Comparative Analysis of Preservice Teachers' Reflective Thinking in Synchronous versus Asynchronous Online Case Discussions

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Abstract:
This study was undertaken to better understand the nature of preservice teachers' reflective thinking during case discussions about classroom management in two online formats: synchronous versus asynchronous. Findings indicated that when participants engaged in synchronous online case discussions they had higher levels of critical reflection than when they engaged in asynchronous online case discussions. Also, participants' initial preferences for asynchronous discussions changed from the beginning to the end of this study. Reasons for changes in participants' format preferences and descriptions of participants' levels of critical reflection are discussed.

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How and what teachers learn from cases are questions that continue to intrigue teacher educators who use case-based teaching methods as part of their pedagogical repertoire (Lundeberg, Levin, & Harrington, 1999; Merseth 1996). Good cases that represent the messy, complex, and situated nature of teaching and learning are excellent catalysts for discussion (Levin, 1995, 1999b). Cases also present us with a way of connecting theory with practice and can provide a focus for developing reflective thinking and for engaging in problem solving and critical thinking (LaBoskey, 1994; Richert, 1992). However, the increased use of online and web-supported courses used in many teacher education programs (Wright, Marsh, & Miller, 2000) prompted this study of different formats for discussing dilemma-based cases in a web-supported course.

Online case discussions may be conducted in synchronous (occurring at the same time) or asynchronous (occurring over time) modes, which may be facilitated or unfacilitated. If a case discussion is facilitated this may be done by the course instructor or by students in the course (Kara, Bonk, & Angeli, 2000). Although course management tools such as Blackboard or WebCT are only delivery systems (Clark, 1994), and similar outcomes may be achieved from face-to-face (F2F) case discussions, this study was designed to (a) understand prospective teachers' preferences regarding different formats for online case discussions, and (b) analyze the quality of reflective thinking about the content of cases discussed in synchronous versus asynchronous discussion environments during a web-supported course about the interaction of classroom management and instruction.

This article offers reasons provided by preservice teachers about their preferences for different formats for online case discussions and provides a content analysis of the discourse from a subset of the participants who each engaged in two synchronous and two asynchronous online case discussions. The research questions that guided this study were: (a) Do preservice teachers prefer synchronous or asynchronous online case discussions? What reasons do they provide for their preferences? (b) Do preservice teachers prefer peer-facilitated or instructor-facilitated online case discussions? What reasons do they provide for their preferences? (c) What can be learned about the level of preservice teachers' critical reflection, as it was originally defined by Dewey (1933) and operationalized by Harrington, Quinn-Leering, and Hodgson (1996) and Hutchinson (1996), in synchronous and asynchronous online case discussions?

THEORETICAL PERSPECTIVE
From a social-constructivist perspective learning occurs through interactions with others in a social environment and is mediated by various tools and symbols systems used in that environment (Vygotsky, 1962). From this perspective, dialogue with others and with oneself are important means for constructing knowledge (Vygotsky). Based on this viewpoint, prospective teachers construct their understandings of teaching and learning based on their prior knowledge and beliefs, their current and past experiences related to learning to teach, and on focused reflection on these experiences. Toward this end, cases and case methods can be used as pedagogical tools for exploring the complexities of teaching and learning in guided contexts, for promoting perspective-taking and developing critical reflection, and for helping teacher candidates make connections between theory and practice (Lundeberg & Levin, 2003). This study was undertaken with prospective and beginning teachers in a social-constructivist context that was mediated by online discussions with peers (Blanton, Moorman, & Trathen, 1998). Some of the online case discussions in this study were facilitated by an instructor whose goal was to promote a critically reflective stance about the problems and issues in dilemma-based cases about the interaction of classroom management and instruction, and some were facilitated by peers. This article focuses on ways the format of online case discussions (synchronous or asynchronous and instructor or peer-facilitated) supported critical reflection about the content of cases.

RELATED RESEARCH
Research on Cases and Case Discussions
Most of the research undertaken in the past two decades about the use of cases and case-based methods in teacher education settings (Levin, 1995, 1999a; Lundeberg, Levin, & Harrington, 1999; Merseth, 1996) focused on the use of printed cases that are discussed in F2F settings. For example, research suggests that discussing cases with peers in a F2F environment positively affects the quality, form, and content of teachers' thinking about cases, compared to the understanding of those teachers who only read and write about a case (Levin, 1995, 1999a). Furthermore, preservice teachers who discuss cases with others are able to gain additional perspectives on the issues in the cases, and clarify and/or elaborate their understandings of various topics embedded in cases they analyze together (Levin, 1995). Research also suggests that teachers prefer learning from cases and case discussions over more didactic methods of instruction, and that teachers can learn about classroom management, motivational issues, cultural diversity, and teaching mathematics from reading, writing about, and discussing cases (Levin, 1999b).

Research on Computer-Mediated Communication (CMC)
Much of the literature about CMC discusses its benefits (Harisim, 2000) or reports on instructional design considerations for successful online discussions (Zhang & Carr-Chellman, 2001). Several recent studies focus on student and instructor satisfaction with learning and reflection promoted through various kinds of CMC used with preservice teachers but most of these studies involved only asynchronous discussions among preservice teachers. A few recent studies directly compare what or how teacher candidates understand from online cases discussions in synchronous versus asynchronous formats (Bonk, Hansen, Garbner-Hagen, Lazar, & Mirabelli, 1998; Im & Lee, 2003), or address the role of the facilitator (Zhang & Carr-Chellman, 2000), or analyze the qualities of case discussion discourse (Angeli, Bonk, Supplee, & Malinkowski, 1998; Ferdig & Roehler, 2003). Bonk et al. (1998) compared synchronous and asynchronous computer conferencing about cases and found asynchronous discussions to be more productive with regard to student engagement in the learning process and

overall responsiveness. Although participants in synchronous discussions generated a lot of content, participants in asynchronous discussions were more likely to challenge and encourage each other during extended peer interactions and dialogue.

In a their study with preservice teachers at a cyber university in South Korea, Im and Lee (2003) also found that asynchronous discussions were more task-oriented and yielded more discussion about the posted discussion topics. However, the synchronous discussions yielded more social interactions, which led to the formation of social bonds, the exclusion of information sharing, and a more academically-focused discourse.

In the Angeli et al. (1998) study, preservice teachers were asked to construct and post two problematic cases generated from their field experiences along with probable resolutions to these cases based on their Educational Psychology course lectures and readings. Participants were also asked to provide feedback regarding cases posted by at least four peers and to summarize the electronic discussion of their own cases. All 146 teacher candidates in this study received three weeks each of heavy scaffolding (HS = more structured tasks, instructor guidance and feedback, moderator questions, and recommendations from cooperating teachers) and weak scaffolding (WS = feedback from peers, and instructor feedback only upon request) regarding their cases. Results of the qualitative analysis of 35 randomly selected HS and 25 WS case discussion threads revealed these preservice teachers (a) clarified their thinking about their field observations and the text material from their class by writing and discussing cases, (b) shared problems, and (c) received feedback about events in their field experiences that was supportive and encouraging. While participants generated more cases in the HS condition and produced higher-quality cases in the WS condition, Angeli et al. (1998) were disappointed in the number of participants who failed to warrant their responses to the cases by citing Educational Psychology theory and concepts, the task-orientated versus mastery-oriented focus of the participants in this study, and the lack of a real learning community among the participants.

In a study of preservice teachers in Reading methods courses at a large U.S. university, Ferdig and Roehler (2003) reported that asynchronous discussions of video cases (a) did not always promote desired patterns of thinking in all participants, and (b) that it is important to consider whether the instructor and preservice classroom environment supports constructivist learning practices such as online case discussions. In addition they found (c) that the purpose of such discussions must be challenging for the participants, (d) related to the objectives for the course, and (e) modeled appropriately by the instructor (or other discussion facilitators) who also understands and can respond to potential cohort effects when they are revealed.

In this study the focus is on reasons behind the participants' preferences for various online case discussion formats and on ways to describe the quality and levels of critical reflection revealed in both written case analyses and the discourse during synchronous and asynchronous online case discussions.

METHODS
Participants
All students enrolled in a web-supported classroom management course designed primarily for post-baccalaureate preservice teachers at a university in the southeastern United States engaged in a total of six online case discussions from their homes. Participants alternated between using the asynchronous Discussion Board and synchronous Virtual Classroom features of Blackboard 5.0. Twenty-five students in this course were a cohort group preparing to be elementary teachers, nine were preservice or lateral entry middle grades or high school teachers, and two were experienced teachers enrolled in a doctoral program. Of the 36 students in the class, six were male and 30 were female. All but two of the students were in the mid to late 20's, and 28 students were European-Americans and eight were African-Americans.

Data Collection Procedures
All 36 students completed an anonymous survey about their perceived preferences and prior experience with synchronous and asynchronous online discussions during the first week of the course and participated in practice synchronous and asynchronous discussions before the online case discussions began. Students were

assigned alphabetically to four small groups of nine participants. Each group alternated discussing printed, dilemma-based cases (Silverman, Welty, & Lyon, 1992) in both synchronous and asynchronous modes so that each student participated in two synchronous and two asynchronous discussions and two peer-facilitated and two instructor-facilitated discussions. After completing four online case discussions, students were asked to choose the discussion mode they preferred for the final two case discussions. To match the students' format preferences and to accommodate those not teaching elementary grades, five new groups with between 5-7 participants in each group were formed: (a) instructor-facilitated synchronous, (b) instructor-facilitated asynchronous, (c) peer-facilitated synchronous, (d) peer-facilitated asynchronous, and (e) a group for those interested in grades 6-12.

All asynchronous case discussions continued for five days and participants were asked to contribute a minimum of five times after posting their initial case analysis to the Discussion Board. Each synchronous discussion lasted for one hour. Students in the synchronous discussions sent their initial case analysis to the instructor through the Digital Dropbox feature of Backboard 5.0. A total of six written case analyses and active participation in all six online case discussions counted for 25% of each student's final grade. There was no time allotted during class for F2F discussion of these cases. Due to absences and attrition only 31 of 36 participants completed all of the online discussions and submitted all written case analyses.

During the final class meeting students used the anonymous survey feature in Blackboard 5.0 to answer the same survey questions posed at the beginning of the semester about preferences for discussion format, plus some additional questions designed to elicit their reflections and to promote metacognitive thinking about various aspects of online case discussions. Students were also asked to reanalyze the first case they had analyzed and discussed at the beginning of the semester. After completing their reanalysis each participant was given a copy of their original case analysis and asked to compare and count the (a) number of problems and issues identified in both their initial and final case analysis, (b) number of problems solutions suggested, (c) number of steps in their action plans, and (d) number of references cited to warrant their responses to the case. However, only 32 students successfully submitted their final case reanalysis and answered the final survey questions.

Data Sources
Data analyzed for this study included 36 initial and 32 final survey responses to questions about participants' perceived preferences for case discussion formats and reasons for their preference. In addition, when the course was over, eight participants were selected to have their initial written analyses of the first four cases and all the discourse analyzed from the two synchronous and two asynchronous case discussions. Those eight participants were purposefully selected from the 31 students who completed all aspects of the study and had participated in each of the four possible formats for discussion: synchronous with instructor facilitation, synchronous with peer facilitation, asynchronous with instructor facilitation, and asynchronous with peer facilitation.

Data Analysis Procedures
In both the initial and final survey, participants were asked to anonymously state their preferences for case discussion format, facilitation format, and the reasons for their preferences. A content analysis of these pre and post case discussion surveys was undertaken to categorize the reasons stated by the participants for their preferences.

Using NUD*IST N6 (2003) software, two of the researchers analyzed eight participants' initial written analyses of the first four cases and all the discourse during the discussion of these four cases. This analysis was based on Dewey's (1933) definition of critical reflection as operationalized in previous research on cases conducted by Harrington et al. (1996) and Hutchinson (1996). Dewey's definition of critical thinking includes the concepts of open-mindedness (the ability to understand and take multiple perspectives), wholeheartedness (the ability to identify and address the limitations in one's assumptions about authority and understand the complexity and ambiguity of issues), and responsibility (the ability to consider the moral and ethical consequences of choices and actions on self, others, and the broader society). Harrington et al. (1996) and Hutchinson (1996) previously

operationalized these concepts into three progressively more complex levels of critical reflection, which were used to analyze the depth of reflective thinking about the cases discussed online. Table 1 provides Dewey's definitions of critical reflection and offers examples of the kinds of statements from this study that were scored at each level.

Table 1
Dewey's (1933) Definition of Critical Reflection by Level with Examples

Content analysis of eight participants' written case analyses and their subsequent discussions during four cases yielded a total number of critically reflective statements for each of three levels for open-mindedness, wholeheartedness, and responsibility and an overall mean scores for reflection for each individual. Mean scores for each type and level of critical reflection were then aggregated across participants based on their occurrence during synchronous versus asynchronous discussions. Because only eight participants' data were compared, no statistical analysis was performed due to lack of power and too few degrees of freedom. Reliability for scoring these data was achieved through the establishment of scoring protocols and decision rules prior to data analysis. The scoring of each researcher was also audited by a second researcher and peer debriefing was used to resolve any conflicts in scoring. Triangulation (Yin, 1994) was achieved through both data triangulation (multiple case discussions by multiple participants across time) and investigator triangulation (data analysis conducted by multiple researchers).

FINDINGS AND DISCUSSION
RQ #1: Do preservice teachers prefer synchronous or asynchronous online case discussions? What reasons do they provide for their preferences?

The analysis of anonymous initial and final survey responses to determine the particiapants' perceived preferences for synchronous or asynchronous online discussions revealed both a quantitative and a qualitative shift from the beginning to the end of the semester. As seen in Table 2, only three participants predicted that they would prefer synchronous discussions at the start of the semester, while 33 participants predicted they would prefer asynchronous discussions. These initial preferences appeared to be based on familiarity with the asynchronous Discussion Board feature of Blackboard because 31 out of 36 of the participants had used it in previous courses and were unfamiliar with synchronous discussions. However, at the end of the semester the number of participants preferring synchronous discussions increased from three to 17 participants, while the number preferring asynchronous discussions decreased from 33 to 15 participants.

Table 2
Survey of Initial and Final Preferences for Synchronous versus Asynchronous and Peer-Facilitated versus Instructor-Facilitated Online Case Discussions

Reasons the participants' offered for initially preferring asynchronous discussions included having (a) more time to think and respond, (b) a more flexible time schedule to participate in the discussion, and (c) previous negative experiences with online chat sessions. The three participants who initially predicted they would prefer synchronous online discussions said they (a) liked having a set time schedule for the discussion, (b) preferred getting immediate feedback to their comments, and (c) thought that other people's responses would inspire their own thinking.

Reasons offered at the end of the course by the 17 participants who stated they now preferred synchronous discussions included liking: (a) immediate feedback from peers and the professor; (b) the pace of the discussions, which they said felt more like a real conversation; (c) the convenience of having a one-hour chat, rather than having to check many times during the week to see how the asynchronous discussion was progressing; and (d) being challenged to think intensely and learn from peers in a short time frame. The 15 participants who stated they still preferred asynchronous online discussions at the end of the semester said they (a) preferred the convenience of participating in the online discussions whenever they had the time, and (b)

liked being able to take their time reading, thoroughly thinking through, and then responding in greater detail to others' responses to the cases. However, (c) they did not like waiting for their peers to respond to their postings, and (d) felt there was often too much to read on the Discussion Board.

RQ #2: Do preservice teachers prefer peer-facilitated or instructor-facilitated online case discussions? What reasons do they provide for their preferences?

As can also be seen in Table 2, the numbers of participants preferring peer-facilitated or instructor-facilitated case discussions, as well as those with no preference, did not change much from the beginning to the end of this study. Whether these numbers represent the same or different people is unclear because the surveys were anonymous. However, the 17 participants who indicated an initial preference for instructor facilitation stated that (a) they would stay on task better, (b) the instructor would have deeper insights and was more knowledgeable about the cases, and (c) the instructor was more experienced at case facilitation. However, at the end of the semester fewer people preferred instructor-facilitation because (a) they had learned to appreciate and value their peer's insights and thinking about the cases. In fact, in addition to the eight people who indicated a definite preference for peer facilitation at the end of the semester, five of the 13 who said they still preferred instructor-facilitation also said (b) they valued their peers' ideas, and (c) felt more comfortable with their peers. The main reason they gave for preferring instructor facilitation, however, was that they stayed on task better during these discussions. Furthermore, the eight participants who preferred peer-facilitated discussions and the 10 who stated they liked both modes also said (d) the atmosphere was more casual and relaxed during peer-facilitated discussions and (e) peer-facilitated discussions allowed them to dig more deeply into things they wanted to talk about rather than responding to the instructor's queries. Many participants also stated how much they learned from their peers, which was not something they commented on in the initial survey.

RQ #3: What can be learned about the levels of preservice teachers ' critical reflection in synchronous and asynchronous online case discussions?

To answer the question about the level of preservice teachers' critical reflection in synchronous and asynchronous online case discussions, aggregate mean scores for critical reflection were computed for eight randomly selected participants based on their four written case analyses and four subsequent discussions. As can be seen in Table 3, means for their initial written analyses about three of the four cases are lower than means for levels of critical reflection during the discussion of each case. For example, in the Anita Underwood case, which was the first case analyzed and discussed, these eight participants averaged 1.67 (range 1-3) for critical reflection on their written analysis of this case but had a mean score of 1.78 for level of critical reflection for the online discussions of this case. This trend held for the first three written case analyses and subsequent case discussions, although there was no observed mean difference of participants' levels of critical reflection for the case analysis and discussion of the fourth case.

Table 3
Means for Initial Case Analysis versus Discussion for Cases 1-4 Based on Levels of Reflection

One interpretation of these trends is that online discussions of cases can promote preservice teachers' levels of critical reflection more than just writing about the case without benefit of discussion. However, levels of reflection can be influenced by the content of particular cases, which was evidenced in this study when the means for the written analysis and discussion of the fourth case did not differ. Further examination of the initial written analyses and the discourse indicated that this case did not generate differing opinions or multiple perspectives among the participants. This may have been due to a cohort effect (Ferdig & Roehler, 2003) because the vast majority of the preservice teachers in this study expressed similar ideas about standardized testing and did not generate any controversy or offer different viewpoints during the discussion. Without differing perspectives there was little to debate and no disagreement to cause any dissonance during discussion of this case. Therefore, the quality of the cases used for discussion is an important factor in this kind of

research. Alternatively, it is possible that these results stemmed from discussion fatigue, although data from the final two case discussions, which are not reported here because the elementary and middle grade participants did not discuss the same cases, showed similar trends to the data reported for the first three cases.

Influence of Discussion Format on Individual's Levels of Reflections

Another way to look the influence of discussion format on the levels of critical reflection for the eight participants whose discourse we analyzed is to compare means between the two synchronous and two asynchronous discussions in which they each participated. As can be seen in Table 4, seven of the eight participants had mean levels of critical reflection that were higher for the synchronous discussions than for the asynchronous discussions.

Table 4
Comparison of Mean Levels of Critical Reflection During Synchronous and Asynchronous Case Discussions

This finding is counter-intuitive given previous research comparing synchronous and asynchronous discussions, which found asynchronous discussions to be more challenging and task-focused (Bonk et al., 1998; Im & Lee, 2003). Other research on computer-mediated discussions has also indicated that asynchronous discussions are beneficial because they encourage reflection, offer extended time for discussion, and encourage students who may be silent in F2F discussions to participate (Cifuentes, Murphy, Segur, & Kodali 1997; Harasim, 2000; Killian & Willhite, 2003). However, in this study nearly half of the participants came to prefer synchronous online case discussions by the end of this study, despite their initial preference for asynchronous discussions. Furthermore, a sample of participants' levels of critical reflection in this study yielded higher mean levels of critical reflection during synchronous online case discussions. Some reasons for this difference in findings from previous research can be seen in the following quotes from two participants who came to prefer synchronous online case discussions, as expressed in the anonymous survey at the end of the semester:

Originally I thought that I would prefer asynchronous discussions, but as the semester progressed synchronous became my preferred method. I like the immediate feedback from my peers and the facilitator. I like the active discussion that is taking place. I felt I retained more and applied the theories we read better because it was active. I also learned more about my peers during the discussion. (Student #23)

I preferred synchronous discussions because they were more manageable than the asynchronous discussions. With the synchronous discussions there was a short period of time in which we were able to discuss the case. It was clear exactly how much a student needed to contribute and when the discussion was over. Another benefit was the immediate feedback we received from our peers and our professor. I found it extremely helpful when the other students questioned my ideas or asked probing questions because I was forced to think on the issue more deeply. Although the asynchronous discussions also allowed for feedback, it did not do so in the same way. We had to wait and hope that someone would respond to our questions or statement. Even when they did respond, it was difficult to get clarification in a timely fashion. Both types of case discussions forced us to think seriously about the issues, but synchronous discussions seemed to provide more consistent and immediate feedback. One added bonus to the synchronous discussion is that we were able to connect with other learners, an important method of teaching and learning. (Student #10)

Categories and Levels of Critical Reflection in Online case Discussions

The fact that synchronous online case discussions promoted slightly higher levels of critical reflection during this study is interesting, but the relative proportion of the three elements that make up Dewey's (1933) notion of critical reflection is also of interest. As can be seen in Figure 1, when all the online discussion discourse is aggregated, 37% of all critically reflective discourse identified in this study was related to the notion of open-mindedness, which is about understanding and taking different perspectives. Forty-three percent (43%) of the reflective discourse in this study was about Dewey's notion of wholeheartedness, which is about the ability to identify and address the limitations in one's assumptions and understand the complexity and ambiguity of issues in teaching, and only 20% was about responsibility, which has to do with the ability to consider the moral and ethical consequences of choices and actions on the self, others, and the broader society.

Figure 1. Percentages for three categories of critical reflection

Dewey's (1933) elements of open-mindedness, wholeheartedness, and responsibility can be broken down even further into three levels, which indicate a progression from simple and unitary to more complex and multi-dimensional levels of reflective thinking (Harrington et al., 1996; Rodgers, 2002). As can be seen in Table 5, the highest numbers of critical reflection for the eight participants are at Level 2 in the areas of open-mindedness and wholeheartedness. This means that on average these participants were able to go beyond seeing the teacher as the sole authority in the classroom (Level 1, open-mindedness), and shift from a teacher-focused perspective to focusing more on the needs of students (Level 2, open-mindedness). These data also indicate movement beyond the participants' view of learning as mainly being a teacher-directed activity (Level 1, wholeheartedness) to seeing teaching and learning as an interactive, reciprocal process in which both students and teachers play an active role (Level 2, wholeheartedness). In addition, as seen in Table 5, the fewest instances of participants' critical reflections were about issues related to responsibility and even fewer examples of Level 1 and Level 3 thinking in the area of open-mindedness were seen.

Table 5
Comparative Levels of Critical Reflection Across Four Online Case Discussions

One interpretation of these findings is that these preservice teachers were poised to develop more in the areas of open-mindedness (taking multiple perspectives and seeing the limitations in one's assumptions) and wholeheartedness (understanding the complexity of teachers' roles and the complex nature of the teaching and learning process), and less in the area of responsibility (ability to consider the moral and ethical consequences of choices and actions on the self, others, and the broader society). Perhaps this is because multi-dimensional kinds of critical reflection in the areas of openmindedness and wholeheartedness may be necessary before it is possible to develop higher levels of responsibility. This is speculation but a good place for further research using Dewey's notion of critical reflection to analyze the discourse of more experienced teachers. Nevertheless, these patterns found among this group of graduate-level preservice teachers are a little stronger than those found in a previous study with undergraduate preservice teachers, which also used Dewey's levels of critical reflection to evaluate the content of cases they wrote (Levin, 1999b). That study found mainly Level I and Level 2 thinking in the areas of open-mindedness, wholeheartedness, and responsibility with only one person showing evidence of Level 3 thinking about wholeheartedness (seeing the limitations in one's assumptions) in the case she wrote.

RECOMMENDATIONS
In considering the implications of participants' preferences for synchronous over asynchronous online case discussions, we recommend that students in online or web-supported courses be given opportunities to participate in both kinds of online case discussions so that they can experience each. Once they have the opportunity to participate in both types of discussions and have discussed and reflected on the pros and cons of each, then we recommend that students be allowed to choose the discussion format they prefer. Each format appears to have benefits, but even more importantly, these different opportunities for learning are consistent with adult learning theories (Knowles, 1984; Merriam & Caffarella, 1991), which tell us that adults learn best when they have choices, some control over their learning environment, opportunities to get feedback from others, and chances to work in small groups.

Also, a few participants suggested in the final survey that they would have preferred synchronous discussions if the groups were smaller. Therefore, we also recommend keeping groups for synchronous discussions at no more than 5-6 participants and groups for asynchronous discussions no larger than 6-8 participants. Having too few people in a discussion group has the potential to limit the number of perspectives and voices needed for a robust discussion, but having too many participants makes it difficult to keep up with the pace of synchronous

discussions or to read the large volume of postings. Future research into the optimal sizes of online discussion groups would provide empirical validation for these recommendations.

Although the number of participants preferring peer-facilitated or instructor-facilitated case discussions, as well as those with no preference, did not change much from the beginning to the end of this study, there is value in offering students a choice after experiencing both formats and discussing the pros and cons of each. While the instructor-facilitated discussions in this study were perceived to be more focused and task-oriented compared to a more relaxed and conversational tone of the peer-facilitated discussions, both formats are viable from a social-constructivist perspective (Blanton et al., 1998). That is, students can be both task-oriented and conversational, if peer facilitators are well prepared for the responsibilities of leading case discussions (Cifuentes et al., 1997). However, peer facilitators need to understand the goals and purposes for engaging in online case discussions, be provided with specific guidelines by which to facilitate discussions, and have some practice as case discussion leaders. Peer facilitators also need to prepare ahead of time, especially for synchronous discussion that progress quickly, and they need to prepare open-ended questions that solicit multiple responses versus questions that elicit only yes or no answers. Furthermore, everyone needs to know who the peer facilitators are and understand their function so that all participants can follow established norms for online case discussions.

Finally, this study also highlighted the critical importance of selecting high-quality cases for discussions of any type. Good cases should foster multiple perspectives to serve as catalysts for problem solving and critical thinking, which can in turn promote critical reflection. Dilemma-based cases provide real-world classroom contexts for prospective teachers to discuss teaching and learning, encourage both theoretical and practical understandings, and provide opportunities for critical reflection on social, ethical, and epistemological issues. They can also influence teachers' beliefs (Lundeberg & Levin, 2003). One of the cases used in this study did not promote these opportunities for this group of teachers, reminding us that the choice of cases is crucial in both research and practice.

Limitations and Future Research
There are several limitations in this study concerning issues of generalizability. First, participation in online case discussions was only one aspect of this course that may have influenced the participants' levels of critical reflection. For example, their readings, other coursework, maturation, and their classroom teaching experiences might also have an impact on levels of critical reflection during the course of this study. Second, when new groups were formed based on participants' preferences, the number of people in each group was not equal, which may have an impact on the internal validity of this study. Third, only 31 of 36 participants completed all aspects of this study and the complete discourse from only eight participants' was analyzed. It is hard to generalize from findings based on such a small number, even though content analysis of their case writing and case discussions offers rich and extensive data for understanding the concept of critical reflection.

This study was limited to one group of graduate-level preservice and beginning teachers taking one course about classroom management during one semester, so these findings are not transferable. However, a counter-balanced design was employed so that all students participated in the same number of synchronous and asynchronous discussions, and in an equal number of case discussions facilitated by peers or the instructor, before choosing their preferred format for the final two online case discussions. Such a design is ecologically valid and highly recommended when conducting classroom-based research. In addition, although most of the participants were familiar with asynchronous discussions and with the course management tool used, holding practice "chat" sessions using the Virtual Classroom and a practice asynchronous discussion using the Discussion Board feature of Blackboard 5.0 before beginning the online case discussions is also strongly recommended. Such practice eliminated technical problems that are often reported in the CMC literature and appeared to counteract possible novelty effects that can be a problem with CMC research (Clark, 1994). Another limitation of this study was the decision to make all initial and final survey responses anonymous, which prevented tracing responses of specific students to their discourse in the different discussion formats.

In the future, it would be valuable to replicate this study and to add conditions so that F2F, small-group case discussions are part of the research design. Also, using the testing features of Blackboard 5.0, rather than the anonymous survey feature, would allow better tracking of each individual's data collected throughout this study. Applying different data analysis protocols used by other CMC researchers to these data would also be worthwhile in order to compare findings directly to findings in other studies (Im & Lee, 2003). And finally, replicating this study with experienced teachers to see how their levels of critical reflection compare to that of novice, preservice teachers is of particular interest to teacher educators so that we can better understand how critical reflection develops and how teaching experience influences teachers' levels of critical reflection.

SUMMARY AND CONCLUSIONS

According to their final surveys, participants in this study learned to reflect critically about the interaction of classroom management and instruction, and found that online case discussions are viable tools for promoting critical reflection about issues related to classroom management. While instructors might prefer asynchronous or F2F case discussions, this study showed that today's students are comfortable with and can learn from synchronous discussions. However, as discussed earlier, it is important to provide adult students with choices for case discussion formats, as long as they are engaging in critical reflection about the issues in the cases.

Trends found by comparing the levels of critical reflection in participants' initial written case analyses to the discourse in the online case discussion discussions, which shifted from a teacher-focused to a more student-focused perspective, were especially satisfying given that the majority of the participants in this study were preparing to do student teaching or take lateral entry teaching positions the following semester. However, as some participants reported in their final surveys, it was not solely the online case discussions that served as catalysts for this shift. They also reported that course readings, other assignments, and their field experiences as interns or lateral entry teachers in real classrooms during this study also influenced their thinking about the interaction of classroom management and instruction. Therefore, we conclude that a web-supported course that uses case-based teaching methods and online case discussions has the potential to promote critical reflection in preservice teachers only if they are also getting relevant experiences in classrooms where they can apply what they are learning. We are not convinced that only discussing cases online without the opportunity to participate in real classrooms would have similar benefits, although this is certainly a question for additional research.

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