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The effect of peer feedback for blogging on college students' reflective learning processes

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Abstract

Reflection is an important prerequisite to making meaning of new information, and to advance from surface to deep learning. Strategies such as journal writing and peer feedback have been found to promote reflection as well as deep thinking and learning. This study used an empirical design to investigate the interaction effects of peer feedback and blogging on college students' reflective thinking skills and their learning approaches. Forty-four first- and second-year undergraduate students participated in the study. Students kept blogs each week throughout a whole semester. Two journals were sampled at the beginning and end of the semester for each student. A repeated measure one-way ANOVA suggested that students' reflective thinking level increased significantly over time; however, peer feedback was found to negatively affect students' reflective thinking skills. The result of the study suggests more carefully designed uses in the future.

Keywords: Weblog; Peer feedback; Reflection; Deep and surface learning

1. Introduction

Reflection is deemed to be an important prerequisite for deep and meaningful learning (e.g., Moon, 1999). In general, reflection is defined as a cycle of inquiry for the purpose of making meaning or finding solutions for a troubling situation or question. Models of reflection abound, each with a different focus; e.g. Kolb's (1984) model of experiential learning, Schön's (1983) model of reflective practice, Mezirow's (1991) model of transformative learning, and King and Kitchener's (1994) model of reflective judgment. Based on these models and others, Moon (1999) defines reflection as "a mental process with purpose and/or outcome in which manipulation of meaning is applied to relatively complicated or unstructured ideas in learning or to problems for which there is no obvious solution" (p. 155).

Scholars seem to agree that the degree of reflection is a function of how much of the learner's schema or cognitive structure is used or changed. When past experience only flashes through the mind, the learner is not involved in deep levels of reflection and the representation of the thinking process (if there's any) is mostly descriptive. In her model, Moon identifies learning as a continuum ranging from the stage of "noticing," "making sense," "making meaning," "working-with-meaning," to "transformative learning" (1999, p. 139). The first two stages are *surface learning* where the learner simply memorizes new ideas, while beginning at the third stage the learner does *deep learning* by actively integrating new ideas into cognitive structure. In agreement with Mezirow (1991), Moon (1999) believes that reflection helps to move learning from surface to deep stages.

Many scholars in the reflective tradition (i.e., Mezirow, 1991; Taggart & Wilson, 1998) have agreed on a pyramid-shaped model of reflective thinking where reflective process comprises multiple levels (e.g., association, integration, validation, and appropriation). Within this interaction of learning and reflection, Moon's (1999) model situates reflection as an

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important component of learning, but it is still unclear whether specific stages of reflection can predict the type of learning (surface or deep). Thus, an important question is, "Will reflective thinking levels predict the learner's learning stages?"

However, previous research has also indicated that reflection is an effortful action and students find it difficult to engage in reflection over extended periods of time without external support (Harri-Augstein & Thomas, 1991). It has been found that most college students are involved in "quasi-reflective" thinking as their reflections usually stop at the lower level (King & Kitchener, 1994). Therefore, various strategies have been recommended for encouraging reflection. Among them, journal writing and peer feedback have been identified as an effective ways to promote students' reflective thinking skills. Journal writing offers a method for students to externalize their thinking and reflection, while peer feedback can provide a different perspective and allow peers to assimilate and accommodate their thinking.

This paper reports a research study that investigated two questions related to reflection — that is, do reflective thinking levels predict learners' learning stages and does peer feedback on online journals result in enhanced stages of reflection? We begin by providing an overview of the literature related to reflection, learning, and support strategies for reflection. We then describe the research questions, the study design, and report results of the study. We end with discussion and conclusions based on the results.

1.1. Role of reflection in learning

Reflection is defined as purposeful thinking oriented toward a goal (Dewey, 1933). Doubtful situations trigger reflection (Dewey, 1933), and we can hypothesize that reflection serves to accommodate new information and minimize the "disequilibrium" in learners. During the process of examining experiences, if the learner finds a problem or doubt, his or her thinking deepens. Thinking can be further more reflective when the learner begins to contextualize thinking to find the cause and effect of the situation. In order to illustrate the role of reflection in learning, Moon (1999) proposed a hypothetical model, called "a map of learning," that synthesized the theories of cognitive structure, Piaget's theory of assimilation and accommodation, stages of learning (similar to information processing theory), deep/surface learning, and best possible representation of learning (BPR). Reflection is suggested to be the means of integrating learning into the cognitive structure and relating it to previous knowledge; reflection on the learning process enables the learner to take a critical overview and accumulate further understandings of the self or the knowledge, hence pushing him/her into the higher-order learning stage. If the learner questions his or her premises, begins to tolerate individual differences, outgrows egocentrism and moves to exocentrism, and broadens thinking into a larger (such as sociopolitical) context, his/her schema is used to a great extent (Moon, 1999). This idea of different levels of reflection suggests that learners will not only make meaning but modify the cognitive structure so that his/her schema is used or changed to a large extent (Moon, 1999).

Moon's model pinpoints the place of reflection in learning, but it doesn't explicitly account for different levels or quality categories of reflection and whether levels of reflection will predict the learner's contemporary learning stages (surface or deep). Specifically, research in response to such a question is still missing in the field. In addition, Moon's *Map of Learning* is mainly a hypothetical model that is in need of support and clarification from empirical work and in-field observation of reflective activities in a concrete learning environment (Fig. 1).

1.2. Journaling and peer feedback for reflection development

Different methods have been suggested for supporting reflection and journaling has been found to be an effective strategy because it offers a means by which students can externalize their reasoning and reflections on experiences (Stickel & Trimmer, 1994) and then reframe experiences within the learning context (Andrusyszyn & Davie, 1997). Journaling has become a popular technique that is used not only as a tool to promote reflective thinking skill (e.g. Hiemstra, 2001; Jasper, 1999; Keys, 1999) but also an assessment of reflection since journals provide "evidence" of whether or how reflective thinking skills are used (Bourner, 2003; Wood & Lynch, 1998).

Weblogs are a popular web-publishing and online journaling tool, and they can facilitate reflective thinking because people who write blogs (bloggers) can easily access different points of views. Bloggers generally reported that their classmates' blogs or comments provided diverse perspectives and information so that they could more likely gain "a holistic, in-depth view of the content" (Sharma & Xie, in press).

In agreement with this empirical observation, Moon (1999) has suggested that working with others can facilitate reflection. Boud (1999)) further suggested that working with peers instead of someone who were presumably "superior" such as mentors or teachers can help reflection.

A "critical friend" is said to promote reflective thinking skills. Moon (1999) suggested that:

> "working with others can facilitate learners to reflect and can deepen and broaden the quality of the reflection so long

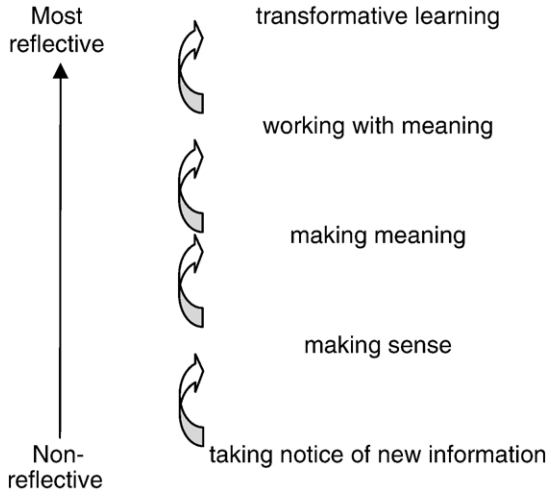

Fig. 1. A simplified model on stages of learning, adapted from Moon's (1999) Map of Learning.

as all the learners are engaged in the process. Another person can provide the free attention that facilitates reflection, ask challenging questions, notice and challenge blocks and emotional barriers in reflection." (p. 172)

If the critical friend is involved in another person's relatively individualized journaling process by providing constructive feedback, both parties will have opportunities of seeing different perspectives, which may influence or fundamentally change the way students assimilate and accommodate information. No two persons have had the exact experiences; therefore their cognitive structures are expected to be different. When two people's making- and working-with-meaning processes are so closely intertwined, they may feel the need to modify their cognitive structure not only to accommodate new information but also to tolerate individual differences. If the two people start with different values or worldviews, it is possible for an overhaul of the cognitive structure to take place, which is called "transformation" by Mezirow (1991).

Boud and Australasia (1985) compared peer learning with mentoring on the possibility of engaging in reflective thinking, commenting that participants were more likely engaged in reflection when a teacher was not present. Eisen (2001) studied the role of peer based learning in professional development from the lens of transformative learning defined by Mezirow. She found that "relationally based activities" including peer dialogue and feedback sparked individual and joint reflection. Good and Whang (2002) found that a "journal buddy" (who traded and commented on each other's journals) helped pre-service teachers in their reflection and meaning-construction processes.

Findings in these works were mostly observations or reflections researchers made after the studies were completed. However, empirical research on the effect of peer feedback on learners' reflective journaling and learning processes has been sparse. A recent review of the literature indicates few research that examined whether peer feedback and journaling can increase students' reflective thinking, and also whether the level of reflective thinking exhibited by students can be related to their level of learning.

1.3. Research questions

The reported study aimed to investigate the effect of peer feedback for journaling on college students' reflective thinking skills. The research questions were:

- Will weblogging over time reinforce participants' reflective thinking?
- Will students who give and receive peer feedback on their blogs exhibit higher levels of reflection than those who do not give or receive such feedback?
- H_0: students who give and receive peer feedback on their blogs will not exhibit higher levels of reflection than those who do not give or receive such feedback;
- H_a: students who give and receive peer feedback on their blogs will exhibit higher levels of reflection than those who do not give or receive such feedback)
- Will participants' reflective thinking level predict their learning approaches or stages, hence their learning achievements?

2. Method

The research involved a longitudinal empirical study that examined students' usage of a weblog over a regular university semester. Data were collected from weekly weblog journals, a self-report survey on students' learning approach, and students' course grades.

2.1. Participants

Forty-four college students enrolled in two sessions of an introductory political science course at a northeastern land-grant university participated in the study. All were first-year students and one-third of them were female. Absence in self-report survey and failure to complete weekly weblog journals led to some subject attrition. Data from twenty-seven students were used for analysis. The pre-study demographic survey indicated that none of participants had used a weblog previously.

2.2. Instruments

Several potential reflective thinking coding schemes were explored to see whether they provided a suitable framework for evaluating the reflection level. The coding scheme by Wong, Kember, Chung, and Yan (1995) was eventually used due to the following reasons: (a) the coding scheme was developed using the conceptual framework of Boud and Australasia (1985) and Mezirow (1991), thus matching the current research's theoretical assumption of a pyramid-shaped model of reflective thinking; (b) the scheme was in-field tested and the reliability was 0.88; (c) the scheme offered a detailed rubric with clarification of evaluation criteria, hence making its application consistent across different raters and subject contents; (d) the scheme classified reflective thinking into six levels, allowing for more gradation in scoring (refer to Table 1).

The Revised Study Process Questionnaire (Biggs, Kember, & Leung, 2001), a 20-item Likert-scaled survey, was used to determine participants' learning approach in two dimensions — Deep Approach (DA) and Surface Approach (SA). Each dimension was measured by 10 items. The dimension where a participant scored higher (either DA or SA) was considered as

Table 1
Coding scheme of different levels of reflection

Code (in rank-scaled score)	Qualitative levels
6	Outcomes of reflection
5	Appropriation
4	Validation
3	Integration
2	Association
1	Attending to feelings

Note: 0 referring to *non-reflection*.

the dominant learning approach of that participant. This questionnaire was used because it was tested to be a valid and reliable tool for measuring students' "approach of learning". The reliabilities for these two latent dimensions/factors were reported as 0.73 and 0.64 respectively.

2.3. Procedure

The researchers worked with the instructor of the course and incorporated blogging into the course syllabus. Specifically, Blogger (http://www.blogger.com), one of the most widely used weblog services, was used in this study. A journaling structure guideline was given to students at the beginning-of-the-semester. This structure guideline was developed by the researchers based on Dewey's (1933) model of the five phases of thinking for structured reflection. This structure meant to encourage students to look for questions and confusions in their learning and also urged them to find solutions and resources to reconcile the confusions. Participants were told that the course requirements included the completion of reflective journals using Blogger and that they must write at least one journal every week. In order to motivate students, this assignment was given 10% of their total grades. The students were told that the blogging assignments would provide an avenue to express their confusions about class and help their paired buddy to resolve their concerns. All participants attended a one-hour orientation to learn how to use Blogger and write a reflective journal.

Participants were then randomly assigned to two groups: control and treatment groups. All groups were taught by the same instructor and the in-class activities were same for both groups. All participants registered their Blogger accounts using pseudonyms assigned by the researchers so that no one in the class would know another student's blog URL unless they were told. The control group blogged for one semester without peer or instructor input or feedback. For the treatment group, students were paired and they kept journals for a month as well as responding to their paired peer's journals. A peer-feedback guide was handed out at the beginning of the study. The guide provided general instructions of providing constructive feedback instead of "nitpicking," for example, "avoid giving groundless remarks" and "concentrate on the learning content" etc. The goal of the research was to find a practical and realistic approach for the students to write blogs and help each other on their reflection and learning. A whole-semester scaffolding to students' feedback to each other seemed too much work for the instructor, hence not applicable in practice. However, both the researchers and the instructor monitored the first two weeks' blogs and participants' feedback to each other's blogs. Email reminders were sent from the researchers to those students who were lagging behind or not responding to their partners' blogs in a meaningful way.

Two sample journals were gathered (one at the second week and the other at the last week of the semester) and graded respectively for each participant. At the end of the semester, participants completed the Study Process Questionnaire (SPQ) (Biggs et al., 2001) that measured their learning approaches — surface vs. deep learning.

2.4. Data analysis

The researchers employed the Coding Scheme of Reflective Process by Wong et al. (1995) in coding weblogging journals and determining the participants' reflective thinking levels. Two raters coded the journals. After reaching 100% agreement on scoring the first 10 blog samples, both raters scored the remaining sampled journals. The calculated inter-rater reliability (Cohen's Kappa) was 0.83 for the coding of the beginning-of-the-semester blogs and 0.92 for the coding of the end of the semester blogs. The average score of both raters' grading was used for data analysis.

A repeated measure ANOVA was conducted to examine the effects of inter-group factor (peer feedback) and within-group variable (time) on blogging-based reflection development level. Then a correlation analysis was used to examine whether participants' reflective thinking level in journaling would predict their learning approaches (as indicated by SPQ survey result) and their learning performances (as indicated by their course grades).

3. Results

A repeated measure ANOVA indicated no interaction effect between treatment and time. For the control group, which was not involved in peer feedback, students' mean score on reflection increased by 1.04 point after a semester of keeping journals; however, for the treatment group who received and wrote feedback, students' score increased by 0.93 point over time.

Table 2 shows the mean reflection scores for both groups in two samplings and the differences of reflection scores for both groups over time. Fig. 2 shows no observed interaction effect between the treatment and time.

The following table shows the analysis of variance for the relationship of time and group for their reflective thinking score (Table 3).

The interaction effect between time and group is not statistically significant. This suggests that in the population, the effect of group (feedback or non-feedback) on students' reflective thinking scores would not be different for the first half or the second half of the semester. Also, the effect of time on students' reflective thinking scores would not be different for students who were or were not sending and receiving feedback (Table 4).

The main effect of time on students' reflective thinking scores is statistically significant at the 0.001 level. In the population, as students keep blogging, students tend to be more reflective as time passes by (3.05 vs. 2.07) (Table 5).

Table 2
Mean reflection scores and standard deviation for two samplings and their differences for both groups

Group	*N*	First sample	Second sample	Difference
Control	13	2.34	3.38	1.04
		(.69)	(1.21)	
Treatment	14	1.78	2.71	.93
		(1.01)	(.96)	

Note: Standard deviation in parenthesis.

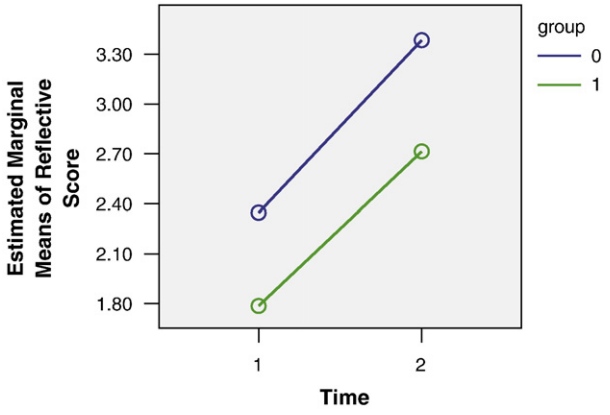

Fig. 2. No observed interaction effect between treatment and time.

The main effect of different feedback group on students' reflective thinking scores is statistically significant at the 0.05 level for a one-tailed test. In the population, students who send or receive feedback on their weblogs tend to be less reflective than those who do not send or receive feedback (2.25 vs. 2.87).

For the first research question, it was found that if students continued journaling, their reflective thinking level increased over time — the exhibited reflective thinking skill of students increased equally for both groups from the first to the second half of the semester.

For the second research question, the null hypothesis was retained (students who give and receive peer feedback on their journals will not exhibit higher levels of reflection than those who do not give or receive such feedback). In fact, the results showed that contrary to the alternative hypothesis, students who gave and received peer feedback on their journals exhibited lower levels of reflection than those who did not give or receive such feedback and this difference was statistically significant.

Subsequently, correlation analysis was performed to examine the relationship between participants' reflective thinking level (as indicated in online journals at the last semester week), their learning approaches (DA or SA as indicated by SPQ survey result), and their course grades (continuous-scaled) (Table 6).

The results indicated a significant positive association between participants' reflective thinking level and their course grades: Spearman's $\rho=0.40$, $p=0.048$. Therefore, the higher reflective thinking level was positively correlated to course grades. It was also found that participants' learning approach would predict their course grades, Spearman's $\rho=0.54$, $p=0.02$. Specifically, participants with Deeper Approach in learning tended to get higher course grades. However, there was insufficient statistical evidence to suggest that reflective thinking level might predict learning approach, Spearman's $\rho=0.16$, $p=0.67$.

Table 3
Analysis of variance for the relationship of time and group for their reflective thinking score

Source of variation	SS	*df*	*p*-value
Model			
Time	13.04	1	.000 [a]
Group	5.10	1	.028 [b]
Time * Group	4.07E-02	1	.809

[a] Statistically significant at the 0.001 level.
[b] Statistically significant at the 0.05 level.

Table 4
Interrelationship between time and reflective thinking score

	Mean	Std. Error
First-half semester	2.07	.168
Second-half semester	3.05	.209

Note: $F=19.09$, $p=0.000$.

Table 5
Interrelationship between group and reflective thinking score

	Mean	N
Feedback group	2.25	13
Non-feedback group	2.87	14

Note: $p=0.028$ for one-tailed test.

Table 6
Correlations (r, p) between reflective thinking levels, learning approaches, and course grade

	Reflective thinking score	Learning approach
Learning approach	.16	
Course grade	.40 [a]	.54 [a]

[a] $p<0.05$.

4. Discussion

The present study investigated the extent to which blog-based online journaling, with different peer-feedback situations, could influence students' reflective thinking development and hence learning achievement. The results indicated that all students improved in their reflective thinking skills as time passed by, and the higher a student's reflective thinking level was, the higher his/her course grade was. However, the students who were involved in solitary blogging demonstrated a significantly higher level of reflection consistently over time than those who provided and received feedback.

4.1. Effect of blogging

As many researchers have pointed out, when students are required to journal for their coursework or field of study, the link between learning experiences and reflective activity could be strengthened because "a specific allocation of time which can be used for reflection" is incorporated (Boud & Australasia, 1985). Britton (1978) identified the role of writing in the reflecting process as allowing students to switch roles between participants and spectators of their own thinking. When students are writing, in order to produce an articulate statement they need to first construct ideas in their mind, which corresponds to the meaning

making process in Moon's (1999) model. Then when students pause and become readers of their own writing, they have another chance of speculate on these ideas and test their viability according to their existing schema. In order to articulate their ideas, students assume roles of participants and readers so that the "learning and the representation of the original learning both occur" at any time in Moon's model. Since the representation of the learning is available to the learners, the workload in their working memory will be greatly reduced. Therefore, students can better engage in their learning — making and working-with-meaning. The findings of the study confirmed that if students are constantly engaged in journaling/blogging activities, their reflective thinking level demonstrated by their journal entries would increase over time.

4.2. Effect of peer feedback

Contrary to the prediction of previous research findings, peer feedback did not promote students' reflective thinking skills when combined with journaling. Although students were randomly assigned to different feedback groups, the students in the feedback group constantly showed lower reflective thinking level than those who were journaling in a secluded manner. Peer feedback seemed to have counteracted the effect of journaling. There could be various reasons to account for this surprising result.

First, journaling is a self-introspective process. Thus, when students were journaling, they could be distracted by the fact that their writings would be examined by other students and they might have refrained from journaling about subjects that they thought other people wouldn't understand or might laugh at. Prior studies have found that individuals wrote something "presentable" and that illustrated their "sense-making" when they knew that there was a good chance that other people would read them (Sharma & Xie, in press). They deliberately avoided "babbling" what was on their mind. Instead, they adopted a more conservative approach to journaling.

The second reason might result from the quality of peer feedback. Latham (1997) expressed a fundamental concern about peer feedback because he was doubtful whether peers were able to offer the same high-quality feedback that teachers can. According to Vygotsky's (1978) theory of "zone of proximal development", students can benefit from interacting with more capable peers. However, in the case of online journaling with peer feedback, it is inevitable that students may interact with less able peers (in terms of either reflection skills or content knowledge) or peers who are less motivated in online journaling. A closer look at the peer feedback in the study revealed that students did not engage in meaningful or constructive feedback activity. Their comments were more social (such as "good job", "I agree") rather than providing informative or constructive prompting.

Additionally, the students in the treatment group were paired. There seemed to be a reciprocal adverse effect on their attitude toward reflection from peers. It was found that if one of the pair didn't demonstrate higher level of reflective thinking in their journals, it was very likely that the other would not engage in higher level of reflective thinking either.

4.3. Reflection and deep/surface learning

The study finding confirms Moon's assumption that reflection facilitates learning achievement, but the correlation between participants' reflective thinking level and their learning approaches was relatively low. The results did not provide adequate statistical evidence to support the belief that reflection could upgrade one's learning from surface to deep approaches. However, deep learning as reviewed in the literature generally means two things: a learning approach or a learning outcome. Biggs, Kember, and Leung (2001), Marton (1983), Svensson and Hogfors (1988) contributed to the view that deep-surface learning was a static learning approach that a learner adopted for some time or for a specific task. The Study Process Questionnaire (Biggs et al., 2001) was designed to measure students' deep/surface learning approach. The deep learning approach identified by Biggs et al. (2001)) was characterized by students' intrinsic motivation. Since students were required to write the reflective blogs, even though their reflection level might increase over time, their intrinsic motivation towards the whole course and the blogging activity would not necessarily increase accordingly.

In contrast, Ausubel, Novak, and Hanesian (1978), Moon (1999) and other researchers have considered deep or surface learning as a possible result of a learning process. Ausubel et al. (1978) noted that meaningful/deep learning consisted of concept learning and propositional learning. Novak and Gowin (1984) then described reflective thinking as a process of extracting concepts from learning content, forming and reforming the propositions among concepts. Some researchers (e.g. Hatton & Smith, 1995; Linn, 1995; Sandberg & Barnard, 1997) emphasized that only when students have a comprehensive understanding of content knowledge, could they achieve deeper learning.

The final grades of the students consisted of scores from quiz and reflective journals. These final scores were more likely able to capture the true details of whether students had formed a thorough conceptual understanding of the course content. Therefore, those assessment tools were better able to reveal the deep or surface learning processes of the students as opposed to the Study Process Questionnaire. Since participants' reflective thinking level and their course grades was positively correlated, this result not only confirmed the claim of previous scholars (e.g., King & Kitchener, 1994; Kolb, 1984; Mezirow, 1991; Moon, 1999; Schön, 1983) on the value of reflective thinking in promoting learning performance but also supported the idea that students who conducted more reflective thinking might have processed the learning content more deeply, which in turn provides support for Moon's (1999) model. Further, it might be possible that reflection was the mechanism for learners to form a "robust, coherent, conceptual understanding" for integrated knowledge (Davis, 2003, p. 99).

5. Limitations and future research

Previous researchers (Slavin, 1995) pointed out that peer feedback on journaling should be constantly moderated to reduce off-track and passive behaviors in interactive discourse, and that structured protocols for peer feedback should be used

while ensuring opportunities for equal participation and a "trusting and non-threatening relationship" among peers (Eisen, 2001). Bonk and his colleagues further identified four "key action areas" for instructors' moderation (Bonk, Kirkley, Hara, & Dennen, 2001). They consist of pedagogical, social, managerial and technical actions. The pedagogical role requires the instructor to ask questions, provide feedback, probe, etc. The social role involves creating a friendly environment and offering affective support. The managerial actions can include designing and coordinate assignment and overseeing tasks and course structure and requirements. The technical role includes actions such as assisting the use of technology. In addition, structured peer learning improved academic achievement and boosted student attitudes (King, 2002). However in this study, because of the practical constraints, monitoring and scaffolding were only provided in the first few weeks of the semester. Results and analysis of the blogs showed a more effortful moderation from the instructor and more structure of constructive feedback could have scaffolded a collaborative development of reflections among students.

This study found that beyond instructors' moderation on the feedback, it could also be helpful if scaffolds could have been provided by the instructor about how to find topics to journal about for the first-year college students. The researcher found that in spite of the orientation with the journaling structure guideline provided, some students did not understand what reflection was, how this strategy could help them in their study, or how to implement their reflection. As a result, many students either recounted what they read or learned in class or commented on the way the instructor conducted the class. Even as their reflective thinking scores increased over time, their average score by the end of the semester was only 3.05 out of 6 (the highest possible score of reflection with the coding scheme used in this study). It was indicated in research that self-selected topics in journaling made graduate students question the learning content more deeply because students are perforce engaged in finding the trigger for a doubtful situation while trying to identify a topic to write about. However, a lot of lower-class college students are not cognitively ready to find the trigger by themselves without any help from the instructor. It is recommended that in future studies scaffolds should be offered that focus students on the key points of the new learning and contain prompts for them to mentally scan existing cognitive structure in an attempt to find conflicting ideas.

It was one of the limitations of the study that the attrition rate was quite high (38.6%), which was mainly due to students' failure in keeping up with weekly blogs. This fact suggested that writing might not be a natural approach of conducting reflection for all students, or 10% of the final grades may not be a strong enough incentive for all students to keep blogging for a semester. Another possible reason was rooted in the fact the students' blogs were hidden from the rest of the class except for their partners in the peer-feedback group. Not having a central location for all blogs prevented students from seeing the blogging activities of the rest of the class. Through the semester, some students might feel lonely and bored, hence gave up doing it. Future research can be done by putting the blog sites of all students in the peer-feedback group in a central location where they can comment on any others' blogs instead of being paired.

The ability to think reflectively is germane to learning in that it makes learning meaningful. Efforts should be intensified to identify cost effective and feasible ways to improve this indispensable skill. The present study can serve to provide some insights about how college students make uses of journals and peer feedback. More research is needed to advance our knowledge of finding scaffolding strategies for both peer feedback and journaling to promote reflective thinking skills.

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