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Students' Attitude to Peer Assessment Process: A Critical Factor for Success

Peer assessment has been frequently used to improve students' academic writing skills. However, how to address students' unsatisfactory attitude during the peer assessment process remains a major challenge to further improve students' learning outcome and engagement. In our project, we implemented Interactive Peer Assessment, which comprised various components, to improve students' attitude during the peer assessment process. One hundred and fifty-three students participated in the Interactive Peer Assessment on academic writing at a wiki platform. Data were collected from student questionnaires and the records in webpages of wiki platform. It was found that the students demonstrated different levels of attitude changes in the form of compliance, identification and internalisation, and that different attitude changes were elicited by various components of the Interactive Peer Assessment. Significant learning improvement was also found in students' academic writing skills. Results of this study demonstrate the value and importance of incorporating strategies planned specifically to foster and maintain a positive attitude in the peer assessment process so as to enhance the desired effectiveness of peer assessment on learning outcomes and engagement.

Keywords: peer assessment; attitude; attitude change; academic writing, engagement

Introduction

Assessment is a core element in education. In the practice of assessment for learning, peer assessment has been frequently used to improve students' academic writing in higher education context (Cartney's, 2010; Guilford, 2001; Lu & Bol, 2007; Topping, Smith, Swanson & Elliot, 2000; Venables & Summit, 2003; Xiao & Lucking, 2008). However, although the positive effects of peer assessment on learning have been consistently reported, students do not always participate in the peer assessment process as seriously as teachers and researchers would like or expect them to. Consequently,

1
2
3 the quality/effectiveness of peer assessment declines when students do not take it
4
5 seriously. Research has identified that interaction during the feedback process is
6
7 beneficial in learning since both the assessor and the assessee are engaged in high-level
8
9 processes (Kollar & Fischer, 2010). Jung, Choi, Lim & Leem (2002) also suggested
10
11 that collaborative interactions between students of similar levels promote active
12
13 participation in online discussions and are important in enhancing learning. To improve
14
15 students' attitude and engagement during the peer assessment process, the researcher in
16
17 this study implemented an Interactive Peer Assessment method which comprised
18
19 various components, such as to request students to record their personal participation in
20
21 online learning, to serve the dual role of assessor and assessee, and to provide feedback
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23 on peers' feedback.
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30 **Literature Review**

31 *Assessment for learning*

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33 While assessment of learning aims at categorising student's performance, assessment
34
35 for learning aims to provide information which can be used as feedback to modify
36
37 teaching and learning activities in which students are engaged and ultimately improve
38
39 their learning (Black & Wiliam, 1998a, 2003). Assessment for learning is administered
40
41 to identify the student's strengths and weaknesses, assist educators in the planning of
42
43 subsequent instruction, aid students in guiding their own learning, and foster increased
44
45 autonomy and responsibility for learning on the part of the student (Cizek, 2010).
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51 Therefore, a strong connection should be developed among assessment, learning and
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53 teaching (Baird, Andrich, Hopfenbeck & Stobart, 2017; Black, 2015; Black & Wiliam,
54
55 2018). Studies on assessment for learning have been conducted from students',
56
57 teachers' and theoretical perspectives (e.g., Bennett, 2011; Black & Wiliam, 1998b,
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1
2
3 2009; Brown, Kennedy, Fok, Chan & Yu, 2009; Carless, 2005; Elwood, 2006; Holmes,
4
5 2015).

6
7 To achieve the goals of assessment for learning, the learner should perceive a
8
9 gap between the desired goal and his or her present state (Black & Wiliam, 1998b).
10
11 Teachers should engineer effective classroom discussion and other learning tasks to
12
13 elicit evidence of students' understanding, and to develop the capacity of students to
14
15 clarify and share their learning intentions and criteria for success (Black & Wiliam,
16
17 1998b, 2009). Feedback, either from the students themselves, their peers, or their
18
19 teachers, should then be provided to move learners forward. With the knowledge of the
20
21 gap in their learning, students should take actions to close the gap in order to attain the
22
23 desired goal (Black & Wiliam, 1998b). This can be assisted by activating students as
24
25 instructional resources for one another and as owners of their learning using peer
26
27 assessment (Black & Wiliam, 2009; Leahy, Lyon, Thompson & Wiliam, 2005; Wylie &
28
29 Lyon, 2015). The benefits of peer assessment in enhancing learning, particularly in
30
31 higher education institutions have been well documented in the literature (Topping,
32
33 1998).

41 *Peer Assessment in Academic Writing*

42
43 Topping (2009, p. 20) defined peer assessment as 'an arrangement for learners to
44
45 consider and specify the level, value, or quality of a product or performance of other
46
47 equal-status learners'. Students are required to use their knowledge and skills to review,
48
49 clarify, and correct the work of others (Ballantyne, Hughes & Myloanas, 2002). Peer
50
51 assessment can force students to reflect on assessment tasks, pay greater attention to
52
53 what factors lead to a good or poor assignment. As a consequence, in subsequent tasks,
54
55 students may demonstrate a better understanding and greater confidence and produce
56
57 better quality work (Dochy, Segers & Sluijsmans, 1999; Mowl & Pain, 1995; Topping
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2
3 et al., 2000). Recent studies highlighted that students learn more from providing peer
4
5 feedback than receiving it (Cho & Cho, 2011; Nicol, Thomson & Breslin, 2014;
6
7 Walker, 2015) and peer feedback without marks helps remove discomfort and enhance
8
9 its effectiveness (Jackson & Marks, 2016; Nicol et al., 2014; Patton, 2012). With its
10
11 ability to enhance learning gains, peer assessment has been commonly used in the
12
13 training of academic writing skills. Various studies have reported that students'
14
15 performance was generally improved (Cartney's, 2010; Gielen, Peeters, Dochy,
16
17 Onghena & Struyven, 2010; Guilford, 2001; Lu & Bol, 2007; Topping et al., 2000;
18
19 Venables & Summit, 2003; Xiao & Lucking, 2008).

24 25 ***Challenges in the Implementation of Peer Assessment***

26 27 *Students' Competence and Peer Pressure*

28
29 Notwithstanding the many advantages of using peer assessment in learning, and
30
31 particularly in improving academic writing, have been identified, we need to address
32
33 some challenges in its implementation. Two commonly mentioned challenges are the
34
35 concerns about students' competence to carry out peer assessment and the pressure from
36
37 peers that arises during the peer assessment process. Students may lack the ability to
38
39 assess peers' work due to their limited and informal assessment training and lack of
40
41 knowledge, content expertise, and experience (Hanrahan & Isaacs, 2001; Sluijsmans,
42
43 Brand-Gruwel and van Merriënboer, 2002). Students may also have different
44
45 interpretations of assessment criteria (Poon, McNaught, Lam & Kwan, 2009). Students
46
47 may have to withstand peer pressure and consider their friendships and relationships
48
49 with peers in their assessment (Gennip, Segers & Tillema, 2009), which may make
50
51 them less objective and make it hard for them to avoid any personal prejudice (Brindley
52
53 & Scoffield, 1998; Cartney, 2010; Cheng & Warren, 1997; Daniels & Magarey, 2000;
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3 Rees, Sheard & McPherson, 2002). All of these challenges make it difficult to
4
5 implement peer assessment pedagogy to enhance students' learning effectively. To deal
6
7 with the challenge of students' competence, a teacher usually provide training on
8
9 assessment to equip students with assessment skills. In addition, the arrangement of
10
11 multiple assessors to carry out reciprocal peer assessment on an essay on the same topic
12
13 can also improve the quality of peer assessment. To alleviate peer pressure in the peer
14
15 assessment process, the provision of an anonymous peer assessment setting is a strategy
16
17 which can facilitate students to provide more critical feedback (Guilford, 2001; Lu &
18
19 Bol, 2007; Vanderhoven, Raes, Montrieux & Rotsaert, 2015).

24 25 *Students' Attitude in Peer Assessment Process*

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27
28 Apart from the challenges of students' competence in peer assessment and peer
29
30 pressure, another challenge which is not commonly addressed by researchers is
31
32 students' attitude in the peer assessment process. In previous studies, students' overall
33
34 attitudes towards peer assessment were frequently reported as one of the research results
35
36 (Chen, 2010; Cheng & Warren, 1997; Hanrahan & Isaacs, 2001; Li & Steckelberg,
37
38 2004; O'Shea, Baker & Allen, 2007; Sluijsmans et al., 2002; Smith, Cooper &
39
40 Lancaster, 2002; Venables & Summit, 2003; Vickerman, 2009; Wen & Tsai, 2006;
41
42 Xiao & Lucking, 2008; Zou, Schunn, Wang & Zhang, 2017). The opinions of the
43
44 students/participants were usually surveyed at the end of a peer assessment. However,
45
46 none of these studies seemed to have elaborated on students' attitude during the
47
48 assessment process.

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52
53 Learning is an active, generative, and effortful process, and good learning
54
55 requires students to adopt a mindful approach. Engagement refers to commitment,
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57 participation and effortful involvement in learning (Henrie, Halverson & Graham,
58
59 2015). Students' learning effectiveness was good only if they were highly motivated in
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1
2
3 peer assessment activities (Lin, Liu & Yuan, 2001). However, it cannot be assumed
4 that students will always behave in an ideal way. Students, as group members, often
5 exert less effort in collaborative tasks with possible causes such as social loafing, the
6 free-rider effect, diffusion of responsibility, and interaction disabilities (Salomon &
7 Globerson, 1989). Placing students in a group and assigning them a task does not
8 guarantee that they will engage in effective and meaningful collaborative learning
9 behaviour (Kollar & Fischer, 2010; Soller, Lesgold, Linton & Goodman, 1999). The
10 reliability and validity of peer assessment can be contaminated by the aforementioned
11 social processes (Topping, 2009). There is evidence that students' emotional state, such
12 as their worries about the seriousness of their fellow students to provide constructive
13 feedback, can negatively affect peer assessment (Cartney, 2010; Cheng & Warren,
14 1997; Shute, 2008; Zhu, 1995). A few studies also stated that students expressed
15 negative comments towards peer assessment (Cheng & Warren, 1997; Topping et al.,
16 2000; Venables & Summit, 2003). The study by Jonsson, Lundahl and Holmgren
17 (2015) clearly stated that it is a challenge to engage students in assessment for learning
18 activities. While the importance of active engagement in the peer assessment process to
19 enhance learning effectiveness has been stressed by many academics (Cheng & Warren,
20 1997; Dixon, Hawe & Parr, 2011; Swaffield, 2011; Topping et al., 2000; Wever, Keer,
21 Schellens & Valcke, 2011; Xiao & Lucking, 2008), it appears that these studies did not
22 elaborate on or offer any solution on how to encourage students to be more active and
23 serious. There are only a few studies that have attempted to improve students' attitude
24 in the peer assessment process by requesting students to give feedback on peer feedback
25 (Kim, 2009), assess peers' performance within a group (Weaver & Esposto, 2012) and
26 assess peers in an anonymous setting (Guilford, 2001; Li, 2017; Lu & Bol, 2007).
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3 The effectiveness of peer assessment may vary, depending very much on
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5 students' attitude in the peer assessment process. The critical issue, therefore, is how
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7 students can be motivated using certain strategies with sound underpinning theories of
8
9 attitudes and attitude change so that students get engaged from the very beginning of the
10
11 peer assessment process.
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14 15 16 *Attitudes and Attitude Change* 17

18
19 Motivating students for the assessment process means, in essence, dealing with
20
21 students' attitudes towards learning. Attitude is defined as 'a relatively enduring
22
23 organisation of beliefs about an object or situation predisposing one to respond in some
24
25 preferential manner' (Rokeach, 1996, p. 530). Attitude change refers to a change in
26
27 predisposition. The change is 'either a change in the organisation or structure of beliefs
28
29 or a change in the content of one or more of the beliefs entering into the attitude
30
31 organisation' (Rokeach, 1996, p. 530). A person's attitude towards a particular object
32
33 or issue may influence his or her behaviour towards the object or issue (Olson & Zanna,
34
35 1993). Research has demonstrated that attitude and behaviour are correlated (Fishbein
36
37 & Ajzen, 1974; Bohner & Wanke, 2002).
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41
42 In addition to exploring the possible change in the attitude of students due to
43
44 intervention strategies, it is also important to understand the level of attitude change,
45
46 that is, whether a change is superficial or deeper and more lasting. In this respect,
47
48 Kelman (1958) suggested three processes of attitude change: compliance, identification,
49
50 and internalisation. The attitude change of compliance is a relatively superficial type of
51
52 change. The person adopts the induced behaviour with two main purposes: to gain
53
54 specific rewards or approval and avoid specific punishments or disapproval by
55
56 conforming. The change in attitude is not because the person agrees with the
57
58 underlying reasons or rationales; rather, the behaviour comes from the external demands
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3 of a specific setting. The accepted behaviour is manifested only under surveillance by
4 the influencing agent. Another process of attitude change is identification. It occurs
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6
7 ‘when an individual accepts influence because he wants to establish or maintain a
8
9 satisfying self-defining relationship to another person or a group’ (p. 53). The person
10
11 would like to see himself or herself as being similar to others or enacting a role
12
13 reciprocal to that of other people. The induced behaviour will continue only if a mutual
14
15 relationship is maintained. As a reasonable inference, the depth of attitude change of
16
17 identification can be regarded as relatively superficial since it depends largely on
18
19 external sources. The third attitude change process is internalisation. It occurs ‘when
20
21 an individual accepts influence because the content of the induced behaviour, the ideas
22
23 and actions of which it is composed, is intrinsically rewarding’ (p. 53). The induced
24
25 behaviour is useful for the solution of a problem, or it may be congenial to the
26
27 individual’s needs. The power of the influencing agent is based on its credibility, that
28
29 is, its expertness, trustworthiness, and underlying ideology. The induced response is
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31 performed under the condition of the relevance values of the issue, regardless of the
32
33 surveillance or the salience relationship of the influencing agent. Attitude change in the
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35 form of internalisation can be regarded as change at a deeper level and a more lasting
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37 change.
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45 Based on the rationale discussed above, this study applied an interactive peer
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47 assessment strategy which comprises nine instructional components (elaborated in
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49 Research Procedure) to engage students in the peer assessment process for learning
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51 academic writing skills. It aimed to address the following two research questions. The
52
53 theoretical framework of this study is illustrated in Figure 1.
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56 What are the impacts of the different components of the interactive peer
57
58 assessment on the level of attitude change in the students’ learning process?
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3 To what extent does the interactive peer assessment help produce higher-quality
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5 group reports?
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8 [Insert Figure 1 here]
9
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11 Figure 1. Theoretical framework of the study (Component (1) - (9) are elaborated in
12
13 Research Procedure)
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16 **Research Methodology**

17

18 *Context of the Study*

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21
22 The first author is a teacher trainer to train pre-service and in-service teachers. This
23
24 study was implemented in the Information Technology in Education course taught by
25
26 the first author. Four classes of first-year students who were studying for the Higher
27
28 Diploma in Early Childhood Education programme (class size of about 40; a total of
29
30 153 students, 148 females and 5 males) were invited to participate in the study. After
31
32 graduation, the majority of them would become nursery teachers in Hong Kong. Two
33
34 major objectives of the course are to explore the role of information technology in early
35
36 childhood education and to enhance students' academic writing skills. Students were
37
38 required to critically discuss some controversial issues related to using information
39
40 technology in early childhood education and to submit group reports in Chinese (their
41
42 first language) for assessment. This represented 50% of their overall assessment of the
43
44 course. The three controversial issues listed below were given to the students for
45
46 critical discussion. In each class, the students were divided into six groups, and two
47
48 groups were assigned to discuss one of the issues on an interactive wiki platform. In
49
50 other words, a total of eight groups of students wrote on one topic, so there were 24
51
52 reports in total.
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59 The following controversial issues were given to the students for discussion.
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- (1) A child's development in terms of creative thinking capability is inhibited by using information and communication technology.
- (2) A child's development in terms of social communication ability is inhibited by using information and communication technology.
- (3) Children are not secure when using the Internet.

Research Procedure

We are interested in exploring the impact of the interactive peer assessment on the students' attitude in the process and the improvement of their reports. The study included two phases, the peer assessment preparation phase and the peer assessment implementation phase. If no support was given to students, they might just use their own criteria to assess peers' work (Tsivitanidou, Zacharia & Hovardas, 2011).

Research has confirmed that domain-specific accuracy and peer-assessment accuracy during learning could be improved by the provision of respective scaffoldings (Konings, Zundert & Merrienboer, 2019). The peer assessment preparation phase was, therefore, included, and it lasted for seven weeks. It aimed to help the students develop the necessary content knowledge for the writing task, understand the assessment criteria, prepare a draft group report, and develop peer assessment skills.

The peer assessment implementation phase lasted for six weeks and included a number of interactions between the students in the process of reciprocal peer assessment within an online wiki environment (Figure 2). Web-based platforms have been identified as a technical tool which is able to facilitate assessment processes (Wen & Tsai, 2006). Peer assessment in an online environment allows students to carry out assessment activities which transcend the restrictions of time and physical location. Students can participate in online peer assessment anytime, anywhere. The online environment also makes an anonymous setting relatively easier to implement. In

1
2
3 addition, a teacher is able to monitor students' performance during the assessment
4 process using a web-based platform. In particular, wikis, which have the potential
5 benefit of facilitating online collaborative learning, have been used as a learning
6 environment for peer assessment activities (Ng, 2013; Ng, 2016; Ng et al., 2018;
7 O'Shea et al., 2007; Wever et al., 2011; Xiao & Lucking, 2008). It has become a
8 common activity in higher educational settings to develop writing skills in a wiki
9 environment (Trentin, 2009; Wichmann & Rummel, 2013).

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20 [Insert Figure 2 here]

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24 Figure 2. The process of the interactive peer assessment

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26
27 The interactive peer assessment was a teaching strategy package consisting of
28 nine components. Since students might consider online interaction less personal and
29 they might initiate inappropriate behaviours due to the physical absence of the person in
30 the exchange, a set of policies was required to instruct learners (Toprak, Ozkanal, Aydin
31 & Kaya, 2010). The first component was, therefore, to request students to (1) comply
32 with a code of ethics for online discussion. The second component was to request
33 students to (2) create an open record of their personal participation in online learning.
34 The underlying reason was that students were often more engaged in their work in the
35 process if they knew that their performance was closely monitored by the lecturer and
36 their peers (Caballe, Juan & Xhafa, 2008; Wang, 2010). On the other hand, the students
37 were required to (3) serve the dual role of assessor and assessee, as research (Gielen &
38 Wever, 2015) stated that the quality of both peer feedback and the final product could
39 be improved as a result of this instructional design. Another component of the
40 Interactive Peer Assessment was to request students to (4) provide feedback on peers'
41 feedback, as this practice could promote task engagement, enhance reviewers'

1
2
3 capability and reflective awareness (Lee, 2015). To help students to provide more
4
5 critical feedback, the researcher included another component to arrange students to (5)
6
7 assess peers' reports in an anonymous setting similar to the studies by Lu and Bol
8
9 (2007), and Vanderhoven's team (2015). In addition, students were more engaged in
10
11 the learning tasks if their performance counted towards their overall grades (Lizzio &
12
13 Wilson, 2013). Therefore, the students in this study were informed at the start of the
14
15 peer assessment activities that (6) both the draft and final reports were to be assessed by
16
17 the lecturer, (7) higher marks would be given for the provision of constructive feedback
18
19 that was subsequently adopted by peers and (8) higher marks would be given for the
20
21 adoption of constructive feedback. Furthermore, the students were arranged to (9)
22
23 engage in peer interactions on multiple occasions, as collaborative interactions with
24
25 peer students were important to enhance learning (Jung et al., 2002; Swan, 2001). All
26
27 these instructional components aimed to provoke either compliance, identification, or
28
29 internalisation attitude change (as suggested by Kelman (1958)) in the students during
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31 the learning process.
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40 In the process, each group reviewed two reports on the topic the same as their
41
42 own. In other words, each group worked with two other groups on the same topic. The
43
44 two groups they worked with were from other classes. Informed by the model and
45
46 methods of feedback in the writing process suggested by Keh (1990), students were
47
48 required to assess the content, organisation and presentation, and use of references by
49
50 giving a mark in the range of 1 (unsatisfactory) to 8 (very good) for each aspect. Data
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52 were collected during the process using the wiki platform and at the end of the project
53
54 using a questionnaire. The questionnaire was adapted from that by Falchikov (1986).
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Analysis of Data Collected by the Questionnaire

The questionnaire aimed to understand the participants' views and their experiences on the peer assessment process more generally. In this paper, we report the findings of the thematic analysis of the participants' responses to the open-ended questions which can provide a glimpse of their attitude change. According to Guest and his colleagues (2012), thematic analysis is a commonly used method of analysis in qualitative research. It focuses on identifying and describing both implicit and explicit ideas with the data. The analytical process requires involvement and interpretation of the researcher. In this study, the researchers started to analyse the comments collected from the questionnaire using an inductive approach to identify and examine themes. A theme is regarded as a unit of meaning that is observed in the data by a reader of the text. The emerged themes were then analysed using a deductive approach. The researchers interpreted the emerged themes and classified them into different categories of attitude change suggested by Kelman (1958). The results from the inductive and deductive thematic analyses were reported as evidence of the students' change of attitudes towards peer assessment.

In this study, the questionnaire asked the students to express whether they were affected by each component of the interactive peer assessment in the process and in what ways they were affected. The following is a sample question.

At the beginning of the course, students were briefed and invited to agree and comply with the "Code of Ethics for Online Discussion".

Did this arrangement influence you in the peer assessment process? Yes / No

If Yes, in what way(s)?

The researcher interpreted students' comments using an inductive approach to explore different themes, such as more serious in the peer assessment process and more

1
2
3 respectful to fellow students. Since this study focused on students' attitude change in
4 the peer assessment process, the researcher then interpreted the nature of these themes
5 using a deductive approach to examine whether it fell into any one of the three main
6 categories of attitude change of "Compliance", "Identification" and "Internalization"
7 suggested by Kelman (1958).
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19 For elaboration, some typical responses of the sample question, and the
20 respective emerging themes and attitude change are listed in Table 1.
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24 Table 1. Typical responses given by the students and the respective emerging themes
25 and attitude change.
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28 [Insert Table 1 here]
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33 Analysis of Data Collected by the Wiki Platform 34

35 To provide triangulation of results, the researcher extracted the contents created
36 by the students on the wiki pages for analysis. In Stage 1 of peer assessment (refer to
37 Figure 2), we verified whether the students were willing to provide qualitative
38 comments to justify the assessment marks. It is reasonable to infer that the students
39 who are willing to provide qualitative comments instead of simply giving marks are
40 more serious in the assessment process. In Stage 2, each group assessed peers in the
41 aspect of the reasonableness of assessment, the usefulness of feedback and seriousness
42 of attitude. We computed the descriptive statistics and conducted a one-sample
43 Wilcoxon signed rank test on the data to support the findings of attitude change due to
44 compliance and identification. In Stage 3, each group reviewed the authors' responses
45 to the provided feedback. We checked how many groups expressed their gratitude if
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3 their comments were accepted. It supports the attitude change due to identification. In
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5 Stage 4, we reviewed how many pieces of constructive comments were finally adopted
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7 to improve the final reports. This result strengthens the findings of attitude change due
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9 to compliance and identification. In Stage 5, we checked whether the students were still
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11 willing to provide both marks and comments even though it was the end of the peer
12
13 assessment process. This information supports the attitude change due to
14
15 internalisation. Moreover, the assessment marks given by students to peer draft, and
16
17 final group reports were analysed to identify if there is any improvement in the quality
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19 of the reports. We verified the actual increment of assessment marks and also
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21 conducted a related-samples Wilcoxon signed rank test to confirm its significant
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23 improvement.
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32 **Results**

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34 To explore the impact of the interactive peer assessment on students' attitude, the
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36 researcher analysed the data collected from the questionnaires and the wiki platform.
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38 One hundred and fifty-three students participated in this study, and a total of 145
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40 students completed the questionnaires, giving a response rate of about 95%.
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45 *The impact of the different components on attitude change*

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49 The overall results of the thematic analysis of the participants' responses to the
50
51 open-ended questions are listed in Table 2. It is followed by the interpretation of
52
53 attitude change provoked by the respective components. As shown in the table, the
54
55 percentage of students affected (indicated Yes in the question) by various components
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57 ranged from 63% to 96%.
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3 Table 2. The impact on the students by various components of the interactive peer
4 assessment strategy.
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7 [Insert Table 2 here]
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10 11 *Comply with Code of Ethics for Online Discussion*

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14 The code of ethics for online discussion encouraged students to respect their peers. It
15 also informed students that the lecturer would review the contents on the online
16 platform from time to time. The students expressed that they became seriously and
17 actively involved in the peer assessment process. This information suggests that the
18 attitude change of compliance happened among students since they were under
19 surveillance by the lecturer, who had greater power. Students also reported that they
20 became more respectful to fellow students, which can be regarded as supporting
21 evidence of the attitude change of identification, which involves establishing and
22 maintaining the desired relationship with others.
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36 37 *Create an Open Record of Personal Participation in Online Learning*

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39 In the early stage of the course, each student was requested to create a page on the wiki
40 platform to record personal participation. The students responded that they participated
41 in the learning process more due to the request to record personal participation. Since
42 both the lecturer and fellow students within the group could review the participation
43 record, the students reported that they participated more in the online learning process,
44 which can be interpreted as the effect of the attitude change of compliance. The
45 students demonstrated better behaviour due to the surveillance of the lecturer. On the
46 other hand, it can also be considered as evidence of the attitude change of identification
47 since the students desired to behave as a constructive member within the group to
48 maintain a mutually supportive relationship.
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Serve Dual Role of Assessor and Assessee

In the peer assessment process, the students, in a unit of groups, were required to serve the dual role of assessor and assessee. They acknowledged that they were more serious in the peer assessment process, expected to learn from peer feedback, and respected fellow students more, which is clear evidence of the attitude change. Since they acted the same reciprocal role and desired to maintain a mutually supportive relationship with each other, their behavioural changes can be interpreted as the effect of attitude change of identification.

Feedback on Peers' Feedback

During the peer assessment process, the students were required to provide feedback on peers' feedback, and they were informed of this in advance. The degree of the students' seriousness in the peer assessment process, reflected by the quality of the feedback, was assessed by their peers under the feedback on feedback arrangement. They reported that they were more respectful to fellow students and more serious in the peer assessment process. Since the students sought to maintain a mutually supportive relationship with others, these behavioural changes suggested the attitude change of identification.

Assess Peers' Reports in an Anonymous Setting

In the implementation of the peer assessment, the students were requested to assess the reports written by students in other classes. The identification of authors and assessors was removed so as to create an anonymous setting. To a great extent, the students felt more comfortable in providing feedback under this arrangement. They also opined that the quality of feedback was enhanced. As the students served as critical friends by assessing their peers in an anonymous setting to maintain a mutually supportive

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3 relationship, their behavioural changes can be interpreted as an attitude change caused
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5 by identification.
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9 *Knowledge of Lecturer Assessing Draft and Final Reports*

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12 At the beginning of the peer assessment process, the students were informed that their
13
14 draft and final reports would be assessed by the researcher to enable him to understand
15
16 the improvement made after a series of learning activities. Since the students were
17
18 informed in advance, a direct effect was that the students wanted to obtain higher marks
19
20 from the lecturer. The change whereby they behaved more seriously in the peer
21
22 assessment process, looked for better performance, and expected guidance from the
23
24 lecturer can be regarded as typical evidence of attitude change of compliance.
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29 *Knowledge of Higher Marks for the Provision of Constructive Feedback*

31
32 At the beginning of the peer assessment phase, the students were informed that the
33
34 lecturer would be rewarding the provision of constructive feedback that was
35
36 subsequently adopted by peers by giving a higher mark of participation. The weighting
37
38 of the mark of participation in peer assessment counted 30% of their overall assessment
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40 on the course. Results suggest that some behavioural changes were brought about by
41
42 the attitude change of compliance since the students wanted to obtain higher marks: for
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44 example, they became more serious in the peer assessment process and more willing to
45
46 provide feedback. On the other hand, since the adoption of constructive feedback could
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48 generate higher marks of participation for their peers, the students were more willing to
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50 improve their reports by accepting feedback. They did this to recognise their peers'
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52 serious attitude to maintain a mutually beneficial relationship with others.
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Knowledge of Higher Marks for the Adoption of Constructive Feedback

After the students assessed the draft group reports, they were required to consider their peers' feedback when revising their reports. The students were asked to make a list of feedback that they adopted in their revisions of the report. The students were informed that there was potential for receiving higher marks of participation if constructive peer feedback is adopted to revise the group reports. As shown in Table 2, the students' behaviours were affected by the attitude change of compliance as they wanted to receive higher marks from the lecturer. They expressed that they were more serious in the peer assessment process and more willing to accept feedback. They also considered that the arrangement encouraged students to improve their performance. At the same time, the adoption of constructive feedback could give a message of recognition to their peers for their efforts and further generate higher marks for their peers. Students might also change their attitude and behaviours due to identification to maintain a mutually beneficial relationship.

Engage in Peer Interactions on Multiple Occasions

During the interactive peer assessment, the students were required to engage in peer interactions on multiple occasions. Students considered that the interactive design contributed to their learning and made them more serious in the peer assessment process. They also expressed that interaction promoted self-reflection. It suggests that students, to a certain extent, had internalised the value of peer assessment and considered peer assessment was intrinsically beneficial to their learning.

Triangulation of results with data from the wiki platform

To provide triangulation of results, we examined students' actual performance by analysing the data recorded in the wiki platform. In Stage 1 of peer assessment (refer to

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2
3 Figure 2), all the groups provided qualitative comments together with the assessment
4 marks. This suggests that the students were willing to participate in peer assessment
5 with serious attitude. This evidence supports the attitude changes happened due to
6 compliance and identification.
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12 In Stage 2 peer assessment, students in a unit of groups were required to give
13 feedback on peer feedback. They were required to answer the following three
14 questions.
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20 Do you agree that the marks given by peers for the group report are reasonable?

21 Unreasonably Low | Reasonable | Unreasonably High
22
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24

25 Do you agree that the comments provided by peers are useful to improve your
26 group report?
27

28 (0 Marks: Not useful at all; 10 Marks: Highly useful)
29
30

31 Do you agree that your peers seriously assessed your draft group report?
32

33 (0 Marks: Not serious at all; 10 Marks: Very serious)
34
35

36 About 73% of groups considered the assessment marks given by their peers to be
37 reasonable. For question 2 and 3, the mean and standard deviation were 6.2 and 1.1, 6.9
38 and 1.6, respectively. A one-sample Wilcoxon signed rank test was carried out on the
39 test value of 5, the mid-value of the range, for both question 2 and 3. Significant results
40 were found which indicated that the median value was significantly different from the
41 midpoint of the range. This suggested that students considered the qualitative feedback
42 provided by their peers positive and useful for improving their reports, and their peers
43 were serious in the peer assessment process. These results further support the findings
44 obtained from the questionnaires that different components, such as complying with the
45 code of ethics for online discussion, performing the dual role of assessor and assessee,
46 providing feedback on peer feedback, and assessing peer reports in an anonymous
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3 setting, enabled the students to engage more seriously in the process and they thereby
4 provided better quality feedback. It augmented the evidence of attitude changes in
5 compliance and identification demonstrated by the students.
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10 In Stage 3 of the peer assessment implementation phase, the students were
11 required to review and respond to the authors' responses to the feedback provided.
12 Since some authors expressed their acceptance of feedback in Stage 2, many students in
13 this stage expressed their appreciation to the authors: typical feedback was "thank you
14 for accepting our feedback". A total of 24 groups were formed in four classes, and each
15 group was required to assess two peer reports. In this arrangement, a total of 48
16 concurrent units of peer assessment occurred in the process. In 33 (69%) units of peer
17 assessment, the students as a group explicitly expressed their appreciation after their
18 comments were accepted by authors. The fact that the students felt satisfied and
19 expressed their appreciation to their peers provides good supporting evidence of their
20 change in attitude due to identification.
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35 In Stage 4, about 81% of constructive qualitative feedback provided was
36 eventually adopted to improve the final reports. The high percentage of feedback
37 adopted can be interpreted as evidence of the attitude changes of compliance that aimed
38 to get reward and identification to maintain a mutually beneficial relationship.
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44 In Stage 5, all the groups were willing to provide assessment marks and
45 qualitative feedback. It had come to the end of the peer assessment, and it was no
46 longer important to maintain a mutually supportive relationship. However, the students
47 were still willing to make an effort in assessing their peers' reports with qualitative
48 feedback. This evidence, to a certain extent, reflects that the students had internalised
49 the value of peer assessment in enhancing their learning effectiveness.
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3 As reflected in the results, the majority of the students were influenced by
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5 different instructional components of the strategy. Results suggested that their
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7 engagement in the peer assessment process was improved mainly as a result of (a) the
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9 attitude change of compliance, through which they aimed to obtain rewards of getting
10
11 higher marks, and (b) the attitude change of identification, through which they hoped to
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13 establish and maintain a mutually supportive and beneficial relationship with others. At
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15 the end of the peer assessment process, a certain level of attitude change in terms of
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17 internalisation also occurred.
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Results on the effect of interactive peer assessment on the quality of the group reports

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27 In order to examine the impact of the interactive peer assessment on improving
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29 students' group reports, the marks given by the students to the final report were
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31 compared with those given to the draft report. **Results from the related-samples**
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33 **Wilcoxon signed rank test showed that there were statistically significant increases in**
34
35 **the peer assessment marks given to all three aspects, the content, organisation and**
36
37 **presentation, and use of references.** The mean marks, in the range from 1 to 8,
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39 increased from 3.76 to 5.67 in content, from 4.16 to 5.81 in organisation and
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41 presentation, and from 3.14 to 5.73 in the use of references. To combine all three
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43 aspects for analysis, significant overall improvement was also found. It suggests that
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45 after the students identified improvements in peers' final report on the basis of their
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47 constructive feedback, they were willing to give a higher mark to recognise peers
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49 improvement.
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Discussion and Conclusions

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59 This research explored the impact of interactive peer assessment on students' attitudes
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3 in the learning process and their learning outcomes in terms of academic writing. We
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5 did not do a self-report questionnaire to measure the participants' views of peer
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7 assessment prior to the implementation of our peer assessment strategy because most of
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9 the students were not familiar with peer assessment. In the Hong Kong education
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11 system, peer assessment in secondary school, and even in higher education, is rarely
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13 used (Keppell & Carless 2006). In this study, all the participants were the students who
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15 took the same course taught by the first author. The duration of this study covered the
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17 whole period of the course. From the perspective of research ethics, all students should
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19 undergo the same learning experience without any loss due to the implementation of
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21 research. Therefore, we did not include any control group for fear that it might have
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23 deprived some students of learning opportunities if we had adopted an experiment-
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25 control group design.
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31 According to the theoretical framework, students were expected to be more
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33 engaged in the learning process under the intervention of interactive peer assessment.
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35 As shown in the results, the students became more serious and wanted to improve their
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37 group reports due to their desire to obtain higher marks from the lecturer. The students
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39 also participated more under surveillance by the lecturer. These results are consistent
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41 with the theory of the attitude change of compliance suggested by Kelman (1958). It
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43 also strengthens the findings in previous studies (Caballe et al., 2008; Wang 2010) that
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45 once students knew that their performance was closely monitored by the teacher, they
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47 were often more engaged in their work with higher participation and contribution in the
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49 process.
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55 The component of feedback on peer feedback in this study made students more
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57 serious in the peer assessment process. The result was similar to Kim's (2009) study
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59 that students would have higher metacognitive awareness in their learning process,
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3 better performance and greater motivation towards the peer assessment if they were
4 requested to feedback on peer feedback. On the other hand, since the adoption of
5 constructive feedback would enable peers to obtain higher marks from the lecturer, the
6 results show that the students were more willing to adopt feedback so as to maintain a
7 mutually beneficial relationship due to attitude change of identification. The
8 behavioural pattern was consistent with the study by Walker (2015) that students'
9 attitude was a critical factor to adopt peer feedback. If students considered peers'
10 feedback useful and positive, they would have a more positive perception of peer
11 assessment (Kaufman & Schunn, 2011). At the same time, it also aligns with the
12 finding of previous studies (Gielen et al., 2010; Mulder, Baik, Naylor & Pearce, 2014)
13 that performance improvement is related to the critical attitude of the assessee towards
14 peer feedback.

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31 Regarding the interactive feature of the strategy, the students agreed that it had a
32 positive impact on various aspects of their learning. Evidence from the wiki platform
33 also demonstrated that the students were willing to participate in the learning activities
34 even though they had come to the final stage of the peer assessment. Therefore, it can
35 be argued that the students had, to a certain extent, internalised the value of the peer
36 assessment for improving their learning. This finding echoes the observation by Rust
37 (2007) and Swan (2001) that active discussion among course participants significantly
38 influences students' satisfaction and perceived learning in a positive way. This
39 argument also aligns with the opinion of Jung and his colleagues (2002) that
40 collaborative interactions with peer students are important in enhancing learning, and
41 Kollar and Fischer (2010) that peer assessment should be implemented in a more
42 interactive way. From a broader perspective, the interactive peer assessment in this
43 study promoted learning by social interaction. Students learned by negotiating and
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3 collaborating with others with the underpinning rationale of sociocultural and
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5 constructivist perspectives of learning suggested by Vygotsky (1978).
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10 Students' academic writing skills were improved with the intervention of
11
12 interactive peer assessment in this study. It further confirmed the effectiveness of peer
13
14 assessment in improving academic writing skills in higher education reported in
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16 previous studies (Cartney's, 2010; Guilford, 2001; Lu & Bol, 2007; Topping, Smith,
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18 Swanson & Elliot, 2000; Venables & Summit, 2003; Xiao & Lucking, 2008). It also
19
20 strengthens the findings from Zundert, and his colleagues (2010) on the development of
21
22 domain-specific skills benefits from revisions during peer assessment. Particularly, a
23
24 wiki platform was used as a tool to mediate the learning process. Similar to previous
25
26 studies that used a wiki environment for training academic writing in higher education
27
28 (Trentin, 2009; Wichmann & Rummel, 2013), multiple users were allowed to create
29
30 content and share knowledge online collaboratively in a constructionist approach
31
32 (Timmis, Broadfoot, Sutherland & Oldfield, 2015). The transparency feature of wiki
33
34 facilitated surveillance from the lecturer and peers within the group, and it provoked
35
36 attitude change of compliance. Results of actual improvement of students' reports
37
38 suggest that a wiki environment was able to facilitate and add value to the peer
39
40 assessment process.
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47 From a holistic perspective, results suggest students' attitude was positively
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49 affected in the form of compliance, identification and internalisation by different
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51 components of the teaching/assessment strategy. The students demonstrated a good
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53 attitude in the learning process and obtained improvement on the quality of their group
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55 reports. The results align with those of Lin, Liu, and Yuan (2001), who found that the
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57 effectiveness of students' learning is good only if they are highly motivated in peer
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3 assessment activities. Previous studies (Chen, 2010; Cheng & Warrant, 1997; Li &
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5 Steckelberg, 2004; O'Shea et al., 2007; Smith et al., 2002; Venables & Summit, 2003;
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7 Vickerman, 2009; Wen & Tsai, 2006; Xiao & Lucking, 2008) frequently explored
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9 students' overall attitude toward peer assessment at the end of the intervention. This
10
11 study contributes to the literature by investigating students' attitude during the whole
12
13 process of peer assessment. It also suggests methods to improve students' attitude
14
15 towards peer assessment.
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19 From the practical point of view, we suggest that teachers could consider the
20
21 impact of different components in our interactive peer assessment model (see Table 2).
22
23 When teachers want to provoke quick attitude change especially at the very beginning
24
25 of the peer assessment process, the appropriate direction is to activate attitude change of
26
27 compliance. These strategies involve offering a reward and creating an environment
28
29 that includes surveillance by others with greater power. However, it should be noted
30
31 that the attitude change of compliance is not enduring. To achieve a more lasting
32
33 positive attitude change, teachers could apply strategies to provoke the attitude change
34
35 of identification which focuses on the desire to establish and maintain a satisfying
36
37 relationship with others. However, it usually takes a relatively long time for the attitude
38
39 change to occur since it takes time to establish the relationship. The ideal situation is
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41 that students would internalise the value of peer assessment in improving their own
42
43 learning. The results of this study confirm that the intentionally inserted interactive
44
45 feature can have the effect of provoking a certain level of attitude change of
46
47 internalisation. The nature of different categories of attitude change and its effective
48
49 period are illustrated in Figure 3. Teachers are therefore advised to obtain an in-depth
50
51 understanding of the attitude changes of compliance, identification, and internalisation
52
53 suggested by Kelman (1958) and to apply the interactive peer assessment components
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3 (see Table 2) to provoke attitude change and to improve the effectiveness of any
4
5 assessment strategies.
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8 [Insert Figure 3 here]
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11 Figure 3. The development and effect of attitude change of compliance, identification
12 and internalisation in the peer assessment process.
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17
18 To advance our understanding of both theories and practices in this area,
19 researchers could conduct similar research with control groups to further evaluate the
20 effectiveness of the interactive peer assessment teaching method. In this study, there is
21 evidence that the students had, to a certain extent, internalised the value of peer
22 assessment in enhancing their learning. However, it is not easy to determine at what
23 stage the internalisation process began. Since the attitude change of internalisation is
24 the most desirable outcome but it is a complex process, it would be valuable to design
25 further research to look into the internalisation process.
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42 commercial, or not-for-profit sectors.
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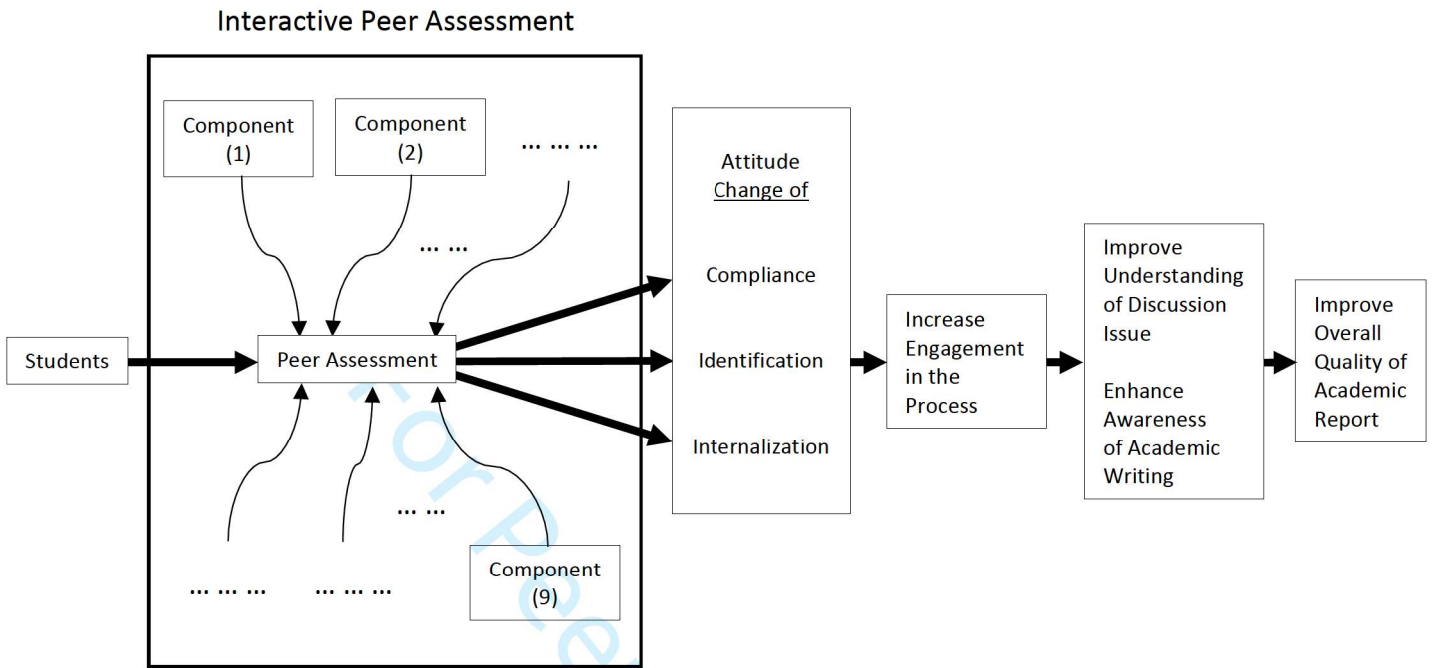


Figure 1. Theoretical framework of the study (Component (1) - (9) are elaborated in Research Procedure)

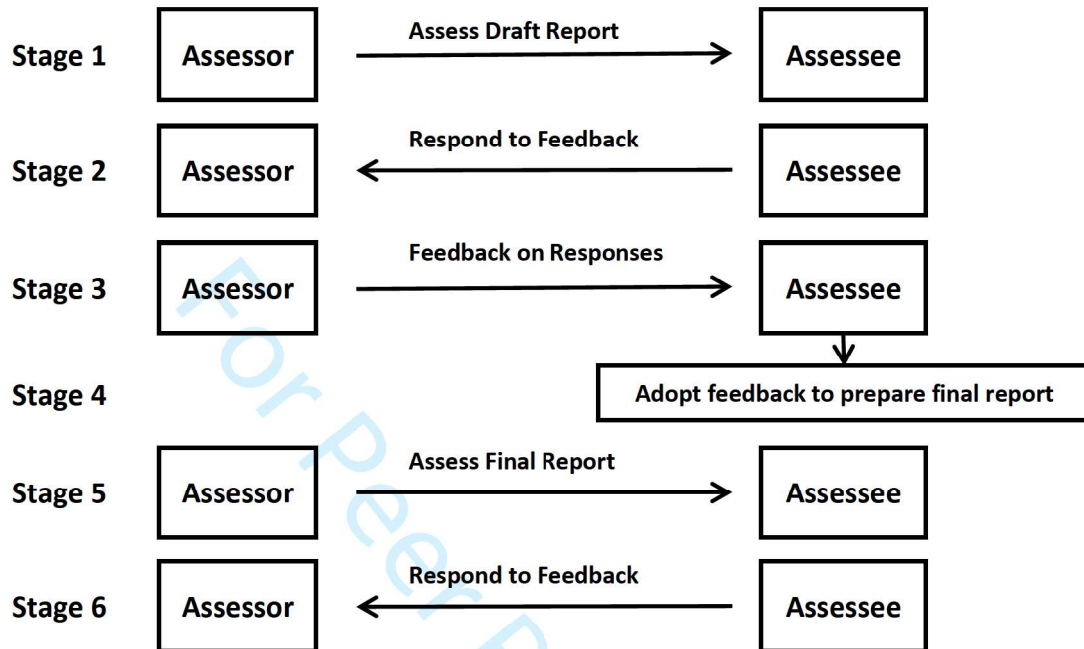
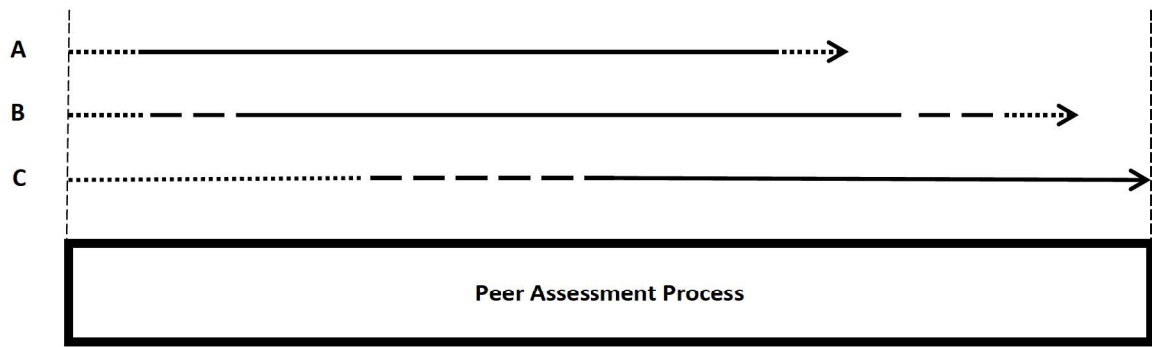


Figure 2. The process of the interactive peer assessment



- A :** **Attitude Change of Compliance**
It takes short time to develop and the desired attitude fades out quickly after removing the intervention component. It is suitable for provoking quick attitude change at the early stage of intervention.
- B :** **Attitude Change of Identification**
It takes longer time to develop and the desired attitude gradually fades out after removing the intervention component. It is suitable for maintaining the desired attitude during the intervention.
- C :** **Attitude Change of Internalization**
It takes a long time to develop and the desired attitude is long lasting. It is suitable for provoking prolonged attitude change.

Figure 3. The development and effect of attitude change of compliance, identification and internalization in peer assessment process.

Table 1. Typical responses given by the students and the respective emerging themes and attitude change.

Component	Typical Response in Questionnaire	Emerged Theme	Attitude Change
Comply with Code of Ethics for Online Discussion	<i>I became more serious to assess peer report and provide appropriate feedback.</i>	More Serious in Peer Assessment Process	Compliance
	<i>It made me more engaged in the peer assessment process.</i>	More Participation in Peer Assessment	
	<i>I was more respectful to peers.</i>	Respect Fellow Students	Identification
	<i>It let me know the importance to respect intellectual property right.</i>	Respect Intellectual Property	(Unclassified)

Table 2. The impact on the students by various components of the interactive peer assessment strategy.

Component	% of Students Affected	Impact	Percentage of Comment	Attitude Change
(1) Comply with Code of Ethics for Online Discussion	78%	More Serious in Peer Assessment Process	47%	Compliance
		More Participation in Peer Assessment	11%	
		Respect Fellow Students	24%	Identification (Unclassified)
		Respect Intellectual Property	4%	
		Others	14%	
(2) Create an Open Record of Personal Participation in Online Learning	63%	More participation in online learning activities	91%	Compliance Identification (Unclassified)
		Less participation in online learning activities	9%	
(3) Serve Dual Role of Assessor and Assessee	72%	More Serious in Peer Assessment Process	41%	Identification
		Expect to Learn from Peer Feedback	19%	
		More Respectful to Fellow Students	8%	
		Promote Self-reflection	18%	(Unclassified)
		Better Understanding of Requirements	3%	
		Others	11%	
(4) Feedback on Peers' Feedback	78%	More Serious in Peer Assessment Process	57%	Identification
		Respect Fellow Students	4%	
		Enhanced Learning Effectiveness	19%	(Unclassified)
		Others	20%	
(5) Assess Peers' Reports in an Anonymous Setting	81%	More Comfortable in Providing Feedback	61%	Identification
		Enhanced Quality of Feedback	33%	
		Others	6%	(Unclassified)
(6) Knowledge of Lecturer Assessing Draft and Final Reports	82%	More Serious in Peer Assessment Process	34%	Compliance
		Look for Better Performance	30%	
		Expect Guidance from Lecturer	15%	
		Better Understanding of Assessment Criteria	4%	(Unclassified)
		Others	17%	
(7) Knowledge of Higher Marks for the Provision of Constructive Feedback	85%	More Serious in Peer Assessment Process	44%	Compliance
		More Willing to Provide Feedback	8%	
		More Willing to Accept Feedback	11%	Identification (Unclassified)
		Wanted to Improve Group Report	10%	
		Serious Attitude was Recognized	10%	
		Others	17%	
(8) Knowledge of Higher Marks for the Adoption of Constructive	86%	More Serious in Peer Assessment Process	46%	Compliance
		Encourage Student to Improve Performance	14%	

Feedback		More Willing to Adopt Feedback	24%	Compliance, Identification
		Others	16%	(Unclassified)
(9) Engage in Peer Interactions on Multiple Occasions	96%	Able to Learn from Others	29%	Internalization
		Interaction Enhanced Learning	25%	
		Enhanced Learning Effectiveness	11%	
		Promote Self-reflection	11%	
		Serious Participation in Peer Assessment	9%	
		Others	15%	(Unclassified)

For Peer Review Only

Response to Reviewers' Comments

Title : Students' Attitude to Peer Assessment Process: A Critical Factor for Success

Paper ID : NILE-2019-0344

We would like to thank the editor and reviewers for their constructive comments. The manuscript was revised taking every suggestion provided by referees into consideration. This paper was also carefully proofread. Responses to comments are listed below.

Reviewers' Comments	Our Response
I suggest to introduce a research design associated with thematic analysis witch you use in your research	We introduced the research design associated with thematic analysis in the section "Analysis of Data Collected by the Questionnaire". Related texts are highlighted in RED.
I will advise testing the normality and based on the results decide if is correct to use parametric test (t-test) non-parametric test.	Thank you for the comment. After testing the normality, we used the non-parametric tests of one-sample Wilcoxon signed rank test and related-samples Wilcoxon signed rank test. Related texts are highlighted in RED in the sections "Analysis of Data Collected by the Wiki Platform" and "Results".