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Effects that Facebook-based Online Peer Assessment with Micro-teaching Videos Can Have on Attitudes toward Peer Assessment and Perceived Learning from Peer Assessment

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The present study investigates the effects that Facebook-based online peer assessment with micro-teaching videos can have on attitudes toward peer assessment and perceived learning from peer assessment. The study recruited a sample of 31 university students who were enrolled in a teacher-training course. Using assessees' micro-teaching videos, the experimental group performed two rounds of online peer assessments targeting teacher performance; by comparison, the control group performed two identical rounds of peer assessment, but without the assessees' micro-teaching videos. The results show that the two groups experienced significantly positive changes in attitudes toward peer assessment over time. Moreover, the experimental group's perceived learning about teaching competency was lower than the control group's after completing the first-round peer assessment, but significantly increased over time. Finally, the open-ended responses show that participants regarded Facebook as a convenient tool for performing peer assessments, but voiced their concerns about Facebook's open and non-anonymous features.

Keywords: online peer assessment, video, attitude toward peer assessment, perceived learning, Facebook

INTRODUCTION

Peer assessment is a widely used instructional strategy (Topping, 1998, 2009) in many different fields and subjects, including teacher training (Al-Barakat & Al-Hassan, 2009; Napoles, 2008; Sluijsmans, Brand-Gruwel, van Merriënboer, &

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Martens, 2004; Sluijsmans, Moerkerke, van Merriënboer, & Dochy, 2001). Pre-service teacher training has prioritized the goal of cultivating pre-service teachers' ability to perform peer assessments (Freese, 1999; Sluijsmans et al., 2001). Once pre-service teachers enter in-service teaching after graduation, they may need to assess their colleagues' teaching performance, to be assessed by colleagues, and to play a role as an assessor in their own classroom. Therefore, it is beneficial for pre-service teachers to learn how to critically assess others' performance and accept criticism from others, as well as to gain experience with different kinds of assessment strategies (Sluijsmans et al., 2004).

Videos, which can capture the richness and complexity of teaching practices in the classroom, play an important role in teacher training (Brophy, 2004). Videos not only enable educators to review their own or peers' teaching performance (Hatton & Smith, 1995), but also serve as a basis on which both peers can provide feedback and educators themselves can reflect about their own performances. Brophy (2004) warned that teachers who aimlessly observe a video documenting teaching may gain no new insight into their own teaching. Hence, he suggested that, in order to transform videos into effective learning tools, educators should use videos in coordination with well-designed learning activities: this coordination should help establish clear goals and objectives with which teachers can analyze their own teaching performance during the video-review exercises. Wu and Kao (2008) have suggested combining videos with online peer assessment. However, little research has addressed the task of assessing either the effectiveness or the efficiency of this combination (Wu & Kao, 2008), even though these topics merit vigorous research efforts.

State of the literature

- Peer assessment helps pre-service teachers improve the quality of their teaching performance and develop abilities to assess teaching and learning.
- When blended with well-designed learning activities, videos can become effective learning tools to support teacher learning.
- Researchers and educators have regarded Facebook as a potential tool for teaching and learning and have requested effective teaching strategies for using Facebook to facilitate learning.

Contribution of this paper to the literature

- The study's findings could help researchers develop a model for an effective combination of online peer assessment and videos via Facebook groups.
- The study found significantly positive shifts in pre-service teachers' attitudes toward peer assessment across time.
- The present study found that the combination of online peer assessment and micro-teaching videos likely enables pre-service teachers to significantly increase their perceived learning about teaching competency over time.

Recently, social-networking sites like Facebook have been growing rapidly and have attracted millions upon millions of users (Socialbakers, 2015), especially young people (Celik, Yurt, & Sahin, 2015). Given the popularity of—and students' familiarity with—Facebook, researchers and educators have regarded it as a potentially powerful tool for teaching and learning and have asked for the development of appropriate teaching strategies that harness social networks' positive application to learning (Joly, 2007; New Media Consortium and EDUCAUSE Learning Initiative, 2008).

Hence, the current study (1) examines the effects that Facebook-based online peer assessment with micro-teaching videos can have on pre-service teachers' attitudes toward peer assessment and perceived learning from peer assessment over time and (2) clarifies learners' opinions about the advantages and disadvantages of using Facebook to support such learning activities. The objective of the study is to provide an effective model for using Facebook in support of online peer assessment with videos.

LITERATURE REVIEW

Online peer assessment

Rooted in social constructivism and cognitive conflict theory (Falchikov & Goldfinch, 2000; Topping, 1998), peer assessment is an instructional strategy by which learners can "consider and specify the level, value, or quality of a product or performance of other equal-status learners" (Topping, 2009, p. 20). In keeping with the aforementioned theoretical perspectives, peer assessment may facilitate joint knowledge construction between assessees and assessors through discourse. Peer assessment may also cause cognitive conflict and lead learners to deal with flaws in cognition when they receive assessors' feedback that differs from their own opinions. Peer assessment often involves the use of qualitative approaches, like textual descriptions or oral statements, as well as quantitative approaches, like numerical scores or ratings. Peer assessment can be implemented for writing, oral presentations, portfolios, exam performances, or other skill performances. Topping (1998) reviewed hundreds of peer-assessment studies and found that peer assessment can facilitate the cognition, meta-cognition, and motivation of university students.

Several researchers have studied the effects of peer assessment on teacher training. For example, Al-Barakat and Al-Hassan (2009) had pre-service teachers observe the teaching performance of peers and carry out post-observation peer assessments. They found that peer assessments (1) helped pre-service teachers better understand their own teaching performance's strengths, weaknesses, and areas of potential improvement, and (2) helped the pre-service teachers develop their own teaching abilities and assessment skills. Similar findings have been reported by KOC (2011), which studied prospective teachers' views on peer assessment after the prospective teachers both viewed peers' teaching performance and completed peer-assessment tasks.

With the development and application of Internet technology, researchers have begun to use Internet technology to assist peer assessment and to investigate online peer assessment (e.g., Liang & Tsai, 2010; Xiao & Lucking, 2008). Online peer assessment not only can permit the occurrence of assessment activities at any time and in any place, but also—by eliminating the uncomfortableness arising from negative face-to-face critiques of peers—can strengthen students' willingness to participate in such activities (Lin, Liu, & Yuan, 2001a). Davies (2000) noticed that students may hold a negative impression of non-anonymous peer assessment because they experience difficulty in openly criticizing their peers or in being openly criticized by peers. However, Lin, Liu, and Yuan (2001a) found that students who engaged in anonymous peer assessment would still hesitate to criticize their peers' performance during online peer assessment. Furthermore, Topping (1998) warned that anonymous peer assessment may create unfair assessments in the form of unjustifiably high or unjustifiably low scores. Regarding such problems, researchers suggested that instructors should clearly discuss assessment criteria with students (Topping, 1998) and pay careful attention to monitoring the assessment process (Tsai, Lin, &Yuan, 2002).

Attitude toward peer assessment

Attitude toward peer assessment has been positively associated with students' achievement performance (Lin, Liu, &Yuan, 2001b), and hence has attracted researchers' attention regarding the promotion of effective peer assessment. Several studies have demonstrated that, on the whole, university students' attitudes toward peer assessment can be positive (e.g., Prins, Sluijsmans, Kirschner, & Strijbos, 2005; Wen & Tsai, 2006). More specifically, Wen, Tsai, and Chang (2006) found that pre-

service teachers held positive attitudes toward peer assessment. However, attitudes toward peer assessment may change over time. Studying a group of in-service teachers who were graduate students, Wen and Tsai (2008) used a three-round online peer-assessment procedure and uncovered evidence that the teachers' attitudes toward peer assessment remained positive from start to finish, but that the positiveness declined over time. Therefore, Cheng and Warren (1997) found that, from before to after a peer assessment task, first-year undergraduate students exhibited an increasingly positive shift in their attitudes toward this grading process.

Videos

Educators have widely adopted videos in the professional training of teachers. Videos that can provide an accurate record of real individuals' teaching performance can enable pre-service teachers to detach themselves from an actual teaching context so that they can attentively review their own or others' teaching performance (Hatton & Smith, 1995). With videos, pre-service teachers can concentrate on a specific teaching dimension by controlling the stop and re-play operation on the videos. Moreover, videos enable peers to share with one another their own teaching experiences and to discuss various teaching-performance issues with one another (Brophy, 2004).

Few studies have extensively discussed the effectiveness and feasibility of applying videos to teacher training (Brophy, 2004; So, Pow, & Hung, 2009; Star & Strickland, 2008). For instance, Zhang, Lundeberg, Koehler, and Eberhardt (2011) explored the promises and challenges of using three types of videos (i.e., published videos, teachers' own videos, and their colleagues' videos) in teacher professional development. In the aforementioned study, in-service teachers used all three types of videos; then, the teachers rated the extent to which the given video helped enhance their reflection on their teaching practices. The study found that teachers rated their own videos as the most useful, followed by colleagues' videos. Moreover, the study discovered that, after observing their own video multiple times and having related discussions with their peers, the in-service teachers could analyze their own teaching from multiple perspectives. Finally, the study found that, by observing peers' videos, the in-service teachers vicariously experienced peers' struggles in teaching, learned teaching strategies from their peers, and gained new insights into their own teaching.

Educational uses of Facebook

Facebook is a social-networking website that requires users' real personal information for registration and that enables users to build their own personal social connections. Facebook offers various interactive features that enable the users to engage in text-based communication with others via walls, inboxes, and chat formats, which in turn permit the sharing of pictures, videos, links, and so on. In addition to giving users the option of establishing personal pages, Facebook users can group their social connections by interest; in this way, the users can establish Facebook groups with different levels of privacy protection. And just as they do on their personal Facebook pages, users can interact with group members on their Facebook group pages.

By taking into account what Facebook can provide its users, researchers have recognized its potential for assisting learning and started to examine the educational uses of Facebook. Several studies have found that university students can open-mindedly treat Facebook as an online learning tool for their academic studies (Kabilan, Ahmad, & Abidin, 2010; Roblyer, McDaniel, Webb, Herman, & Witty, 2010). Moreover, Haverback (2009) observed and monitored an online Facebook group set

up by his students, who discussed their assignments, asked and answered questions, posted messages, and supported each other in the Facebook group. He found that students actively participated in the discussions on Facebook and exhibited an improved understanding of the theories discussed in class. In addition, students could get questions answered sooner via the Facebook group page than via conventional email (but only if a Facebook group member was on Facebook at the time). Kabilan, Ahmad, and Abidin (2010) suggested that instructors should consider using Facebook in coordination with classroom-based learning goals in order to strengthen the overall learning experience.

Perceived learning

Perceived learning has been regarded as "beliefs and feelings one has regarding the learning that has occurred" (Caspi & Blau, 2008, p. 327). Perceived learning is a retrospective self-assessment about how much learners have learned from an educational experience. Rovai and Barnum (2003) recommended that, in their studies, researchers use perceived learning rather than such performance measurements as course grades or test scores. The two researchers based this recommendation on two central arguments: (1) course grades—even when nuanced with references to course participation, late assignments, attendance, and the like—cannot precisely reflect what students have learned; and (2) grades may be unreliable measures of learning when different teachers (on one or more occasions) or even the same teacher (on more than one occasion) may assign different grades to learners for a single performance or for qualitatively identical performances in an authentic task. Horzum, Kaymak, and Gungoren (2015) similarly stated that test scores are notably limited regarding the extent to which they can measure cognitive dimensions of learning. Accordingly, the current study operationalizes learning by using self-reported perceptions of learning.

METHODS

Participants

Using convenience sampling, the study recruited a group of 30 sophomores and 1 senior at a four-year university in Taiwan who had all enrolled in a three-credit-hour contemporary teacher-training course that prepares students to teach adult learners**.** All participants were randomly assigned to either the experimental group (N = 16) or the control group (N = 15). Participants received incentives to complete the surveys.

Experimental procedure

The study was conducted in the final teaching project of the experimental course. All the participants were required to perform two micro-teaching sessions for the final teaching project. More specifically, all the participants before the study were required to choose a teaching topic, develop their lesson plans, and prepare their teaching materials for the final teaching project. The first and second rounds of micro-teaching lasted for five weeks each. During that time, seven or eight participants performed a ten-minute teaching demonstration in the course every week. After performing a ten-minute teaching demonstration, every participant received assessments from three randomly assigned student assessors. The student assessors who received the same treatment as their assessees had to type in written feedback for their corresponding assessees within three days on the course's Facebook group wall.

The study videotaped the micro-teaching of the experimental group and uploaded the micro-teaching video to the Facebook group wall so that the assessors

could review the video during their peer assessment. The experimental group was required to note a precise time range (a beginning time and an ending time) corresponding to every video clip that the assessors critiqued in their comments; in this way, the study ensured that the assessors had actually reviewed their assessees' videos, as required for the peer assessment. Conversely, the study did not videotape the control-group participants' micro-teaching.

Prior to the study, the course instructor established the course's Facebook group page and set it as secret for privacy protection so that nonmembers could neither see nor join the group without an invitation from the Facebook group's current members; indeed, only current members could view the group's posts. In the week before the study, the course instructor provided the participants with an explanation of the peer-assessment process, making specific references to assessment dimensions, criteria, and examples. The dimensions of peer assessments consisted of teaching content, teaching material, teaching media, teaching process and strategy, teacher–student interaction, classroom management and atmosphere, and assessment used in the micro-teaching. The course instructor also demonstrated how to use the course's Facebook group page and asked all the participants to join it.

All participants were asked to complete the surveys prior to the study (Time 1), after the first round of peer assessment (Time 2), and after the second round of peer assessment (Time 3). At Time 1, the study assessed demographic data and attitude toward peer assessment, and collected responses to two open-ended questions. At Time 2 and Time 3, the study measured both attitude toward peer assessment and perceived learning from peer assessment.

Instruments

The study assessed attitude toward peer assessment at Time 1, Time 2, and Time 3. The current study developed the six-item scale on attitude toward peer assessment on the basis of Wen and Tsai (2006) and Tseng (2004) (e.g., "Peer assessment is helpful to my learning," "Peer assessment makes me feel nervous and tense"). For the scale on attitude toward peer assessment, participants were asked to rate the items on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree).

Perceived learning from peer assessment was measured at Time 2 and Time 3. The scale on perceived learning from peer assessment consists of 11 items that the current study modified on the basis of Tsai (2011). The scale focuses on students' perceived learning from peer assessment (e.g., "Overall, peer assessment helps me learn how to teach," "Peers' comments help me understand the strengths of my teaching"). For the scale on perceived learning from peer assessment, participants were asked to rate the items on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree).

At Time 1, participants were asked (1) to provide demographic data and Facebook-experience information and (2) to respond to two open-ended questions addressing personal perceptions of the Facebook group's advantages and disadvantages for supporting peer-assessment.

Data analysis

Data were checked for missing values, outliers, and normality. The values for skewness and kurtosis ranged from -.92 to .74 and -.75 to 1.53 respectively; this indicated that normality in the data could be assumed, as these values were well within the recommended values of -3 to 3 for skewness and -8 to 8 for kurtosis (Kline, 2005). The study used expectation-maximization algorithms to impute missing values for continuous variables. Preliminary analyses involved an

examination of principal component analysis (PCA), Cronbach's alpha coefficients, and descriptive statistics. Further, to the research constructs, the current study applied separate mixed-design repeated-measures analyses of variance (ANOVAs). In this regard, the study used treatment as a between-subjects factor as well as time as a within-subject factor. Finally, the study analyzed—and grouped into similar responses—all of the participants' short responses to open-ended questions that (1) were on-topic and (2) referred at least generally to Facebook's role in peer assessment.

RESULTS

Validity and reliability analyses of the instrument

To investigate the construct validity of the instrument, the current study conducted PCAs with varimax rotation separately for the data on attitude toward peer assessment collected at Time 1 and the data on perceived learning from peer assessment collected at Time 2. For attitude toward peer assessment, the Kaiser-Meyer-Olkin measure of sampling adequacy was .64, exceeding the recommended value of .6 (Hair, Anderson, Tatham, & Black, 1998), and Bartlett's test of sphericity was significant (X^2 (15) = 72.81, p < .05). The PCAs highlighted two components that were labeled as "positive perception of peer assessment" (4 items) and "negative perception of peer assessment" (2 items). The eigenvalues of the first and second components were 2.86 and 1.43, and accounted for 47.63% and 23.89% of variance, respectively. The Cronbach's alpha values for the scale and two sub-scales were .70, .80, and .68, respectively.

For the perceived learning from peer assessment, the Kaiser-Meyer-Olkin measure of sampling adequacy was .78 and Bartlett's test of sphericity was significant (X^2 (55) = 213.30, p < .05). After two cross-loading items were removed, the responses produced two components labeled as "perceived learning from teaching reflection" (6 items) with an eigenvalue of 5.22 and "perceived learning about teaching competency" (3 items) with an eigenvalue of 1.37. The two components accounted for 57.99% and 15.21% of variance, respectively. The Cronbach's alpha values for the scale and two sub-scales were .91, .91, and .86, respectively.

Descriptive statistics

Of the 31 participants, 20 (64.5%) were female students and 11 (35.5%) were male students. And of the 31 participants, 16 (51.6%) had used Facebook for over one year but less than two years; the remaining 15 (48.4%) had used Facebook for over two years. Altogether, 25 (80.6%) participants had used Facebook almost every day during the past six months. Moreover, all of the participants in this study had participated in other Facebook groups previously.

Table 1 presents the mean and standard deviation that were calculated for the two research constructs and their factors for each group across time. On average for both the experimental group and the control group, changes in attitude toward peer assessment were increasingly positive over time. Also for the two groups, positive perception of peer assessment was increasingly positive over time, and negative perception of peer assessment continuously decreased over time. Especially noteworthy is the fact that the experimental group's negative perception of peer assessment was lower than average at Time 3. The experimental group reported higher-than-average levels of perceived learning from peer assessment, perceived learning from teaching reflection, and perceived learning about teaching competency over time, but only perceived learning from teaching reflection exhibited a pattern of decline. The control group presented higher-than-average

Table 1. Descriptive statistics

Variable	Experimental Group (n = 16)			Control Group (n = 15)		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
APA	3.91(.57)	4.13(.63)	4.28(.78)	3.81(.48)	4.28(.43)	4.38(.33)
PPPA	4.13(.58)	4.23(.74)	4.38(.81)	4.13(.61)	4.50(.46)	4.65(.48)
NPPA	3.53(.90)	3.09(.71)	2.91(.99)	3.83(.82)	3.17(.75)	3.17(.45)
PL		4.53(.64)	4.58(.63)		4.84(.54)	4.82(.51)
PLTR		4.75(.67)	4.70(.65)		4.87(.66)	4.89(.61)
PLTC		4.08(.78)	4.33(.75)		4.78(.41)	4.69(.37)

APA=attitude toward peer assessment, PPPA=positive perception of peer assessment, NPPA=negative perception of peer assessment, PL=perceived learning from peer assessment, PLTR=perceived learning from teaching reflection, and PLTC=perceived learning about teaching competency.

levels of perceived learning from peer assessment, perceived learning from teaching reflection and perceived learning about teaching competency, but perceived learning from peer assessment and perceived learning about teaching competency showed a pattern of decline over time.

Differences in attitudes toward peer assessment

The current study conducted three 2 (Treatment: experimental or control group) x 3 (Time: Time 1, Time 2, Time 3) mixed-design ANOVAs: one for attitude toward peer assessment and one for each of the two factors of attitude toward peer assessment (i.e., positive perception of peer assessment and negative perception of peer assessment). Mauchly's tests revealed that the assumption of sphericity was met for attitude toward peer assessment ($X^2(2) = 1.71$, $p > .05$), for positive perception of peer assessment ($X^2(2) = 2.29$, $p > .05$), and for negative perception of peer assessment ($X^2(2) = 1.86$, $p > .05$), indicating that there was no need to apply corrections of degrees of freedom to the F-ratios. These ANOVA results reveal that the main effects of time on attitude toward peer assessment ($F_{(2, 58)}$=13.05, $p < .00$, partial η^2=.31), positive perception of peer assessment ($F_{(2, 58)} = 7.51$, $p < .01$, partial $\eta^2 = .21$), and negative perception of peer assessment ($F_{(2, 58)} = 11.07$, $p < .00$, partial $\eta^2 = .28$) were all statistically significant. The Bonferroni post hoc tests demonstrate that attitude toward peer assessment was more positive at Time 2 ($M = 4.20$) and Time 3 ($M = 4.33$) than at Time 1 ($M = 3.86$). Negative perception of peer assessment was also lower at Time 2 ($M = 3.13$) and Time 3 ($M = 3.03$) than at Time 1 ($M = 3.68$). Moreover, positive perception of peer assessment was more positive at Time 3 ($M = 4.51$) than at Time 1 ($M = 4.13$). These results indicate that online peer assessment both with and without the use of micro-teaching videos empowered attitude toward peer assessment and positive perception of peer assessment, and reduced negative perception of peer assessment. The study found no evidence that either (1) the treatment had a significant main effect on or (2) treatment and time had a significant interaction effect on attitude toward peer assessment, on positive perception of peer assessment, or on concern about peer assessment.

Differences in perceived learning

The current study conducted three 2 (Treatment: experimental or control group) x 2 (Time: Time 2, Time 3) mixed-design ANOVAs: one for perceived learning from peer assessment and one for each of the two factors of perceived learning from peer assessment (i.e., perceived learning from teaching reflection and perceived learning about teaching competency). The assumption of sphericity was not violated for perceived learning from peer assessment, perceived learning from teaching reflection, or perceived learning about teaching competency, due to the fact these repeated-measures variables only had two levels (Field, 2013). These ANOVA results reveal that an interaction effect between treatment and time on perceived learning about teaching competency ($F_{(1, 29)} = 4.47$, $p < .05$, partial $\eta^2 = .13$) was statistically

significant. The study conducted follow-up paired sample t-tests to explore whether the difference occurred across time for each group, and the results indicate that the effect of time for the control group was not significant ($p > .05$), but that the effect of time for the experimental group was significant, $t(15) = -2.16$, $p < .05$. For the experimental group, the level of perceived learning about teaching competency at Time 3 ($M = 4.33$) was significantly higher than the level of perceived learning about teaching competency at Time 2 ($M = 4.08$), indicating that the experimental-group participants' perception of learning about teaching competency increased over time. Moreover, the study conducted follow-up independent sample t-tests for each time point to explore the interaction, and the results indicate that the effect of treatment for the first time point was significant, $t(23) = -3.12$, $p < .01$, but that the effect of treatment for the second time point was insignificant ($p > .05$). The results, overall, show that the experimental group experienced a lower level of perceived learning about teaching competency ($M = 4.08$) than the control group ($M = 4.78$) after the first round of peer assessment. The study found no evidence of either (1) significant main effects of treatment and time on either perceived learning from peer assessment or perceived learning from teaching reflection, or (2) a significant interaction effect between treatment and time on either perceived learning from peer assessment or perceived learning from teaching reflection.

Findings from open-ended responses

The current study analyzed participants' short responses to open-ended questions at Time 1 in order to clarify the participants' opinions about the advantages and disadvantages of using the Facebook group for peer-assessment tasks. According to the open-ended responses, most participants perceived that the use of Facebook for peer assessment was convenient. Participants stated that their perception of Facebook's convenience reflected three dimensions: Facebook's usefulness in daily life, its popularity among undergraduates, and its clear user-interface layout. Some participants also praised Facebook for sending them notifications about new updates, for helping make the latest course information available in a timely manner, and for rapidly delivering peers' messages (i.e., peers' comments, responses to comments, and replies to questions).

The responses to the current study's open-ended survey items reveal that participants regarded the open and non-anonymous nature of Facebook posts as both advantageous and disadvantageous. Some participants stated that Facebook's open and non-anonymous nature can result in fairness and objectivity. A representative example of this view is one participant's assertion that "people on Facebook are more likely to try to avoid unfair Facebook posts when everybody can read them." However, several participants expressed concern that Facebook's open and non-anonymous nature would inhibit people from directly identifying the shortcomings of others' performance and would lead to an unjustified glut of positive comments so as to spare others' feelings. Some participants also expressed discomfort with comments that they had written and with comments that others had written openly to the whole class on Facebook. Finally, some participants reported that information can flood the Facebook walls within minutes of Facebook posts' release that could undermine peer assessment. These participants felt that a Facebook group's wall cluttered with posts would prevent users from noticing critical information and locating important specific content.

DISCUSSION AND CONCLUSIONS

The aim of this study was twofold: (1) to examine effects that Facebook-based online peer assessment with microteaching videos can have on pre-service teachers'

attitudes toward peer assessment and perceived learning from peer assessment, and (2) to clarify the opinions that pre-service teachers may have regarding their perceptions of Facebook groups' advantageous or disadvantageous contributions to peer assessment. The present study has provided evidence related to the pedagogical benefits of incorporating microteaching videos into online peer assessment in teacher learning. The study has also provided an effective model of how researchers and educators can use Facebook to support the integration of micro-teaching videos into online peer assessment.

The current study's results show that time had a significant main effect on attitude toward peer assessment. As they participated in more online peer-assessment tasks, the pre-service teachers tended to hold attitudes toward peer assessment that were increasingly positive. These results are inconsistent with those uncovered by Wen and Tsai (2008), who found evidence of decreasingly positive attitude toward peer assessment. Moreover, the present study found that time also had significant effects on two factors of attitudes toward peer assessment: positive perception of peer assessment and negative perception of peer assessment. Both of these factors exhibited the same change-related trends as attitude toward peer assessment. More specifically, change in negative perception of peer assessment tended to be apparent after round one, and then the level of negative perception of peer assessment was likely to be maintained until the completion of round two. Therefore, changes in positive perceptions of peer assessment may take longer to be evident than changes in negative perception about peer assessment.

A possible explanation of both the changes in positive perception of peer assessment and the changes in negative perception of peer assessment is that, after participating in online peer assessment, the current study's pre-service teachers experienced reduced negative perception of peer assessment. Participants' negative perception of peer assessment might reflect concerns about peer assessment. As shown in their responses to open-ended survey items, the participating pre-service teachers were concerned about the effects of the open and non-anonymous nature of Facebook posts on the content quality of peer comments and on interpersonal relationships. Giving participants explanations and examples of peer-assessment criteria before the actual peer assessment in the study may have helped reduce the participants' concerns about the peer-assessment process. Moreover, while progressing through the first round of online peer assessment, pre-service teachers may have discovered that using Facebook to perform online peer assessment was not bad or was better than what they had initially thought; hence, the level of their concern decreased. However, their positive perception of peer assessment may not have grown until they perceived peer assessment's gradually manifesting benefits to learning. The present study did not find evidence that the treatment affected attitude toward peer assessment, positive perception of peer assessment, or negative perception of peer assessment. These findings indicate that the use of micro-teaching videos in online peer assessment may not contribute to changes in pre-service teachers' attitudes toward peer assessment, positive perception of peer assessment, or negative perception of peer assessment.

The study found evidence that the interaction between time and treatment had a significant effect on one factor of perceived learning: perceived learning about teaching competency. After completing the first peer-assessment round, pre-service teachers who performed online peer-assessment tasks with micro-teaching videos had significantly lower perceived learning about teaching competency than did the pre-service teachers who had performed the tasks without micro-teaching videos; however, the former group of participants experienced, across time, a significant increase in their perceived learning about teaching competency after the second round of peer assessment. Conversely, pre-service teachers who performed online peer-assessment tasks without micro-teaching videos experienced, across time, an

insignificant decrease in perceived learning about teaching competency. These findings imply that, the integration of micro-teaching videos into online peer-assessment tasks can sustainably bolster pre-service teachers' efforts to acquire teaching-related knowledge and teaching-related skills. It is worth noting that online peer-assessment tasks without micro-teaching videos may immediately increase pre-service teachers' perceived learning about teaching competency only after the first round of peer assessment, but later may decrease perceived learning about teaching competency.

The current study found no evidence that either treatment or time had significant effects on perceived learning or on another factor of perceived learning: perceived learning from teaching reflection. This finding indicates that the enhancement of pre-service teachers' perceived learning from teaching reflection may not benefit from the use of micro-teaching videos in online peer assessment. Zhang et al. (2011) found that, among teachers, observing a peer's video may not be as effective at facilitating critical reflection as observing one's own video. Hence, it is possible that viewing assesses' micro-teaching videos during online peer assessment might not help pre-service teachers promote their reflections and might not help increase pre-service teachers' perceived learning from teaching reflection. Moreover, participants in the current study had limited teaching experience, knowledge, and skills; after all, the experimental course was the participants' first departmental course related to teaching. It should also be noted that participants may have made unjustifiably positive comments about a genuinely poor teaching performance in order to preserve harmonious relations with peers or, at best, to avoid conflict. Hence, during peer assessment, peers' comments about one another's teaching performance may have been superficial and lacked sufficient critical value to facilitate teaching reflections.

Qualitative findings from open-ended responses reveal that the use of Facebook to support online peer assessment with micro-teaching videos had advantages and disadvantages. Before peer assessment, participants in the study felt uneasy expressing their true thoughts about others' performance in a non-anonymous context. These findings were consistent with previous studies (e.g., Davies, 2000). Nevertheless, the participants felt that non-anonymous peer assessment could help them avoid attracting unfair and subjective comments from peers, a finding that is consistent with previous studies' findings (e.g., Topping, 1998). The current findings may help system developers design and develop a Facebook application that (1) supports online peer assessment with micro-teaching videos, (2) enhances the advantages and minimizes the disadvantages associated with *the* open and non-anonymous nature of Facebook posts, and (3) solves problems related to the sometimes confusing, cluttered presentation of these posts.

In the present study, the small sample size likely yielded both a lack of significant treatment effects on most research constructs and reduced the generalizability of the study. The convenience sampling strategy used may not offer an adequately representative sample of the population, and therefore limit the generalizability of the results. Hence, future similar research should utilize larger sample sizes and random sampling. Additionally, the current study relied on self-reported survey data; future research could use multiple data sources or triangulation to strengthen the conclusions. In light of the aforementioned findings and discussion, future researchers might consider integrating self-assessments into online peer assessments with micro-teaching videos. In this way, the research stands a better chance of facilitating pre-service teachers' teaching reflection and of enhancing their perception of learning.

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