

Teacher guide book

Enhancing learning engagement and outcomes through formative e-assessment tasks in the

General Education foundation course



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Introduction

The GE foundation course is compulsory for all first-year students at EdUHK. Students are expected to think carefully about a broad range of issues, construct and attain knowledge, and apply what they have learned to their own lives after completing the course. Therefore, the GE foundation course is large-scale and meaningful for developing undergraduates' generic skills for their lives and future work. Prior studies have highlighted the importance of GE in reinvigorating higher education (Bok, 2013; Roth, 2014; Wells, 2016). Wells (2016, p. 2) claims that GE “is expected to expose students to a diverse array of ideas, incorporate curricular and cocurricular experiences, provide a space of connection, offer intellectual challenge, and be exciting to boot.”

In spite of the significant contribution of GE, there are challenges to its implementation in universities. Boyer (1988, p.2) pointed out that in reality GE tended to be neglected as the “spare room in academic life”. Students have low motivation to attend GE courses and their course engagement is also negative (Keeling & Hersh, 2012; Kirk-Kuwaye & Sano-Franchini, 2015; Most & Wellmon, 2015). The movement towards accountability in higher education also raises questions about the tangible learning outcomes produced by GE (Rhodes, 2010). Fernandez (2006) found that most student essays for a GE course offered lengthy descriptions of background information but an inadequate level of higher-order thinking such as reflection and creation. According to our observation as tutors of the GE foundation course, the challenges to learning engagement and outcomes mentioned above also exist in our university.

Formative assessment has been identified as an integral component of good teaching, students' active engagement, and a higher level of achievement (Ecclestone, 2010; Johnson et al., 2016; Spector, 2015). Formative assessment is “the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they

need to go and how best to get there” (Assessment Reform Group 2002, p.2). The claim made by Black and Willam (1998, p.2) that “Formative assessment does improve learning” has inspired many researchers and practitioners in higher education.

The development of new learning technologies provides opportunities for teachers to conduct formative e-assessment (FEA) to strengthen the effects of formative assessment on learning since it can encourage student engagement because of its flexibility in time and place and its affordance of creating interesting assessment tasks (Laborda et al., 2015). It can also enhance learning outcomes because of its affordance of providing dialogical feedback (Webb, 2010).

Considering the challenges that the GE foundation course is confronted with and the potential of FEA on learning engagement and outcomes, four objectives of the project are proposed:

1. Designing FEA tasks to activate students’ class participation and improve their learning achievement
2. Developing three cases of implementation of FEA tasks in tutorials
3. Devising a teacher guidebook for designing and implementing FEA tasks through crystalizing the experience and results to be accumulated in the proposed project
4. Investigating the effects of FEA tasks on students’ learning in the GE foundation course in terms of learning engagement and outcomes

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Formative e-assessment task design

GE foundation course

The GE foundation course is a compulsory 3-credit point course for all first-year students in the second semester in the Education University of Hong Kong. This course introduces students to a selection of major themes and topics in GE. Students are expected to think critically about a broad range of issues, construct and attain knowledge, and apply what they have learned to their own lives after completing the course. Therefore, the GE foundation course is a large-scale programme that is seen as meaningful for developing undergraduates' generic skills for their lives and future work. Classes of the GE foundation course comprise weekly lectures and tutorials, both of which last two hours per week. The lectures are delivered face-to-face or via video by leading scholars or practitioners. A small class environment is used for tutorials where students participate in the activities arranged by instructors to develop their understanding and thinking about course content. GE foundation course assessment consists of multiple tasks which contribute to a final grade. Table 1 summarizes the assessment requirements.

Table 1. Assessment requirements of GE foundation course

Assessment task	Weight
E-journals	1 st E-journal
	2 nd E-journal
	3 rd E-journal
Essay	30%
Group presentation	20%
E-portfolio	10%
Video lectures (3 times)	Online quizzes
	Online discussion forum
Class participation	4%

FEA tasks in class

The FEA tasks were designed considering their links to lecture content and summative assessment tasks (i.e., e-journals, group presentation and essay) in GE foundation course. There is alignment between FEA tasks and the intended learning outcomes. Three tools (i.e., Kahoot, Mentimeter and Google+) were used to conduct various FEA tasks such as quizzes, peer assessment and project inquiry so as to enhance their understanding and critical thinking of the topics in lectures and apply what they have learned to their own lives. In this way, the validity of FEA tasks was guaranteed. Because a variety of FEA tasks was conducted through tutorials, the collected multiple sources of evidence from students demonstrated their learning progress over a period of time. This ensured the reliability of FEA tasks.

Kahoot is a user-friendly interactive game-based student response system used in educational settings (Dellos, 2015; Graham, 2015; Siegle, 2015). In this study, Kahoot was used to create quizzes and surveys. For example, a group competition on Hong Kong's Basic Law (See Figure 1) and voting on freedom and security were integrated in the instructional process to clarify and deepen student understanding of the topics in lectures and assignments. Mentimeter, is another open-source interactive student response system (Rudolph, 2018). In this study, an online peer assessment using Mentimeter was used to evaluate samples of the assignments (i.e., e-journals, group presentation and essay). The students anonymously rated sample work based on their interpretation of the provided criteria of the assignments. After online voting, a Q&A session was conducted to inquire about the reasons behind students' rating and seek their advice on the refinement of the chose sample. With the help of Mentimeter, it was expected that the instructor would share the criteria of the major assignments in GE course with the students in an effective way.

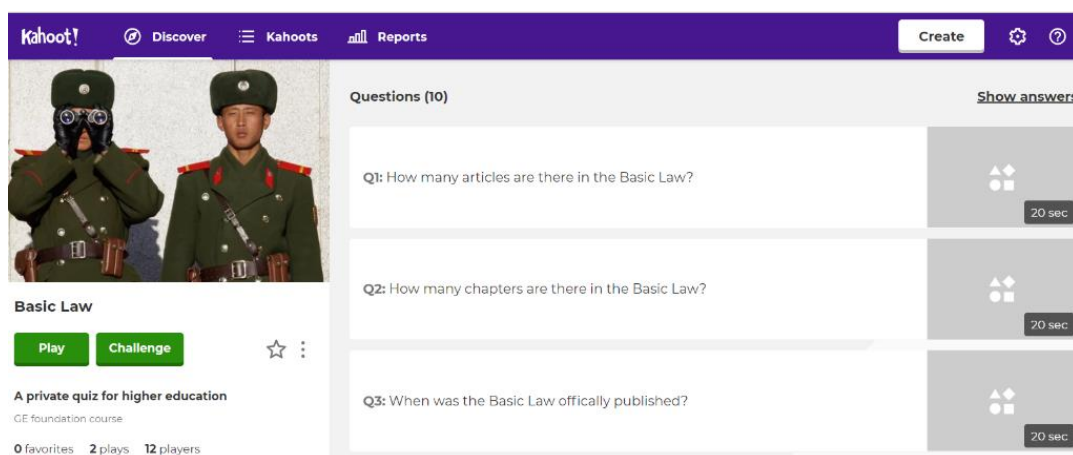


Figure 1: Interface of a group competition on Hong Kong's basic law

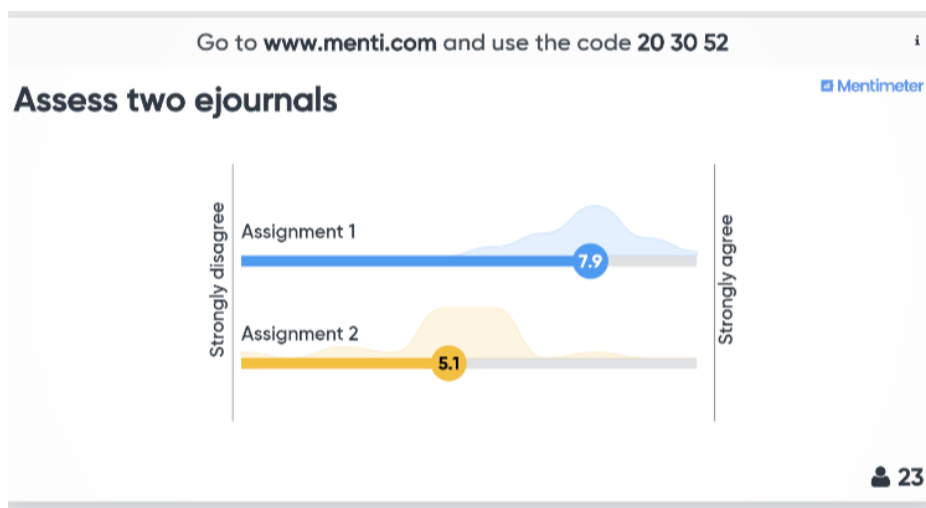


Figure 2: Interface of peer assessment using Mentimeter

Google+ is an online social network which is supposed to enhance the interaction between students and others (Gonzalez, Cuevas, Motamedi, Rejaie & Cuevas, 2013). In this study, Google+ was introduced in the first tutorial with the purpose of establishing online communities to do a group project which would be presented at the end of the course. The students were randomly grouped with two or three peers in the first tutorial. They were required to share their inquiry questions with other groups and solicit comments online or in class. They also needed to submit a proposal on a proposal template on Google+ before they proceeded with their project inquiry. They

could edit the proposal together using Google Docs. In this way, the students could see other group's proposals and give feedback for refinement. The instructor reviewed the submitted proposal in a face-to-face consultation. Figure 3 captures an interface of one group work.

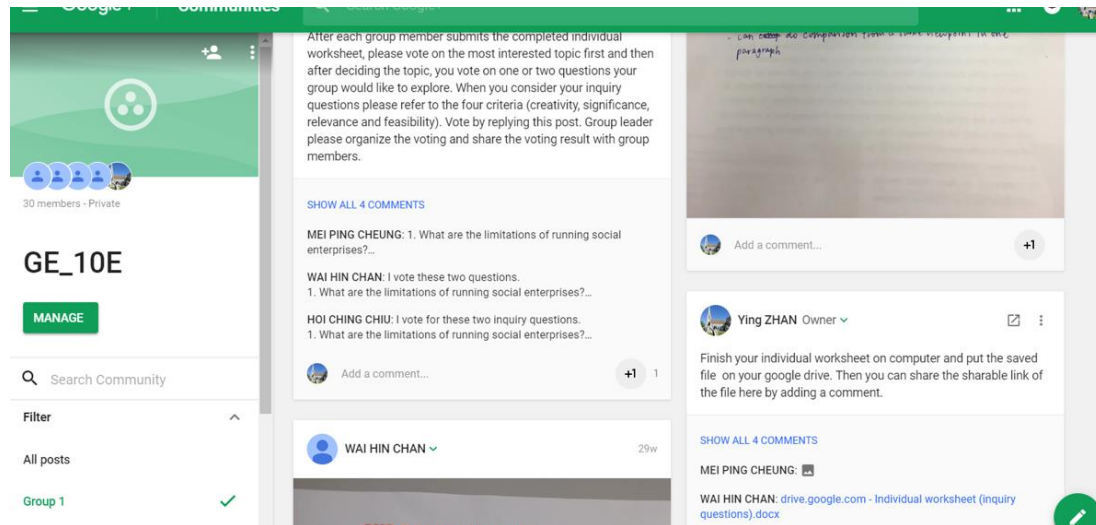


Figure 3: Interface of one group work on Google+

Peergrade

Online peer assessment (OPA) was designed by linking it with e-journal writing assignments using a free app, Peergrade (<https://app.peergrade.io>), as the platform. The three OPA design elements commonly suggested in the literature were considered. First, OPA training included sharing the project objectives with the participants, teaching them how to use Peergrade, sharing the peer assessment rubric in question form (with an accompanying Q&A session) and giving them the opportunity to practise assessing a sample e-journal entry. The training materials (See Appendices 1& 2) were made into text and video clips which were uploaded on Moodle for reference. Second, guiding questions were provided for the participants to use in their OPA, which were in line with the original e-journal rubric but made more explicit references to rational thinking and argumentative writing. Third, the participants were required to enter their answers to each guiding

question in no less than 20 words. Therefore, they needed to justify their judgement. At the end of the comment sheet, they were asked to summarise their suggestions on how to improve the quality of e-journal writing. Figure 4 presents the interface of the Peergrade results.

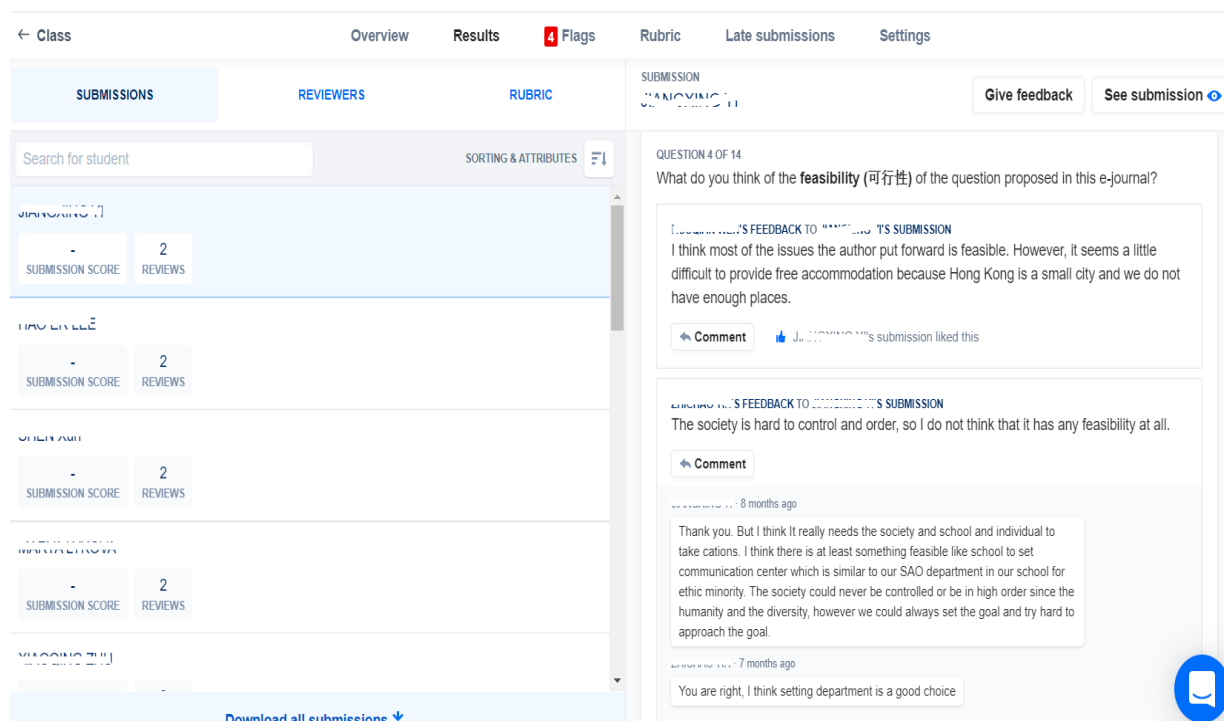


Figure 4. Interface of Peergrade results in instructor management system

In addition to the general design of OPA, this intervention included three culturally embedded elements. First, to mitigate the negative influence of face, anonymity was obtained by randomly assigning peers to review e-journal drafts on Peergrade. The double-blind nature of the review process provided a safe environment for the students to feel comfortable critically commenting on the work of their peers and making honest and direct suggestions. Second, to encourage the participants to judge critically using peer pressure, the participants were required to evaluate the usefulness of their peers' feedback at the end of OPA. Figure 5 shows the interface for student evaluation of the usefulness of peer feedback on Peergrade. Third, to motivate the

participants to actively engage in OPA, their participation in OPA accounted for 4% of the final course mark.

REACTIONS TO FEEDBACK

QUESTION 1 OF 2
How useful is the feedback?

Not useful at all.

Not very useful.

Somewhat useful. Could be more elaborate.

Very useful. Minor things could be better.

Extremely useful.

Comment Edit response

Not useful at all.

Not very useful.

Somewhat useful. Could be more elaborate.

Very useful. Minor things could be better.

Extremely useful.

83%

Figure 5. Interface of students' evaluation of the usefulness of peer feedback in instructor management system

Enlightened by Rubin's (2006) framework of the academic journal review process, the instructors played the administrative role of 'editor', managing all online submissions and coordinating the peer assessment process, while the participants played the two roles of 'writer' and 'reviewer', submitting their e-journal entries for review and reviewing the work of their peers assigned to them. The participants completed two cycles of Peergrade activities. Figure 6 presents a single cycle, comprising four stages: submitting a draft, reviewing the work of two students, reacting to peer review comments and revising their draft.

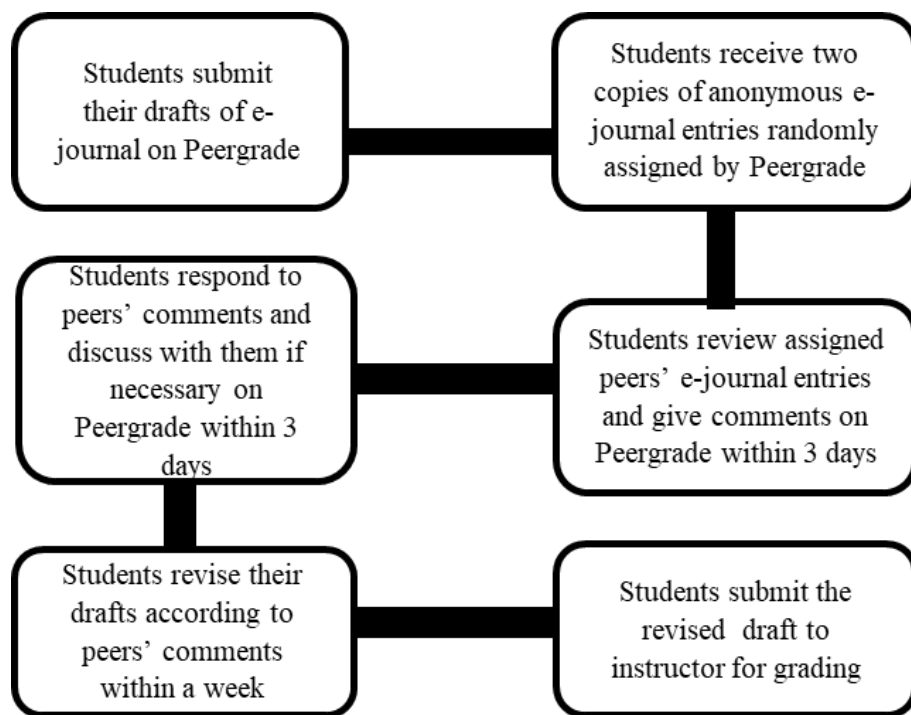


Figure 6. A cycle of Peergrade activities

Teacher audio feedback

Teacher audio feedback was connected with one of the assignments in GE foundation course, namely group presentation which required students to explore one of the learned topics and present with PPT slides at the end of course. Audio feedback was implemented during student project-based learning in three stages namely deciding inquiry questions (See inquiry question template in Appendix 3), making inquiry proposal (See project proposal template in Appendix 4) and designing PPT slides (see Figure 7). The students were required to submit their group work step by step on Google Drive. After the teachers received students' work, they would use talk and comment for chrome to make audio comments in Google documents and slides and the students responded to their teachers' feedback and refined their work. Figure 8 captures the interface of

teacher's audio comments and students' responses on the group inquiry questions in Google Docs.

In short, audio feedback presented three features namely electronic, asynchronous and ongoing.

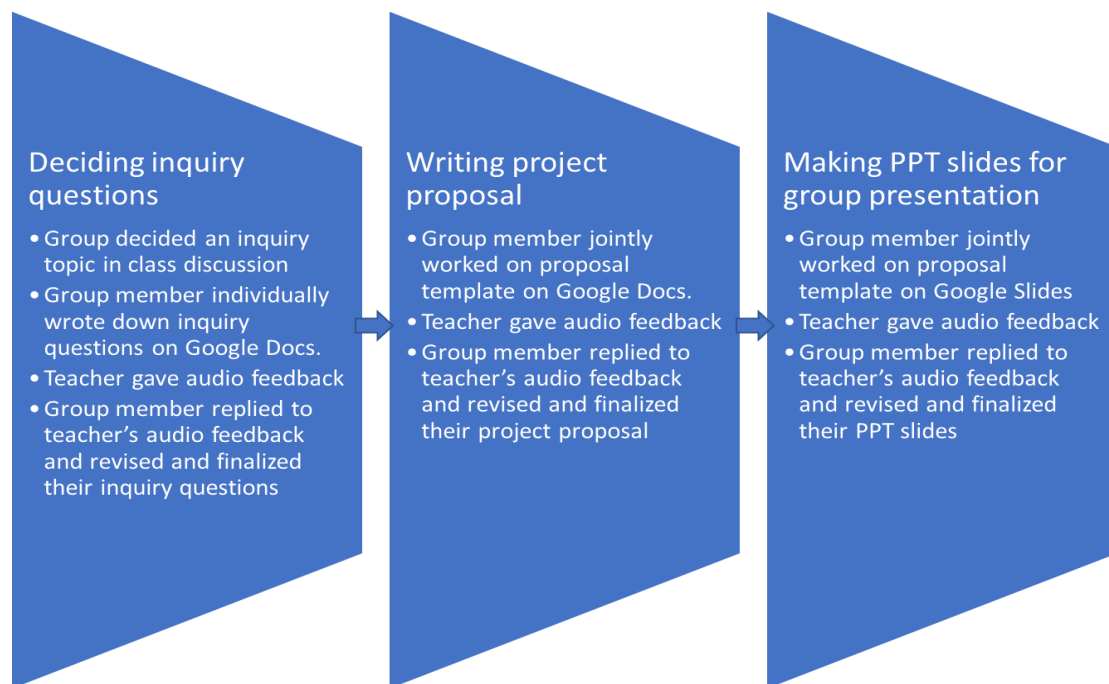


Figure 7. The flowchart of audio feedback process

As this was the first time that the students in experimental groups had obtained audio feedback in Google Docs and Slides, the provision of relevant training was necessary. The training included sharing the objectives of this intervention study, giving guidance on how to submit their work using Google Docs and Slides on Google drive, and receive and respond to teachers' audio feedback by doing the demo and giving students chances to try out. The training materials (See Appendices 5 & 6) were made into text and video clips which were uploaded on Moodle for reference. The training session ensured that students could use technology to receive and take up audio feedback without difficulties.

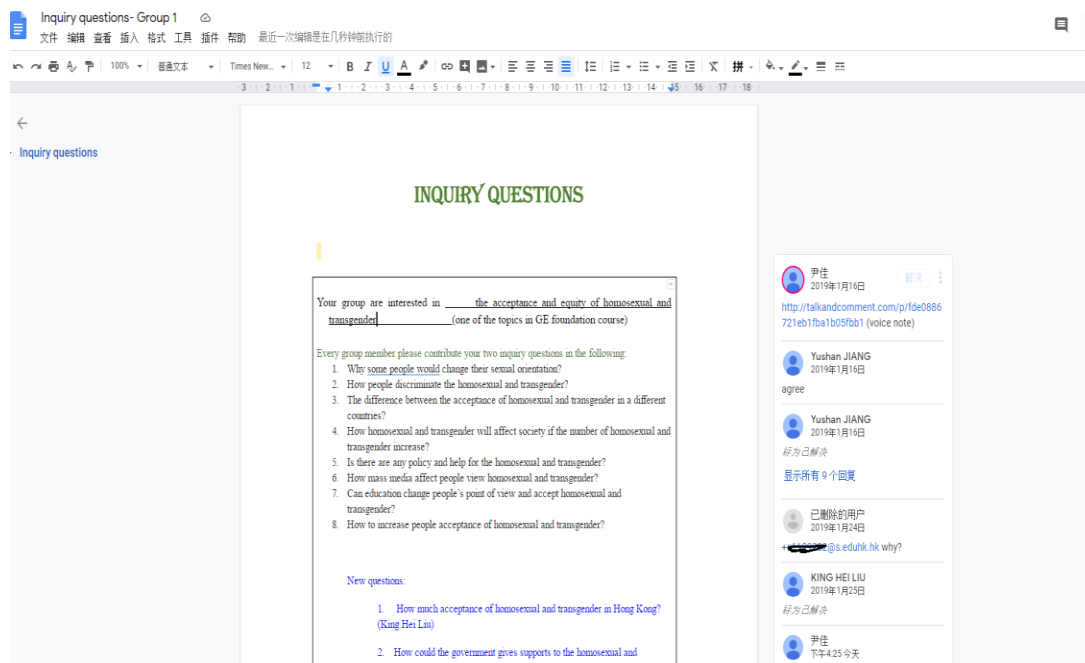


Figure 8. The interface of audio feedback and students' responses on the group inquiry questions

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Case studies

Case 1: Enhancing learning engagement through formative e-assessment in General Education foundation course tutorials

Introduction

Prior studies have highlighted the importance of General Education (GE) in reinvigorating higher education (Bok, 2013; Roth, 2014; Wells, 2016). Wells (2016, p. 2) explains that GE “is expected to expose students to a diverse array of ideas, incorporate curricular and co-curricular experiences, provide a space of connection, offer intellectual challenge, and be exciting to boot.” In spite of the significant contribution of GE, there are challenges to its implementation in universities. Boyer (1988, p.2) described GE as “neglected stepchild of the undergraduate experience”. Students’ engagement in GE courses is frequently negative (Keeling & Hersh, 2012; Kirk-Kuwaye & Sano-Franchini, 2015; Most & Wellmon, 2015). Therefore, it is important to find ways to engage students in GE courses.

Formative assessment has been identified as an integral component of good teaching, active student engagement, and a higher level of achievement (Ecclestone, 2010; Johnson et al., 2016; Spector, 2015). The development of new learning technologies provides opportunities for teachers to strengthen the effects of formative assessment on learning as it can encourage student engagement because of its temporal and spatial flexibility. It is also a low-cost tool for creating interesting assessment tasks while enhancing meaningful interactions with content, peers and self (Gikandi, Morrow and Davis, 2011; Laborda, Sampson, Hambleton, and Guzman, 2015) . This study designed formative e-assessment (FEA) as an intervention to enhance student course engagement. It attempted to answer the following two research questions.

- Do the designed FEA tasks enhance students' participation in tutorials in a General Education Foundation course?
- What do the students think of the designed FEA tasks and their effectiveness in course engagement? and why?

Literature review

Student engagement is always believed as an important factor which affects students' learning outcomes and learning achievements (Carini, Kuh & Klein, 2006; Coates, 2005; Park, 2005). According to Gunuc and Kuzu (2015, p.588), student engagement refers to

the quality and quantity of students' psychological, cognitive, emotional and behavioral reactions to the learning process, as well as to in-class/out-of-class academic and social activities, to achieve successful learning outcomes.

Gunuc and Kuzu (2015) believe that student engagement includes campus engagement and class engagement. Since this study only focused on student engagement in a GE foundation course tutorial, class engagement is the focus of the literature review. In the GE field, student engagement in courses is always regarded as the biggest challenge (Keeling & Hersh, 2012; Kirk-Kuwaye & Sano-Franchini, 2015; Most & Wellmon, 2015). However, there is lack of studies which explore how to enhance student engagement in GE courses. To the best of the authors' knowledge, only Kirk-Kuwaye and Sano-Franchini (2015) proposed academic advisers should help students to find out their personal purposes of taking the course. It suggests that students' learning motivation is closely related to their engagement in the course. However, Kirk-Kuwaye and Sano-Franchini have not collected empirical data to demonstrate their proposal. Therefore, it is meaningful to empirically explore the methods which could enhance student engagement in GE courses.

Formative assessment has been identified as an integral component of good teaching, active student engagement, and a higher level of achievement (Ecclestone, 2010; Johnson et al., 2016; Spector, 2015). Formative assessment is “the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there” (Assessment Reform Group, 2002, p.2). The claim made by Black and Wiliam (1998, p.2) that “Formative assessment does improve learning” has inspired many researchers and practitioners in higher education. The development of learning technologies provides opportunities for teachers to conduct formative assessment in their classrooms.

The existing literature has shown the positive role of FEA in engaging students in meaningful learning experiences. In their literature review on the functionality of FEA. Gikandi et al. (2011) illustrated why FEA could enhance student engagement. They believe that FEA could promote deep learning and student motivation through three forms of interaction (i.e., learner-content/ activities, learner-others and learner-self). A number of studies provided empirical evidence to demonstrate the power of FEA in engaging students in the learning process. Herrington, Reeves, and Oliver (2006) demonstrated learner engagement could be enhanced through the students’ participation in an authentic learning context where assessment tasks were supported by technological resources in three different disciplines. Sorensen and Takle (2005) designed threaded discussion forums which provided collaborative assessment for educational technology majors and they found that this FEA enhanced participation, motivation and ownership of learning. Chung, Shel and Kaiser(2006) also found that an interactive online discussion in a circuitry course could engage learners cognitively and affectively. Armellini and Aiyegbayo (2010) found that a collection Web 2.0 tools enhancing students’ interaction with peers and teachers increase student engagement in three courses of media studies, psychology and interprofessional education. Jiao

(2015) reported that an e-tutor used in engineering courses encouraged students to correct errors through multiple submission to receive award marks for assessment, which contributed to students' active engagement in learning. Lin (2008) demonstrated that participation in e-portfolio processes allowed preservice teachers to self-assess their own work in a reflective way, which promoted later learning. The above literature review shows that the existing experiences are mostly related to the use of FEA in disciplinary courses and the use of FEA tasks in engaging students in GE courses is seldom reported.

However, FEA does not always bring about positive effects on students' learning processes. Gikandi et al. (2011) believed that the design of FEA could affect its effectiveness. They argue that only a valid and reliable FEA could enhance engagement and leaning. A valid FEA should be authentic, provide effective feedback, use multidimensional approaches and give learners support. A reliable FEA needs to document learning progress, collect multiple sources of evidence and share rubrics with students.

There are still some challenges in implementing FEA. Lin (2008) in her study found that using e-portfolio was time consuming and might stress students because its purpose is unclear. It also could not fit the variety of learning styles. Hamid, Waycott, Chang, and Kurnia (2011) found that students' lack of ICT skills prevented them from actively participating in e-activities and also there were time management issues and limited technical infrastructure in some universities. Bennett, Bishop, Dalgarno, Waycott and Kennedy (2012) also found students' unfamiliarity with the technologies and limited technical infrastructure might be obstacles for using Web 2.0 technology in learning but they could be relatively easy to overcome. They were more concerned about constructive alignment between assessment and intended learning outcomes (Biggs, 1999) which echoes Lin's (2008) finding. They also worried about a clash of "practice logic" which

illustrates the conflict between participation and collaboration valued by Web 2.0 and an individual's contribution towards qualification emphasized by higher educational practice. The clash of "practice logic" was also demonstrated in Waycott, Sheard, Thompson and Clerehan(2013) study. Students were reported to show concern about the copyright of their work since it was visible to others for comments on line.

Most of the existing experiences of using FEA are accumulated in the West. Assessment is a social activity and we can interpret it only by considering the social, cultural, economic and political contexts where it takes place (Sutherland 1996; Gipps 1999). It is meaningful to explore the effectiveness of FEA in Eastern universities and challenges that learners may encounter in their use of FEA. As stated by Carless (2012), the cultural values of Confucianism such as collectivism, hierarchical relations, a pragmatic approach to learning and effort may influence the development of formative assessment in the Chinese context. In the previous studies on FEA, cultural factors are seldom mentioned. The concern is if Chinese cultural values play roles in mediating the effectiveness of FEA on student engagement in this study.

Methodology

This study adopted a quasi-experimental design to demonstrate the effectiveness of FEA intervention (see FEA tasks in class for reference) on student course engagement. At the end of the tutorials in one term, 2 experimental groups and one control group were required to do a survey on course engagement and 8 students from experimental groups attended 2 focus group interviews. This mixed-methods approach provided broader evidence on the effectiveness of FEA intervention than would be explored by a single approach, thereby increasing the usefulness and credibility of the results found (Creswell & Plano Clark, 2011).

Participants

Table 2. The distribution of participants' majors

Major		
	Frequency	Percentage (%)
Math	1	1.89
Science	1	1.89
Chinese	6	11.32
English	2	3.77
Visual Arts	3	5.66
Physical Education	2	3.77
Music	2	3.77
Sociology	4	7.55
Psychology	1	1.89
Environment Education	1	1.89
IT	2	3.77
Liberal Studies Education	3	5.66
General Studies Education	1	1.89
Special Education	1	1.89
Others (e.g. Chinese History, History Education, Greater China Studies, etc)	10	18.87
Missing	13	24.53
Total	53	100

Convenience sampling (Cohen, Manion & Morrison, 2018) was adopted to find participants in this study. Three classes comprising instructors and their students participated in this study on a voluntary basis. Both instructors were female and ranked as senior lecturers. One of them taught a control group and the other taught two experimental groups. 70 students were involved in the study, but 17 students declined to take part. In total, control group had 20 students, experimental group 1 had 18 students and experimental group 2 had 15 students. The participants exhibited variations in age, gender and major. The participants' age ranged from 18 to 24 years old, the average age was 19.49. 43% were male while 57% were female. Table 2 summarizes the distribution of participants' majors.

Data collection

This study used a survey and focus group interviews to collect the evidence on the effectiveness of FEA intervention on student engagement. The survey was adopted from the classroom engagement part in a student engagement scale (Gunuc & Kuzu, 2015). In the scale of class engagement, there are three subscales namely cognitive, emotional and behavioral. In total, 12 items were involved and adapted to the GE foundation course context under study. The items were rated on a six-point Likert scale ranging from “strongly disagree” (=1) to “strongly agree” (=6). Cognitive engagement refers to students’ investment on learning, learning motivation and effort. A sample item for cognitive engagement is “I am willing to take tutorials of a GE foundation course.” Emotional engagement refers to students’ emotional reaction in class and relationship with teachers and peers. A sample item for emotional engagement is “My instructor respects our opinions in discussions”. Behavior engagement refers to students’ attendance and participation in educational activities in class. A sample item for behavioral engagement is “I actively participate in class activities”. Table 3 containing all the subscales and items presents Cronbach’s alpha internal consistency reliability coefficients and the item-total correlation of the specific subscales, based on the data collected from the participants of the study.

Focus-group interviews were adopted to elicit student attitudes and evaluation on the effectiveness of FEA intervention, which complement and enrich the quantitative evaluation through the survey. 4 students from each experimental group voluntarily attended a focus group interview. The focus groups interviews were semi-structured to ensure the moderator was able to maintain a topic focus. The interview protocol addressed three major aspects namely students’ attitudes towards FEA tasks, evaluation on the effectiveness of FEA intervention on tutorial engagement as well as the underlying reasons behind their attitudes and evaluation. On average,

the interview lasted one hour and 20 minutes. The interview was conducted in Cantonese and audio recorded for later analysis.

Table 3. Student Engagement: Cronbach's alpha coefficients and Item-to-scale correlation

Student Engagement ($\alpha=.88$)					
Cognitive Engagement ($\alpha=.72$)		Emotional Engagement ($\alpha=.83$)		Behavioral Engagement ($\alpha=.79$)	
Item	Corr.	Item	Corr.	Item	Corr.
1	.472	5	.699	9	.554
2	.572	6	.668	10	.591
3	.396	7	.684	11	.614
4	.665	8	.603	12	.617
Mean	.526	Mean	.664	Mean	.594

Data analysis

The survey data were analyzed using SPSS 21.0. Descriptive analysis was used to reveal the status of students' tutorial engagement in terms of cognition, emotion and behavior. An independent T-test was used to compare the students' tutorial engagement of experimental groups with that of control groups. The transcribed focus group interview data were analyzed in an inductive way (Thomas, 2006). The coding process began with open coding which generated a great number of codes such as user friendliness, easy access, positive emotional reaction, and examination-oriented learning attitudes. These initial codes were further combined into larger categories. For example, the codes such as learning motivation, time consuming, difficulty of tasks, examination-oriented learning attitudes, and low course learning motivation were combined into the category of factors influencing the effectiveness of Google+.

Findings

Survey results

Table 4 shows that the participants' behavioral engagement is lowest among all groups. It also reveals that the mean scores of experimental groups' cognitive engagement ($M=4.42$), emotional engagement ($M=4.93$) and behavioral engagement ($M=4.36$) are higher than control group's cognitive engagement ($M=4.29$), emotional engagement ($M=4.71$) and behavioral engagement ($M=4.16$). However, there is no significant difference between them.

Table 4 also indicates the independent T-tests result for the comparison between the experimental groups and control group concerning their report on each item of the survey. It reveals that only Item 3 of the dimension of cognitive engagement ($P<0.01$) and Item 8 of the dimension of emotional engagement ($P<0.01$) show significant difference between the experimental and control groups. The participants in the experimental groups would like to invest more time and energy to finish every assignment and have a stronger sense of belonging to their group. However, since the mean differences of other items in the dimensions of cognitive engagement and emotional engagement are very small, no significant difference is found in the two dimensions.

Table 4. The independent T-test results for the comparison between experimental groups and control group in each item

Dependent variable/items	Experimental groups		Control groups		Mean difference	<i>t</i>	<i>P</i>
	Mean	SD	Mean	SD			
<i>Cognitive Engagement</i>	4.42	.65	4.29	.54	.13	.79	.43
1. I am willing to take tutorials of a GE foundation course.	4.15	1.03	4.50	.76	-.35	-1.31	.20
2. I try to do my assignments in the best way.	4.73	.72	4.75	.79	-.02	-.11	.92
3. I spend enough time and make enough effort to finish every assignment in the course.	4.33	.89	3.65	.93	.68	2.66	.01**
4. I try to do my best during tutorials.	4.48	.67	4.25	.55	.23	1.32	.19
<i>Emotional Engagement</i>	4.94	.64	4.71	.60	.23	1.28	.21
5. My instructor always offers help when I need it.	4.82	.73	4.85	.67	-.03	-.16	.87
6. My instructor respects our opinions in discussion.	5.03	.77	5.05	.76	-.02	-.09	.93
7. The tutorial is entertaining.	4.94	.90	4.50	.83	.44	1.78	.08
8. I feel myself as a part/member of as student group.	4.97	.73	4.45	.61	.52	2.68	.01**
<i>Behavioral Engagement</i>	4.36	.57	4.16	.41	.20	1.38	.17
9. I carefully listen to my instructor in class.	4.58	.61	4.25	.64	.33	1.84	.07
10. I carefully listen to other students in class.	4.24	.71	4.25	.55	-.01	-.04	.97
11. I actively participate in class activities.	4.30	.73	4.00	.56	.30	1.70	.10
12. I actively think and respond to the questions proposed by the instructor.	4.33	.78	4.15	.49	.18	1.05	.30

Interview result

Necessity and effectiveness of FEA intervention

Eight participants from the two experimental groups talked about their attitudes towards FEA intervention and qualitatively evaluated its effectiveness on their tutorial engagement. Most of the participants showed their positive attitudes towards the online quiz and poll using Kahoot or Mentimeter. Some of them believed that Kahoot was an eye-catching platform, which made them more active, entertained and better informed in class. The following extract shows this point of view.

Student 1: Kahoot could catch our attention easily because of its vivid setting and exciting music background. So, I like it very much and feel more willing to participate in class.

Student 3: I have the same feeling. Kahoot is entertaining and interesting. We burst into laughter when we found an unexpected answer provided by the app and have a deep impression of that question. (Focus group interview 1)

Some of the participants also believed that Kahoot enhanced their sense of belonging to a group, which triangulates the finding of the survey. For instance, Student 2 mentioned:

The instructor asked us to use group mode in the Kahoot test and we wanted to gain the highest mark, so we needed to cooperate and discuss with each other in a short time period. This experience made me realize that I am one of my group who needs to contribute.

Most of participants also indicated their fondness of Mentimeter which was used for peer assessment of the sample assignment. They thought the online poll could instantly show what fellow-students thought about the quality of a sample assignment and were able to compare it with

their own judgement. The follow-up justification on the grade provided through a Q&A session could also enhance their understanding of the criteria of assignments, which made them more carefully listen to the instructor and peers in Q&A session. For example, Student 6 valued her instructor's input:

The online poll using Mentimeter gave me a visual representation of the whole class's evaluation on the sample assignment. I don't always give a similar judgement, so when the inconsistency appeared, I would listen to my instructor more carefully and find out why and would pay more attention to the criteria which I had misunderstood or ignored in the process of writing the assignment.

The participants thought clarification of the criteria of assignments made them ensure the time and energy they needed to invest on each assignment, which qualitatively explained the significant difference in this aspect reported by the survey. The following extract reveals this point of view.

Student 7: After I clarified the criteria of the e-journal through the online poll and conversation with my instructor, I got to know how much time and energy I needed to spend to write a decent journal. This expected investment made me handle the assignment confidently.

Student 6: I agree. We need to plan before we start our assignments. The activity conducted in class made me aware of this. (Focus group interview 2)

However, compared with the Kahoot test and Mentimeter poll, the participants appeared not to welcome group project inquiry through Google+ and doubted its effectiveness on tutorial engagement. The following extract is the typical reaction and evaluation of Google+.

I don't like Google+ and don't think using Google+ could engage us more in tutorials.

Compared with Google+, I would like to use WhatsApp to communicate with my peers

about the project proposal and data collection or just have a face-to-face discussion in the library. (Student 4)

Inhibiting factors

Several inhibiting factors in the process of implementing FEA intervention were reported by the participants, namely unfamiliarity with Google+, learning attitudes and motivation, and time commitment. All the participants claimed that they used Google+ for the first time in this study and were not familiar with its function and some of them even had difficulty in registering into Google+ groups. For example, Student 4 said:

I remembered that I could not use my iPhone to register in Google+ groups in the first class and figured out how to do that. The unfamiliarity with the Google+ made me reluctant to use it to communicate with my group members. We privately set up a discussion group in WhatsApp and discussed our project there.

Participants' examination-oriented learning attitudes appeared to prevent them from actively participating in the activities organized through Google+. Five of them mentioned that since the participation in Google+ would not count in the group presentation, they did not want to spend time reviewing others' work and making comments. For example, Student 8 mentioned:

My participation in Google+ was not active and I have not read proposals from other groups, nor leave comments. It will not count for anything if I do this. I need to invest my time on the project itself instead of reviewing others' work.

Two of them mentioned that they wanted to give the impression that they were more knowledgeable and competent than they were in case revealing weaknesses may count against

them in the group presentation, therefore they did not want to discuss on Google+. For example, Student 5 mentioned:

I don't want the teacher to know about the process of our inquiry in case we made stupid mistakes which would give a bad impression to the instructor. This bad impression will affect her judgement on our group presentation. This is what we want to see.

Three participants also mentioned their low course learning motivation prevented them from actively engaging in the activities. For example, Student 7 said:

The GE foundation course is compulsory for us. A variety of topics were selected for us to learn. I don't like some topics like basic law, social enterprise. The lectures are boring and difficult to understand without Power Point slides sometimes. I don't think it is worth spending much time and energy on this course. I just focus on how to finish my assignments in tutorials.

Two participants complained about the time needed to finish tasks in Google+. They did not think the time spent on these activities was worth the weight of group presentation in final course grade. For example, Student 4 said:

We needed to propose individual questions online and then vote which question was the best and then figure out the group proposal. This requires us to spend more time negotiating with others online. Quite time consuming. And the group presentation only accounts for 20% of the final grade. What we did online did not deserve this

Three participants believed that it might be better to skip the Google+ activities and directly consult the instructor face to face in order to save time and gain more personalized help. For example, Student 8 said:

It might be more efficient to ask the instructor about our concern in the project preparation. I like the face-to-face consultation since the tutor replied quickly and we can ask her on the spot if we don't get the meaning. In Google+, the instructor just offered several sentences of non-specific feedback. And if we did not understand, we would not follow it up online.

Discussion

FEA has been regarded as a powerful weapon to enhance students' course engagement through bringing about meaningful interactions with content, others and self (Gikandi et al., 2011). A number of empirical studies have provided convincing evidence in the Western context (e.g., Armellini & Aiyegbayo, 2010; Chung et al., 2006; Herrington et al., 2006; Lin, 2008; Jiao, 2015; Sorensen & Takle, 2005). This Eastern study provides some evidence to demonstrate that FEA really matters in student engagement even though the difference between the experimental and control groups was not statistically significant in general.

It is noteworthy that experimental group participants developed a stronger sense of group belongingness than those in the control group because of their participation in the group competition on Kahoot. Kahoot is known as a student response system which is supposed to motivate students in a fun environment (McLaughlin & Yan, 2017) and little research has reported its role in creating a learning community. This finding is rational considering collectivism is closely aligned with Confucianism in the Hong Kong context. Levine (2011) suggests that shared purposes, codependency, and collective responsibility can promote learning in learning communities. Such a suggestion is in agreement with the principles of collectivism, which value the contributions of group members and highlight codependency on one another (Wei & Li, 2013).

It is also significant to find that the participants in experimental groups would like to spend enough time and make enough effort to finish every assignment in the course. According to focus group interview data, the participants believed that online peer assessment using Mentimeter made them clear of the criteria of assignments which enabled them to guarantee sufficient time and effort for each assignment. This finding supports the claim made by Gikandi et al. (2011) that reliable FEA should share rubrics with students in order to increase students' learning motivation and engagement.

The participants appeared to like Kahoot and Mentimeter more than Google+. The participants were not attracted to or connected with Google+ which echoes the finding of Gonzalez et al. (2013). Although Kahoot and Google+ both engaged students in group activities in either synchronous or asynchronous ways, Google+ was less friendly to the participants than Kahoot. The unfamiliarity with the system seemed to prevent student active participation. The unfamiliarity with technology has been also reported as an obstacle in other studies (e.g., Bennett et al., 2012; Hamid et al., 2011). In addition to unfamiliarity with Google+, the participants also complained about excessive time being spent on group inquiry on Google+ after class which increased their workload. Some of them believed that face-to-face discussion and consultation would save time rather than discussing and giving feedback online. The time management issue has been also reported by other researchers such as Lin (2008) and Hamid et al. (2011). It seems that a main challenge for the participants' acceptance of Google + was not the value behind the group activities as much as using a tool that was unfamiliar and uncomfortable to the students.

The concerns about constructive alignment and clashes of practice logics in the study of Bennett et al. (2012) was not raised by the participants in this study due to two reasons. In this study, the designers paid more attention to constructive alignments between FEA and intended

learning outcomes assessed by the assignments. The group members were given the same mark as a result of project inquiry. The other reason could be explained as cultural differences. Group activity is more appreciated by Hong Kong students due to collectivism in Confucianism than their Western counterparts who are strongly affected by individualism.

In this study, two other inhibiting factors such as low course learning motivation and examination-oriented learning attitudes were also reported which are seldom mentioned in Western literature on FEA. It is not unexpected to find that students have low learning motivation in GE courses, which has been mentioned by other researchers (e.g., Keeling & Hersh, 2012; Kirk-Kuwaye & Sano-Franchini, 2015; Most & Wellmon, 2015). Kirk-Kuways and Fano-Franchini (2015) suggest that learning motivation is closely related to student engagement in class. Therefore, it makes sense that when students' course learning motivation was low, their participation would be inactive even if with FEA intervention.

There is a strong examination culture in Chinese society (Berry, 2011; Kennedy, 2016; Zhan & Wan, 2010). As Berry (2011, p. 200) explains, "For thousands of years, Chinese people have been very used to examinations and have culturally accepted high-stakes examinations as a means of determining their future prospects". In this study, the participants judged the value of project inquiry according to its weight in the final course grade and questioned the worthiness of time spent on it. They did not want to review and give comments on other groups' proposals because this activity did not contribute to group presentation grade. This contrasts with the finding by Armellini and Aiyegbayo (2010) that students at the University of Leicester would actively participate in purposeful, effectively moderated e-activities which were not assessed for marks. Another interesting finding is that they wanted to discuss on WhatsApp instead of Google+ since they did not want to give a bad impression to their instructor in case they made mistakes. Some

students may be wary of seeking advice from instructors due to the power role of their teachers (Price, Handley and Millar, 2011). This could cause “Faking good” (Gibbs, 2006), when the participants tried to make a good impression that they were more knowledgeable and competent than they were in case that disclosing shortcomings might count against them in the group presentation at the end.

Conclusions

This study examined the effectiveness of FEA on students’ course engagement in terms of cognition, emotion and behavior. The findings reveals that in general, FEA increased students’ course engagement but not in a significant way. The significant change in course engagement only exists in students’ sense of belonging to their group and their effort in assignments. The participants preferred Kahoot and Mentimeter to Google+ and reported some inhibiting factors in using Google+ including their unfamiliarity with it, examination-oriented learning attitudes, low course learning motivation, and time constraints.

The findings of the study have implications for practitioners to implement FEA in their course teaching in Easter universities. First, instructors can make good use of Kahoot and Mentimeter to engage students in group activity and peer assessment, which will enhance their sense of group belongingness and guarantee the completion of course assignments. Second, it would be better for students to choose their familiar apps to do online group activity. Google drive and Whatsup were mentioned by the participants in this study as their familiar apps to communicate and share materials with group members. In addition, online group activity could be blended with instructors’ consultation and face-to-face discussion among group members to improve the efficiency of group work. Third, the course learning motivation was found as an inhibiting factor which affected the efficiency of FEA in this study. Therefore, it is necessary to

find a way to attract students to spend more time and effort in doing FEA. The students in Eastern contexts are more likely to be affected by examination culture. Therefore, giving a weight of scores to FEA tasks may motivate them to participate in those tasks. The scores could be given considering students' participation and contribution. Meanwhile, in order to avoid "Faking good" (Gibbs, 2006), instructors should create a safe discussion atmosphere on line by sharing intentions of online group work with students and giving constructive suggestions on line to help them to perform better in their work.

In spite of the interesting findings mentioned above, the study has some limitations which need to be cautiously considered when generalizing its findings to other contexts. First, convenience sampling was used to select participants, which might underrepresent the whole population of Hong Kong university students. Second, two different instructors respectively taught experimental groups and control groups. Although both of them were senior lecturers, their different teaching style may affect students' engagement. Third, because students' course learning motivation would greatly influence GE course engagement (Kirk-Kuways & Fano-Franchini, 2015), it would be better to issue a motivation survey to both experimental and control groups to ensure that they are equivalent groups. Therefore, the robustness of quasi-experimental design should be increased to disseminate more generalizable and convincing evidence in future exploration. Meanwhile, engaged learning enabled students to be creative and critical and self-regulated (Garrison & Akyol, 2009; Gikandi et al., 2011). Therefore, in future studies, it would be meaningful to explore if students can advance their high-order thinking skills by using FEA, which would deepen students' learning outcomes.

This study contributes to our understanding of the use of FEA at tertiary level in the Eastern world which has been ignored in the literature. It shows possible cultural mediating effects when

using FEA in a Hong Kong university such as collectivism in Confucianism and examination culture. It also have implications on the design and implementation of FEA by considering these non-assessment and non-technology issues.

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Case 2: What matters in design? Cultivating undergraduates' critical thinking through online peer assessment activities conducted in their e-journal writing process

Introduction

Critical thinking (CT) is one of the attributes that higher education providers seek to cultivate in their students to help them contribute effectively to the global workforce (Liu, Frankel & Roohr, 2014). Research has suggested that critical thinkers are more able to make decisions and judgements in complex circumstances (Gambrill, 2006), achieve higher academic results, participate more actively and intelligently in social affairs and find jobs more easily (Stupple et al., 2017).

The belief that CT can be taught and learnt is widely accepted (Puig et al., 2019). Online peer assessment (OPA) has been proposed as an effective strategy for cultivating CT among students in higher education (e.g., Dominguez et al., 2015; Filius et al., 2018; Guiller, Durndell & Ross, 2008; Kay, Hardy & Galloway, 2018; Novakovich, 2016; Yang, 2009). OPA engages peers in social interactions and negotiations (Pryor & Crossouard, 2008), inevitably involving sociocultural factors. Most intervention studies have been conducted in Anglophone contexts. However, cultural resistance to peer assessment in Confucian heritage contexts has been reported by a number of researchers (e.g., Liu, Li & Zhang, 2018; Zhan, 2019a; Zheng et al., 2018). Therefore, Western style OPA may not be applicable to students from the Eastern world. When the East meets the West, the cultural adaptation of OPA seems inevitable. To maximise the effectiveness of OPA in the development of CT among students in Confucian heritage contexts, its negative cultural influences should be combated and its positive influences should be reinforced.

This study considered the possible negative and positive cultural influences in the OPA process to design OPA for a normal university in Hong Kong and explore its effectiveness on

students' CT development in a General Education course and their beliefs and suggestions for this design. The following three research questions were addressed:

RQ1: To what extent do Hong Kong undergraduates develop their CT by using OPA?

RQ2: What OPA design elements do they consider effective?

RQ3: What are their suggestions for refining the OPA design to maximise its effectiveness?

Literature review

OPA and CT cultivation

Peer assessment refers to students judging the performance or achievements of their peers (Topping et al., 2000). Recently, the peer assessment process has been facilitated by the use of Information and Communications Technology (ICT). Students can give and receive feedback at their own pace, anytime, anywhere (Shang, 2017), reducing the burden on teachers to administer and manage peer assessment (Papadopoulos, Lagkas & Demetriadis, 2012). ICT allows students to critically review each other's work in a double-blind design, providing a certain level of comfort (Lin, 2018). It also allows them to benefit from multimedia educational resources and structured peer feedback activities (Yuan & Kim, 2018) and to engage in asynchronous or synchronous communication with each other (Gikandi & Morrow, 2016).

OPA has been proposed as an effective educational strategy for cultivating CT, which refers to a reasonable and reflective way of thinking to 'establish clear and logical connections between beginning premises, relevant facts and warranted conclusions' (Ivic, 2001, p.10). A number of studies have investigated the effects of OPA on CT among undergraduate students (e.g., Dominguez et al., 2015; Filius et al., 2018; Guiller, Durndell & Ross, 2008; Kay, Hardy & Galloway, 2018; Novakovich, 2016; Yang, 2009). For example, Guiller, Durndell and Ross (2008)

reported that a higher level of CT was found in OPA than in face-to-face peer assessment, especially in the form of justification with evidence. Dominguez et al. (2015) used a design-based approach to adjust the OPA design to develop students' CT. In his quasi-experiment, Novakovich (2016) found that blog-mediated peer feedback fostered CT and reflection in student writing. Kay, Hardy and Galloway (2018) reported that their participants used PeerWise (an online application for peer assessment) and critically reflected on the quality of the self-generated multiple choice questions submitted and on the feedback they received.

Effective OPA design elements

The success of OPA in promoting students' CT is conditional and what instructors need to consider in their design should be clarified (Filius et al., 2018). Three effective OPA design elements have been commonly mentioned in previous studies. First, OPA training is a crucial element in preparing students for OPA. For example, participants in the study by Dominguez et al. (2015) reported that OPA training on how to give meaningful feedback, a specific lesson on CT and the presentation of good examples of class work were the most useful elements. Filius et al. (2018) found that students valued their feedback training on how to be critically constructive, on how to initiate a dialogue on the feedback received and on the need to pay more attention to the arguments, which facilitated their deep learning. The importance of OPA training was echoed by a recent meta-analysis study conducted by Li et al. (2020), who suggested that rater training was the most important factor influencing the effect size of peer assessment.

Second, teacher guidance in the OPA process can help guide and support students' CT development. For example, Yang (2009) reported that student teachers used the questions asked by their instructor on a blog as an anchor to facilitate their critical reflection on each other's teaching practice. Dominguez et al. (2015) found that students appreciated the FRISCO guidelines (acronym of 'focus', 'reasons', 'inferences', 'situation', 'clarity' and 'overview') provided on the

OPA platform to support their CT practice. Noroozi, Biemans and Mulder (2016) argued that teacher guidance such as guiding questions, an OPA template, sentence openers or content checklists created a safe and respectful environment for students to provide critical feedback without fear of hurting their peers' feelings.

Third, the content of peer feedback is closely related to its effects on students' CT development, so it is essential to clarify the type of feedback that students are encouraged to produce. Novakovich (2016) found that the critical comments with explanation provided by the participants were significantly correlated with their development of CT. Filius et al. (2018) reported that the participants thought it would be useful to have peer feedback with suggestions that made them think, reflect and review their answers. Justified peer feedback and concrete suggestions for improvement also proved useful for the participants to critically reflect on the quality of their multiple choice questions submitted in the study conducted by Kay, Hardy and Galloway (2018).

Possible cultural influences in the OPA process

The literature has shown that the greatest challenge of peer assessment in Confucian heritage contexts is that students may be reluctant to criticise the work of their peers because of the potential risks involved in peer assessment, such as loss of face, awkwardness or even shame (Liu, Li & Zhang, 2018; Zhan, 2019a; Zheng et al., 2018). Zhan (2019a) reported that Chinese undergraduates tended to praise their peers on the strength of their presentation, but withheld negative comments, remained silent and avoided challenging their peers publicly to avoid embarrassment. Liu, Li and Zhang (2018) showed that Chinese undergraduates tried to maintain a harmonious atmosphere in OPA, which prevented them from critically pointing out problems and making constructive suggestions. Zhang et al. (2018) reported a similar finding in their study. Panadero and Alqassab

(2019) proposed that anonymity has the potential to mitigate the unwanted interpersonal effects derived from peer assessment.

Chinese culture is a collectivist culture that emphasises interdependence, which contributes to group cohesion and enables Chinese people to develop their responsibility and conformity (Wei & Li, 2013). Peer recognition and peer acceptance are extremely important for Chinese students under the influence of collectivism. They appreciate belonging with their friends and helping others, which can drive their achievement behaviour (King, McInerney & Watkins, 2013). Zhang et al. (2014) found that to gain peer recognition, their Chinese participants posted better essays on blogs when peer assessment was involved. Although Zhang et al. (2014) did not discuss whether peer pressure could improve the quality of peer feedback, it can at least encourage Chinese students to establish personal accountability for each team member and to engage more actively in OPA. Indeed, students' active engagement is closely related to the development of CT (Dominguez et al., 2015).

The lack of students' active participation in the OPA process has been reported as a major challenge by some researchers (e.g., Meek, Blackmore & Marks, 2017; Mostert & Snowball, 2013; Shang, 2017). A possible solution may be to give marks to the OPA activity itself given the examination culture of Confucian heritage contexts. Chinese students are well known as exam-oriented learners who are motivated by the desire to improve their grades (Zhan, 2019b). For instance, Chang et al. (2015) graded team projects for three rounds of OPA activities to encourage students to constantly seek improvement. Yuan and Kim (2018) also found that the feedback score, which counted for three points in the final course mark, extrinsically motivated students to write high-quality feedback.

Methodology

This study adopted a quasi-experimental design to demonstrate the effectiveness of OPA intervention (see Peergrade activity design for reference) on students' development of critical thinking in their e-journal writing assignments.

Participants

Convenience sampling was used to recruit the participants. Three instructors of the General Education foundation course were approached and their students were invited to participate in the study. The 93 participants (34 male and 59 female students) were between 18 and 23 years old. They studied in a variety of majors, including Chinese language, science, mathematics, English language, arts, social studies, psychology, environmental studies and liberal studies. Sixty-nine undergraduates from four tutoring groups taught by two instructors gave their consent to use Peergrade and thus formed the experimental groups. In addition, 24 undergraduates from 2 tutoring groups taught by another instructor consented to provide their e-journal entries without engaging in peer assessment activities, forming the control groups.

Data collection

The e-journal entries of the participants were collected during the study to determine whether there was a significant development of CT in the experimental groups. The first e-journal entries (e-journal 1) of the experimental and control groups were collected before the first round of Peergrade activity, while the third e-journal entries (e-journal 3) were collected after the second round of Peergrade activity.

Thirty-two participants in the experimental groups were invited to participate in individual semi-structured interviews. Twenty-three agreed to be interviewed. The participants were encouraged to recall the whole OPA process, to identify the most effective design element and

why, and to provide suggestions for improvement. All interviews were conducted in Cantonese and were audio recorded.

Data analysis

The coding scheme of Anderson et al. (2001) was adopted for a content analysis of their e-journal 1 and e-journal 3. Anderson et al. (2001) emphasised the justification of the arguments as evidence of CT among students, which is consistent with the purpose of the General Education foundation course under study. Each statement was coded according to three types of justification: no justification, when a statement was made without trying to justify it; weak justification, when a statement was supported by anecdotal or informal evidence, such as broad generalisation; and strong justification, when a statement was justified by reference to formal research, statistical evidence or published texts. A 3-point Likert scale was used to rate these three types of justification (*no justification* = 1, *weak justification* = 2, *strong justification* = 3). Two raters were involved in the coding of the 186 journal entries. They were first trained in coding 20 e-journal entries to form a preliminary consensus on the coding scheme. The inter-rater reliability coefficients for e-journal 1 and e-journal 3 were .73 ($p < .01$) and .78 ($p < .01$), respectively. The means of the scores given by the two raters were used for further statistical analysis. Paired t-tests were used to determine the extent to which the participants in the experimental and control groups developed their CT.

Deductive analysis (Azungah 2018) was adopted to analyse individual interview data based on six OPA design elements, namely OPA training, provision of guiding questions, peer feedback requirements, anonymity, student evaluation of the usefulness of peer feedback and summative use of OPA, as discussed in the Intervention section. To increase the credibility of the qualitative data analysis, a peer examination (Hitchcock and Hughes 1995) was conducted by another assessment expert and any interpretation uncertainties were resolved with the assistance of the interviewees.

Findings

Students' CT development through OPA

As shown in Table 1, the mean CT of the experimental groups ($M = 1.57$; $SD = .50$) for e-journal 1 was slightly lower than that of the control groups ($M = 1.75$; $SD = .40$). However, the results for e-journal 3 indicated that the mean CT of the experimental groups ($M = 2.14$; $SD = .45$) was higher than that of the control groups. The experimental groups showed a significant increase in the mean CT from e-journal 1 to e-journal 3 (Diff = .57; $t = 6.93$; $p < .001$), while the control groups showed a slight but not significant increase (Diff = .13; $t = 1.37$; $p > .05$). These results indicate that the students in the experimental groups made more progress in their ability to justify their arguments with credible and reliable evidence.

Table 1 about here

Students' beliefs and suggestions for the OPA design

OPA training

Twenty-one participants believed that OPA training was an effective design element to facilitate the development of their CT. They felt that they could better understand the expectations of their instructors and the objectives of Peergrade activities. One participant used the metaphor of an 'anchor' to describe OPA training, explaining the following: 'My tutor clearly explained the objectives of Peergrade, which helped me realise the importance of learning from each other in promoting our CT'. In addition, they believed that a shared understanding of how to do peer assessment was created through collectively marking e-journal entries using guiding questions. This provided a good basis for the participants to make judgements, discuss with their peers and help them realise their responsibility. The following extract illustrates this point of view:

My tutor analysed a sample e-journal entry with us and conducted a Q&A session to ensure that we fully understood the guiding questions. We were then asked to independently assess another e-journal entry and to share and discuss our practice reviews with her. This was very useful for me to understand what I should bring to peer review and how to judge my classmates' e-journal entries.

In addition, OPA training was believed to enable the participants to predict the steps of the Peergrade activity cycle and their duration. This helped them to effectively allocate their time and effort to ensure their participation in Peergrade activities.

Provision of guiding questions

Five participants believed that guiding questions helped them to more systematically examine whether the arguments were relevant to the question, whether they were appropriate to draw a conclusion or whether there was sufficient and convincing evidence to support an argument. These considerations could activate their CT. However, eighteen participants felt that the guiding questions were too detailed, which led them to lose their focus during critical judgement. For example, one participant explained: 'answering lengthy guiding questions made me feel exhausted. Without focusing on certain aspects, I tended to finish the task instead of thinking deeply'. In addition, some participants believed that OPA did not involve mechanically analysing each part by answering the guiding questions, but in making their judgement based on their intuition and knowledge.

The participants suggested two main ways to refine the design of the guiding questions. First, they suggested that they should be able to choose some guiding questions they would like to answer, which could make their thinking more focused and critical. Second, they proposed that their tutors provide more training on how to identify typical fallacies in academic writing and cultivate their capabilities for holistic judgement.

Peer feedback requirements

Eleven participants mentioned that the word limit for their feedback encouraged them to justify and develop their judgement. They needed to think carefully about their peers' e-journal drafts to identify fallacies and use evidence to convince the writers of their judgement. They saw this peer review process as a way to practise their CT. The following extract shows this point of view:

On the Peergrade platform, I needed to explain why I agreed with specific points in a draft and why I thought a point was inappropriate using examples and evidence. I think that giving feedback that way helped me practise my CT.

In addition, fourteen participants agreed that receiving feedback from their peers who identified problems in their e-journal drafts and offered solutions and suggestions for improvement helped them critically reflect on their writing and develop their arguments more rationally. For example, one participant explained the following:

I think that only the comments that focused on my weaknesses and gave specific suggestions on how to overcome these weaknesses helped me think more about my writing. When I received this type of comment, I compared and contrasted my thoughts and peers' thoughts on the topic and tried to make more convincing arguments.

Anonymity

Seventeen participants mentioned that the anonymity of Peergrade activities allayed their concerns about hurting the feelings of their peers when they honestly criticised their e-journal drafts. The following extract illustrates this point of view:

As the tutoring class is very small and we know each other, it is difficult for us to make critical comments because we fear that it will affect our relationship. So it is good when we can give our opinion anonymously. This helps us share our opinions freely and critically.

In contrast, twelve participants indicated that the protection of privacy and face provided by anonymity encouraged them to appreciate the comments of their peers and to think critically about their e-journal drafts. For example, one participant stated:

Anonymity protects the identity of the writer of the e-journal. It helps us save face and makes us more willing to consider the comments of our peers, because we know that the criticism does not target the author but the draft. When we are open to listening to others' suggestions, we become more critical of our own work.

However, seven participants highlighted two problems caused by anonymity. First, anonymity was obtained by random assignment on Peergrade, which could lead to a mismatch between the reviewed drafts and the interest and knowledge of the peer reviewers. Some participants felt less confident in assessing topics they were not interested in or good at, so they found it difficult to justify their comments and make suggestions for improvement. As a result, some suggested that the instructors manually assign journal drafts to peers working on the same topic.

Second, anonymity appeared to prevent the participants from having a continuous dialogue on the received feedback. Some participants explained that by not knowing who assessed their work, they could not find their reviewers on Peergrade in time to discuss a specific comment, which could result in a loss of opportunities to practise their CT. Therefore, some participants suggested that Peergrade automatically send a reminder email to reviewers when writers respond to their comments.

Student evaluation of the usefulness of peer feedback

Thirteen participants reported that they felt pressured when reviewing the drafts, because they knew that the usefulness of their comments would be evaluated by their classmates receiving

feedback. However, they believed that this type of peer pressure forced them to think critically when judging their peers' e-journal drafts. For example, one participant said:

I did not want to receive a bad evaluation from my peers. Although they did not know who I am, I felt bad when my peers did not acknowledge the usefulness of my comments. Therefore, I try to be careful when I think and judge the work of my peers.

The same participant further explained why she was disappointed when her peers did not appreciate her comments.

This Peergrade activity connected us and I am one of the contributors. I hope that my comments were found useful by my peers and helped them progress. The acknowledgement of my peers will increase my sense of achievement and responsibility.

These extracts show that this participant emphasised the interdependence of OPA and how it was reinforced by the evaluation of the usefulness of peer feedback.

Summative use of OPA

Although the score for Peergrade participation represented only 4% of the final course mark, 20 participants indicated that they were extrinsically motivated by this score. For example, one participant stated that 'it might be difficult to encourage us to do extra work like Peergrade without any grade reward'. He further explained:

Sometimes one mark makes a difference in your GPA. Without this incentive, it seems that what you do is worthless. We are used to be motivated to learn by our grades.

Some of the participants also realised the importance of Peergrade activities to increase their e-journal score, which accounted for 30% of their final course mark. They felt that Peergrade gave

them a second chance to revise their drafts based on feedback from their peers, which in turn increased their performance.

However, the participants proposed a better way to reward students for their full participation in OPA. They suggested that they should not receive a score for completing the OPA tasks. Instead, this score should be proportional to the quality of the feedback and revisions, which would motivate them to critically review and revise their work. In addition, some participants proposed that Peergrade activities should have a higher weight in the final course mark to increase their engagement in OPA.

Discussion and conclusions

This study showed that the participants in the experimental groups developed their CT significantly more than those in the control groups. Similar findings on the effectiveness of OPA for students' CT development have been reported by several researchers (e.g., Dominguez et al., 2015; Novakovich, 2016; Yang, 2009). More importantly, this study explored the students' perceptions of the most important OPA design elements for developing their CT. Except for the participants' doubts about the effectiveness of the guiding questions provided, OPA training, peer feedback requirements, anonymity, student evaluation of the usefulness of peer feedback and summative use of OPA were considered effective design elements by more than half of the participants, although some may require further refinement. Dominguez et al. (2015, p.575) proposed that 'CT may grow and be reinforced with time as a reflex of the stimulatory activities and the engagement of the participants'. To some extent, these five design elements of OPA either increased the repeated practice of CT or enhanced students' active engagement.

Culture-free OPA design elements to promote CT among students

OPA training and peer feedback requirements have been identified as effective design elements in different cultures. This study provided qualitative evidence to echo the results of Li et al. (2020), who found that peer assessment training was the main factor explaining students' learning gains in their meta-analysis study. In this study, the instructors clarified their expectations and the objectives of OPA at the start of the process. As suggested by Pithers and Soden (2000), learning to become a good 'critical thinker' must be explicitly acknowledged as an objective of CT instructional designs (OPA in this study). Only when students share this objective will they seek to achieve it by engaging in OPA. Creating shared value in group work can help students understand their responsibility.

Peer feedback requirements were found to stimulate the participants' awareness of judging with evidence and providing solutions. When the participants shared their thoughts on the work of their peers, they were required to provide evidence for their criticism. Some participants saw this as an opportunity to practise their CT. More than half of the participants believed that cognitive feedback, which identified their writing weaknesses and made suggestions, was conducive to the development of their CT. These results are consistent with those reported in other studies in Western contexts (e.g., Filius et al., 2018; Novakovich, 2016).

However, instructors should be very careful when providing detailed guiding questions to students for effective peer feedback for CT development. Indeed, the guiding questions provided constrained the participants' thinking because of the large number of questions to be answered and the rigidity in choosing the questions to focus on in this study. This result differs from those of Yang (2009) and Dominguez et al. (2015), who showed the usefulness of guiding questions for students' CT development.

Culture-specific OPA design elements to promote CT among students

Anonymity, student evaluation of the usefulness of peer feedback and summative use of OPA were found to be effective and culturally sensitive. Provided by Peergrade, anonymity helped combat the negative influence of face culture in the OPA process. Indeed, being afraid of losing face or protecting others' face, Chinese students tend to hide their honest opinions and avoid challenging others in public (Liu, Li & Zhang, 2018; Zhan, 2019a; Zheng et al., 2018). Without conflicts of thought, however, CT cannot be activated (Zhan & Wan, 2016). Anonymity has the potential to effectively mitigate these unwanted interpersonal effects (Panadero & Alqassab, 2019). The participants in this study allayed their fear of hurting their peers' feelings and losing face when they were asked to critically review the work of other students in a double-blind design.

The participants indicated that their peers' evaluation of the usefulness of their feedback had a positive effect on their engagement in OPA activities. This evaluation appeared to provide more social cues, which generated a higher level of social presence, thereby putting more peer pressure on individual group members (Roberts, Lowry & Sweeney, 2006). Under the influence of collectivism, Chinese students are more like to convert this peer pressure into a driving force for deep learning and working harder (King, McInerney & Watkins, 2013). Some of the participants in this study critically reviewed peers' e-journal draft to gain recognition from their peers and help each other to perform well. This is further evidence that Confucian culture should not always be seen as an obstacle to formative assessment (Zhang et al., 2014).

It is also well known that there is a strong examination culture in Confucian heritage contexts, with students generally having strong extrinsic learning motivations (Zhan, 2019b). This examination culture has made the utilitarian nature of education (e.g., entry into a prestigious university, career and social mobility) prominent in China (Carless, 2011). This study showed the positive effect of this examination culture on the participants' engagement in the OPA activities.

Despite the very low weight of the score assigned to the Peergrade activities, most of the participants were extrinsically motivated by this additional score. In addition, some participants found that the Peergrade process helped their e-journal writing assignment, which represented 30% of their final mark. Being aware of the strong alignment between the assessment task and the objectives of OPA, the students were more actively engaged in OPA.

Suggestions for refining the culturally embedded design of OPA

The suggestions proposed by the students to refine the OPA design deserve our attention if we want to make the OPA process more beneficial for their CT development in a specific cultural context. As discussed above, OPA training is essential for students to set explicit goals and eliminate any misunderstandings regarding the assessment rubric. Therefore, this should be considered as a standard component of OPA for the development of CT among students. Instructors should also ask their students to explain their judgement and provide suggestions for improvement, which can offer them a chance to question and reflect on the focal question, thus leading to CT development (Filius et al., 2018). In addition, instructors should give students the opportunity to choose the guiding questions they would like to answer, thereby allowing them to take a more proactive role in OPA. Indeed, Pretorius, van Mourik and Barratt (2017, p.389) found that a ‘novel flexible assessment regime’, allowing students to have autonomy in deciding what to assess and how to assess in OPA, can contribute to students’ development of higher-order thinking, including CT.

More importantly, instructors must fully understand the sociocultural context in which students learn and use all positive sociocultural influences and mitigate negative influences to develop students’ CT. Although anonymity helped combat the negative influence of face in this study, it can be refined by assigning student work to those with the same interest and using technology to send a reminder email to reviewers as soon as the writers respond to their comments

to initiate a dialogue on the feedback received. As discussed earlier, although the participants reported some positive effects of China's examination culture, there were still concerns about extrinsic motivation and surface participation due to the grade reward. Therefore, the practice of superficial engagement in OPA for grades should be identified as soon as possible. More measures are needed to ensure that students feel that their investment in OPA is worthwhile for their CT development. For example, instructors should carefully consider how marks are awarded and how these marks are determined based on the time and effort spent by students on OPA and the quality of their feedback (Kay, Hardy & Galloway, 2018).

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Case 3: Using audio feedback to enhance students' learning engagement and outcomes in project-based learning for group presentation

Introduction

In spite of the significant contribution of GE, there are challenges to the implementation of GE courses in universities. Students have low motivation to attend GE courses and their course engagement is also negative (Keeling & Hersh, 2012; Kirk-Kuwaye & Sano-Franchini, 2015; Most & Wellmon, 2015). The movement towards accountability in higher education also raises questions about the tangible learning outcomes produced by GE (Rhodes, 2010). In order to address the above-mentioned challenges, this study implemented an intervention of audio feedback to facilitate students' project-based learning for assignment of group presentation in the context of Hong Kong University GE foundation course. The study would explore if audio feedback could exert positive influences on student learning engagement and outcomes and examined the factors mediating its effects. Two specific research questions were explored as follows.

- RQ1: Does audio feedback enhanced students' learning engagement and outcomes in their group projects?
- RQ2: What factors mediate the impacts of audio feedback on students' learning in group projects?

Literature review

Literature review shows that audio feedback has four major advantages than written one. First, it can provide quicker and more timely comments on what students have done than written one (e.g., Broadbent, Panadero, & Boud, 2018; Deeley, 2018; Jonsson, 2012; McCarthy, 2015). Deeley (2018) found that her participants acknowledged the usefulness of audio feedback because it made

them feel they were on the right track of learning and resolved tricky situation quickly. Second, audio feedback has great flexibility and convenience which enable students to overcome time and location constraints (e.g., Carruthers et al., 2015; Jonsson, 2012). Carruthers et al. (2015) reported that 68% of the participants most liked the convenience brought about by audio feedback. Third, compared to written feedback, audio feedback is more informative (e.g., Emery & Atkinson, 2009; Gould & Day, 2013; Ice et al, 2007; Merry & Orsmond, 2008; Nemec & Dintzner, 2016). Emery and Atkinson (2009, p.3) found that students preferred audio feedback to written one since it included much richer information which described “where and what to be improved”. In addition to the content of audio feedback, intonation, nuance and emphasis within the feedback convey more information to students (Merry & Orsmond, 2008). Last but not least, audio feedback enabled social presence of teachers (Oyarzun, Conklin, & Barreto, 2016) and be perceived by students as being more personal (Eckhouse & Carroll, 2013). As a result, this may lead to a dialogic approach to feedback (Carless, 2015; Murphy & Barry, 2016).

Audio feedback also has its technological drawback in the eyes of teachers and students. The students have reported the difficulties in downloading large size audio files (McCarthy, 2015) and playing the files because technological incompatibility (Deeley, 2018), and relocating certain parts of a long audio file (Borup, West, & Thomas, 2015; Morris & Chikwa, 2016). Teaching staff have stated difficulty finding a quiet place to record their comments (Henderson & Phillips, 2015) and unfamiliarity with technology to provide audio feedback (Cann, 2014).

Recently, some researchers have found that audio feedback might not excel written feedback in bringing about positive influences on learning (Elola & Oskoz, 2016; Espasa et al., 2019; Morris & Chikwa, 2016). In addition to the technological affordance and problems of audio feedback, other factors such as individual characteristics, content and timing of feedback and

further opportunities to discuss with teachers may mediate the effectiveness of audio feedback. Individual characteristics like their learning style and prior experience of feedback possibly mediate students' acknowledgement of positive impacts of audio feedback on their learning. Gould and Day (2013) linked some participants' dislike of audio feedback with their learning styles. Morris and Chikwa (2016) also claimed that teachers needed to consider a tailored approach of giving feedback considering students' learning styles. Espasa et al. (2019) proposed that students' prior experience of feedback should be carefully considered when analysing its impact. No matter which format of feedback, audio or written is used, the content of feedback really matters in deciding its influence on learning. Gould and Day (2013) found audio feedback quality influenced students' acknowledgment of its usefulness. The participants preferred specific audio feedback. Espasa et al. (2019) emphasized the feed-forward nature of audio feedback which aimed at making improvements enhanced its power on learning. In addition, teachers' continuous interaction and dialogues with students who have received audio feedback maximize the effectiveness of audio feedback on learning. Carruthers et al. (2015) reported that the participants complained lack of opportunities to discuss with teachers about the received audio feedback to clarify vague and confusing comments, which influenced their engagement with audio feedback.

The existing literature reveals that teachers may take advantages of technology to provide detailed, timely, personal and supportive comments on student work while considering the possible technical problems. It seems that technology alone cannot guarantee the effectiveness of audio feedback on learning. Some researchers have endeavoured to find out the mediating factors beyond technology. However, such an investigation is scarce and not focused. It is necessary to explore if there are other factors than those mentioned in the literature and how these factors interacted with each other jointly deciding the impacts of audio feedback on learning.

Methodology

This study adopted a quasi-experimental design to demonstrate the effectiveness of audio feedback intervention (see audio feedback design for reference) on students' learning engagement and outcomes in their group projects for group presentation.

Participants

Convenience sampling was used to recruit the participants. Three teachers in the General Education foundation course were approached and their students were invited to participate in the study. 72 undergraduates from four tutorial groups taught by two teachers gave consent to try out the intervention served as experimental groups, while 25 undergraduates from two tutorial groups taught by another teacher did not receive audio feedback in their inquiry process and only got face-to-face feedback at the end of their presentation thus served as control groups. The participants (39 males and 58 females) were aged between 18 and 23 years and studied in a variety of majors in social science.

Data collection

Survey

A survey targeted at measuring if students' critical thinking disposition and learning engagement was enhanced by audio feedback. The scale of critical thinking disposition was adapted from the critical thinking subscale of the MSLQ (Pintrich et al., 1993) which consisted of 5 items. As stated by Pintrich et al. (1993), this subscale is designed to assess students' tendency to apply their

previous knowledge to evaluate ideas presented in the classroom critically. The items under this scale were rated on a 6-point Likert scale from “never” (=1) to “always” (=6). The scale of learning engagement was adopted from the classroom engagement part in a student engagement scale (Gunuc & Kuzu, 2015) which consisted of three subscales namely cognitive, emotional and behavioral. In total, 12 items were involved and adapted to the GE foundation course context under study. Cognitive engagement refers to students’ investment on learning, learning motivation and effort. Emotional engagement refers to students’ emotional reaction in class and relationship with teachers and peers. Behavioral engagement refers to students’ attendance and participation in educational activities in class. All the items were rated on a six-point Likert scale ranging from “strongly disagree” (=1) to “strongly agree” (=6). Cronbach’s alpha coefficients were adopted to indicate the reliability of each scale adopted in the survey (Table 1). The alpha coefficient for all four scales ranged from .815 to .906, suggesting good reliability (Fink 2015). The survey was issued to both experimental groups and control groups at the end of the course.

Retrospective journals

Retrospective journals were employed to collect qualitative data answering the research questions. The students in experimental groups were offered guideline which enabled their journal entries to comply with the research objective (McDonough and McDonough 2014) and they voluntarily submitted their retrospective journal entries at the end of the course. They were required to write

about the perceived impacts of audio feedback on their project-based learning and the factors facilitating or inhibiting its impacts. They can choose the language they felt comfortable English or Chinese to express their ideas. 24 retrospective journals were finally collected. The data would complement and triangulate the results of survey on the impacts of intervention.

Individual interviews

The students who wrote retrospective journals were invited to attend individual interviews and 17 of them accepted the invitation. The purpose of interview were two-fold. One was to get in-depth understanding about the factors mediating the influences of audio feedback on student project-based learning. The other was to clarify the meaning which was not explicitly expressed in their retrospective journal entries. The interviews were semi-structured and were conducted in their mother tongue and audio-taped. The average length of interviews was about half an hour.

The two teachers who taught experimental groups were also invited to participate in the individual interviews to understand their beliefs of impacts of intervention by comparing the experimental groups with their previously taught groups in the course and the factors which might mediate such influences. The semi-structured interviews were conducted in their mother tongue and also be audio-taped. The interview lasted for an hour.

Data analysis

The survey data were analyzed by SPSS 21.0 to see if experimental groups excelled control groups in critical thinking disposition and learning engagement. Descriptive analysis and Independent T-test were adopted to show the differences. Retrospective journal entries and interview data were

analyzed using the approach of thematic analysis (Braun & Clarke, 2006). The data were initially coded by reading and interpreting the retrospective journal entries and interview transcripts. The initial codes were further condensed and categorized according to research questions, which became subthemes and themes. Themes were then checked against the entire dataset iteratively and by peer examination (Hitchcock & Hughes, 1995).

Findings

Impacts of audio feedback on student project-based learning

Student learning engagement

Table 2 reveals that although the means of cognitive ($M=4.574$) and behavioral engagement ($M=4.639$) of experimental groups are higher than those of control groups (cognitive engagement: $M=4.240$; behavioral engagement: $M=4.340$), the level of difference is not significant (cognitive engagement: $p=.068$; behavioral engagement: $p=.072$). However, experimental groups ($M=4.924$) exhibited higher emotional engagement level than control groups ($M=4.497$) in a significant way ($p=.006$).

Table 2. Independent T-test analysis of learning engagement and critical thinking disposition between control groups and experimental groups

		Mean	SD	Mean Difference	<i>t</i>
Cognitive engagement	Control groups	4.240	0.627	-0.334	-1.849
	Experimental groups	4.574	0.823		
Emotional engagement	Control groups	4.497	0.572	-0.427	-2.828**
	Experimental groups	4.924	0.675		

Behavioral engagement	Control groups	4.340	0.603	-0.299	-1.821
	Experimental groups	4.639	0.739		
Critical thinking disposition	Control groups	3.515	0.891	-0.526	-2.855**
	Experimental groups	4.042	0.773		

** $p < .01$

The evidence collected from retrospective journal entries triangulated with the findings of the survey. Some students recalled in their retrospective journal entries that they could feel teacher's respect for their ideas in their tones which shortened the distance between the teachers and them. More importantly, they could make their own choice of the inquiry questions after considering teachers' comments. They felt safe due to the help of teachers' feedback in different stages of their group work. The following extract shows this point of view.

The teacher gave us comments on if our project proposal was meaningful and feasible.

I think he respected our choice and did not force us to follow up his ideas. We did the work under teachers' guidance which kept us on the track. We felt safe and confident to do our project. (Retrospective journal 3)

Two teachers also reflected that the students engaged more in their projects and tutorials by asking questions and discussing with them than those previously taught by them. They believed that audio feedback would improve student learning motivation and the feeling of being supported.

Student learning outcomes

Table 2 shows that experimental groups had higher level of critical thinking disposition ($M=4.042$) than control group ($M=3.515$) and the difference was significant ($p = .005$). Some students also reported this change in their retrospective journal entries. They believed that audio feedback provided them more angles to investigate the chosen issues and also they had made decisions on the inquiry questions after discussion. Therefore, they became more critical about the received information from peers and teachers. The following extract shows this point of view.

My teacher gave me a lot of constructive and critical comments on Google platform which made me be more aware of the issues that I often ignored and made me not to take things for granted. For example, when I worked with my group mates, I did not question if these were applicable in our situation. Because of my teachers' rhetorical questions, we rethought about that and took a new perspective towards the issue (Retrospective journal 11).

In addition to critical thinking disposition, most of the students agreed that the quality of their final group presentation improved because of taking up audio feedback in the revision. They pointed out the improvement on their arguments and design of PPT slides, as shown by the following extract.

The teacher's comments made us dig more into the inquiry questions. He suggested us to enrich our arguments by considering multiple perspectives and providing more valid evidence. In addition, he provided some practical comments on the design of PPT slides which made our work more eye-catching and straightforward. (Retrospective journal 16)

The two teachers echoed the students' claim on the improvement of quality of group presentation. For example, one teacher said:

Although not all of the students improved, I could say the quality of group presentations would be higher than those in the former year. Their inquiry questions became narrow and interesting and their argumentation was more logical and better supported. (Teacher interview 1)

Mediating factors

Technological affordance and problems

Most of the students acknowledged technological affordance of audio feedback on Google platform. They majorly mentioned three technological affordances of such teacher feedback, namely convenience, timeliness and social presence. A lot of students mentioned that compared with traditional face-to-face teacher feedback, audio feedback was more convenient to access and follow up, as shown by the following extract.

The biggest advantage of audio teacher feedback is its convenience. You can get teacher feedback when you available. You don't need to negotiate with the teacher about consultation time. You know, this is group work and our group members come from different majors. It is very hard to find time when we are all available. Meanwhile, you can repeatedly listened to your teachers' feedback if you like. (Student interview 10)

Some students also talked about the timeliness of teacher feedback because of the help of technology. They thought they could gain immediate feedback after they submit the work which helped them to make revision. One student said

It is quick to gain teacher feedback after we finish one subtask. The immediate feedback helps us to refine our step by step. Normally, we often get teacher's feedback after group presentation but it is too late for us to improve our work. (Student interview 3)

In addition to its convenience and timeliness, some students also mentioned that when they listened to teachers' feedback, they felt it was authentic and emotional which made them more involved in the process.

You seemed to have teacher by your side and encouraged you to do the work better and solved your puzzles. The feeling is very good. Compared with the text message, you can get more information beyond words. (Student interview 8)

However, a number of students reported some technical problems which inhibited them from retrieving audio feedback. Recording quality was the major problem claimed by the students. They complained that sometimes the volume of recording was too low and they had to play the recording for several times to understand teacher feedback. Another problem was that it might not be straightforward to find the target part of teacher feedback that students would like to focus on in their revision. Some students claimed that they needed to drag the sound track to find what they really wanted to follow up.

Content of audio feedback

Many students mentioned that their teachers gave them comments on their inquiry questions and proposals by analyzing their weakness and strengths and giving possible directions for them to continue their projects. This kind of feedback gave them a sense of safety and as well as sense of being respected. Like Student 20 mentioned in the interview, the teachers acted as a “tour guide” to lead them in the inquiry journey which helped them to avoid getting lost and impatience in the exploration. Other evidence came from teacher’s interview to demonstrate the feed-forward function emphasized by teachers when giving audio feedback to the students, as shown as follows.

For example, I analysed significance, feasibility and creativity of their inquiry questions and then the students understand what questions they may reconsider and reformulate. I also provided some suggestions for them to negotiate with each other to achieve the final decision on inquiry questions. I think these suggestions move their project forward to the next stage. (Teacher interview 1)

The feed-forward comments provided by teachers in some students' eyes were general. However, they thought the teachers' comments on the global aspects of project was acceptable and also left them some space to do self-exploration. In addition, they believed if they would like to know more comments on some specific parts, they could use reply comment function to ask questions. Therefore, the general audio feedback was regarded by them as the starting point for further communication with the teachers. For example, Student 19 said:

My teacher gave us suggestion and options and sometimes these suggestions were general. Our group members and I asked why questions in reply and ask for more details. In the dialogue with the teacher, we benefited a lot and enriched our thoughts.

However, some students had different reactions to general audio feedback. They complained that suggesting general direction for project exploration was not helpful enough and hoped that their teachers could give concrete solutions to them. Without detailed audio feedback, they seemed not to be able to continue their projects to a higher standard. The different reactions towards general audio feedback were related to students' initiatives and learning motivation which will be discussed in later subsection.

Dialogues with teacher

As mentioned before, general feedback triggered some students to have dialogue with teacher. In addition, some students replied audio feedback on Google platform by discussing with teachers about the comments, which they might not agree to or felt difficult to follow up. The following exact shows this point of view:

My teacher gave us some comments to refine our PPT slides. Some of them were very straightforward and easy to follow up. However, he asked us to find more literature to support STEM education in Hong Kong secondary schools. It is very difficult to find the local paper on this since STEM is very new here. I reported this difficulty to him and we discussed. Finally, I used some practical examples of STEM to replace literature. It worked! (Student interview 10)

Audio feedback triggered more dialogues with teacher than before in some students' eyes because teacher voice gave them a sense of being with teacher in their project work and encouraged them to communicate with their teachers. The following extract shows this point of view.

Listening to teacher's feedback made us feel that our teacher was here for help and he was one of our team. The tones and emphasis made by him in the comments gave us confidence and a sense of closeness. We took initiative to talk with him more about our project by replying to his comments and even asking him questions after tutorial.
(Retrospective journal 10)

Students' learning motivation

Students' learning motivation was believed as a mediating factor by both the students and teachers involved in the experimental groups. Some students who reported their interest in group project tended to engage actively in the feedback process. For example, one student mentioned:

I was interested in the inquiry questions of group project. I was involved myself much in the process by listening to teachers' comments carefully and asking questions I was not sure about. I am benefited a lot from teacher's audio feedback. (Student interview 1)

The two teachers also mentioned that the influence of audio feedback on student project-based learning varied according to their learning motivation. The students who had intrinsic learning motivation played active role in communicating with them about their progress of project while the students who had extrinsic learning motivation might not follow up their comments. For example, one the teacher said:

Student learning motivation really matters in the feedback process. I have students who have strong learning motivation. Even if you don't give feedback to them, they will come to your office for feedback. I also have some students who just want to finish the

course work. They seldom replied to my comments and revised their work. They might not gain a lot from my audio feedback (Teacher interview 2)

Time

Time was another factor which might facilitate or inhibit the influence of audio feedback on student learning. Some students mentioned the ongoing audio feedback on their work at different stage of project helped them a lot. They could identify their problems in the project as soon as possible and also still had chances to fix them before they went into the next stage of project. The following extract shows this point of view.

Unlike the feedback we usually get in the course work, in GE we got teachers' feedback continuously as we did our project. The ongoing feedback helped us to identify problem and fix problems as soon as possible and guarantee the quality of our project (Student interview 6)

Some students believed that asynchronous audio feedback created time for them to think over teacher's comments and figure out the questions that they would like to ask in the reply, which enabled high quality of communication. The following extract demonstrates this point of view.

I think gaining teacher feedback on line enabled me to have time to think about since it might not be easy to ask teacher questions as soon as I got his feedback. After I listened to his comments, then I would think which comment was uncertain and which one I might not agree to. Then I could ask questions on line to consult Dr. Chan further. Such communication would save time for both of us and be effective for revision.
(Retrospective journal 3)

However, some students did not share the same view. They believed that asynchronous audio feedback created time gap in communication and the misunderstanding might not be resolved as

immediately as face-to-face communication did, which in turn influenced the power of audio feedback. For example, one student mentioned:

Because there is a gap among the time when we listened to teacher's comments, when we replied to his comment and when we listened to his new comments, so it might cause some misunderstanding or ignorance of some comments. If we could communicate with each other online at the same time, it would be benefit us more.

(Student interview 11)

In addition, some students mentioned there would be time conflict between their major learning and GE course learning and they were more likely to be half-hearted about their reply to audio feedback and save more time for their major work. This time conflict issue was also identified by the two teachers, as shown in the following extract.

Some students told me that sometimes our deadline of submitting work and reply to teacher's comments coincided with the deadline of their major work. When they faced the time conflict between their major course learning and GE course learning, they tended to choose major course work since they believed their major work really mattered for their future (Teacher interview 2)

Discussion and conclusion

This study examined the impacts of audio feedback on student learning engagement and outcomes in the context of GE foundation course in a Hong Kong university. The collected data demonstrated that students' emotional engagement was significantly promoted by audio feedback. This finding resonates with Espasa et al (2019) who reported that digitally recorded feedback could enhance affective relationship between students and instructors in university online courses. Ryan, Henderson and Phillips (2020) also found that undergraduates preferred digital feedback due to its relational and affective benefits.

In addition, the data analysis revealed that audio feedback enhanced students' critical thinking disposition and improve the quality of group presentation. The positive impacts of audio feedback on learning outcomes have also been reported in some previous studies (e.g., Rodway-Dyer, Knight & Dunne, 2011; Nortcliffe & Middleton, 2008; Ice et al., 2007).

More importantly, this study explored the factors mediating the impacts of audio feedback on student project-based learning. Five mediating factors namely technological affordance and problems, content of audio feedback, dialogues with teacher, student learning motivation and time were identified in this study. These factors either facilitate or hinder audio feedback to play its power over learning. They appeared to interact with each other and jointly decide the impacts of audio feedback on student project-based learning.

The students involved in this study believed that technology brought about convenience of getting access to teacher comments anytime and anywhere. Such convenience was also acknowledged by the students in other studies (e.g., Carruthers et al., 2015; Jonsson, 2012). The technology-enabled convenience made the students to digest teachers' comments and reflect on their work. In addition, the students in this study mentioned they got speedy feedback to help them to revise their inquiry questions, proposal and PPT slides. This finding echoes with what other researchers found in their studies (e.g., Broadbent, Panadero, & Boud, 2018; Deeley, 2018; Jonsson, 2012; McCarthy, 2015). Speedy feedback could help to solve tricky situation quickly and help the students on the right track of inquiry (Deeley, 2018). Meanwhile, social presence afforded by technology was perceived by the students in this study. The human voice has a great effect on perceived social presence (Garrison et al., 2000). Creating a social presence in online environments may help students to relieve their anxiety that they may occasionally have in the process of doing their project alone (Erthner & Simons, 2006). Technology is also a double-edged sword. This study

also identified low quality of recording and difficulty of finding the targeted part of a long audio file which hindered students to use audio feedback in the revision of their work, Such technological problems have also been reported by other researchers (e.g., Borup, West, & Thomas, 2015, Henderson & Phillips, 2015; Morris & Chikwa, 2016).

Beyond technology itself, other factors such as content of feedback, dialogue with teacher, students' learning motivation and time were also found to mediate the impacts of audio feedback on project-based learning. Most of the students involved in this study appreciated feed-forward comments provided by the teacher. The feed-forward comments target at students' learning future and give students confidence and possible solutions, thus making them learn better (Espasa et al., 2019; Deeley, 2018). In spite of its feed-forward nature, some students reported that teachers' comments were general. It is interesting to find the differential reactions of students towards teachers' general comments. Some students did not mind the generality of teacher comments because they thought they had responsibility to do self-exploration and took initiatives to communicate with teachers for further suggestion if necessary. However, other students appeared to rely on teachers' specific guidance to polish their projects and tended to complain about the usefulness of teacher general comments. The finding was partly inconsistent with what Gould and Day (2013) found that students preferred specific audio feedback.

In addition, this study reported that audio feedback triggered students' dialogues with teacher, which enhanced their emotional engagement and critical thinking disposition. Rodway-Dyer, Knight, and Dunne (2011) verified that receiving audio feedback might motivate students to seek extra face-to-face feedback and guidance from teachers. Espasa et al. (2019) also found that compared with written feedback, audio feedback could promote interaction, dialogue and a sense

of closeness with teachers. Dialogical feedback has great potentials for emotional and relational support and individual cognitive development (Steen-Utheim & Wittek, 2017).

Students' learning motivation appeared to mediate their engagement with audio feedback in this study, which in turn partly decided its impacts on their project-based learning. This factor has been seldom mentioned in the existing literature and could be added into the discussion on the mediation of individual characteristics such as learning style and prior feedback experiences in the literature (e.g., Espasa et al., 2019; Gould & Day, 2013; Morris & Chikwa, 2016). The students who had interest and curiosity in doing projects actively participated in the feedback process while those who just wanted to finish the task might not take up teachers' comments. This factor interacted with other factors such as content of feedback, dialogue with teacher jointly decided the impacts of audio feedback on their project-based learning which will be discussed later.

Time issue included ongoing and asynchronous features of audio feedback designed in this study and time conflict with students' major learning. In the literature, timeliness of audio feedback has been highlighted (e.g., Broadbent, Panadero, & Boud, 2018; Deeley, 2018; Jonsson, 2012; McCarthy, 2015). In this study, beyond timeliness afforded by technology, ongoing feedback design in three stages of project was acknowledged by the students as a facilitating factor. Boud and Molloy (2013) argued that assessment feedback was a cyclical and ongoing process which enabled students to have second chance to refine their work, in turn improved learning. Asynchronous audio feedback in this study caused students' different reactions. Some students thought asynchronous audio feedback enabled them to have time to think over teachers' comments and guarantee high quality of later communication with teacher while others thought time difference hindered continual dialogues with teachers. Another interesting finding is about the

perceived time conflict. Students tended to choose their major learning as a priority when there was time conflict between major learning and replying audio feedback in GE course.

Last but not least, this study also suggests possible interactions among the identified mediating factors. For example, the factor “student learning motivation” appeared to interact with other two factors “content of audio feedback” and “dialogues with teacher”. The students who had intrinsic learning motivation appeared to accept the generality of teacher comments, take responsibility of doing project exploration and initiatively seek for dialogues with teacher if necessary. On the contrary, the students who had extrinsic learning motivation seemed to prefer specific teacher comments and were reluctant to have dialogues with teacher. For another example, the factor “social presence afforded by technology” interacted with the factor “dialogues with teacher” as shown in the finding part. Audio feedback can foster social presence within what is known as a community of inquiry and generate more social communication cues than written feedback (Garrison et al., 2000). Nevertheless, the above-mentioned interactions among these mediating factors are tentative, which needs more scientific verification.

The paper is concluded by making some tentative suggestions for the advancement of audio feedback practice on the basis of the findings shown by this study. First, technology brings about both opportunities and challenges with opportunities overshadowing challenges in the process of giving feedback. However, technology alone cannot guarantee the effectiveness of audio-feedback on project-based learning. Who and how use audio feedback really matter. Second, the dialogues with teachers following the received audio feedback is important in deciding the impact of audio feedback on student project-based learning. Dialogical feedback is “crucial in promoting regulation of learning and its monitoring” (Espasa et al., 2019, p.2), which facilitate project-based learning. Educators need to think about how to enhance and continue students’ dialogues with

teacher on the received audio feedback. Third, students' learning motivation influences if they play active or passive role in taking up teachers' comments. We need to develop students' mindset of "proactive recipience" (Winstone et al., 2017) and encourage them to take direct responsibility for their projects and acting upon audio feedback.

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Appendix

Appendix 1: Information sheet for Peergrade intervention arrangement

Course No: (Friday)

Project objectives

This project aims to enhance freshmen's learning engagement and outcomes, as well as reflective thinking and critical thinking skills in the General Education (GE) foundation course by incorporating **Peergrade**, an online peer assessment platform, into your learning process.

How to realize

During the process of writing e-journals, you will collaborate with your classmates on an online peer assessment platform called **Peergrade**. You can anonymously give your constructive feedback to your peers and also get feedback from your peers on Peergrade.

There will be 2 assignments on Peergrade platform to submit your first and second e-journal respectively and give each other feedback.

Assignment 1(A1):

- a) You need to finish your 1st e-journal and submit it in **Doc. format** to the Peergrade “Assignment 1: First e-journal”. The deadline is **15th Feb.**

- b) After submission session closes, you will be randomly assigned two e-journals to review. You are expected to give constructive comments on these journals. The review session will be from 17th Feb. to 19th Feb..
- c) After getting feedback from your peers, you need to respond to their comments **by telling how you will do in your revision considering their suggestions or explaining why you don't accept their suggestions on the platform.** The react session will be from 20th Feb. to 21st Feb.
- d) You need to revise your e-journal **with track change** according to your peer feedback. You submit your finalized first e-journal **in Doc. format** on Moodle Platform for judgment before 25th Feb. The teacher will judge your finalized e-journal and give you feedback on Moodle. Please check teacher feedback on 1st Mar. on Moodle.

Assignment 2(A2):

The procedure of doing Assignment 2 is the same as Assignment 1 mentioned above. **Pay attention to the deadlines for each step of Assignment 2.**

Time Schedule:

You will get email reminders when every session begins and ends. The detailed time schedule for the assignments is shown in the following table.

Deadline	Assignment	Platform
15-Feb	1a. Submit 1 st e-journal (Doc. format)	Peergrade(A1)
17-Feb- 19-Feb	2a. Review on 2 anonymous e-journals	Peergrade(A1)
20-Feb- 21-Feb	3a. React to peer feedback on 1 st e-journal	Peergrade(A1)
22-Feb- 25-Feb	4a. Revise 1st e-journal based on peer feedback (with track change)	
25-Feb	5a. Submit the finalized 1st e-journal (in Doc. with track change)	Submit it on Moodle
1-Mar	6a. Check teacher feedback on the finalized 1 st e-journal	Check teacher feedback on Moodle
8-Mar	1b. Submit 1 st e-journal (Doc. format)	Peergrade(A2)
10-Mar- 12-Mar	2b. Review on 2 anonymous e-journals	Peergrade(A2)
13-Mar- 15-Mar	3b. React to peer feedback on 1 st e-journal	Peergrade(A2)
16-Mar- 22-Mar	4b. Revise 1st e-journal based on peer feedback (with track change)	
22-Mar	5b. Submit the finalized 1st e-journal (in Doc. with track change)	Submit it on Moodle
28-Mar	6b. Check teacher feedback on the finalized 1 st e-journal	Check teacher feedback on Moodle

Participation really counts

Students' participation will count for 4 points in total which will influence the final grades.

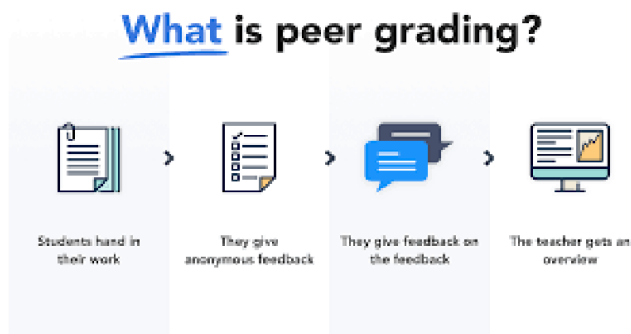
Reviewing and reacting in each assignment will count for 1 point respectively as shown in the

following table.

Assignment	Task	Score
A1	Review on 2 anonymous e-journals	1
	React to peer feedback	1
A2	Review on 2 anonymous e-journals	1
	React to peer feedback	1

Appendix 2: Manual for using Peergrade

Peergrade training



Peergrade is an online platform where students can give each other anonymous constructive feedback. You can not only review and learn from peers' work but also respond to the feedback your peers provide to you.



Peergrade



✓ No downloads required



✓ Run it everywhere



✓ Mobile devices friendly

Peergrade

1. Log in

Go to <https://www.peergrade.io/> .

click the ‘**log in**’ button in the top right corner of the page.



Peergrade

2. sign in

- Sign in with your Google account assigned by the university:

[s+ “student number”@s.eduhk.hk.](#)

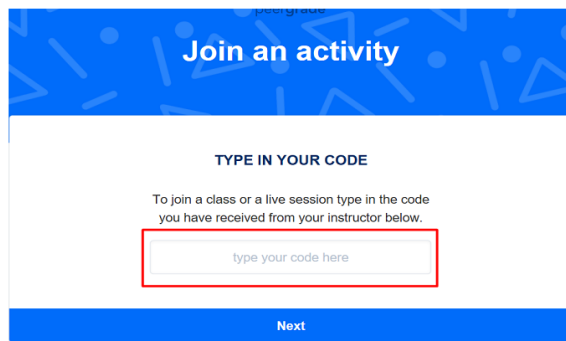
- When you sign in for the first time, it will ask you for identity, Please choose “**student**”.

A screenshot of the Peergrade login form. It has a blue header with the word 'Login'. Below it are two input fields: 'Email or username' (with an '@' icon) and 'Password' (with a lock icon). A blue 'Log in' button is below these fields. At the bottom, there are two options: 'Sign in with Google' (with a Google 'G' icon, highlighted by a red box and an arrow) and 'Sign in with Clever' (with a 'C' icon).

Peergrade

3. Join a class

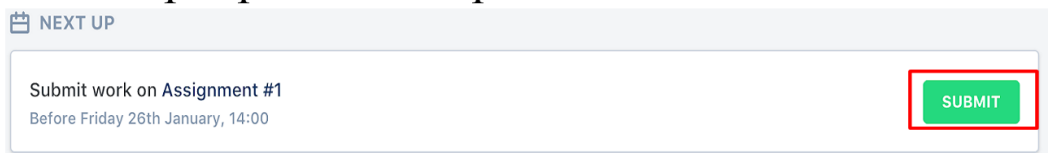
- Then, the system will ask you for a “Class Code”, Please enter: **N4NKDH**
- If you didn't see it, click on the “Join with code” button.



Peergrade

4. Submit assignment

If the assignment is open for submission, it will be shown up top in 'Next Up'. Click on “Submit”.



Then, you can upload your work. Once you have added your submission, click “submit”.

Peergrade

4. Submit assignment

Testing 1 Submission saved successfully

Assignment Submission Review React Results

Submitted

SUBMISSION

Peergrade student handout-07012019

Change Delete

Loading preview

Preparing to render the preview.

Download

Peergrade

5. Review peer's articles

Reflective Journal- testing 1 Reflective Journal JJ

← Class Assignment Submission Review React Results

Submission #1 COMPLETED 0 / 2

Attributes of paper

Q1 Conception

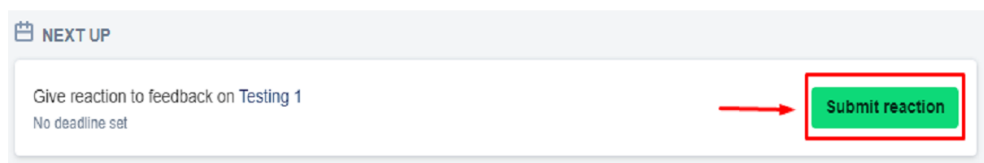
Identification and justification of aim and question are absent or very unclear

Attempt made to identify and justify aim and question, but very confused

Peergrade

6. React to peer feedback

- After the review session ends, the react session starts. React session will show up in the “**Next Up**” window, too.



- Click on “**Submit reaction**”.

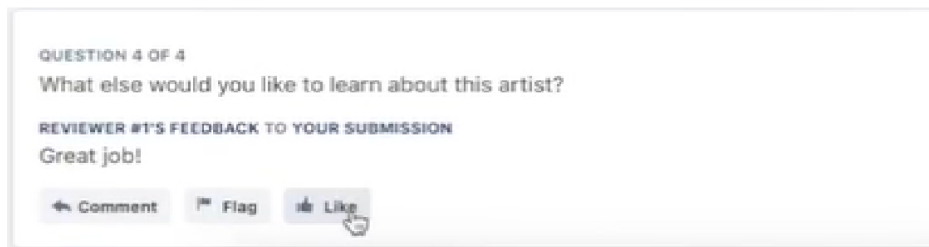
PS: You need to **finish reviewing 2 articles** to get access to reaction session.

Peergrade

- **6. React to peer feedback**

a) Choose reviewers to react.

❖ If your peers praise you, you can click “like”.



Peergrade

- **6. React to peer feedback**

a) Choose reviewers to react.

- ❖ If your peers give you suggestions or point out your weaknesses of journal, you need to click “comment” to reply

QUESTION 3 OF 4
How did the writing draw your attention?

REVIEWER #1'S FEEDBACK TO YOUR SUBMISSION
There were basic facts and it didn't draw my interest.

I had a fair amount of interest but the writer could add in some more details and style to make it more interesting.

The writer did a great job of combining facts and writing style.

[Comment](#) [Flag](#)

Click the flag and send a message to notify your teacher.

SEND YOUR MESSAGE ☐ [Send](#)

Peergrade

6. React to peer feedback

b) Grade the usefulness of the feedback

Review [✓](#) **React [✓](#)** Results

Reviewer #1 [^](#) COMPLETED 1 / 1

[✓](#) Reviewer #1 [←](#)

QUESTION 1 OF 2
How useful is the feedback?

YOUR REACTION TO REVIEWER #1'S FEEDBACK
Not useful at all.

Not very useful.

Somewhat useful. Could be more elaborate.

Very useful. Minor things could be better.

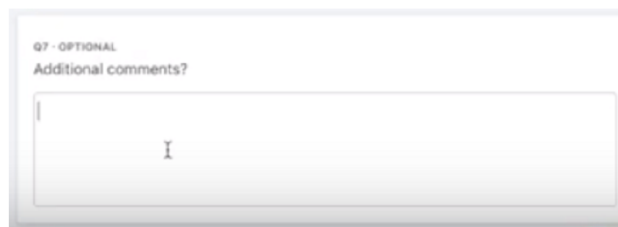
Extremely useful.

Peergrade training

6. React to peer feedback

c) Offer additional comments:

- 1) whether you **accept or reject** to reviewers suggestions and **explain reasons**.
- 2) **how you will revise your e-journal** based on the feedback,



Q7 - OPTIONAL
Additional comments?

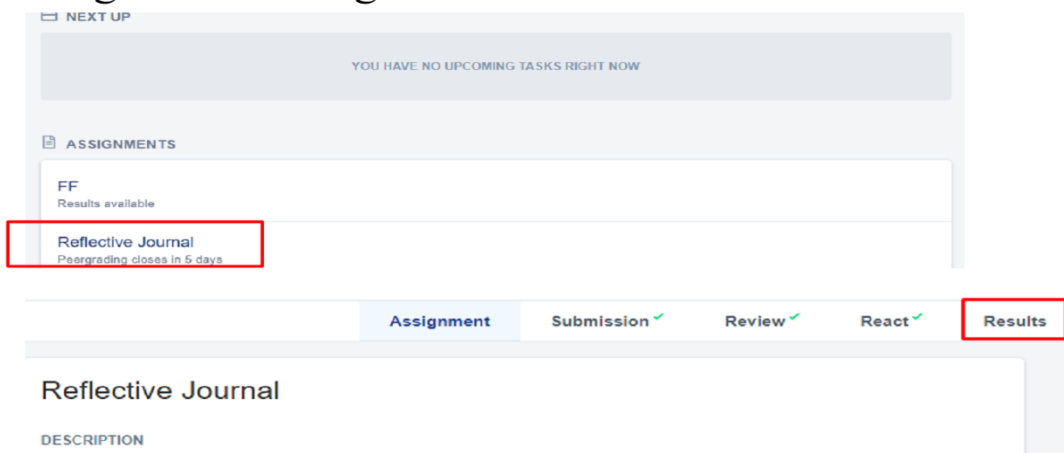
A text input field with a cursor inside, intended for providing additional comments.

Peergrade training

7. Check Results

After all session ends, you still check all the record.

Log in --->“Assignments” ---> “Results”



Navigation bar: NEXT UP, YOU HAVE NO UPCOMING TASKS RIGHT NOW, ASSIGNMENTS, FF Results available, Reflective Journal Peergrading closes in 5 days.

Assignment: Reflective Journal

Submission: ✓, Review: ✓, React: ✓, Results: ✓

Reflective Journal

DESCRIPTION

Peergrade

7. Check Results

TEST CLASS

Testing 1

← Class

Assignment

Submission ✓

Review ✓

React ✓

Results

Given

Received

Summary

SUBMISSIONS

Submission #1

FEEDBACK YOU GAVE

QUESTION 1 OF 2

Mention something that your classmate did well 👍

YOUR FEEDBACK TO SUBMISSION #1

First, I like your examples in this article very much because.....
second,

Comment

Flag

QUESTION 2 OF 2

Mention something that your classmate could improve at 📝

YOUR FEEDBACK TO SUBMISSION #1

I think you could solve the problem of ... by ...For example,

Comment

Flag

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Appendix 3: Inquiry question template

INQUIRY QUESTIONS

Submit by Group _____

Your group are interested in _____ (one of the topic in GE foundation course)

Every group member please contribute your two inquiry questions in the following:

All the group members can consider the following criteria of choosing good inquiry questions and your teacher's feedback to decide the inquiry questions.

Criteria of choosing good inquiry questions

Criteria	Descriptor
Creativity	The question is new and interesting which does not just echo the content presented in the lecture.
Significance	The answer to the question can contribute to our understanding of the concerned issue or make us do better in practice.
Relevance	The question is relevant to students' life experiences and their living context.
Feasibility	The question can be answered by the students for the moment considering their ability, resources and time.

Your group's final inquiry questions are:

Appendix 4: Group project proposal template

OUR INQUIRY PROPOSAL

This proposal is submitted by Group: _____

We plan to investigate: _____ (Inquiry topic)

The specific inquiry questions are:

The background of the selected topic (what is the basic information of the topic and why it is important for us to explore this topic)

Please figure out a plan to collect and analyse data/ information to answer the question(s).

- **What data do you plan to collect to answer your inquiry questions?**
- **How do you plan to get these data? (From the documents, online resources or collecting data by yourselves. If you want to collect your own data, what method you plan to use, survey or interview. You need to think about the details of survey design or interview question design)**
- **How do you plan to analyse your data? (i. e., categorization of the data - how many aspects do you plan to report to answer the target questions and what are they?)**

We plan to divide the work amongst ourselves (E.g. John and Jane— find the literature and design the PPT)

Appendix 5: Information sheet for audio feedback intervention arrangement

Project objectives

This project aims to enhance freshmen's learning engagement, reflective thinking, and critical thinking skills in the General Education (GE) foundation course by incorporating Google audio feedback into your learning process.

How to realize

Group folders and Docs will be created on Google Drive for online collaboration before the course.

Teachers and students will collaborate on Google Drive for both group presentation and individual essay. The collaboration could be done in the following 4 tasks:

a. Decide inquiry questions

After each group chooses a project topic, everyone in a group needs to contribute 2 specific inquiry questions related to the chosen topic into the Google Doc "Inquiry questions". The deadline is **16th**

Feb. Meanwhile, the teacher will offer audio feedback on Google Docs to help them to decide their inquiry questions for group work. Group members must respond to teacher's feedback on **28th Feb**

to explain their final decision for the inquiry questions.

b. Write project proposal

After deciding the inquiry questions, each group will write a proposal in the Google Doc “Our Inquiry Proposal”. The deadline is 20th Feb. Similarly, the teacher will offer audio feedback on Google Docs. Group members must respond to teacher’s feedback on 24th Feb to **explain how they will revise the proposal and what kind of help they need.**

c. Design PPT slides

After getting teacher’s feedback on the project proposal, students are to finalize their proposal, collect data and design their PPT slides. Each group can choose to use Google Slides to edit PPT slides together or to upload PPT slides to the group folder on Google Drive. The deadline is 3rd Mar. Teacher will give audio feedback to improve the design of PPT slides. Group members must respond to teacher’s feedback on 5th Mar to **explain how they will revise their PPT slides.**

d. Write an outline of individual essay

Students need to submit their outlines of individual essay on Google Drive Folder “Individual Essays” before 25th Mar. Students will get audio feedback from the teacher. Everyone must respond to teacher’s feedback on 1st Apr to **explain how he or she is going to revise his or her**

outline and what kind of help he or she need. Based on that, everyone finishes his or her essay

and submit it on Moodle platform through Trunitin link before 18th Apr.

Time Schedule

Students will get email reminders 2 days before each deadline. The detailed schedule for each task

is shown below:

Deadline	Assignment	Teacher Feedback	Platform
15-Feb	1a. Choose a topic		
15-Feb-16-Feb	2a. Submit individual inquiry questions		Google Docs
17-Feb		Teacher gives audio feedback on individual inquiry questions	
18-Feb	3a. Decide group inquiry questions	Students respond to teacher's audio feedback and decide group inquiry questions	
18-Feb-20-Feb	1b. Write a proposal		
20-Feb	2b. Deadline of the proposal		
21-Feb-23-Feb		Teacher gives audio feedback on project proposal	
24-Feb		Students respond to teacher's audio feedback, and revise the proposal	Google Slides
25-Feb-3-Mar	1c. Design PPT slides		
3-Mar	2c. Deadline of PPT slides		
4-Mar		Teacher gives audio feedback on PPT slides	
5-Mar		Students respond to teacher's audio feedback, and revise the PPT slides	
8-Mar	Group presentation I (2 groups)		
22-Mar	Group presentation II (4 groups)		

25-Mar	1d. Deadline of detailed outline of individual essay		Google Docs
26-Mar- 31-Mar		Teacher gives audio feedback on individual essay outline	
1-Apr		Students respond to teacher's audio feedback and revise the outline	
2-Apr- 18-Apr	2d. Write individual essays		Turnitin link on Moodle

Participation really counts

Students' participation will count for 4 points in total which will influence the final grades. The

score distribution of each task is shown in the following table.

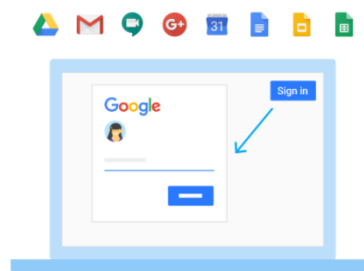
Task	Submission	Responses to teacher audio feedback
Individual inquiry questions	0.5	0.5
A proposal	0.5	0.5
PPT slides	0.5	0.5
Outline of individual essay	0.5	0.5

Appendix 6: Manual for use audio feedback on Google Drive

Part I – Getting ready with Google Drive

1. Sign in

Go to www.google.com and in the top-right corner, click **Sign in**. Enter your G Suite email address and password.



2. Create Google drive folders and files

Click on **【New (新建)】**, you will get several options for creating new files in your Google drive: you can choose to create a new folder or upload a folder from your computer. Also, you can select documents-Docs/ Sheets /Slides.



3. Share files and documents

Share your files and folders by clicking Share and then choose what collaborators can do. They'll get an email notification, too.



You can share by sending emails to a specific collaborator or share links of the file that everyone got the link can view or edit it. In this case, we set it as could be edited. Thus, students can all view and edit the documents at the same time.

Part II- Google Docs

We can use Google Docs directly on your Google Drive.

1. Create Google Docs

Click on **【New(新建)】** , Choose [Google Docs]  **Google Docs**

2. Edit

2.1 Rename: Rename the doc simply by clicking on the name of the document.

2.2 Add or edit text: Just click in the page and start typing.

2.3 Featured editing buttons are similar to Microsoft Word document.

3. Add comments

Before you start the chatting, please note that anyone viewing the file who is signed in to a Google Account will be included in the chat. So, make sure you're signed in with your account if you're viewing a file but aren't able to chat.

First, in the top-right corner, click Chat , or you can use short-cuts showed below (see Picture 1).



Picture 1. Open Chatting History

After clicking the Chat button. You will see a chat window as shown in Picture 2:



Picture 2. Chat Window

Then, click on “Comment (評論)” (see Picture 3).



Picture 3. Comment Button

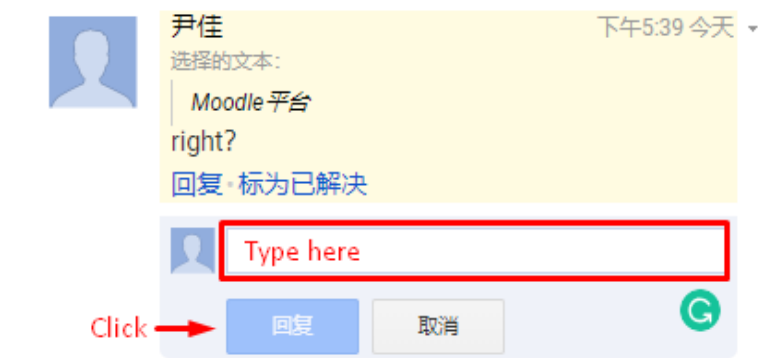
You will see a comment window appear right near to you cursor (see Picture 4). In other words, you can add comment to certain words or paragraph by selecting them before adding a comment.



Picture 4. Comment window

4. Response to comments

Click on the comments, and the chat box will show up as Picture 5. Type into the chat box and Click “Reply(回復)”.



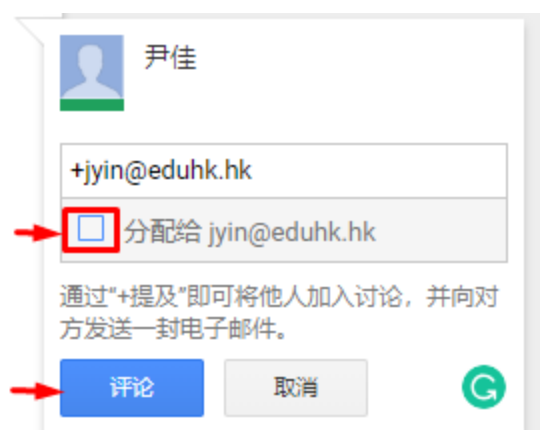
Picture 5. Chatting Box

If you want to chat to a specific person or gain his or her attention, you can use “+”, or “@” in the type box as showed in Picture 6. Your contact list will show up.



Picture 6. Use “+” or “@” to chat

Then, you can click on the person’s email address (as shown in Picture 7) and the system will send the person an email to inform him or her. You can use this method to ask questions or to respond to your teacher or peers, to make sure that they can get an email reminder and don’t miss your message.

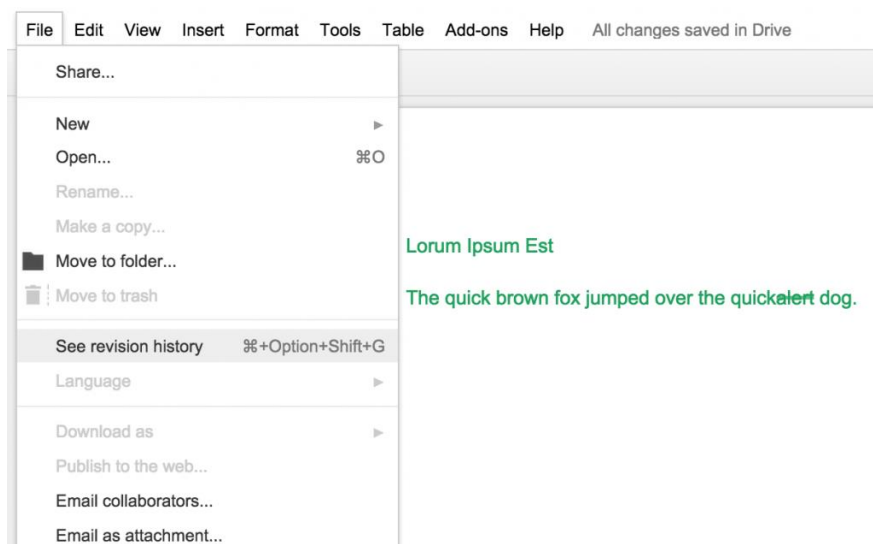


Picture 7. Assign task to specific person

5. Track Changes

5.1 View history version

Go to “File”->”See revision history”. You can see different versions of the document, and you can name the versions too.



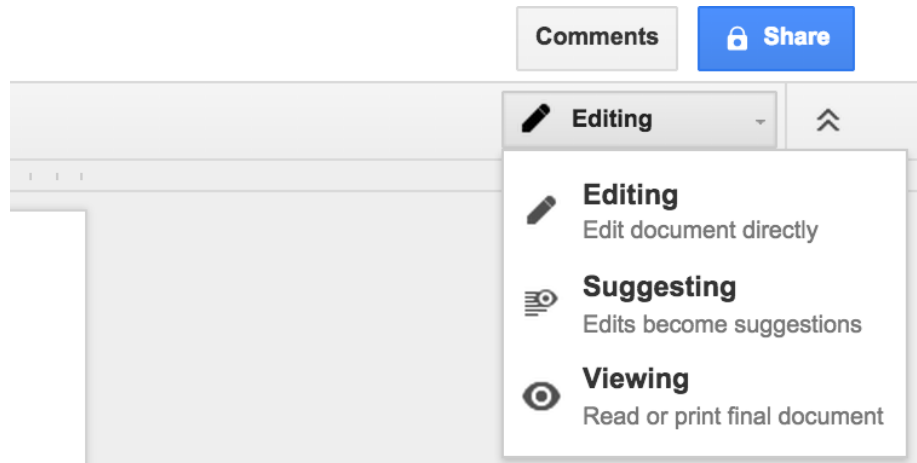
5.2 Making Suggested Edits

You can also propose changes directly in the document without editing the text by suggesting an edit.

Your suggestions won't change the original text until the document owner approves them.

Click on “**Editing**” button in the right top corner, and choose” **Suggesting**”mode.

To suggest an edit, simply begin typing where you think the edit should be made in the document. Your suggestions appear in a new color, and text you mark to delete or replace is crossed out (but not actually deleted until the document owner approves the suggestion).



The document's owner will receive an email with your suggestions. When they click any suggestion, they can **Accept**(check)or **Reject**(close) it.

