THE ROLE OF PEER FEEDBACK IN UNIVERSITY STUDENTS' WRITING PERFORMANCE DURING AN ONLINE PEER ASSESSMENT ACTIVITY

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Abstract.
Although the benefits of online peer assessment and peer feedback on writing performance have been demonstrated, many learners might not recognize or benefit from specific change responses. This study investigated the correlation between online peer assessment and peer feedback on student writing performance. The correlation test was employed to analyze the data in this study. This study involved 145 undergraduate students (75 females and 70 males) from the State University of Malang, where the English course is mandatory for all students. This study revealed that online peer assessment and peer feedback on students' writing performance had a significant and strong relationship. On the other hand, the differences between the online peer assessment and peer feedback variables in each group were insignificant. Peer assessment and online peer feedback might have a close relationship; they can help pupils enhance their writing skills. However, there were no significant variations in each group's online peer assessment and peer feedback factors.

A. INTRODUCTION

In recent years, the deployment of peer assessment, an alternate method of teacher evaluation, has received a lot of attention (Rada & Hu, 2002) due to its efficacy in student learning (K. Topping, 1998). Peer assessment is a means for students to examine and determine a product's level, worth, or quality and the performance of peers of similar rank (K.J. Topping, 2009). It is possible to assess writing, oral presentations, portfolios, exam performance, and other sophisticated activities. Peer assessment can take on either a summative or formative nature. This article aims to help students organize their learning, evaluate their strengths and shortcomings, identify areas that require improvement, and cultivating metacognitive skills as well as other personal and professional talents through a formative approach. Peer feedback is delivered in larger quantities and with higher timeliness than teacher input. A peer assessor can produce an evaluation that is as reliable and valid as a teacher's with less assessment skill but more time.

During the learning process, students are assisted in planning their individual education, identifying their strengths and shortcomings, identifying areas for remediation, developing transferable expert Knowledge and critical thinking abilities, and strengthening their ability to think critically and solve problems (Smith et al., 2002). As a result, peer evaluation has been found to promote learner-to-learner communication between students (Sluijsmans et al., 2002). Peer assessment activities are similar to training activities wherein students put their assessment skills to the test. According to Per Dochy et al. (1999), during the learning process, learners can study their colleagues, and many have a deeper understanding of their peers' performance than their teachers.

Students can learn in this environment without an instructor. As a result, Topping (1998) predicted the emergence of computer-aided peer evaluation as a growing field when examining the recent enhancements in peer assessment. By leveraging anonymous online marking and feedback, Tsai et al. (2002) claimed that online peer assessment can enhance peer learners' flexibility in spacetime while promoting students' attitudes toward peer evaluation. Using the internet to facilitate peer assessment has fundamentally altered the process. Evidence shows that peer assessment, especially in writing, can result in enhancements in the effectiveness and quality of learning that are comparable to, if not surpassing, improvements in teacher performance. Importantly, there are benefits to becoming an assessor.

Y. C. Tsai & Chuang (2013) discovered that using a web-based method to execute structured peer assessment encourages students to critique their work and upgrade it to produce writing with higher-quality arguments. Shih (2012) found that using Facebook to perform an online peer assessment activity can stimulate pupils' curiosity in English writing and their enthusiasm for writing and improve their writing skills and Knowledge. Peer assessment via websites has been demonstrated to improve EFL students' writing as well as their favorable attitudes toward technology (Ciftci & Kocoglu, 2012). Similar findings were reported by Xiao & Lucking (2008); researchers found that peer assessment positively impacted students' writing performance and happiness in a Wiki setting. In other words, some students are unlikely to recognize the educational benefits of receiving specific feedback signals from their peers. Although previous studies have shown that online peer assessment has a beneficial impact on learning, the types of peer feedback students receive may be a significant factor to consider when evaluating the learning activity's outcomes. As a consequence, the function of peer feedback messages in peer assessment and academic achievement is worth investigating. It is worth looking into what kinds of peer feedback can help

learners in particular (Nelson & Schunn, 2009). Previous studies which looked at peer assessment signals simultaneously from both emotional, cognitive, and thinking skills perspectives discovered that the amount of peer assessment and the increasing effects of peer feedback differed. Emotional input that is more favorable from older learners, such as university students, was observed to result in inferior writing quality (Cho & Cho, 2011). Positive affective feedback was more prevalent among university students than cognitive or metacognitive input (Chen & Tsai, 2009).

Computer-assisted formative assessment was previously implemented in the L2 writing course (e.g., Turnitin, Peerceptiv, and Google Docs). Web 2.0 technologies, such as blogs, wikis, social networking, and cloud-based applications, have been popular. This has rekindled interest in peer feedback research, with a number of comparison studies being conducted to determine how CMC peer input compares to traditional face-to-face feedback (Ho et al., 2020). Guardado & Shi (2007) evaluated student perceptions to examine the impact of virtual peer assessment on rewriting on Facebook. The results highlighted students' unfavorable feelings about online connectivity, with students reporting that it lacked the immediacy of face-to-face involvement, discouraging communication and thereby limiting chances for clarification and the negotiation of meaning. They found that CMC peer feedback was not a straightforward substitute for F2F feedback, so they advocated using OF2F peer feedback after WACMC feedback for efficacy. Certain research indicates that peer feedback on CMC platforms offers advantages surpassing traditional F2F peer feedback. These benefits include heightened student engagement, fostering equal participation, and leading to increased revisions and enhanced writing skills. Traditional peer feedback, according to other studies, has its virtues. Hence, scholars have proposed that peer feedback incorporates both kinds.

Finally, understanding how peer feedback signals can affect learning is crucial, especially since peer feedback for writing tests has been proven advantageous. As a result, this research aims to examine the role of peer feedback content in writing performance. In addition, past research has investigated and proven how evaluation signals, which are emotional, psychological, and thinking skills, alter over time due to the peer-assessment activity. This research examines the correlation between online peer assessment and peer feedback on students' writing performance. The following are the research questions.

B. RESEARCH METHOD

A correlation test was performed to analyze the data utilized in this study. It

recognizes the strong connection between independent and dependent variables. In correlation testing, the intensity or weakness of a relationship is indicated by proximity to either 1 or -1. The relationship between the two variables is weak if the correlation coefficient is close to 0. There are several tests for correlation, namely Pearson, Kendal's, and Spearman. The Pearson Correlation test was utilized in this study. The Factorial ANOVA test, the development of the one-way ANOVA test, followed the correlation test. The one-way ANOVA test uses unpaired samples, while the factorial test is used for paired samples. The factorial technique aims to test whether there are significant differences in the results of various repeated measurements on a research variable. When researchers have quantitative data scales (interval or ratio) for two variables, they employ multiple t-tests as a comparative or difference test. Multiple t-tests is a parametric difference tests performed on two matched data sets.

This research involves 145 undergraduate students (75 females and 70 males) from Malang State University, where the English course is mandatory for all students. Individual schools' final written exam is used to classify students' performance. When students opted to participate in this study, all participants had the same aim: to enhance their ability to write in English in preparation for the IELTS test, which will be held near the end of their studies. As a result, all pupils desire an additional opportunity to practice writing. Students are willing to participate in outside-of-class peer feedback and peer assessment activities supervised by researchers who are not writing teachers at the time. All of the candidates decided to take part. Students were promised that their participation in the study would be completely optional and that anonymous sources would be used to protect individual identity.

In this study, four writing tasks provided by the teachers of Composition 4 were employed, as well as student comments and changes. These exercises included four types of essays: cause-and-effect, problem-solving, compare-and-contrast, and argumentative, with a wide range of topics. Student writing, involving time to finish and trying to write assistance, was not effectively controlled since the researchers did not include an empirical or semi-procedural element. After data collection, the researchers conducted a semi-structured interview with the students to learn about their experiences and opinions toward peer commenting in both forms and sequences. To confirm the reliability of the transcripts, member verification mechanisms were used (Morse et al., 2002). Using these strategies, the researchers frequently verified with the participants to ensure that their responses were accurate during the interview. The transcripts were emailed to the participants after the interview data had been transcribed so they

could check the accuracy of the transcriptions.

Unlike some other online communication platforms, such as Facebook and blogs, Google Docs was designed with education in mind. Google Docs also has a more user-friendly, accessible, and versatile interface than other applications, which makes it more enticing. A study by Ebadi & Rahimi (2017) compared the impact of CMC peer feedback on Google Docs and F2F peer feedback on student writing. The research involved two sets of Iranian English as a Foreign Language (EFL) undergraduate students.

Other research by Semeraro & Moore (2016) found that students used key Google Docs features to foster collaboration during revision and they improved overall writing quality, their modifications were mostly focused on adding informational aspects to assist with structuring their writing, adjustments were generally made at the sentence level, and students were engaged when editing and using technology.

The coding technique proposed by C. C. Tsai & Liang (2009) and Chen & Tsai (2009) in a descriptive study showed that peer assessment communications from emotional, psychological, and thinking skills viewpoints were enhanced. The affective dimension is divided into two categories: (1) supporting the comments and (2) opposing them. There are three types in the cognitive dimension: (C1) direct correction, (C2) personal opinion, and (C3) guidance. The metacognitive dimension has two types: (M1) appraisal and (M2) reflection. Messages of peer feedback confirm the report's Knowledge, abilities, or methods. Messages unrelated to affective, cognitive, or metacognitive feedback were also placed in the IR category.

While the coding for student feedback was based on the Liu & Sadler (2003) schema, enabling the study of three types of feedback: area (global or local), natural (revision-oriented or non-revision-oriented), and discourse (e.g., evaluation, advice, and clarification). The global area refers to comments on content, concept development, coherence, and writing organization, whereas the local area refers to criticism on vocabulary, grammar, spelling, and mechanics. Discourse functions can be categorized as either focused on revision or not centered on revision. The functions of revision-oriented discourse include proposals, identification, suggestions, explanations, and clarifications. Compliments or suggestions that aren't detailed enough are examples of non-revision-oriented functions. The sources of the changes are WACMC feedback, OF2F feedback, or a combination of both. The revision area relates to how much the first draft was changed, whether on a local or global scale. Language, vocabulary, spelling, and mechanics are only a few of the local changes. Changes to content,

organization and concept development are all part of a global revision.

The students had to discuss the appropriateness of the topics they had picked with the teacher following the school's introduction to the writing assignment. Students were asked to publish their findings to a peer review mechanism electronically after completing the assignment to begin the peer review process. Each report was given to five students randomly for a blind examination; in other words, each student was given five papers to read.

In addition to offering feedback on their classmates' work, the students graded the presentations using a five-dimensional peer assessment rubric (Liang & Tsai, 2010): (1) knowledge, assessing the depth of information covered; (2) suitability, evaluating the appropriateness of the topic; (3) correctness, gauging the accuracy of expressed concepts; (4) creativity, appraising the imaginative aspects of the report; and (5) overall, providing an evaluation of the study's comprehensive judgment. Both the teacher and students assigned grades on a scale of 1 to 7 for each dimension. Upon completion of the initial round of peer review, the students incorporated revisions into their reports guided by the anonymous feedback from their peers. Subsequently, they submitted the revised reports to the system for the second round of peer review.

Training sessions were provided to small groups consisting of a maximum of four students. The training was divided into two two-hour sessions. The objective of this project was to familiarize students with valuable peer feedback and the commenting feature in Google Docs. Students were instructed to provide particular feedback, which involves pinpointing issues and proposing solutions; concentrated feedback, encompassing both global and local comments, with a preference for the former; well-rounded feedback, assessing both strengths and weaknesses; and considerate feedback, appraising strengths and weaknesses without resorting to derogatory or insulting remarks, such as phrases like "This is lame" or "This idea seems poor." Students taught themselves how to create a Google Docs account, log in, upload documents, and share them with others. Students were then shown how to use Google Docs' editing tool, which allowed them to add comments to their documents.

The primary objective of this study was to investigate the relationship between online peer assessment and peer feedback concerning students' writing performance. The researchers investigated what types of feedback signals reviewers provided in the first round that can assist them in enhancing their scores in the second round. Each instance of peer feedback (the complete feedback message) could only be classified into one group, according to the message's central premise.

Initially, the comprehensive allocation of peer assessment signals within pertinent clauses related to affective, cognitive, and metacognitive aspects was assessed across the three peer assessment sessions. The relationship between peer and teacher scores was also investigated to see if peer ratings accurately represented undergraduate students' writing ability. This research investigated the diverse functions of affective, cognitive, and metacognitive peer feedback messages in the progression of students' performance across the three instances of peer assessment activities. This analysis was conducted through ANOVA based on peer ratings.

C. RESULTS AND DISCUSSION

1. Results

a. Descriptive statistics

Descriptive statistics serve as an initial method of analyzing data, offering a summary of the measured variables. Descriptive statistics analysis encompasses both data concentration, represented by measures such as Mean, Mode, Median, etc., and data distribution, which includes metrics like standard deviation, variance, etc. Table 1 displays the mean and standard deviation of all variables examined in the study.

Table 1. Descriptive Statistics of research variables

No	Indicator	Round 1			Round 2			Round 3	
		mean	SD		mean	SD		mean	SD
1	Knowledge	4.62	1.81		4.63	1.81		4.61	1.80
2	Suitability	4.81	1.82		4.82	1.81		4.84	1.82
3	Correctness	4.19	1.63		4.21	1.67		4.23	1.62
4	Creativity	4.69	1.68		4.65	1.69		4.68	1.69
5	Overall	4.47	1.69		4.47	1.69		4.50	1.70
6	Specific	3.49	1.36		3.50	1.36		3.51	1.36
7	Content	3.18	1.28		3.19	1.28		3.22	1.29
8	Evidence	2.96	1.16		2.95	1.16		2.93	1.17
9	Idea Development	3.39	1.13		3.40	1.13		3.41	1.12
10	Grammar	3.09	0.99		3.10	0.99		3.11	0.99
11	Spelling	2.89	1.14		2.88	1.15		2.90	1.15
12	Balanced	3.04	1.00		3.05	1.00		3.07	1.00
13	sensitive	3.14	1.27		3.17	1.27		3.18	1.27

Table 1 describes the mean and standard deviation of all indicators in Round 1, Round 2, and Round 3. Creativity indicator has the highest mean in the Round 1 group, Knowledge has the highest mean in the Round 2 group, and Suitability has the highest mean in Round 3 group.

b. Spearman's Correlation

Correlation analysis, employed as a statistical technique in this study, aims to

ascertain the degree of association between variables. The outcomes of the correlation test using the Pearson method are detailed in Table 2.

Table 2. Pearson Peer Assessment Correlation Test Results

	Knowledge	Suitability	Correctness	Creativity	Overall
Round 1	0.933**	0.984**	0.860**	0.960**	0.859**
Round 2	0.933**	0.981**	0.857**	0.950**	0.859**
Round 3	0.901**	0.980**	0.850**	0.949**	0.860**

Table 2 illustrates the correlation among the indicators related to the peer assessment variable, assessed through five indicators: Knowledge, Suitability, Correctness, Creativity, and Overall. The table indicates a robust and statistically significant correlation (r > 0.80) among the indicators comprising the peer assessment variable. When given Round 1, 2, and 3 treatments, the same results were revealed; the Pearson correlation test showed that all indicators forming the peer assessment variable had a strong and significant correlation (r> 0.80).

Table 3. Results of Peer Feedback correlation test

	Specific	Content	Evidence	Idea Development	Grammar	Spelling	Balanced	sensitive
Round 1	0.890**	0.944**	0.931**	0.862**	0.924**	0.843**	0.936**	0.940**
Round 2	0887**	0.941**	0.919**	0.860**	0.917**	0.831**	0.935**	0.935**
Round 3	0.886**	0.933**	0.886**	0.857**	0.915**	0.830**	0.937**	0.934**

Table 3 shows the correlation between indicators on the peer feedback variable as measured by eight indicators: Specific, Content, Evidence, Idea_Development, Grammar, Spelling, Balanced, and Sensitive. Table 3 shows that the indicators forming the peer feedback variable have a strong and significant correlation (r> 0.80). Similarly, for Round 1, 2, and 3 treatments, the results of the Pearson correlation test showed that all indicators forming the peer feedback variable had a strong and significant correlation (r> 0.80).

c. Skewness Normality Test

The skewness normality test is a representation of a symmetric distribution of data, indicating that the majority of the data points are centered around the mean. The purpose of the normality test is to assess whether confounding or residual variables in the regression model exhibit a normal distribution. Violation of this assumption can lead to the invalidity or bias of statistical tests, particularly in the case of small sample sizes. Normality tests can be conducted using two methods: descriptive and inferential. Skewness is a statistical quantity showing the slope of the data. This skewness indicates whether the data tends to be in the middle or skewed on one side and the skewness ratio can be used to see the distribution of normal data. Table 4 presents the results of the normality test on the research variables.

Table 4. Skewness Normality Test Results

No	Indicator	Skewness	Std. Error
1	Knowledge	-0.253	0.117
2	Suitability	-0.568	0.117
3	Correctness	-0.048	0.117
4	Creativity	-0.440	0.117
5	Overall	-0.041	0.117
6	Specific	-0.220	0.117
7	Content	-0.155	0.117
8	Evidence	-0.027	0.117
9	Idea Development	-0.505	0.117
10	Grammar	-0.276	0.117
11	Spelling	0.193	0.117
12	Balanced	0.064	0.117
13	sensitive	-0.178	0.117

Table 4 shows the skewness value for each indicator. The skewness value is used as a benchmark to determine whether the data distribution of each indicator meets the assumption of normality and is feasible to be analyzed for further testing. The results of the 13 indicators of skewness values range from -2 to 2, meaning that all indicators met the normality assumption.

d. Factorial ANOVA Test and Multiple T Test

The factorial ANOVA test is a development of the One-Way ANOVA test. The factorial technique examines the significant difference from the results of various measurements carried out repeatedly on a research variable. If the data scales of two variables are quantitative, specifically either interval or ratio, multiple t-tests are employed as comparative or difference tests. Multiple t-tests are parametric difference tests on two-paired data. Table 5 displays the results of the ANOVA factorial test.

Table 5. Results of the Factorial ANOVA Test for the Peer Assessment variable

No	Indicator	Round 1	Round 2	Round 3	F	Post Hoc
		mean	mean	mean		
1	Knowledge	4.624	4.629	4.614	0.029	R1>R3
						R2>R3
2	Suitability	4.810	4.817	4.838	0.009	R3>R1
						R3>R2
3	Correctness	4.191	4.210	4.228	0.019	R3>R1
						R3>R2
4	Creativity	4.688	4.653	4.679	0.017	R1>R3
						R3>R2
5	Overall	4.468	4.473	4.500	0.015	R3>R1
						R3>R2

Table 5 shows the mean of each indicator in each round. From the difference in the average value, it will be tested whether the difference is significant. Furthermore, it will be known which round average value is the largest.

The highest mean of knowledge indicator is in Round 2 of 4.629. However, the difference in the mean of the knowledge indicator in Rounds 1, 2, and 3 is not significant, as indicated by the results of the factorial ANOVA test (F value =0.029). The

highest mean of the Creativity indicator was in Round 1 (M=4.688) and the difference in mean of the Creativity indicator in Rounds 1, 2, and 3 is also insignificant (F=0.017).

As for the Suitability, Correctness, and Overall indicators, the highest mean is in Round 3 (M=4.838, M=4.228, and M=4.500, respectively) and the factorial ANOVA test shows an F value of 0.009, 0.019, and 0.019, respectively. The difference in the mean of the Suitability indicator in round 1, round 2, and round 3 is also not significant.

Table 6. Factorial ANOVA Test Results for Peer Feedback Variables

No	Indicator	Round 1	Round 2	Round 3	F	Post Hoc
		mean	mean	mean		
1	Specific	3.488	3.499	3.506	0.006	R1>R3
						R2>R3
2	Content	3.178	3.191	3.222	0.045	R3>R1
						R3>R2
3	Evidence	2.958	2.950	2.934	0.016	R1>R3
						R2>R3
4	Idea Development	3.391	3.403	3.414	0.025	R3>R1
						R3>R2
5	Grammar	3.092	3.096	3.108	0.011	R3>R1
						R3>R2
6	Spelling	2.887	2.885	2.896	0.004	R3>R1
						R3>R2
7	Balanced	3.036	3.050	3.067	0.035	R3>R1
						R3>R2
8	sensitive	3.143	3.169	3.179	0.031	R3>R1
						R3>R2

The highest mean of the Evidence indicator is in Round 1 (2.958), and the differences between the three rounds are not significant (F=0.016). The multiple t-tests show that the overall mean of Evidence in Round 1 is better than Round 3 and Round 2 is better than Round 3.

As for Specific, Content, Idea Development, Grammar, Spelling, Balance, and sensitive indicators are in Round 3 (M=3.056, M=3.222, M=3.414, M=3.108, M=2.896, 3.067 and 3.179, respectively). The factorial ANOVA test shows that the F value for the seven indicators is 0.025, 0.045, 0.011, 0.004, 0.035, 0.006, and 0.031, respectively. These findings mean that the difference in the means of the four indicators in the three rounds is not significant.

2. Discussion

This study aimed to examine the correlation between online peer assessment and peer feedback on students' writing performance. From this research, teachers can find out the extent of the influence and the correlation between online peer assessment and peer feedback on students' writing performance.

The correlation between online peer assessment and peer feedback on students' writing performance

This study shows that the correlation between online peer assessment and peer feedback on students' writing performance has a significant and strong relationship. These two variables can improve students' writing performance. This finding is supported by Sluijsmans et al. (2002), showing that peer assessment improves students' interpersonal interactions in the classroom. Similarly, Tsai et al. (2002) claimed that engaging in online peer assessment could provide peer learners with increased flexibility in terms of time and space, fostering positive attitudes among students towards peer evaluation. Similar findings were also reported by Xiao & Lucking (2008), revealing that peer assessment positively impacted students' writing performance and happiness in a Wiki setting. In other words, certain students are unlikely to identify the educational benefits of receiving certain peer feedback signals.

According to the Pearson correlation test, there exists a robust and statistically significant correlation among all the indicators that constitute the peer feedback variable. The same results were also obtained when given Round 1, 2, and 3 treatments on peer assessment variables, namely the correlation between indicators: Knowledge, suitability, correctness, creativity, and overall. Overall, the indicators that make up the peer assessment variable exhibit a robust and statistically significant correlation. Semeraro & Moore (2016) found that students used key Google Docs features to foster collaboration during revision, and they improved overall writing quality.

The differences between the online peer assessment and peer feedback variable in each group

The results show that the differences between online peer assessment variables and peer feedback in each group are insignificant. These results are supported by Topping (1998), predicting that computer-aided peer evaluation would become an emergent growth area while analyzing recent improvements in peer assessment. In other research, Y. C. Tsai & Chuang (2013) discovered that using a web-based method to execute structured peer assessment encourages students to critique and update their work to produce writing with higher-quality arguments. Similarly, Ciftci & Kocoglu (2012) implemented peer assessment through blogs and showed that it benefits the EFL (English as a Foreign Language) students' writing and positive attitudes toward technology.

The multiple t-tests show that the overall mean of the variables varied between the rounds; however, none of the differences is significant.

D. CONCLUSION

The research findings show the extent of influence and correlation online peer

evaluation and peer feedback has on students' writing performance based on the research findings. The finding indicates a strong association between online peer assessment and peer feedback on students' writing performance. Peer assessment and online peer feedback can help pupils enhance their writing skills. However, there are no significant variations in each group's online peer assessment and peer feedback factors. In short, this study has wide implications for language learning and teaching.

There are certain limitations in this study that could be considered for rectification in future research. First, readers will only learn about the relationship between online peer evaluation and peer feedback on students' writing abilities in this study. This research can be further developed in the future to include more variables. Second, as participants were selected from one university, they do not reflect all Indonesian students. Further research should cover more students in Indonesia.

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