Research Paper

Two Peer Review Modes: Examining Students' Commenting Patterns, Revisions, and Attitudes in Developing Academic Writing Skills

Mostafa Nazari[*1] ,   Jeff McCarville [2]

[1] Ph.D. Assistant Professor, Department of Arts, Communications and Social Sciences, University Canada West, Vancouver, British Columbia, Canada mostafa.nazari@ucanwest.ca
[2] M.Ed. Faculty, University Access Program, University Canada West, Vancouver, British Columbia, Canada jeff.mccarville@ucanwest.ca

Abstract

This study examines how two different modes of face-to-face and mobile-mediated peer review (FFPR versus MMPR) affect the commenting patterns based on the International English Language Testing System (IELTS) assessment criteria and actual revisions among L2 academic writers. Moreover, the students' attitudes toward peer review will be explored to demonstrate how they mediate between the comments received from their peers and subsequent revisions which might result in writing development. A 16-session IELTS academic writing course was held in a private university in Vancouver, Canada, and 72 English for Academic Purpose (EAP) students participated to exchange peer comments in the classroom and in a mobile application called *Telegram*. In order to conceptualize the peer comments in both groups, the IELTS academic writing assessment criteria were used. The results indicated that the MMPR groups generated significantly more comments with more revision-oriented responses and actual revisions. In addition, the MMPR groups' notes were mainly in terms of lexical resources and grammatical range and accuracy, whereas the FFPR groups centered their topics on task achievement and coherence and cohesion. Finally, based on the results, not only did both FFPR and MMPR students show positive attitudes toward peer review sessions at the end but their negative attitudes decreased. Generally, MMPR students showed more positive attitudes, yet the difference was not significant.

[*]**Corresponding Author:** Mostafa Nazari
 Address: Ph.D. Assistant Professor, Department of Arts, Communications and Social Sciences, University Canada West, Vancouver, British Columbia, Canada

Email: mostafa.nazari@ucanwest.ca
Tel: 7782232394

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1 Introduction

Students experience a form of collaboration in peer review sessions. This can happen by providing constructive and positive comments on writing drafts and by exchanging the roles of an assessor and assessee (Jurkowski, 2018; Van den Bos & Tan, 2019). However, teachers might find designing and implementing successful peer feedback sessions challenging, and students might find the procedure less trustworthy (Neumann & Kopcha, 2019). The efficiency and prevalence of exchanging peer review are more demanding in some language proficiency exams such as the IELTS with life-changing results. The candidates might consider their peers' comments less efficient; instead, they count on their teachers' comments and incorporate them into their revisions. Nevertheless, there are some variables such as peer review training, quality of peer comments, mode of communication, and attitudes toward peer exchange which might affect the way students either participate in peer review sessions or incorporate such comments. The term *attitudes* refer to how students feel about their writing errors and their mindsets for correcting mistakes and making some revisions in their written works (Vo, 2022). This study considers these variables by running a training workshop, examining the comments the students generate, selecting a specific task in the IELTS academic writing test, grouping the students into two face-to-face and mobile-mediated environments of peer review (FFPR and MMPR), and exploring their attitudes. Although many previous studies have examined and compared the effectiveness of computer-mediated peer review (CMPR) with that of FFPR mode, the research on MMPR mode remains limited. Indeed, only a finite number of studies investigated the effectiveness of using mobile instant messaging (MIM) applications in developing candidates' writing development in the IELTS test.

1.1 The Theoretical Framework

Different theories exist in the literature regarding the use of peer review in second language settings such as process writing theory (Hayes & Flower, 1980), collaborative learning theory (Bruffee, 1984), and interactionist theory (Hyland & Hyland, 2006). These theories and perspectives emphasize the role of learners in creating knowledge and using various skills.

1.1.1 Process Writing Theory

As the name indicates, process-oriented writing contains several related drafting processes in order to come up with a meaningful and acceptable writing piece. Process writing theory considers writing as an ongoing, recursive process in which students engage in peer review to produce multiple drafts in a meaning-making activity (Hayes & Flower, 1980).

1.1.2 Collaborative Learning Theory

Collaborative learning theory emphasizes that learning, and even knowledge itself, is constructed socially through communication with knowledgeable peers in a community. It is through collaboration among peers that some kinds of knowledge can be acquired (Bruffee, 1984; Liu & Hansen, 2005).

1.1.3 Interactionist Theory

Interactionist theory suggests that language learning would be enhanced when we create opportunities for learners to negotiate meaning in group work (Hyland & Hyland, 2006). Negotiation is

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the key factor in this theory that assists L2 development by creating a more comprehensible input, drawing students' attention to their linguistic problems and errors, and highlighting the negative evidence (Gass, 2003).

2 Literature Review

2.1 Three Modes of Peer Review: Different Studies

The mode of peer review interaction can be broadly classified into three categories namely face-to-face, computer-mediated, and mobile-mediated. In FFPR, the process occurs when students give comments on peers' drafts by working in pairs or groups. One of the benefits of this practice is developing cognitive abilities among peers when articulating explanations on each other's draft. Moreover, Pritchard and Morrow (2017) believe that FFPR students build stronger social bonds when dealing with a non-threatening or less strict audience who has similar features as them. Recently, computer tools are being used in language education and particularly writing skills to promote peer review groups. Indeed, they are being used as alternatives to face-to-face peer review. With the advent of smartphones, mobile learning has received significant attention in education recently by providing MIM services (Aghajani & Zoghipour, 2018; Andujar, 2016; Soria et al., 2020; Tang & Hew, 2017). Unlike CMPR with its asynchronous nature, MMPR provides both synchronous and asynchronous contexts for exchanging comments.

To date, several studies have compared the modes of peer review and reported valuable findings. These studies argue that the difference in the mode of interaction has affected the number and type of peer comments as well as students' attitudes (Ho, 2015; Rouhshad et al., 2016; Soria et al., 2020). For instance, a study by Rouhshad et al. (2016) examined how different collaborative writing modes (e.g., writing face-to-face versus online through the use of Google Docs) affected learners' interactions. Finding revealed that the FFPR students showed more collaborative patterns of interaction and reported more opportunities for negotiation outside the class compared to that of the CMPR group. In MMPR, several studies tried to compare students' performance in synchronous or asynchronous modes of communication. These studies used MIM applications in peer review environments to improve revision skills and writing development among English as a Second Language (ESL) students (Aghajani & Zoghipour, 2018; Andujar, 2016; Miller, 2016). The overall findings showed that students expressed positive attitudes toward both synchronous and asynchronous features of such apps, generated more comments which were revision-oriented, participated and negotiated actively by creating a community of practice, and produced more accurate sentences with fewer mistakes. For example, Andujar (2016) required students to post daily comments on the mobile phone application WhatsApp. The findings revealed that students not only improved their writing by producing fewer grammatical, lexical, and mechanical errors but also showed active collaboration and negotiation. Aghajani and Zoghipour (2018) used the mobile application Telegram for writing practice by conducting three forms of correction (self-correction, peer-correction, and teacher-correction). A prompt was sent to the students on Telegram, and they posted about 60 words in their group. Better results and more satisfaction were reported in the groups of self and peer

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correction than in the teacher-correction one.

2.2 Attitudes toward Peer Review

Students' attitudes and perceptions toward peer review have been the focus of many research studies. The mode of peer review interaction affects their attitudes and determines their willingness to participate. Students might express positive attitudes towards the use of technology by referring to the importance of reduced stress due to the convenience and user-friendliness of online platforms (Bradley, 2014; Ciftci & Kocoglu, 2012). However, using technologies might have its own challenges that may demotivate students or cause interactional problems while discussing language-related concepts in the classroom (Guardado & Shi, 2007). Arnold et al. (2012) pointed out that students' positive perceptions show their willingness to use peer comments for language learning. Referring to the discussion of technology and attitude, Tang and Hew (2017) admire the use of students' and teachers' attitudes towards mobile applications in writing classes to help us show how such applications are supportive of developing language skills. On the other hand, students might report negative attitudes while using mobile applications which might be due to some technical challenges and their small screens (Winet, 2016). Studying students' perceptions will extend more knowledge on the affective dimensions of language learning.

Previous studies reported both positive and negative attitudes toward peer review. In a study by Li and Zhu (2013), students showed positive attitudes by reporting that their classmates' ideas provided them with some ideas for revision. The length of the essay is another criterion that might affect the attitudes. According to Chen et al. (2020), the length of an assignment is positively correlated to both the students' performance and attitudes toward peer feedback. Students perform better on short essays and welcome their peers' comments. Referring to MIM, Ngaleka, and Uys (2013) pointed out that mobile learning affects students' attitudes. In their study, students used WhatsApp as a communication platform to exchange information about assignments and meetings. The study's findings demonstrated that students showed positive attitudes by using some interactive features of mobile applications such as audio chat. In contrast, Samaie et al. (2018) reported students' negative attitudes while using mobile applications for peer review. The participants of this study had different reasons for adopting negative attitudes such as the efficiency of face-to-face talk and the demanding features of mobile applications such as time, effort, and technical issues. Other perceptions of challenges related to electronic peer review are namely time management and synthesizing different opinions (Bikowski & Vithanage, 2016), attaining co-ownership agreements and having an unequal chance of participation (Arnold et al., 2012), and different language proficiency levels and writing ability (Lee, 2010).

3 The Study

This study aims at examining students' peer review exchanges in two groups of face-to-face and mobile-mediated by referring to the type of comments generated, the incorporation rate of comments into revision, and students' attitudes toward peer commenting. Unlike the previous study by Liu and Sadler

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(2003) which classified peer comments based on the type, nature, and area of comments, the analytical scheme used in this study is the standard IELTS academic writing assessment criteria. The reason this study employed the IELTS assessment analytical scheme was to offer a more customized and related design for assessing students' comments. In addition, using these criteria increases students' awareness of the existing marking rubrics in this test. Although many previous studies have examined and compared the effectiveness of CMPR with that of FFPR mode, the research in MMPR mode remains limited. Indeed, only a finite number of studies investigated the effectiveness of using MIM applications in developing candidates' writing development in the IELTS test. To this end, this study attempts to answer the following three research questions:

RQ1: Do the MMPR and FFPR commenting modes result in a different distribution of peer comments based on IELTS assessment criteria?

RQ2: To what extent do students revise their IELTS task 1 samples based on comments made in both groups?

RQ3: What are the students' attitudes toward FFPR versus MMPR used in this study?

4 Methods

4.1 Participants and Setting

The population of this study was limited to English for Academic Purposes (EAP) students studying at upper-intermediate levels in a private university located in Vancouver, (British Columbia, Canada). 113 students volunteered to participate in this study and took an online DIALANG test which was used to determine the homogeneity of the groups in terms of language proficiency level. Those students who obtained level B2 (n=91) were invited to attend the program. Out of 91, only 72 students attended the peer review training workshop. All of these students had submitted their IELTS overall band score of 6.0 as part of their admission. Therefore, the sample of this study comprised 47 female and 25 male students, coming from various nationalities and language groups within the age range of 22 to 34 with an average of 26.

Students were purposefully divided into the MMPR (n = 36) and FFPR group (n = 36). The participants were divided into three classes of FFPR each with 12 students and three groups of Telegram groups each with 12 members. An attempt was made to set the groups in a way that represents the variety of students in terms of gender and nationality. The sixteen sessions were scheduled for two 90-minute conference sessions per week. The researchers facilitated the peer review groups by assisting the face-to-face classes at the campus and the mobile ones on Telegram. The same assignments, peer review guidance sheet, and logs were used for the two modes. Meanwhile, pseudonyms were used for the participants to protect their identity when analyzing the data in the MMPR groups.

4.2 Instruments

4.2.1 DIALANG Test

In order to measure the participants' level of language proficiency, the DIALANG test, which is an online language assessment test, was administered. This test is designed based on the standards of the Common European Framework of Reference (Alderson & Huhta, 2005) and measures general language proficiency based on a 6-level assessment rate ranging from A1 to C2. Levels A1 and C2 represent

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the lowest and the highest levels respectively.

4.2.2 Mobile Instant Messaging Platform Telegram

The second instrument was an instant messaging platform called Telegram (Version 1.5.12) for peer review meetings. This application provides the opportunity to create groups of users for collaboration in both asynchronous and synchronous modes.

4.2.3 The Questionnaire

Finally, a Likert scale questionnaire was adapted from previous studies (Ho & Savignon, 2007; Liu & Hansen, 2005; Shang, 2017;) to explore students' attitudes toward peer review. This questionnaire contained six sections with a total number of 33 items. Table 1 shows the outline and themes of the questionnaire.

Table 1 The Questionnaire's Outline and Themes (Total Questions = 33)

Section	Title	Question items	Groups
1	Biographical data		Both FFPR & MMPR
2	Attitude toward peer review	1–11 (11)	
3	Peer review in writing & IELTS academic writing	12–17 (6)	
4	Attitudes toward FFPR	18–21 (4)	Only FFPR
5	Attitudes toward CMPR	22–27 (6)	Only MMPR
6	Attitudes toward MMPR	28–33 (6)	Only MMPR

In order to check any potential gap in the quality of the questionnaire, a pilot study was conducted. As Mackey and Gass (2012) stated, a near-final version of the questionnaire needs to be tried out with 50-100 participants similar to the target population; therefore, the questionnaire was administered to 53 participants with similar characteristics to the target population to examine the reliability of the instruments. Moreover, 17 students (n = 17) with similar characteristics to the participants of the main study took the questionnaire to check the timing, wording, and format of the questionnaire items. The questionnaire was also checked for validity by three EAP instructors who were the colleagues of the researchers.

Finally, the internal consistency reliability analysis run on the instrument after revision of the questionnaire in the pilot study yielded a Cronbach Alpha Coefficient of .86, suggesting a highly reliable scale according to Cohen et al.'s (2011) Alpha Coefficient guidelines set at 0.80–0.90 as highly reliable.

4.3 Data collection

As illustrated in Table 2, an eight-week (16 sessions) time plan was used for this study which included the peer review training (sessions 1-4) and the intervention (sessions 5-16). Sessions 1 to 4 were the peer review training workshop adapted from previous studies (Lam, 2010; Min, 2006).

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Table 2. The time plan of the study

Sampling	Sessions 1-4	Sessions 5-16
Proficiency test N = 72	Peer Review Training Workshop	(Intervention) (Writing 3 samples) -Sample 1 (Sessions 5-8) -Sample 2 (Sessions 9-12) -Sample 3 (Sessions 13 to 16)

During the intervention (sessions 5-16), the students wrote three IELTS task 1 samples based on the Cambridge Academic IELTS series. All participants did brainstorming on the topic. Then, the FFPR group wrote their first drafts in the class and gave them to their instructor; whereas, the MMPR group typed and submitted them using Google Classroom. Students' first drafts were returned to them either in the class or in Telegram. The teacher required them to offer peer comments on the peer drafts by using the guidance sheet and peer review logs.

In Telegram, in order to control the flow of comments and ensure equal participation, each participant was requested to post at least one to three comments only in English with permission to share stickers. The researchers facilitated the activity as a member. Figure 1 shows a sample of peer review sessions among MMPR students. The peer review sessions in FFPR occurred when students presented their first drafts to their classmates and had 10 minutes to read and 10 minutes to fill out the logs. Moreover, the teacher asked the students to work with a different partner each time to encourage the richness of peer comments. Finally, the revision of drafts based on peer review logs was conducted in sessions 8, 12, and 16 of the intervention.
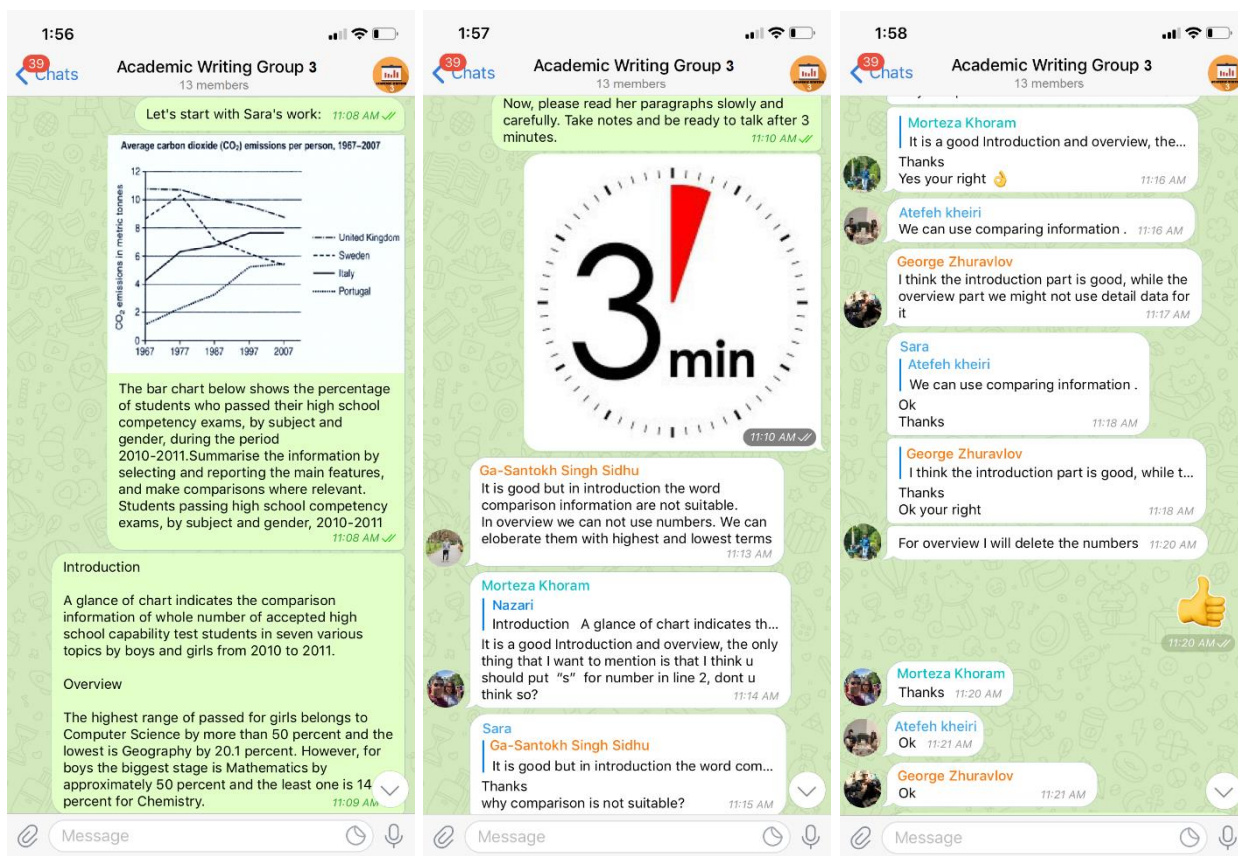
Figure 1. MMPR students' peer review exchange on Telegram

5 Data Analysis & Results

As shown in Table 3, the comments were counted and categorized based on the four assessment criteria of IELTS academic writing task 1. The frequency of actual revisions made and revisions suggested on all three IELTS task 1 samples was calculated, accordingly. Two official IELTS examiners coded 15% of the comments; the inter-rater reliability was determined as .91.

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Table 3 The analytical scheme for classifying peer comments adopted from the IELTS assessment criteria

Part B (IELTS Assessment Criteria)	
Task Achievement	You can highlight the points of highest and lowest proportion to give idea about the whole trend (e.g., "There is no paraphrasing of the title in the introduction")
Coherence & Cohesion	You can link each process with a few connectors, such as, first, second, next… (e.g., "The sentences in paragraph two are not linked properly")
Lexical Resources	You can also use more vocabulary rather than increase and decrease. (e.g., "More vocabulary can be used instead of rented and owned")
Grammatical Range & Accuracy	Don't put (The) before name of countries (e.g., "Start the new sentences with capital letter").

5.1 The IELTS assessment criteria and peer review distribution

The first set of results refers to research question 1: "Do the MMPR and FFPR commenting modes result in a different distribution of peer comments based on IELTS assessment criteria?" Students' comments were classified based on task achievement, coherence and cohesion, lexical resource, and grammatical range and accuracy. The findings report that students in FFPR and MMPR groups commented differently based on these criteria.

As demonstrated in Figure 2, task achievement was the most distributed type of comment given by both groups. The percentage of peer comments related to task achievement and coherence and cohesion type was larger in the FFPR group than that in the MMPR group. More specifically, the FFPR group provided 8% more comments related to task achievement, out of which 2% was related to coherence and cohesion. The percentage of comments, on the other hand, pertinent to the grammatical range and accuracy (28% versus 22%) and lexical resources (27% versus 24%) was higher in the MMPR group than that of the FFPR group.
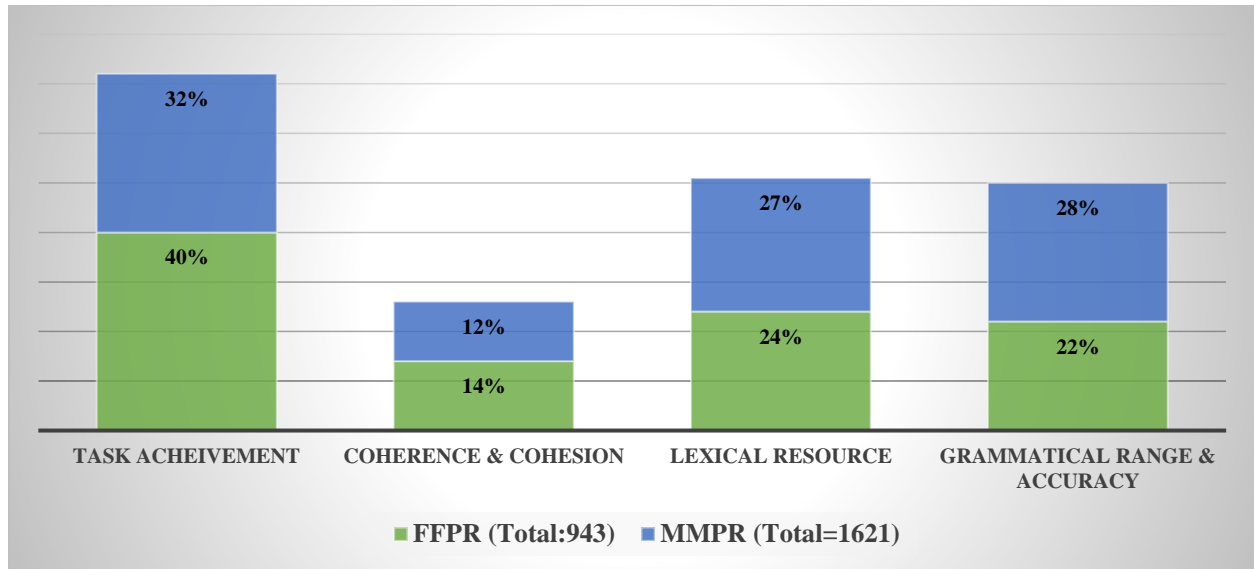
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Figure 2. Peer Review Distribution Based on the IELTS Assessment Criteria

Figure 3 shows that the MMPR group gave 523 comments related to the task achievement according to the IELTS rubric, out of which 393 (66%) were revision-oriented with 168 (43%) comments leading to the actual revisions. The FFPR group provided 372 task achievement comments, where 258 (69%) were revision-oriented with 106 (41%) resulting in actual revisions. The MMPR group produced 2% and 4% larger percentages of global and local actual revisions than the FFPR group, respectively.
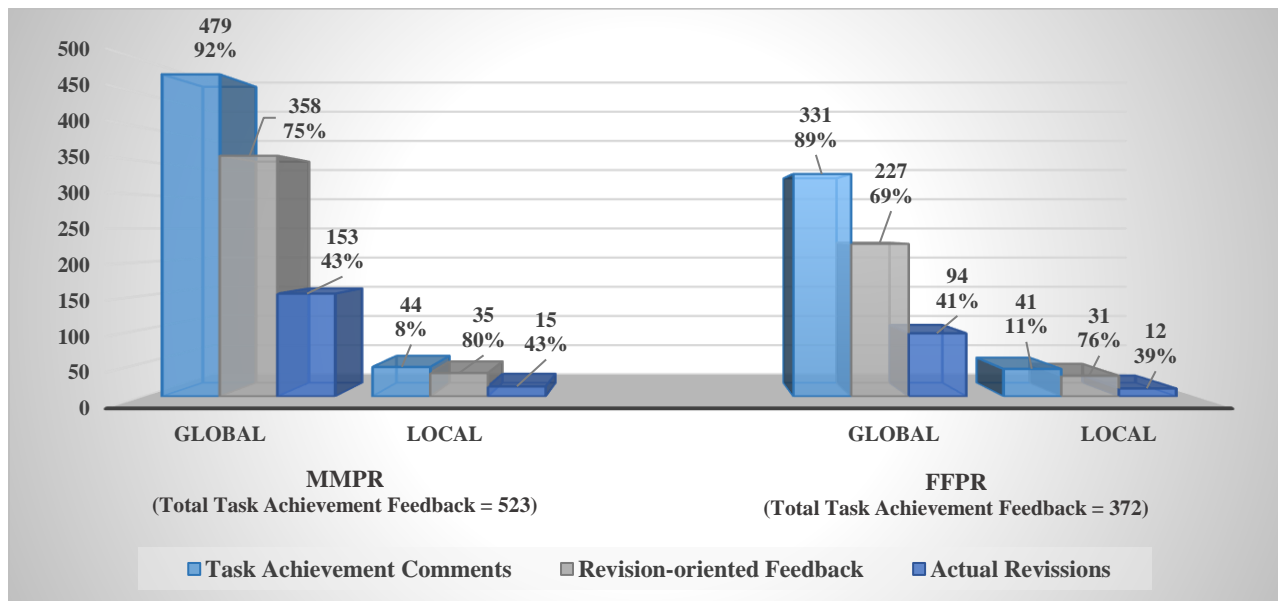

Figure 3. Task Achievement Comments and Actual Revisions by Group and Area

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As displayed in Figure 4, a larger number of coherence and cohesion comments were globally distributed in both groups. While the FFPR group produced 5% more global revision-oriented feedback and made actual revisions (35% versus 30%), the MMPR group made 22% more local actual revisions (49% versus 27%).
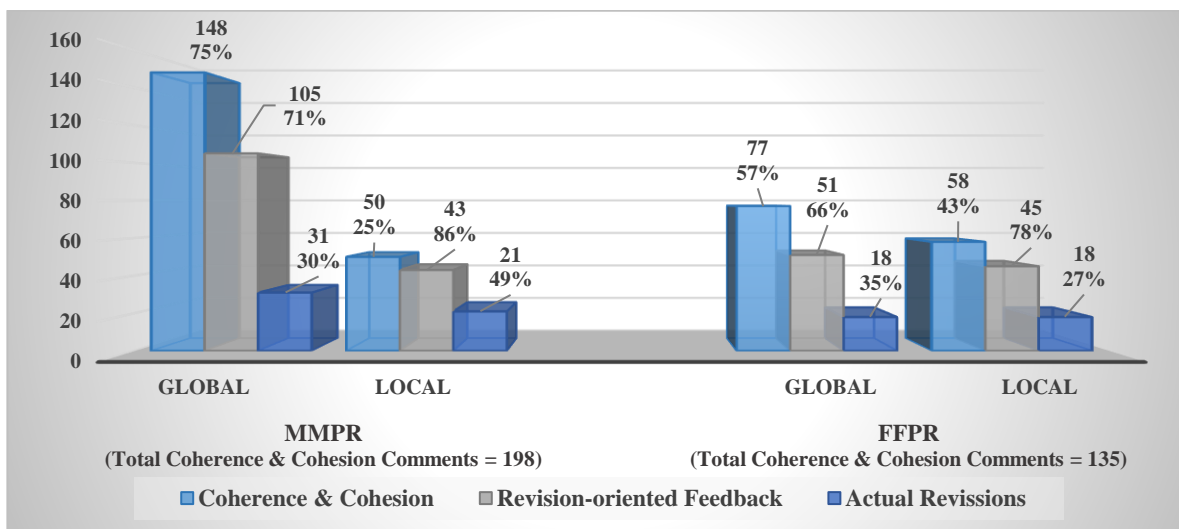

Figure 4 Coherence and Cohesion Comments and Actual Revisions by group and Area

Figure 5 depicts that all lexical resource types of feedback given by the participants were local in nature. The MMPR group made an 8% larger percentage of revision-oriented feedback (87% versus 79%). Moreover, the MMPR group made 11% percentage more actual revisions than the FFPR group (40% versus 29%).
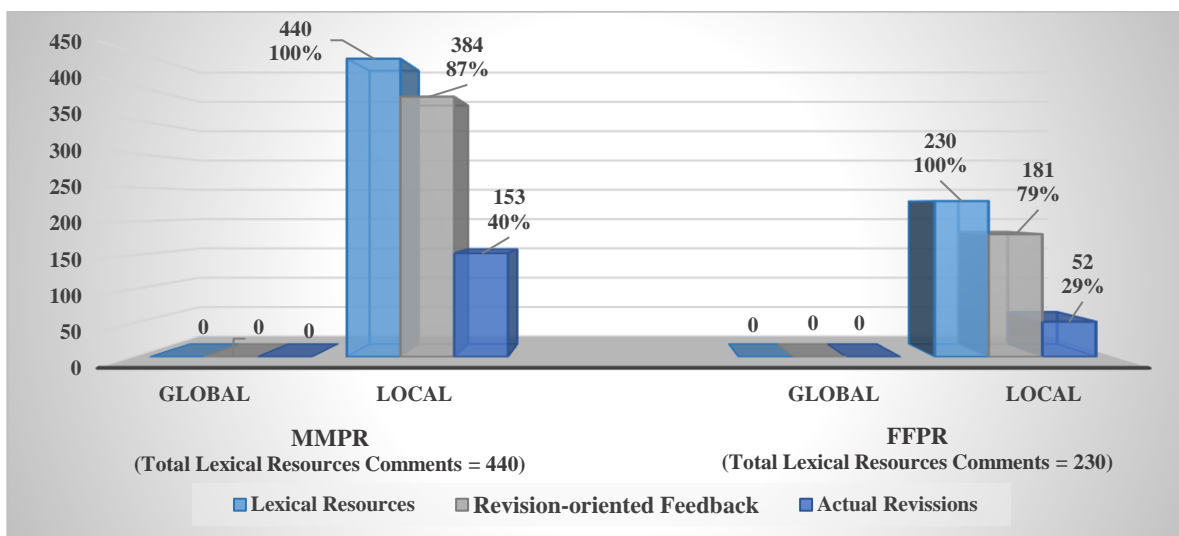

Figure 5 Lexical Resources Comments and Actual Revisions by group and Area

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As Figure 6 presents, all comments related to the grammatical range and accuracy were also local in nature. While 90% of the comments given by the MMPR group were revision-oriented, 86% were revision-oriented in the FFPR group. The MMPR group also worked more on the comments in an attempt to revise more and made 43% of revisions while the FFPR group made 25% of actual revisions.
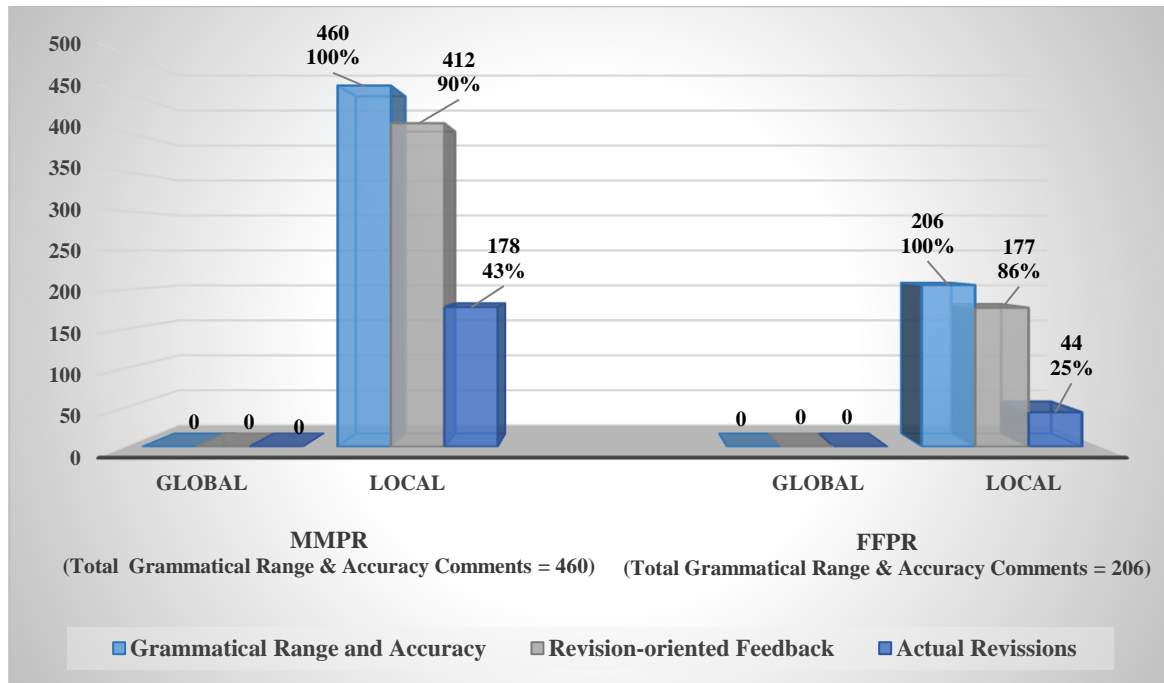

Figure 6. Grammatical Range and Accuracy Comments and Actual Revisions by Group and Area

5.2 Peer review adoption rate in FFPR and MMPR

The second phase of findings concerns the extent to which the students revised their writing samples based on the second research question (*To what extent do students revise their IELTS task 1 samples based on comments made in the MMPR and FFPR groups?*). As discussed earlier, most comments provided by both groups were revision-oriented in nature. This question examines these revision-oriented comments which led to the actual revision by considering the nature and type of comments. As revealed in Figure 7, the MMPR group indicated a larger percentage of revision-oriented comments than the FFPR group (82% versus 75%) with a higher percentage of actual revisions compared to the FFPR group (41% versus 33%). This result indicates that the students in Telegram incorporate more comments into their revisions.
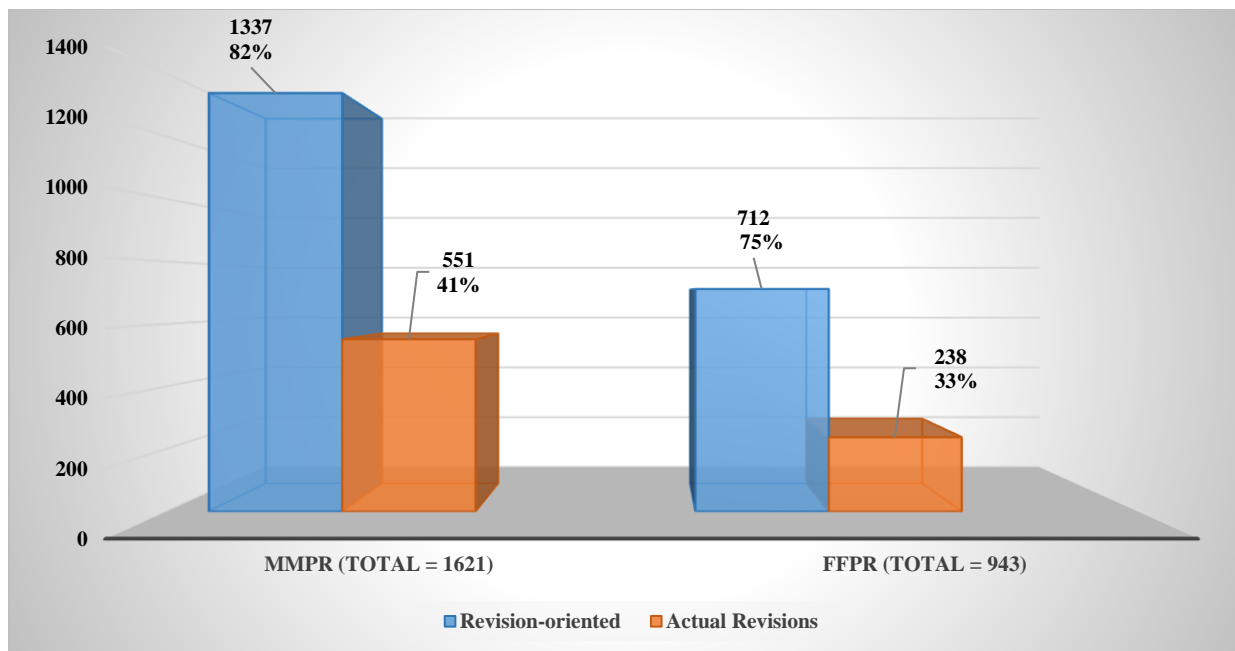
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Figure 7 *Comparing the total Comments, Revision-oriented Comments, and Actual Revisions*

5.3 FFPR and MMPR groups attitudes toward Peer Review

This section of findings concerns the third research question: *What are students' attitudes toward FFPR versus MMPR used in this study?* The results are divided into several categories:

5.3.1 Positive attitudes toward peer review

A Mann-Whitney U Test was run on the scores in order to compare participants' positive attitudes in both groups. As shown in Table 5, the participants' positive attitude toward peer review in the MMPR (*Mean Rank* = 38.11) is more than the FFPR group (*Mean Rank* = 34.89). However, the analysis indicated no significant difference between the two groups, $U = 590$, $z = -.66$, $p = .509$, $r = .07$. Table 4 presents the results of the Mann-Whitney U test on participants' positive attitudes toward peer review in the FFPR and MMPR groups.

Table 4 Results of the Mann-Whitney U Test on Participants' Positive Attitude toward Peer Review

Group	n	Mean Rank	Sum of Ranks	Mdn	U	z	p (2-tailed)
MMPR	36	38.11	1372	6.00			
					590	-.661	.509
FFPR	36	34.89	1256	5.50			

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5.3.2 Negative attitude toward peer review

Table 5 represents the means and standard deviations for the MMPR and FFPR groups in the pretest and posttest.

Table 5 Descriptive Statistics for the Participants' Negative Attitude toward Peer Review

Group		Pretest		Posttest		Mean Difference	
	n	M	SD	M	SD	M	SD
MMPR	36	10.25	1.71	9.75	1.42	-.50	1.27
FFPR	36	9.80	2.29	9.50	1.55	-.30	2.21

Table 6 displays equal variances that are not assumed based on the results of Levene's Test, $F(70) = 6.89$, $p < .05$. An independent-sample t-test was run on the data to compare the mean difference of MMPR and FFPR groups in their negative attitude toward peer review. The results revealed that the difference between pretest and posttest scores for the two groups was not significant, $t(70) = -.45$, $p = .650$, with a large effect size, Cohen's $d = .11$. Examining mean scores for both groups indicated that, as displayed in Table 6, the participants' negative attitude toward peer review in both groups has decreased. This decrease for the MMPR group ($M = 9.75$) was slightly more than the FFPR groups ($M = 9.50$) after treatment sessions. Table 3 displays the results of the independent-samples t-test analysis.

Table 6 Results of Independent Samples t-test for the Participants' Negative Attitude toward Peer Review

	Levene's Test for Equality of Variances		t-test for Equality of means		
	F	p	t	df	p (2–tailed)
Equal variances are assumed	.6.89	.01	-.45	70	.650

5.3.3 Attitudes toward peer review in writing and IELTS academic writing

A Mann-Whitney U Test was performed to compare the participants' attitudes toward the use of peer review in writing and IELTS academic writing in both groups. As displayed in Table 8, the participants in the FFPR groups (*Mean Rank* = 38.72) revealed more gains in attitude than the MMPR groups (*Mean Rank* = 34.28) in the posttest. However, the analysis yielded no significant difference between the two groups, $U = 568$, $z = -.919$, $p = .358$, $r = .10$. Table 7 shows the results of the Mann-Whitney U test.

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Table 7 Results of the Mann-Whitney U Test on Participants' Positive Attitude toward Peer Review

Group	n	Mean Rank	Sum of Ranks	Mdn	U	z	p (2-tailed)
MMPR	36	34.28	1234	5.00			
					568	-.919	.358
FFPR	36	38.72	1394	5.50			

5.3.4 Attitudes toward Face-to-Face peer review

FFPR attitude was examined through four items (18-21) solely in the FFPR groups. Table 8 demonstrated that 30.6 percent of 36 participants agreed that face-to-face peer review helped them improve their writing; 19.4 percent of 36 participants preferred to have a peer review on their writing with teacher review as well; 24.6 percent of 36 participants agreed that reviewing their classmates' writing gives them a different insight on the topic of the writing assignment; 29.2 percent of 36 participants agreed that face-to-face peer review should be used in writing classes. To summarize, all participants in the FFPR groups agreed to have face-to-face peer review in their writing.

Table 8 FFPR Attitude in the FFPR Groups (n =36)

Items	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
18. Face-to-face peer review helps me improve my writing.	0.00	0.00	6.9	30.6	12.5
19. I prefer to have a teacher review my writing, no peer review.	5.6	19.4	18.1	6.9	0
20. Reviewing my classmates' writing gives me a different insight into the topic of the writing assignment.	0.00	0.00	6.9	24.6	16.7
21. I think face-to-face peer review should be used in writing classes.	0.00	0.00	4.2	29.2	16.7

5.3.5 Attitudes toward Computer-Mediated peer review

Six items (22-27) aimed at assessing CMPR attitude in the MMPR groups only. Table 9 shows 27. 8 percent of 36 participants in the group neither agree nor disagree to do computer-mediated (using computers) peer review. In item 23, 22.2 percent of participants disagreed with CMPR being useless for revising writing drafts. Item 24 shows that 23.6 percent of participants neither agreed nor disagreed to give comments on their partner's writing draft in Word document (Microsoft Word). Item 25 shows that 25.0 percent of participants neither agreed nor disagreed to feel relaxed and comfortable when giving comments on the computer. In item 26, 27.8 percent of participants neither agreed nor disagreed to give comments on the Word document is easy. Finally, item 27 depicts that 27.8 percent of participants

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disagreed that giving comments on the Word document is confusing. Almost all participants' attitudes toward CMPR in the MMPR groups were neutral.

Table 9 CMPR Attitude in the MMPR Groups (n =36)

Items	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
22. I like to do computer-mediated (using computers) peer review.	0.00	4.2	27.8	13.9	4.2
23. Computer-mediated peer review is not useful for revising writing drafts.	11.1	22.2	16.7	0.00	0.00
24. I like to give comments on my partner's draft in Word document (Microsoft Word).	0.00	0.00	23.6	19.4	6.9
25. I feel relaxed and comfortable when giving comments on the computer.	0.00	4.2	25.0	15.3	5.6
26. Giving comments on the Word document is easy.	0.00	5.6	27.8	13.9	2.8
27. I feel that the comments inserted in the Word document are confusing.	18.1	27.8	4.2	0.00	0.00

5.3.6 Attitudes toward Mobile-Mediated peer review

The MMPR attitude was examined through six items (28-33) in Table 10. In item 28, 23.6 percent of participants agreed that they feel comfortable using their mobile devices to interact with their partners. In item 29, 20.8 percent of participants agreed to do peer review via a smartphone in writing classes. In item 30, 20.8 percent of participants neither agreed nor disagreed with peer review via a mobile application such as WhatsApp or Telegram can be timesaving. Item 31 shows that 23.6 percent of participants agreed that mobile-based peer review activities can increase interaction among classmates. In item 32, 27.8 percent of participants neither agreed nor disagreed that using mobile applications when providing comments on the writing assignment was easy. In item 33, 33.3 percent of participants agreed that peer commenting via a mobile application should be used in writing classes.

Table 10 MMPR Students' Attitudes Toward Using Mobile-Mediated Peer Review (n =36)

Items	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
28. I feel comfortable using my mobile device or applications to interact with my partner.	0.00	1.4	13.9	23.6	11.1
29. I like to do peer review via a smartphone in writing classes.	0.00	0.00	12.5	20.8	16.7
30. Peer review via a mobile application such as WhatsApp or Telegram can be time-saving.	0.00	15.3	20.8	13.9	0.00
31. Mobile-mediated peer review activities can increase interaction among classmates.	0.00	0.00	13.9	23.6	12.5
32. It is easy to use mobile applications (apps) when providing feedback on the writing assignment.	0.00	1.4	27.8	16.7	4.2
33. I think peer review via a mobile application should be used in writing classes.	0.00	0.00	2.8	33.3	13.9

A paired-sample t-test was run on the scores to compare the participants' attitudes toward the CMPR and MMPR in the MMPR groups. As shown in Table 12, the analysis indicated that the participants had a more positive attitude toward MMPR (M = 22.61) than CMPR (M = 17.58). The mean difference (-5.02) was significant, t (35) = -12.98, p < .05.

Table 11 Results of Paired-samples T-test for CMPR and MMPR Attitude

	n	M	SD	t	df	p (2-tailed)
CMPR & MMPR	36	-5.02	2.32	-12.98	35	.000*

6 Discussion

The results related to research question 1 can be discussed in three aspects: the frequency and distribution of comments, the number of revision-oriented comments, and the number of actual revisions. Task achievement and lexical resources were among the commonly used comments the FFPR group shared in the classroom, whereas the MMPR focused more on task achievement and grammatical range and accuracy.

Surprisingly, the FFPR group made more comments on task achievement than the MMPR group. The possible reasons might be that the FFPR group shared more global comments due to the face-to-face nature of communication, while the MMPR group tried to be more specific when commenting in a non-verbal situation. Although it is commonly believed that task achievement and coherence and cohesion target the global area of feedback, they might refer to local areas such as requiring

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the student to support their sentences with appropriate and accurate data or using linking devices and pronouns. In contrast, lexical resources and grammatical range and accuracy deal with local areas of feedback. Finally, the least generated comments based on the IELTS criteria were coherence and cohesion comments for both groups. This lack of interest might be because they focused on local aspects in both groups and neglected some global features such as text organization and sense of progression.

By referring to the percentage of revision-oriented comments in each IELTS assessment criteria, the findings show that most comments in lexical resource and grammatical range and accuracy criteria were revision-oriented. This is not a surprise because these two criteria entirely refer to local aspects of writing. In other words, no comments were made in the global area of these two criteria. One reason could be that students followed a detailed guidance sheet that addressed numerous aspects of IELTS task 1 writing. Moreover, the IELTS assessment criteria have plenty of sub-categories for each criterion which address non-revision features and positive feedback. Regarding the actual revisions, the rate of revisions made by students based on task achievement and coherence and cohesion comments were almost similar. Nevertheless, the MMPR students made more revisions in lexical resources and grammatical range and accuracy comments compared to FFPR. One likely cause is that more local revision-oriented comments were made in MMPR groups, and that increased the number of revisions.

The findings related to question 2 revealed that the percentage of revision-oriented comments and the percentage of

actual revisions made by MMPR students were larger than FFPR students. Indeed, most actual revisions made in MMPR were local. Similarly, Chang (2012) and Ho (2015) found that not only technology-mediated peer review groups made significantly more comments than the traditional groups but their comments were more revision-oriented and led to more actual revisions. Although the number of revisions in MMPR groups was more than in FFPR groups, the adoption rate percentage of 41% is not satisfactory. These findings seem to be consistent with other research which found almost a similar adoption rate of 48% (Liou & Peng, 2009) and 47% (Liu & Sadler, 2003). The reason for poor adoption rate in Liu and Sadler's (2003) study might be that the researchers used the mobile application MOO for online chat, yet they required students to exchange their electronic drafts via email first; therefore, they could not see their peers' drafts and their chat dialogues simultaneously. However, the results contradict Min (2006) who reported a high adoption rate of 90%.

Regarding question 3, the findings revealed that not only did both FFPR and MMPR students show positive attitudes toward review sessions at the end but their negative attitudes decreased. Generally, MMPR students showed more positive attitudes, yet the difference was not significant. These results are consistent with those of other studies which suggest that the mode of peer review interaction affects students' attitudes, and students will show more positivity when technology is used due to its convenience (Bradley, 2014; Ciftci & Kocoglu, 2012; Elola & Oskoz, 2010; Liou & Peng 2009). Increased positive attitudes in both groups do not corroborate these earlier findings which reported

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technologies cause distractions and demotivate students (Choi, 2007; Guardado & Shi, 2007). A possible explanation for this might be that these studies had been conducted several years ago when students still were not introduced to easy-to-use computer software and mobile applications.

The positive results in the MMPR group might be due to the positive perception of team working and community in online groups (Li & Kim, 2016). Finally, the positive attitudes in both groups partly could affect their revision skills mainly in terms of coherence and cohesion, and coherence and grammatical range and accuracy because research shows that positive attitudes improve vocabulary and grammar (Ducate et al., 2011). The students reported gains in attitude toward peer review effect in developing their writing and IELTS writing skills. Surprisingly, FFPR students revealed more gains than MMPR students although the difference was not significant. The results are not in line with some of those previous studies which claimed that there is no relation between positive attitude and writing development (Kaufman & Schunn, 2011; Strijbos et al., 2010). However, the findings are in agreement with other studies that directly associate writing development with students' perception and willingness to participate (Andujar, 2016; Van der Pol, et al., 2008).

The results of this study suggest that almost all FFPR students adopted positive attitudes toward FFPR sessions and their effects on students' writing skills. Referring MMPR students, their attitudes toward CMPR were neutral; however, they showed agreement with the use of mobile applications. Additionally, comparing CMPR with MMPR, students showed great interest in using mobile applications for future peer review sessions. The results are in accord with recent studies indicating that mobile applications in both synchronous and asynchronous modes are helpful for peer review practice and develop students' writing skills (Aghajani & Zoghipour, 2018; Andujar, 2016; Miller, 2016; Tang & Hew, 2017).

7 Conclusion

The use of mobile communication services known as MIM has gained considerable attention in the field of language learning in recent years. Yet, to date, only a few comprehensive studies have investigated how MIM applications can be effective in facilitating peer review and improving students' revision skills. The comparison between face-to-face and mobile-mediated modes of peer review requires some considerations: The findings confirmed that the MMPR groups produced a larger number of comments overall with a higher percentage of revision-oriented which resulted in a larger number of revisions. Therefore, it can be concluded that using mobile applications in peer review sessions could develop academic writing skills and is worthy of further exploration. Nevertheless, FFPR has its own advantages. The peer review will be more influential when combined with either face-to-face or asynchronous modes of communication which encourages students to generate more focused and deliberate comments. In order to increase the effectiveness and efficiency of peer review, writing teachers should incorporate MMPR with face-to-face mode by considering some factors such as students' familiarity with MIM applications, the usability of such applications, the assessment procedures, and impact on students' revision process.

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This study revealed that students' perception of the importance of peer review affects their participation and engagement in the review sessions. As students' attitudes and perceptions are linked to their classroom participation and their willingness to revise their writing drafts, increasing their awareness, praising their endeavors, and encouraging them will make them perceive the peer review practice more worthwhile. In addition, well-organized training sessions are required to familiarize students with the procedures of peer review, new technologies, and ICT skills. Finally, we hope that the findings of this investigation promote further research among other scholars who are interested in using MIM for language teaching and learning, specifically for a second language writing course. Although future studies might use more state-of-the-art technologies to enhance various aspects of language learning, the emphasis should be put on enhancing the quality of education. In other words, pedagogy should drive the technology, not vice versa (Burston, 2015).

8 Limitations, Implications, and Suggestions for Future Research

The small size of 72 participants and the limited number of three writing tasks are among the limitations of this study which will influence the reliability; therefore, the results could not be generalized outside the scope of this study. In addition, there was no inter-group and inter-assignment analysis to better understand the differences between the groups and students' performance variation. Moreover, the close-ended nature of the questionnaire could not thoroughly examine students' attitudes and the reasons for expressing their reluctance or negative attitudes. Implementing other qualitative measurements such as interviews could enhance the quality of the data.

The pedagogical implications of this study could be useful for language teachers, students, and education professionals. First, MMPR may assist both teachers and students to experience a collaborative writing environment through both the synchronous and asynchronous nature of such applications. For example, writing teachers can begin encouraging students to produce short pieces of writing and extend the length as the course proceeds. Second, L2 writing teachers are suggested to combine FFPR with MMPR. Students might be more motivated and less anxious when these two modes are combined. In order to achieve this aim, sufficient training is needed to get writing teachers familiar with the features and demands of both environments. Finally, curriculum designers can benefit from the chain of practices conducted in this study such as training workshops, assigning writing tasks, managing the mobile groups, collecting their drafts, and assessing their samples.

More future studies can be conducted as an improvement or continuation of this study. First, in order to enhance the generalizability of the findings, more participants and extensive writing assignments are needed for analysis. Also, more efforts are needed to measure the use of MIM applications for writing development on a long-term basis. Longitudinal and case studies might reveal different learning processes and revision patterns in writing classes. Second, future research can examine the use of MMPR in

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various educational contexts, language exams, language skills, and subjects. We know little about other educational contexts such as school settings as well as university levels such as master's and doctoral students' academic writing contexts. Meanwhile, the use of mobile applications can be used in other international exams such as TOEFL, SAT, or GRE. Third, future research could explore teachers' perceptions of the usefulness and value of MMPR by measuring some factors such as their readiness, attitudes, beliefs, and competence.

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