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Using Online Peer Assessment Activities to Enhance Team Collaboration in Two Undergraduate Courses

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Abstract

Group work as a form of cooperative learning has been shown to promote learning in many aspects. However, challenges may arise for group work when members have different expectations and little to no familiarity with each other. This action research was to investigate how well the online peer assessment activities (in the form of Moodle workshops) implemented in two different undergraduate courses would promote individual contribution in a subsequent group project and enhance individual achievements. Online peer assessment activities were introduced in Cohort 2020-21 with the purpose to enhance team collaboration in academically heterogenous groups. The assessment scores of Cohort 2020-21 ($N = 70$) were compared with those of the previous cohort ($N = 69$), which had no peer assessment activities, using independent samples *t*-tests. Additionally, students' opinions about the online peer assessments were identified from the qualitative comments of the teaching-and-learning evaluations of one course and the focus group discussion of another course. Findings showed that students who had participated in online peer assessment activities were perceived by their peers to have better collaboration in the group work than those who had not. However, no evidence suggested that better team collaboration would associate with higher achievements in the group project, nor would the implementation of online scaffolded peer-assessed activities directly connect to higher academic performance in the individual final assessment. How peer assessment activities could be adjusted using the functions of Moodle workshops to cater for the needs of students are discussed.

Keywords: action research, Moodle workshop activity, cooperative learning, online peer assessment, higher education

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Teaching and Learning Context

Group work as a form of cooperative learning has been shown to promote learning among university students in many aspects, such as promoting higher order thinking and reasoning (Klimovienė et al., 2006), and enhancing academic achievements and retention (Tran & Lewis, 2012). Challenges may arise for group work when members come together with different expectations and attitudes associated with response time and level of commitment (Jackson et al., 2014), and little to no familiarity with each other (Akhile, 2018). Therefore, students generally prefer to choose their own group members and cooperate with those who they are familiar with (Nhan & Nhan, 2019; Scanlan, 2018). However, allowing students to self-select their groups often leads to less diverse teams, and academically weaker students or introverts are often left out after the initial round of selection (Chapman et al., 2006).

To ensure that all groups start on more-or-less equal ground for a group project and no students feel left out, the instructor may assign students to groups according to a certain criterion, such as students' academic background, or their academic performance at the beginning of the course or in a previous course. Heterogeneous groups will then be formed with each group having a roughly diverse combination of different majors, concentrations, or years of study; or a roughly similar combination of academically strong and not-so-strong students. Though the issue of equity for group work can be solved, such kind of instructor-assigned heterogeneous groups could not mitigate the challenges of cooperative learning arising from poor group dynamics.

A possible solution to the group dynamics challenges in instructor-assigned groups could be arranging some activities, such as online peer assessments, within each group throughout the semester for team development. It has been pointed out that peer assessment, which involves students learning with and from each other through the process of assessing each other's work, is "an inherently social process" (Van Gennip et al., 2010, p. 281). Conducting an experiment with an intervention group (n = 45, consisting of twelve project teams) and a control group (n = 17, consisting of five project teams) in a Dutch secondary-vocational school, Van Gennip et al. (2010) found that "students in a peer assessment setting significantly feel safer and perceive more unanimity in goals than students in a traditional teacher-assessment setting" (p. 288). In other words, peer assessment activities could contribute to

team psychological safety and facilitate members to work together towards common team goals.

Previous studies also showed that certain peer assessment perceptions or practices may associate with better learning performance in the assessment tasks. For example, through interviewing Taiwanese university students (N = 23) who participated in online peer assessment activities for creating digital artistic works in a course, Cheng and Tsai (2012) found that students who perceived greater psychological safety, higher unanimity in assessment goals, and more cooperative type of social interdependence tended to hold greater cohesive conceptions of and take deeper approaches to learning in online peer assessments. In addition, Mostert and Snowball (2013) surveyed students of a large first-year economics class (64% response rate of over 800 students), whose assignments included an optional online peer assessment exercise for an essay. They found that most students who had participated in the online peer assessment exercise (72%) considered giving feedback, rather than receiving feedback, the useful part of the activity. This suggested that changing the role from a student to an assessor, requiring producing "critical higher order outcomes that students found most useful in improving their work" (Mostert & Snowball, 2013, p. 684).

With increasing adoption of Learning Management Systems by higher education institutions worldwide, online or web-based peer assessment has enjoyed growing popularity and gradually replaced in-person or paper-based peer assessment in university classes (Liu et al., 2018). Compared to the in-person mode, online peer assessment has the benefits of automation of many administrative and logistics processes (such as submission of work, random allocation of reviews, making feedback available, and calculation of marks), assessor anonymity, and flexibility in assessing the submissions anytime and anywhere (Liu et al., 2018; Mostert & Snowball, 2013). However, it has been commented that online peer assessments may not be as rigorous as the in-person mode without the presence of the teacher to monitor the process, and students may experience anxiety in handling technology on their own for the assessment (Liu et al., 2019). Nevertheless, the online mode of peer assessment would be a better choice to implement when there is a tight teaching schedule because the activities will not use up the in-class time.

In view of the above considerations, in the academic year of 2020-21, online peer assessment activities were introduced for two courses that the author taught. These

peer assessment activities were implemented before a group project which was submitted near the end of each course. The present study investigated how well the online peer assessment activities would promote individual contribution in a subsequent group project and enhance individual achievements. It was conducted by comparing the assessment scores of Cohort 2020-21 (with online peer assessment activities) with those of the previous cohort (without peer assessment activities) with regard to individual contribution to group work, group project presentation and an individual final assessment. In addition, students' opinions about the online peer assessments were identified from the qualitative comments of the mid-semester and the semester-end teaching-and-learning evaluations of one course and the focus group discussion of another course.

Method

An action research approach was adopted, in which the author was the practitioner and the researcher.

The two courses selected to implement online peer assessment activities were a Grammar course (Course A) offered to Year-3 English majors in all concentrations (n = 37) in Semester 1 and a Research Skills course (Course B) offered to Year-3 English majors in the Teaching English concentration (n = 33) in Semester 2. These courses were English-medium courses delivered at an English-medium university in China. The peer assessment activities were delivered via Moodle workshops. Each student was required to assess their peers' submissions within the same group. There were four to five members in each group. Thus, each member would assess three to four submissions for each peer assessment activity.

The Moodle workshop, through which the author carried out online peer assessment activities, is a type of online activity provided on the Moodle course page. It allows students to submit their work in the submission phase and assess their peers' submissions in the assessment phase based on a grading scale specified by the teacher (Moodle, 2021). In addition, during the grading evaluation phase the teacher can override the average grade given by peers if the teacher finds out that any of the peer assessors have been too harsh or too lenient in grading, or not in compliance with the grading scale. The operation of the Moodle workshop, including how the author might monitor the grades during the grading evaluation phase, was explained to students of the two courses at the beginning of the se-

mester and after the first peer assessment activity was completed. The students would be freed from worrying about unfair peer assessments if they knew that the instructor was monitoring the grading system.

The online peer assessment activities were implemented in Cohort 2020-21 to replace an individual assessment task, which was graded by the author, in the previous cohort[1]. For Course A, peer assessment activities in the form of seven short textual analyses (25% of the final grade) replaced the task of grammar exercises. Each short textual analysis was assigned to students after a relevant topic was taught. In these assignments, students were required to search appropriate texts, analyse the materials, and then judge the work done by their peers. Therefore, they could be exposed to more examples of language in use in the peer assessment activities than the grammar exercises where the language resources were only provided by the author. For Course B, peer assessment activities in the form of four scaffolded writing assignments (15% of the final grade) replaced the task of critical review of a research article. The writing assignments were related to four different parts of a research study, which aimed at equipping the students with the knowledge and skills for writing a project proposal. When assessing peers' submissions during the assessment phase, students might learn from each other the writing skills and research methods, and reflect on their own inadequacies.

The other assessment tasks of the two courses remained the same between the two cohorts. In addition, the same grouping criteria were applied to the two cohorts. For Course A, students were assigned to groups according to their academic background and academic performance in a previous course or previous assignments of Course A. Thus, each group would consist of members of different concentrations and with diverse academic abilities. For Course B, students were put into groups according to their previous academic performance and the working title of their proposed final-year project. Each group were comprised of members with diverse academic abilities but sharing some common research interests. In Cohort 2020-21, the same groups were maintained throughout the semester for peer assessment activities and the group project.

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[1]The cohort for Course A that was taught by the author and prior to Cohort 2020-21 was Cohort 2018-19, whereas the cohort for Course B that was taught by the author and prior to Cohort 2020-21 was Cohort 2019-20.

Data Collection

Student achievements in the following assessment tasks were retrieved and compared between Cohort 2020-21 and the previous cohort:

1. Contribution to Group Project. This was a sub-task of Group Project, contributing to 3% of the final grade for both courses. Group members were asked to evaluate each other's contribution to their group work based on a grading scale provided by the author with regard to five aspects: team collaboration, amount of effort, intellectual contribution, reliability, and overall contribution to the success of the project.
2. Group Project Presentation. This was also a sub-task of Group Project, contributing to 17% of the final grade for both courses. The instructor assessed the overall performance of the group (14% of the final grade) and individual performance (3% of the final grade) in the project presentation.
3. Final Assessment. This was in the form of a final exam for Course A (30% of the final grade) and a project proposal for Course B (35% of the final grade). Both were semester-end assessment tasks completed by individual students and assessed by the instructor.

The format of the above assessment tasks remained the same between the two cohorts, and the same grading rubrics were used.

Additionally, students' opinions about the online peer assessments were first identified and retrieved from the qualitative comments of the mid-semester and the semester-end teaching-and-learning evaluations of Course A in Semester 1 of 2020-21. These two teaching-and-learning evaluations were anonymous and available online for students to complete in Week 7 and Week 14 of the semester. There were two open-ended questions in each evaluation form to elicit respondents' opinions about the strengths of the course and the suggestions for improving the course. The response rates for the mid-semester and the semester-end evaluations were 48.65% and 91.89% respectively.

Nevertheless, it was found that the comments given in the two teaching-and-learning evaluations that were specific to online peer assessment activities were very few. Therefore, in Semester 2, a focus group discussion was conducted for Course B instead to collect the student opinions. The focus group discussion comprising four students was carried out right after the 14

teaching weeks ended. The participants were invited randomly from a list of 11 students (33.33% of the whole class) who had indicated in an in-class survey their willingness to participate in a subsequent focus group. Only four students were invited to form a mini focus group with the purpose of creating an intimate environment for in-depth discussion of personal topics (Krueger & Casey, 2014), such as how well the participants used Moodle workshops for peer assessments. Written informed consent was obtained from the participants prior to the focus group. The focus group discussion was conducted in a classroom by two research assistants in Chinese (the native language of the participants and the research assistants) and audio-taped. Anonymity and confidentiality within the research team were ensured before the focus group started, and the participants were informed of the right to withdraw from the discussion at any time. The author was not present when conducting the focus group.

Participants in the focus group were asked about their perceptions of the implementation of major technology-integrated teaching and learning activities in the course, including the online peer assessment activities. The discussion was then transcribed by the research assistants, and the participants' names were replaced by codes.

Data Analysis

For quantitative analysis of the assessment scores, the comparison was between Cohort 2020-21 and the previous cohort for the three types of assessment tasks (i.e., Contribution to Group Project, Group Project Presentation, and Final Assessment). As the nature of assessment for Contribution to Group Project and Group Project Presentation was the same between Course A and Course B, the scores of each of these assessment tasks from Course A and Course B of each cohort were combined for the comparison.

The raw scores of each selected assessment from Cohort 2020-21 and the previous cohort were first converted to 100%. Then, the mean and standard deviation were calculated. After that, any significant mean difference of each assessment between the two cohorts were computed using the independent samples *t-test*.

For qualitative analysis of students' comments, the author, who was a bilingual in Chinese and English, reviewed the English comments given in the teaching-and-learning evaluations for Course A and the Chinese transcription of focus group data for Course B. Any comments related to the implementation of online peer assessment activities were extracted and summarized.

Findings

Quantitative Data

Table 1 shows the means, standard deviations and the results of independent samples *t*-tests of the assessment scores for selected assessment tasks from Cohort 2020-21 and the previous cohort. As can be seen from the table, Cohort 2020-21 obtained significantly a higher mean score for Contribution to Group Project than the previous cohort did with a medium effect size (see Table 1 for the *t*-value, significance level and effect size). In other words, students who had participated in online peer assessment activities were perceived by their peers to have better team collaboration and greater participation in the group work than those who had not taken part in the peer assessment activities. This result is in agreement with the findings of Van Gennip et al. (2010), which showed that peer assessment activities could facilitate members to work together towards common team goals.

Table 1

Descriptive Statistics and Independent Samples t-Tests for the Assessment Scores of Selected Assessment Tasks From Cohort 2020-21 and the Previous Cohort

	Assessment score (converted to 100%)						
	Cohort 2020-21		Previous cohort				
Assessment task	*M* (*SD*)	*N*	*M* (*SD*)	*N*	*t*	*df*	*d*
Contribution to Group Project	90.20 (11.18)	70[a]	85.14 (12.56)	69[b]	2.51*	134.71	.43
Group Project Presentation	80.73 (6.62)	70[a]	82.94 (4.87)	69[b]	-2.24*	126.79	.22
Final Assessment:							
Final Exam	68.20 (11.51)	37[c]	63.81 (13.81)	38[c]	1.49	73	.35
Project Proposal	65.72 (14.56)	33[d]	73.72 (10.19)	31[d]	-2.53*	62	.64

[a] The students were from Course A (n = 37) and Course B (n = 33).

[b] The students were from Course A (n = 38) and Course B (n = 31).

[c] The students were from Course A.

[d] The students were from Course B.

*$p < .05$

On the other hand, independent samples *t*-tests showed that Cohort 2020-21 did not achieve significantly higher mean scores than the previous cohort did for the other two types of assessment tasks. Rather, the previous cohort performed statistically significantly better than Cohort 2020-21 with regard to Group Project Presentation and Project Proposal (see Table 1 for the *t*-values, significance levels and effect sizes). Students of Course A of Cohort 2020-21 did obtain a higher mean score for Final Exam than those of the previous cohort did, but the mean difference was not statistically significant. These findings indicated that better team collaboration and greater participation did not necessarily associate with higher academic achievements in group work, and that the implementation of online scaffolded peer-assessed activities did not necessarily result in higher academic performance in the individual final assessment. Moreover, although it was possible that students who participated in peer assessment activities would take deeper approaches to learning and produce critical higher order outcomes in the assessment tasks (Cheng & Tsai, 2012; Mostert & Snowball, 2013), the present findings did not suggest any possible higher order thinking skills applied in the peer assessment activities would be connected to the better performance in the group work or the individual final assessment.

The lack of direct connection between participation in peer assessment activities and academic performance in a subsequent assignment was also noted in the study by Snowball and Mostert (2013). In a large economics class of over 800 undergraduates with an optional peer assessment exercise, they found that whether or not students had participated in the peer assessment exercise was not a significant predictor of the academic performance in the subsequent essay writing, but the students' economics ability (in terms of the final exam performances in a previous economics course and the current course) and English language proficiency (whether English was a first language or a second language for students) were significant determinants of the essay writing performance. Similarly, in the present study, factors other than what could be provided through the online scaffolded peer-assessed activities, such as team leadership and academic English skills, might be in operation in the group work and the individual assessment task.

Qualitative Data

Only two comments which were relevant to the online peer assessment activities were identified from the mid-semester

and the semester-end teaching-and-learning evaluations for Course A of Cohort 2020-21. One comment from the mid-semester evaluation reflected that the grading system of the online peer assessment activities was "a little bit strange but still acceptable." Another comment from the semester-end evaluation appealed to reduce the assignment frequency. The first comment suggested that students of Course A would be satisfied with the peer assessment arrangement even though this assessment format was new to them. The second comment could be linked to the time-consuming nature of peer assessment and the increased workload for students (Ballantyne et al., 2002; Mostert & Snowball, 2013). Thus, when compared to traditional assessment tasks, the frequency of delivering the online peer assessment activities should be reduced; otherwise, the benefits of student learning through peer assessment might be eroded (Ballantyne et al., 2002).

The part of focus group data from Course B of Cohort 2020-21, which were relevant to online peer assessment activities, were extracted and summarized. The data revealed that all four participants found the grading guidelines provided by the author easy to follow to assess their peers' submissions, though two of them considered some of the peer assessments demanding in particular when they merely managed to comprehend the lecture content and complete the assignments. As this type of online activities did not support simultaneous group discussion, it might not be possible for students to seek elaborate support from their peers if they encounter problems in applying the content knowledge to assess their peers' work. Nevertheless, the participants concurred that the online mode of activities enabled them to apply what they had learned and to receive feedback from peers and the instructor in a timely manner. They could also learn from each other through the main points and examples presented in the peers' submissions. Some of them admitted that they would not have reviewed a writing assignment in such a systematic way if they had not asked to do peer assessment. In addition, the peer assessment and peer feedback were anonymous within the group. A participant reflected that she could feel more confident in pointing out the shortcomings of the peers' submissions and grade accordingly. This comment is in accord with previous studies, which showed that anonymous assessors made significantly larger number of critical comments addressing the weaknesses and suggesting improvements than the identifiable assessors did (Howard et al., 2010; Wadhwa et al., 2006). Finally, as pointed out by another participant, the frequent,

scaffolded writing activities compelled her to prepare the assignments according to the schedule and stay engaged in the course activities for a longer time.

Impact

Findings from the present study have been positive regarding using online peer assessment activities to enhance team collaboration and promote individual engagement in course work. Compared to the previous cohort without online peer assessment activities, students of Cohort 2020-21, who had participated in online peer assessment activities, were given significantly higher scores for Contribution to Group Project by their peers. Focus group participants of Course B of Cohort 2020-21 noted that the online mode and peer-assessed feature of the activities extended the class time beyond the classroom and they could learn more from each other's submissions and be more engaged in the course work.

However, there was no evidence indicating that better contribution to group work or greater engagement in course work in Cohort 2020-21 would be associated with higher achievements in the group project or the individual final assessment, as compared to the assessment scores of the previous cohort. It could be possible that the emerging leaders in group work who "provided direction, facilitated effective communication and fostered a sense of a common goal and shared vision" enabled the groups to meet their obligations and submit their work "to an appropriate standard" (Jackson et al., 2014, p. 124). Given the possible important role of group leaders in the group project, the online peer assessment activities could be re-organized to encourage and recognize the contribution of leaders in their groups. Moreover, weaker students may find peer assessments challenging, especially when they are still struggling with their own work. As academically not-so-strong students might benefit less from the peer-assessed writing tasks, their performance in the semester-end writing assignment might also be affected. In order to offer more assistance to academically not-so-strong students, the instructor may make use of the "example submissions" function of the Moodle workshop and include example submissions for students to practice in the practice phase before the assessment phase starts. This function allows students to compare their assessment with a reference assessment. Students may be encouraged to discuss with the instructor in a whole class or with group members in their groups if they are not certain about the grading criteria during the practice phase. Indeed, it has

been showed that peer assessment training, in the form of online synchronous discussion groups on the rubric-based grading of writing samples, could enhance the results of a subsequent online peer assessment in a business writing class for Chinese undergraduates ($N = 81$; Liu et al., 2018).

Furthermore, the feature of assessor anonymity found in the Moodle workshop could be particularly favorable for the academically not-so-strong students to develop their critical comments. In an identified condition, such as the in-person mode, peers might look upon the comments given by any academically strong students within the group as "perceived expertise" (Liu et al., 2018) and withhold their own opinions. In an anonymous online condition, peers may have more time to develop and organize their own comments without being afraid of deviating from the perceived expertise.

Overall, with careful planning and implementation, conducting online peer assessment activities in the form of Moodle workshops could be a promising way to facilitate cooperative peer processes.

Reflection

By conducting this action research, I was better informed about how well the online peer assessment activities were implemented in the two courses. I also had the opportunity to reflect on how the online peer assessment activities could be improved to cater for the needs of my students. In the academic year of 2021-22, I still taught Course A in Semester 1 and Course B in Semester 2. Compared to Cohort 2020-21, one peer-assessment task was removed from the series of peer assessment activities in Course A in order to reduce the workload for students. In Course B, two example submissions were set up for each peer-assessment task for students to practice and compare their assessment with the reference assessment. Students were required to complete assessing the example submissions before they could submit their own work. Thus, they could have a better understanding of the assessment criteria when they prepare their own submission. The online peer assessment activities may further be adjusted in the future based on the findings of the present study.

Findings from the present study can also serve as convincing evidence for students to accept new teaching strategies. In the past, I could only explain the rationale for why a certain teaching strategy was adopted, such as employing the instructor-assigned grouping strategy, instead of the student-selected grouping strategy, but some students might not be convinced. With action research, stu-

dents may also be invited to co-investigate the effectiveness of implementation of certain new teaching strategies by reflecting on their own learning experience and considering the implications of the new teaching and learning practices.

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