-test form	.96	20	.53
Google Docs post-test content	.98	20	.91
Google Docs delayed post-test form	.97	20	.68
Google Docs delayed post-test content	.94	20	.20
Wiki pre-test form	.96	20	.54
Wiki pre-test content	.94	20	.20
Wiki post-test form	.94	20	.25
Wiki post-test content	.94	20	.25
Wiki delayed post-test form	.94	20	.29
Wiki delayed post-test content	.92	20	.11

Appendix X: Average ratings on dimensions of form and content

X1: Google Docs average rating on dimensions of form and content

Participants	Pre-test average scores		Post-test average scores		Delayed post-test	
	Form	Content	Form	Content	Form	Content
1	35.33	43	46	40	43.66	40.33
2	38	35.33	41.66	33.33	42.66	38
3	42	44.33	47	45.66	47.66	46
4	42	43	43.66	38.33	42.66	37
5	36	40	43	41	43.66	39
6	42.66	43.66	48	46.66	48	46.66
7	38.33	41.33	45	40	41.66	37.33
8	36.66	41.33	44.66	41.33	43.33	39
9	40.66	43.33	46.33	44.66	45.33	42.66
10	42	41.33	46.33	43.66	44.66	41
11	39.66	41.33	46	42	44.66	39
12	36.33	37	42.66	37	40	30
13	41.33	39.66	45.66	41.66	45.66	40.66
14	37.33	42.66	45.66	42.33	45	42
15	40	40.66	45	43.66	44	40.66
16	38.33	39.66	43	39.33	38.66	37
17	36	38	41.66	37.33	39	37
18	38	41.66	44.66	40.66	43.66	40
19	40.66	42	46.33	44.66	46	44
20	35.66	39.66	44	39.66	41.66	38

X2: Wiki group's average ratings on the dimensions of form and content

Participants	Pre-test average scores		Post-test average scores		Delayed post-test	
	Form	Content	Form	Content	Form	Content
1	38.33	40.66	43.66	45.33	42.66	46
2	34.33	31.66	35.33	40.66	35.66	38
3	33.66	31.33	35.66	40	36.66	38.66
4	34.66	37	42.66	44.33	43.66	45.33
5	34	38	43.66	46	40.33	43.66
6	34.33	37	40	44	39.66	42.33
7	33.66	34.33	38.66	42.33	37.33	42.33
8	37.33	39.66	41.33	43.66	37	40.66
9	41.66	43.33	43.33	46.33	45	46.66
10	35.66	34.33	36.66	40.33	36	39.66
11	39	41	45.33	47	44	46
12	29.33	29.33	32.33	38.66	30	38.66
13	30.66	30.66	33	38	31.33	36.66
14	40	42	45.66	48	43	44.66
15	34.33	32.66	41.66	43.33	36.33	39.66
16	35.33	33.33	39	44	40.66	42.66
17	44.33	45.66	45.66	47.66	43	46
18	29.66	30.66	36.66	39.33	34.66	37.66
19	42.33	42.66	46	47.66	44.66	46.33
20	39	43	37.66	44	39	41.66

Appendix Y: Frequency of form-focused and content-based peer feedback on Google Docs and Wiki platforms

Appendix Y1: Frequency of form-focused peer feedback comments on Google Docs platform

Pair	Form	Content
1.	49	4
2.	45	2
3.	27	5
4.	43	2
5.	41	0
6.	40	12
7.	41	8
8.	17	5
9.	105	0
10.	43	4
Total	**451**	**42**

Appendix Y2: Frequency of form-focused and content-based peer feedback comments on Wiki platform

Pair	Form	Content
1.	27	2
2.	35	4
3.	21	13
4.	45	7
5.	24	9
6.	22	2
7.	21	10
8.	36	20
9.	25	12
10.	13	10
Total	**269**	**89**

Appendix Z: Frequency of peer responses to local peer feedback points

Z1: Number of peer responses to Google Docs local peer feedback points

Pair	Integrated	Non-integrated
1.	46	5
2.	43	1
3.	29	0
4.	41	2
5.	43	0
6.	44	0
7.	16	21
8.	18	2
9.	82	33
10.	40	3
Total	**402**	**67**

Appendix Z2: Number of peer responses to Wiki local peer feedback points

Pair	Integrated	Unintegrated
1.	21	6
2.	29	3
3.	18	3
4.	40	6
5.	24	1
6.	22	0
7.	21	0
8.	31	5
9.	24	0
10.	29	1
Total	**259**	**25**

Appendix Z3: Number of peer responses to Google Docs content-based peer feedback points

Pairs	Integrated	Unintegrated
1.	3	0
2.	1	1
3.	2	2
4.	1	1
5.	0	0
6.	10	2
7.	5	4
8.	4	1
9.	0	0
10.	0	4
Total	**26**	**15**

Appendix Z4: Number of peer responses to Wiki content-based peer feedback points

Pairs	Integrated	Unintegrated
1.	1	1
2.	2	1
3.	6	3
4.	3	0
5.	7	1
6.	2	0
7.	9	0
8.	143	0
9.	14	2
10.	3	0
Total	**193**	**8**