Effects of Peer Feedback Types and
Feedback Acceptance Levels on Academic Achievement
in Middle School Project-based Learning

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This study aimed to investigate effects of peer feedback types and feedback acceptance levels on academic achievement in project-based learning. The participants were 70 middle-school students taking an English course. They were divided into corrective and suggestive feedback groups. These participants were asked to create user-created content (UCC) as an individual task and provide peer feedback on a peer's UCC in the same type of feedback group. Results showed that there were significant differences in academic achievement according to peer feedback types (corrective vs. suggestive) and feedback acceptance levels (high vs. low). In particular, the suggestive peer feedback group had higher academic achievement than the corrective peer feedback group. Moreover, the group with a high level of feedback acceptance gained higher academic achievement than the group with a low level of feedback acceptance. Moreover, there was an interaction effect between peer feedback types and feedback acceptance on academic achievement. These results indicate that peer feedback types and feedback acceptance should be considered for effective peer feedback activity. These findings provide practical implications for the design and implementation of peer feedback activity in project-based learning.

Keywords : Peer feedback, corrective feedback, suggestive feedback, feedback acceptance, project-based learning

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Introduction

There has been an emphasis on education to help learners transfer knowledge gained in schools to real life. Project-based learning is one of the teaching methods that encourages active participation of learners and gives them the initiative of learning to promote transfer. Project-based learning is defined as student-centered learning where learners produce a concrete product as an individual or a team through the steps of a constructing process (Blumenfeld, Soloway & Marx, 1991). During this process, feedback can facilitate learners to recognize and understand their learning progress and improve their learning performance so that they can participate in the project more effectively (Helle, Tynjälä & Olkinuora, 2006).

According to Kulhavy (1977), feedback in the educational context often means information that is provided to learners for the purpose of changing their behavior or thoughts. Feedback has traditionally been provided by an instructor (Bardwell, 1981). However, peer feedback, which refers to providing feedback on the performance of a peer of a similar level (Topping, 1998), is also being actively used because of the emergence of the constructivist paradigm and the development of technology. Peer feedback plays an important role in project-based learning in that it promotes learner performance by facilitating information sharing and interaction (Ching & Hsu, 2013). Peer feedback has educational effects in cognitive and affective perspectives. Cognitively, learners have opportunities to use cognitive and reflective strategies by providing peer feedback (Cho & Cho, 2011). Moreover, learners tend to perceive peer feedback as useful, since they easily communicate with peers who share similar context, languages, and cognitive levels (Tsui & Ng, 2000; Yang, Badger & Yu, 2006). Affectively, peer feedback improves learner independence, confidence, motivation, and sense of responsibility (Falchikov, 1995).

However, not all peer feedback can improve learning outcomes. Different types of peer feedback have different impacts (Zheng, Lawrence, Warschauer & Lin, 2015). In prior studies on types of peer feedback, learning outcomes and the degree

to which peer feedback is applied to a task revision are different depending on the types of peer feedback. Mixed findings are presented as to what type of peer feedback is more effective on learning outcomes (Tseng & Tsai, 2007). In particular, two types of peer feedback have been frequently studied: corrective feedback and suggestive feedback. Several studies have suggested that corrective feedback has a significant effect on academic achievement (Kim, 2011; Villamil & De Guerrero, 1998), while other studies have argued that suggestive feedback is effective on learning outcomes (Liu & Lin, 2007; van der Pol, van den Berg, Admiraal & Simons, 2008). Given that the type of peer feedback plays an important role in maximizing its benefit, more elaborate empirical research classifying peer feedback into corrective and suggestive types would have practical implications for practitioners in the design of peer feedback activities.

Meanwhile, learners are likely to make a judgment on whether they should accept peer feedback, while they tend to passively accept teacher feedback (Hyland, 1998). This judgmental process of feedback is called feedback acceptance. Feedback acceptance refers to the degree to which learners reflect on peer feedback in the revision of their tasks, based on the measure of usefulness and accuracy of feedback (Anseel & Lievens, 2009; Ilgen, Fisher & Taylor, 1979). Given that feedback acceptance has a complex mechanism involving cognitive and affective factors of a peer feedback receiver, it cannot be asserted that a high or low level of feedback acceptance itself has a positive or negative effect on academic achievement. Rather, the actual effect of peer feedback can be realized in learning when peer feedback receivers make a valid judgment and accept the appropriate feedback, and apply it to their tasks (Lee, 2015; Nelson & Schunn, 2009). However, prior studies have focused more on the benefits of peer feedback from the perspective of the feedback provider, considering the feedback receiver to have a passive role (Sluijsmans, Brand-Gruwel, van Merrienboer & Bastiens, 2002). It should be noted that feedback receivers go through an active process by reflecting upon their own learning and deciding whether or not to accept the feedback

(Strijbos, Narciss & Dünnebier, 2010). Therefore, it is important to consider the extent to which a feedback receiver has reflected on the feedback in task revision and how acceptance of feedback might affect academic achievement, in terms of different types of peer feedback. The purpose of this study is to investigate the effects of different types of peer feedback-specifically corrective and suggestive ones-and the level of feedback acceptance on academic achievement in project-based learning. The results will provide practical suggestions for designing peer feedback activities for teachers, and will also have implications for further research on peer feedback. Research questions are as follows:

1. Is there a difference in academic achievement depending on the type of peer feedback provided (corrective vs. suggestive)?

2. Is there a difference in academic achievement depending on level of feedback acceptance (high vs. low)?

3. Is there an interaction effect between types of peer feedback (corrective vs. suggestive) and levels of feedback acceptance (high vs. low)?

Theoretical Background

Peer feedback

Peer feedback is a communication process through which feedback on value, quality, and success of one's performance or a product is provided by peers of equal status (Topping, 1998). In recent years, peer feedback has been applied to various learning environments such as e-learning, MOOC (massive open online course), and web-based learning (Lee, Hong & Son, 2007; Topping, 1998). Peer feedback is beneficial for learners from the perspective of both the feedback provider and receiver. As a peer feedback provider, learners can develop critical and analytical thinking by providing opinions on peers' products. As a peer feedback

receiver, learners become active participants in learning through meaning negotiation about received feedback with peers instead of passively accepting the feedback.

However, some studies have insisted that learners may have doubts about the validity and accuracy of peer feedback they received (Cho, Schunn & Wilson, 2006). One of the factors that might affect this negative perception about peer feedback is the type of peer feedback that learners received (Cheng et al., 2015). For example, in the study by Lu and Law (2012), positive affective feedback had a more significant relationship with academic achievement than feedback that identifies problems. Cho, Schunn, and Charney (2006) have also indicated that feedback receivers perceived praise type of feedback to be useful. In contrast, Cho and Cho (2011) have shown that learners who receive more affective feedback obtained lower academic achievement. Similarly, several studies have shown that cognitive feedback (e.g., direct correction) was more helpful for learning outcomes than affective feedback (Cheng et al., 2015; Hattie & Timperley, 2007). Prior studies have also classified peer feedback into concise and detailed feedback and suggested mixed results. For instance, Strijiobs et al. (2010) have reported that concise feedback with general content had a significant effect on learning outcomes, while Tsui and Ng (2000) reported that concrete and detailed feedback led to higher academic achievement. As described above, learners are influenced by the type of peer feedback that they receive. However, conflicting findings have been suggested on what type of peer feedback is more beneficial for learning.

Corrective and suggestive peer feedback

A number of studies have suggested various types of peer feedback. Of these, two types of peer feedback are commonly suggested: corrective feedback and suggestive feedback (Cheng et al., 2015; Tseng & Tsai, 2007). Corrective feedback focuses on correction of a task, pointing out errors or problems, and correcting

them. Corrective peer feedback can effectively decrease errors in a task by pointing them out directly (Tseng & Tsai, 2007). However, it tends to be less trusted than teacher feedback. Meanwhile, suggestive feedback refers to suggesting solutions or alternative perspectives to improve task quality. Suggestive feedback is preferred by learners because it suggests ideas about a task which they could not think of themselves (Reed & Burton, 1985). However, irrelevant ideas may be suggested if a feedback provider does not understand the task (Kim, 2011).

Since both types of peer feedback have strengths and weaknesses, as mentioned above, conflicting results have been presented about which type is more effective on learning outcomes. In the study by Sato and Lyster (2012), corrective feedback from peers increased fluency and accuracy in second-language learning. Kim (2011) has also reported that providing feedback about problems in a peer's task is effective in improving performance in an ill-structured task. On the contrary, Martin, Veldman, and Anderson (1980) have insisted that receiving more feedback that points out problems can lead to lower academic achievement. Tseng and Tsai (2007) have shown that suggestive feedback has a positive effect on the improvement of project quality while corrective feedback does not have a positive effect on learning outcomes. Similarly, it has been found that suggestive feedback has a positive correlation with academic achievement (Liu & Lin, 2007).

In summary, not every peer feedback can lead to higher academic achievement, partly because it has a high level of complexity in design and implementation in a classroom situation and is highly dependent on the learning context. Given that prior studies have presented contradictory results on the effective types of peer feedback in academic achievement, it is worth exploring the effects of corrective and suggestive feedback on academic achievement by conducting empirical research to further understand the mechanism of peer feedback.

Feedback acceptance

Feedback acceptance refers to the extent to which feedback is adopted in task

revision, after judging the usefulness and accuracy of feedback by a feedback receiver (Anseel & Lievens, 2009; Ilgen et al., 1979). Feedback acceptance needs to be considered important because it precedes any effects the feedback may have on performance. Ilgen et al. (1979) have mentioned that feedback is information about the appropriateness of a performance that occurred before providing feedback. However, the usefulness and accuracy of information in the feedback are subjectively judged by a feedback receiver. That is, a feedback receiver determines the degree of feedback acceptance after judging whether the provided feedback is accurate and useful with personal criteria. Therefore, feedback acceptance can differ based on individuals' perception on the feedback.

Particularly, the level of feedback acceptance can be different depending on types of peer feedback provided. For instance, Seo (2012) reported that 68% of peer feedback was accepted and reflected in the revision of the task. Especially, feedback that suggested alternatives showed higher acceptance than explanatory and corrective feedback. In the same vein, it has been found that concrete suggestions have a significant correlation with the degree of task correction (van der Pol et al., 2008). These results indicate that suggesting ideas or alternatives can lead to higher feedback acceptance and task correction. On the other hand, Villamil and De Guerrero (1998) have shown that 82% of corrective peer feedback provided is accepted for task correction, leading to correction for most errors in tasks. Storch (2017) has also insisted that corrective peer feedback is inclined to be understood and accepted in collaborative writing.

In conclusion, feedback acceptance is an important variable that should be explored in research on peer feedback. However, there is a lack of research on relationships among feedback acceptance, types of peer feedback, and learning outcomes in an educational context. In addition, prior studies reported contradictory results and research contexts were limited to writing or higher education. Thus, there is a need to explore the effect of peer feedback on learning outcomes by considering feedback acceptance.

Methodology

Participants

Participants of this study were 86 third-year middle-school students from four different classes in Korea. All students were enrolled in an English class. They were females aged from 15 to 16 years old. Since the English class in this middle-school adopted differentiated instruction-which reorganized students according to their English proficiency levels-students were divided into six classes: two advanced classes, two intermediate classes, and two beginner classes. As a performance test, these students were required to individually create user-created content (UCC) about any possible future jobs they could have.

Students in these six level-differentiated classes were divided into two groups for the experiment: a corrective peer feedback group and a suggestive peer feedback group. Each group equally consisted of one advanced class, one intermediate class, and one beginners' class in order to control prior knowledge. Although each feedback group consisted of three different levels of classes, all learners participating in the research were taught by the same instructor. In addition, the UCC project was part of an assessment so that the effect of the instructor on learners was the same in all aspects, including teaching method, teaching materials, and guidance of the instructor on the project.

Treatment

Corrective and suggestive peer feedback were employed for this study, based on the suggestions by Tseng and Tsai (2007). All participants provided corrective or suggestive peer feedback according to the peer feedback group they belonged to. Anonymity of the feedback provider was guaranteed since it could affect the emotional aspect of the provider and the content of the feedback they provided to

their peers (Lu & Bol, 2007). Participants in the corrective peer feedback group provided feedback that directly pointed out errors in a task or corrected them. Specifically, participants directly mentioned or corrected irrelevant contents, grammatical errors, and errors in pronunciation in the UCC. In contrast, participants in the suggestive peer feedback group provided feedback that gave advice or suggested ideas to improve the quality of a task. To be specific, feedback providers in this group suggested ideas for enriching content or indirectly provided advice for grammatical and pronunciation improvement of the UCC. Feedback items were constructed based on the rubric for UCC quality presented by KICE (Korea Institute of Curriculum and Evaluation, 2016) and Lennon (1990). Peer feedback items for each type are shown in Table 1.

Table 1. Feedback items

	Corrective group	Suggestive group
Content	Write any content that is irrelevant to the topic.	Give your friend some ideas to be added in UCC.
Linguistic aspects	Is pronunciation in the UCC clear? Write a word or a sentence that is pronounced poorly and correct it.	Is there a pronunciation that your friend repeatedly makes mistake in the UCC? Give advice to rectify the mistake.
	Are sentences in the UCC grammatically correct? Write sentences with grammatical errors and correct them.	Is there a grammatical mistake that your friend repeatedly makes in the UCC? Give advice to rectify the grammatical mistake.
	Among the key phrases you learned from the teacher in UCC, write sentences that are awkward in the context.	Suggest some ideas about how to use key phrases in an appropriate situation
Others	Is there anything else that needs to be corrected?	Do you have any other ideas that can make the UCC better?

Measures

Feedback acceptance

In order to measure feedback acceptance, an instrument developed by Lee (2015) was modified. All participants marked whether they accepted, partly accepted, or rejected peer feedback they received and wrote reasons for their decision. The feedback acceptance score was calculated by the sum of dividing the ratio of the number of feedbacks accepted, the ratio of the number of feedbacks partly accepted, and the number of feedbacks rejected from the total number of received feedbacks. The formula used for calculating the feedback acceptance score is shown in Figure 1. After calculating the feedback acceptance score, participants were divided into two groups based on the median feedback acceptance score: a high-level of feedback acceptance group and low-level of feedback acceptance group.

$$\frac{\text{Number of accepted feedback}}{\text{Total number of received feedback}} * 2\text{points} + \frac{\text{Number of partly accepted feedback}}{\text{Total number of received feedback}} * 1\text{point} + \frac{\text{Number of rejected feedback}}{\text{Total number of received feedback}} * 0\text{point}$$

Figure 1. Formula for calculating feedback acceptance score

Prior knowledge

Prior knowledge was measured before starting the UCC project in order to control the impact of prior knowledge on academic achievement. Prior knowledge was measured by a mid-term exam conducted by an English teacher with eight years of teaching experience.

Academic achievement

Academic achievement was measured by the sum of the score of a final-term exam (20 points) and the score of UCC quality (10 points). The final-term exam was set and graded by an English teacher with eight years of teaching experience. The rubric for UCC quality was produced based on KICE (2016) and Lennon

(1990) by the English teacher with experience of conducting UCC projects and a researcher with six years of teaching experience.

Procedure

Students in this study were asked to create UCC as an individual project and provide peer feedback once during the project. The specific procedure was as follows. First, prior knowledge was measured to control the effect of prior knowledge on the results of this study. Second, the instructor introduced the topic of the UCC and taught students key expressions for creating the UCC. Third, students created the first draft of the UCC based on essential expressions they learned for two weeks. After creating the first draft of the UCC, each student submitted it by uploading it to YouTube and sharing the YouTube link to the instructor and the researcher. The researcher then randomly assigned the submitted UCC to another student within the same type of peer feedback group. Fourth, before initiating peer feedback activity, pre-training for the same was conducted to help students provide appropriate feedback to their peers for an hour. The pre-training included 1) sharing the purpose and scope of peer feedback, 2) instructions on how to write a good feedback, 3) instructions on how to accept (or reject) feedback from peers, and 4) examples of corrective or suggestive feedback. The examples were provided only for the matching feedback type group. That is, corrective feedback examples were provided to the corrective feedback group only in order to confirm which types of feedback they should provide. Fifth, each student provided paper-and-pencil peer feedback on a UCC anonymously in class. Every student provided peer feedback to a peer's UCC in the same peer feedback group and received feedback from a peer in the same group. In detail, each student watched an assigned UCC in class with a smart pad which the instructor provided to each student. The student then provided peer feedback based on the guide for providing peer feedback. Figure 2 shows the examples of student-generated UCC and peer feedback.
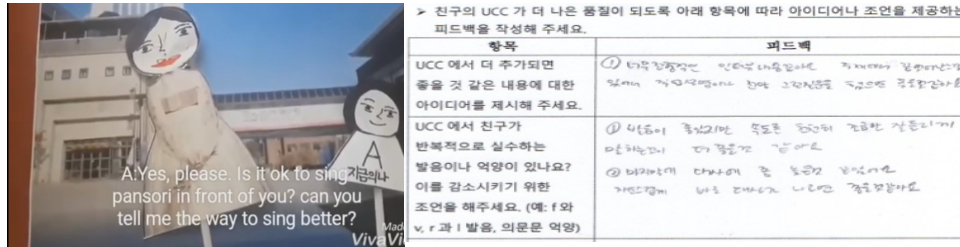
Figure 2. Examples of UCC (left) and peer feedback (right)

Sixth, the researcher double-blinded peer feedback by deleting names of peer feedback providers and typing peer comments to get rid of the effect of hand writing. The researcher also checked whether students provided appropriate feedback according to the guideline provided at the pre-training (e.g., corrective, not suggestive, feedback from the corrective feedback group). After receiving peer feedback, students revised their UCC based on it for a week. They then submitted the final version of their UCC to the instructor and the researcher. Finally, feedback acceptance was measured. The instructor and the researcher assessed the quality of the final version of the UCC and academic achievement.

Data analysis

The detailed procedure of data analysis was as follows. First, statistical analysis and standardized residual analysis were performed using SPSS after data collection. Among 86 students, 16 students who did not take part in the project or did not complete the UCC were excluded. Additionally, three outliers with absolute values of standard residuals above 3 were excluded (Seo, Yang, Kim, Kim & Kim, 2009). Thus, the final number of participants was 67. Second, in order to address research question 1, ANCOVA was conducted with prior knowledge as a covariate. Third, in order to address research question 2, high- and low-level of feedback-acceptance groups were divided based on the median score of the feedback acceptance at 1.40. ANCOVA was conducted while controlling the effect of prior knowledge. Finally, two-way ANCOVA was conducted to address research question 3 with prior

knowledge as a covariate.

Results

Descriptive statistics

Descriptive statistics was conducted to test the normality of data. High and low levels of feedback acceptance groups were divided based on the median feedback acceptance score at 1.40. As shown in Table 2, mean and standard deviation of prior knowledge, feedback acceptance, and academic achievement were 79.43 (SD = 16.258), 1.28 (SD = .607), and 26.24 (SD = 2.539), respectively. Absolute value of skewness ranged from 0.54 to 0.85 and that of kurtosis ranged from 0.36 to 0.76. These data satisfied the normal distribution assumption because absolute skewness and kurtosis values were less than 2 and 7, respectively (Curran, West & Finch, 1996). Table 3 shows descriptive statistics for groups by peer feedback type and feedback acceptance level.

Difference in academic achievement by peer feedback type

Before conducting ANCOVA, two basic assumptions for ANCOVA were tested. First, Levene's test for homogeneity was conducted, confirming homogeneity of academic achievement between the two groups ($F = 1.103$, $p > .05$). Second, correlation analysis was conducted between prior knowledge and academic achievement, finding that there was a significant correlation between the two variables ($r = .591$, $p < .05$). After confirming these assumptions, ANCOVA was performed to find the difference in academic achievement between corrective and suggestive types of peer feedback, inserting prior knowledge as a covariate. Results are shown in Table 4.

Table 2. Descriptive statistics   (*N* = 67)

Variable	M	SD	Range	Skewness	Kurtosis
Prior knowledge	79.43	16.258	38.50-100.00	-0.71	-0.36
Feedback acceptance	1.28	.607	0.00-2.00	-0.54	-0.76
Academic achievement	26.24	2.539	19.00-30.00	-0.85	0.69

Table 3. Descriptive statistics for groups by peer feedback type and feedback acceptance level   (*N* = 67)

		Corrective feedback		Suggestive feedback		Total	
	Variables	M	SD	M	SD	M	SD
High Feedback acceptance	Prior Knowledge	74.24	14.551	77.68	17.591	75.70	15.742
	Academic Achievement	25.29	2.573	28.04	2.357	26.46	2.807
	Adjusted Academic achievement	25.79	.425	28.21	.488	26.83	.353
	n	19		14		33	
Low Feedback acceptance	Prior knowledge	84.17	15.161	82.16	17.258	83.04	16.156
	Academic achievement	25.83	2.410	26.18	2.212	26.03	2.273
	Adjusted Academic achievement	25.37	.476	25.92	.420	25.67	.347
	n	15		19		34	
Total	Prior knowledge	78.62	15.429	80.26	17.272		
	Academic Achievement	25.53	2.480	26.97	2.424		
	Adjusted Academic achievement	25.60	.338	26.90	.344		
	n	34		33			

Table 4. ANCOVA results for academic achievement by peer feedback type
(N = 67)

Source	SS	df	MS	F	p
Prior knowledge	148.79	1	148.79	38.25*	.000
Feedback types	27.89	1	27.89	7.17*	.009
Error	249.00	64	3.89		
Total	46553.50	67			

* p < .05

There was a significant difference in academic achievement between types of peer feedback (F = 7.17, p < .05). Adjusted mean scores of corrective peer feedback and suggestive peer feedback were 25.60 and 26.90, respectively (Table 3). Thus, the suggestive peer feedback group had higher academic achievement than the corrective peer feedback group.

Difference in academic achievement by feedback acceptance level

In order to address research question 2, learners were divided into a high-level of feedback-acceptance group and a low-level of feedback-acceptance group based on the median score of feedback acceptance at 1.40. First, the assumption of homogeneity was confirmed by Levene's test (F = 2.988, p > .05). ANCOVA was then conducted to find the difference in academic achievement between groups with different feedback acceptance levels.

As shown in Table 5, there was a significant difference in academic achievement depending on the level of feedback acceptance (F = 5.39, p <.05). Adjusted mean scores of academic achievement for the high-level and low-level feedback-acceptance groups were 26.83 and 25.67, respectively. These results indicate that learners with high level of feedback acceptance showed higher academic achievement than learners with low level of feedback acceptance.

Table 5. ANCOVA results for academic achievement by feedback acceptance level (N = 67)

Source	SS	df	MS	F	p
Prior knowledge	148.79	1	148.79	37.29*	.000
Feedback types	21.51	1	21.51	5.39*	.023
Error	255.37	64	3.99		
Total	46553.50	67			

*p < .05

Interaction effects between peer feedback type and feedback acceptance on academic achievement

Two-way ANCOVA was conducted to determine the interaction effect between peer feedback type and feedback acceptance level on academic achievement, controlling the effect of prior knowledge. Results of Levene's test revealed that the data satisfied the assumption of homogeneity (F = 2.236, p > .05).

As shown in Table 6, there was an interaction effect between peer feedback type and feedback acceptance level (F = 4.27, p <. 05). In the corrective peer feedback group, the adjusted mean score of the high-level of feedback-acceptance group was 25.79 and that of the low-level of feedback-acceptance group was 25.37. In the suggestive peer feedback group, the adjusted mean score of the high-level of feedback-acceptance group was 28.21 and that of the low-level of feedback-acceptance group was 25.92. These results indicate that higher feedback acceptance of suggestive peer feedback can lead to higher academic achievement. Also, the level of acceptance was more important for the suggestive feedback group, as compared to the corrective feedback group. Figure 3 shows the interaction effect between peer feedback type and feedback acceptance level on academic achievement.

Table 6. Two-way ANCOVA results for academic achievement by peer feedback type and feedback acceptance level ($N = 67$)

Source	SS	df	MS	F	p
Prior knowledge	148.79	1	148.79	44.74*	.000
Feedback type	27.89	1	27.89	8.39*	.005
Feedback acceptance	28.61	1	28.61	8.60*	.005
Feedback type x Feedback acceptance	14.21	1	14.21	4.27*	.043
Error	206.18	62	3.33		
Total	46553.50	67			

* $p < .05$
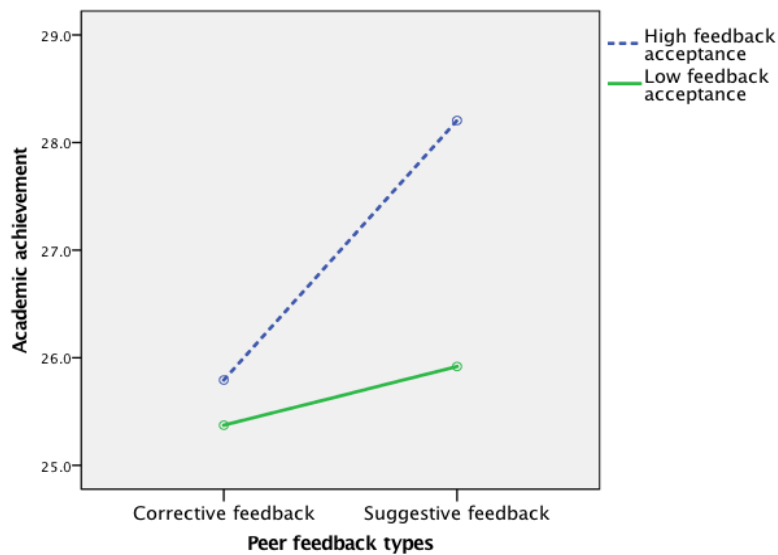
Figure 3. Interaction effect between peer feedback type and feedback acceptance level

Discussion

This study investigated effects of peer feedback types and feedback acceptance levels on academic achievement. The findings of this study have the following

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implications. First, the suggestive peer feedback group gained significantly higher academic achievement than the corrective peer feedback group. According to Straub (1997), suggestive peer feedback can help learners recognize shortcomings of their tasks and gain ideas to improve the quality of a task. Considering the context of this research in which learners conducted an individual project, it can be predicted that learners in the suggestive peer feedback group could have new perspectives about the project and improve its quality, thus leading to high academic achievement. In addition, corrective feedback can be effective when it is accompanied by positive feedback such as praise and suggestion (Hayes & Daiker, 1984). However, in this study, the corrective peer feedback group was asked to provide feedback related to errors in the project, so they could not be provided with positive feedback. This might have led to the lower academic achievement in the corrective peer feedback group. In addition, feedback pointing out errors tends to discourage learners' motivation for learning, while suggestive feedback tends to be perceived positively (Reed & Burton, 1985; Straub, 1997). Considering that the participants of this study were female middle school students, who could be relatively sensitive to the content of the feedback (Lu & Law, 2012), suggestive peer feedback were positively accepted, and this may have led to the improvement of task quality. This result revealed the need for a pre-training session for peer feedback activities to help learners provide suggestive feedback and teach them how to provide positive comments when they point out errors in a task.

Second, the high-level of feedback-acceptance group showed higher academic achievement than the low-level of feedback-acceptance group, consistent with results of previous studies (Anseel & Lievens, 2009). Since learners in this study created their UCC individually, it might have been helpful to receive peer feedback in that peer feedback suggested directions for improvement of the UCC or helped learners recognize errors that they could not find by themselves. Therefore, learners who accepted more peer feedback showed higher academic achievement. This result indicates that peer feedback activities should be designed to promote higher

acceptance of peer feedback. Learners are inclined to be more receptive to feedback when they have more time to read and ponder over the feedback since they are able to refine the feedback more closely and actively process the feedback (Anseel & Lievens, 2009). Therefore, the instructor should prepare activities so that learners can analyze and reflect on the peer feedback.

Third, feedback acceptance moderated the relationship between peer feedback types and feedback acceptance levels. Higher acceptance of suggestive peer feedback led to higher academic achievement, consistent with results of prior studies (Lee, 2015; Seo, 2012). In order to find the reason for this result, researchers of the present study examined opinions written by learners with high feedback acceptance in the suggestive peer feedback group about why they accepted the peer feedback. The learners reported that they could generate new ideas from peer feedback and revise their UCC in a creative way. This indicates that receiving and accepting suggestive peer feedback are effective for enhancing academic achievement.

Moreover, the existence of the interaction effect suggested that feedback acceptance worked differently depending on the type of peer feedback. Particularly, there was a difference in academic achievement between the high- and low-level of feedback-acceptance groups in the suggestive peer feedback type. However, there was little difference in academic achievement between low and high feedback-acceptance groups in the corrective peer feedback type. This indicates that the effectiveness of feedback acceptance can be different depending on the type of peer feedback, although the level of feedback acceptance itself cannot be regarded as effective or ineffective. Researchers of the present study also explored causes of the interaction effect by examining the questionnaire about feedback acceptance. Learners who rejected corrective peer feedback reported that they were not sure about the accuracy of the feedback they received. That is, learners seem to hesitate to accept peer feedback due to lower accuracy of peer feedback than teacher feedback (Strijbos et al., 2010). Regarding peer feedback types implemented in this

study, corrective peer feedback was sensitive to the correctness of the content whereas suggestive peer feedback was relatively flexible in terms of correctness. This might have led learners in the corrective peer feedback group to have a psychological burden on the acceptance of peer feedback. In summary, feedback acceptance could work in a different way depending on the degree of correctness that each type of peer feedback requires and the psychological aspect of learners. Thus, both feedback acceptance level and type of peer feedback should be considered in research on peer feedback.

Limitations of this study and suggestions for future research are as follows. First, the ratio of low-academic level students was low, which limits the generalizability of the research results. Future research needs to replicate the treatments with balanced academic levels. Second, this study measured feedback acceptance as a unidimensional construct. Given the foreign language education context, future studies need to explore feedback acceptance from a variety of perspectives depending on the feedback items such as content, linguistic aspects and so on. Third, learners in this study conducted the peer feedback activity only once. However, the number of peer feedback activities might affect learning outcomes by modifying the task or types of peer feedback that learners find useful. Therefore, it is important to explore patterns of peer feedback types that are effective for learning through multiple peer feedback.

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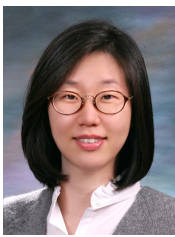
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