Preservice Teachers' Reflection on Clinical Experiences: A Comparison of Blog and Final Paper Assignments

Darci J. Harland
Joshua D. Wondra
Illinois State University

Abstract

*This study focused on the depth of reflection in the writing of preservice teachers who completed end-of-the-semester reflective papers or reflective blogs for undergraduate education course***s** *associated with clinical experiences. Coders rated the depth of reflection as one of four categories: non-reflection, understanding, reflection, or critical reflection. Our analyses revealed that preservice teachers who completed blogs showed higher levels of reflection in their writing compared to those who completed papers. Additionally, the blogs had the added advantage of being shorter by 1,000 words on average. We did not observe any relationship between peer or instructor feedback and overall depth of reflection. We then discuss the importance of teaching reflection and provide suggestions for implementing blog reflections in teacher education courses. (Keywords: blogging, reflection, journal writing, assessment, preservice teachers)*

Researchers and practitioners have long been interested in encouraging reflective practices in teacher education programs (Davis, 2006; Freese, 2006; García, Sánchez, & Escudero, 2006; Hatton & Smith, 1995; H. Lee, 2005; I. Lee, 2007; Shepherd & Hannafin, 2009; Smyth, 1989; Welch & James, 2007; Yost, Sentner, & Forlenza-Bailey, 2000). Although clarifying a definition of reflection is a challenging task (see Hatton & Smith, 1995), common themes involve reflection as a deliberate cognitive process that is used for the purpose of "analyzing connections and relationships" (Davis, 2006) between what is known and what is

experienced. For example, John Dewey (1933), a philosopher and psychologist, emphasized the importance of reflection, describing it as "the kind of thinking that consists of turning a subject over in the mind and giving it serious and consecutive consideration" (p. 3). As teacher educators, we ask that preservice teachers recount their classroom clinical experiences (either observations and/or teaching), compare them to what they know about teaching and learning, and then adjust their teaching accordingly. By mastering the art and skill of reflection, preservice teachers will increase their abilities to improve and modify their teaching. Our assumption is that teachers who have adopted reflective practices will be better equipped to meet their students' individual needs.

College instructors have long used reflective journals to teach reflective practices (Boud, 2001; Killeavy & Maloney, 2010; Gulwadi, 2009; Wong, Kember, Chung, & Yan, 1995). Ongoing journal assignments allow students to develop a regular habit of reflection throughout a semester. For preservice teachers in courses connected to clinical classroom experiences, this practice allows them to reflect in real time, rather than as a culmination of their classroom experiences, as might be done in another common reflective writing assignment, end-of-the-course reflective papers. Interestingly, research on reflective journaling has focused on identifying the presence of reflective content rather than determining the efficacy of journaling in comparison to other types of assignments (Gulwadi, 2009; Wong et al., 1995).

In addition to having students write periodically throughout a semester, instructors have discovered the power

of having students read one another's writing. Donald Finkel (2000), university professor and author of the book "Teaching with Your Mouth Shut," took a radical approach to help his students learn by way of writing. His students submitted their papers for review by their peers in a folder kept on reserve at the university library. Each student read and wrote responses to two peers' papers. He claimed the deep reflection and motivation that came from the peer interaction far outweighed any content he could have taught them.

With the development of free online tools and spaces, Finkel's emphasis on student–student interaction is becoming a reality in college classrooms across the globe. Weblogs or "blogs" are personal, "easily created, easily updateable websites that allow an author to publish instantly to the Internet" (Richardson, 2009, p. 17). In addition to static content, blogs provide a place for posting reflections with the purpose of engaging an online audience in conversation. Blogs easily incorporate both regular reflection and peer interaction, making them a good option for reflective writing within teacher education programs (Tan, 2006; Luehmann & Jeremiah, 2009).

Similar to studies on journaling in general, research on the use of blogs in university classrooms has typically focused on students' impressions and self-reports about the experience without comparing results to nonbloggers (e.g., Kuzu, 2007; Martindale & Wiley, 2005; Wassell & Crouch, 2008; Xie & Sharma, 2005; Yang, 2009). Thus, in our study we compared blogging students to students who wrote end-of-the-course reflective papers. Blogs may compare favorably to reflective papers for several reasons. First, blogging gives students

the opportunity to habitually reflect on their experiences and what they have learned. Second, peers can have the opportunity to read and respond to one another's reflections. This may encourage a sense of community with peers in the course (Palloff & Pratt, 1999; Rovai, 2002). Third, blogging provides instructors with the opportunity to give more immediate feedback to students (Hramiak, Boulton, & Irwin, 2009). Fourth, students can continue to view their blog reflections after they have submitted them to the instructor, whereas paper journals would be unavailable until the instructor graded and returned the assignments (Stiler & Philleo, 2003). Fifth, the blog produces a sense of ownership that may motivate students to use it for ongoing reflection even after the course has ended (Killeavy & Maloney, 2010).

Blogs provide a space for easy exchange of peer feedback and discussion, both of which have the potential to influence preservice teachers' reflection; however, the evidence for a relationship between peer feedback and reflection is somewhat mixed. Xie, Ke, and Sharma (2008) found that students who were partnered showed lower levels of reflection than students without partners. In contrast, Hatton and Smith (1995) and Xie and Sharma (2005) found that peer feedback helped students with their reflections. Additionally, Martindale and Wiley (2005) reported that students wrote more after peers began to read their entries.

In addition to choosing what kind of reflective writing to assign, instructors face the challenge of determining how to assess the writing. Kember and his colleagues (Kember et al., 1999; Kember, McKay, Sinclair, & Wong, 2008; Wong, Kember, Chung, & Yan, 1995) conducted research on assessing reflection from student writing. This line of research ended in a four-category scheme for assessing reflection (Kember et al., 2008). The categories proceed from low to high levels of reflection:

1. Habitual Action or Nonreflection: Reproducing material without showing evidence of understanding it

2. Understanding: Grasp of material without relating it to experience
3. Reflection: Material that has been learned is related to experience
4. Critical Reflection: Shows evidence of a change in perspective or behavior

We modified Kember's framework to develop a depth of reflection (DoR) assessment tool that would specifically measure preservice teachers' reflections.

This study sought to answer three research questions:

1. Will preservice teachers who complete blog posts display greater DoR compared to preservice teachers who complete final paper reflections?
2. Do blogs or papers that are longer (measured by word count) show greater DoR?
3. Do blogs that receive more student or instructor responses show greater DoR?

Methods

Context of the Study

This study was conducted at Illinois State University and involved collecting reflective writing completed within the curriculum and instruction (C&I) course sequence. In addition to content-specific methods courses taken throughout their undergraduate program, all education majors take courses within the College of Education. Each of the courses selected for this study included clinical experiences as well as reflective writing assignments that were aligned with those classroom observations and/or teaching experiences. A total of nine sections of three different C&I courses and three instructors (including the first author) were invited to be a part of the study. Although the instructors had different approaches for encouraging reflective writing, each asked students to share their clinical experiences, make connections between course content and their observations, and apply what they had learned to their future teaching practices. All of the courses in this study included a clinical, classroom experience and were taken by middle or secondary preservice teachers.

Two types of writing were collected: reflections written in end-of-the-course formal papers and reflections written in blog posts. Some instructors assigned formal papers, and others assigned blog reflections. The preservice teachers who wrote papers were given various prompts to focus their reflection on the relationship between clinical experiences and course concepts. Therefore, students were asked to observe specific aspects of the classroom and then reflect on these topics specifically. Although these papers were culminating assessments with a deadline near the end of the semester, students had the option to write various mini-reflections as soon as they observed an assigned topic. The bloggers, on the other hand, were not given any prompts, **but** were instructed to post a total of five reflections throughout the semester. They also were required to read and respond to each other's posts.

A total of 67 preservice teachers participated in the study; 24 wrote reflective papers, and 43 reflected on blog posts. The preservice teachers were enrolled in a C&I course between the Summer 2008 and Spring 2010 terms.

Coding Depth of Reflection into Four Categories

We developed a reflection assessment tool, Framework of Four Levels of Reflection for Teacher Education (see Appendix), based on an extensive body of literature (Kember et al., 2008; Wong et al., 1995; Hatton & Smith 1995; Gulwadi, 2009; Spalding & Wilson 2002). We modified the four level structures from Kember et al. (2008) and Hatton and Smith (1995) to fit the construct of preservice teacher reflections on clinical experiences. Previous studies showed that having too many categories makes it difficult for coders to reach agreements when coding text segments (Kember et al., 1999) and having too few categories does not allow for enough differentiation between the types of reflection (Kember et al., 1995). Therefore, four levels were chosen, including a nonreflective level, two intermediate levels, and the highest level, Critical Reflection.

Level 1: Nonreflection (descriptive). For this study, the first, nonreflective level was attributed to writing that merely described a preservice teacher's clinical experience and made no (or a very weak) attempt to connect lesson effectiveness with teaching methods (see Appendix, p. 133). The following two examples of preservice teacher writing were coded as Level 1 reflections:

> He [the teacher] was able to joke around with the students and there were a few students who like to joke with him. He does not allow them to get too carried away and will redirect them to the class if they get too far off topic. (Student #2014)

> When the students did not understand a concept or phrase, [the teacher] paused to write the question on the board, ask if anyone else knew the answer, and proceeded to confirm the answer and explain why. (Student #1058)

Level 2: Understanding. Writing in the Understanding category included descriptions of clinical experiences in light of course content and the identification of relationships between methods and effectiveness. Entries coded at Level 2 often described "a-ha" moments that reinforced course content; however, there was no analysis of how that experience would translate into future educational practice. The following excerpt was coded at Level 2 due to the justification for the teaching methods used:

> I think this turned out to be an excellent way of getting the kids involved and excited about the book because they couldn't just sit there pretending to pay attention... they HAD to be involved. (Student #2001)

The next quote shows the trite and cliché-entrenched language often used at this second level of reflection:

> I have learned that consistency is key, so by staying consistent we are setting a positive role model for our students. This skill will also prove to our students that we mean what we say, and will most likely lead to the students taking us more seriously. (Student #1080)

Level 3: Reflection. The third level, Reflection, was assigned to writing that used clinical experiences to shape teaching philosophy and practice. Writing at this level included direct application of clinical observations to future classroom practice. In the following text segment, the preservice teacher analyzed the methods used in the lesson and listed ways the lesson might be improved and applied to other content areas:

> Group work can also be done as a think-pair-share activity. This could have also been implemented in our lesson. We could have had them work on their own first, then discussed their answers with a partner, and then came together as a class and discussed final answers. This method can also be used in any other content area classroom. For example, in a history class… (Student #1062)

The following Level 3 reflection analyzed a classroom experience, explaining how it connects to her personal philosophy and future teaching practice:

> I've thought a lot about what this teacher said since that class period and I think I disagree with her. I agree that in some instances reading aloud is not necessary. However, I think it can help the students in so many ways. Reading aloud makes the students listen to how words are pronounced…. (Student #2015)

Level 4: Critical Reflection. Only if preservice teachers showed evidence of a change in basic assumptions and conceptual frameworks based on their clinical experiences would their writing be coded at Level 4: Critical Reflection. Although no reflections in this study were coded at Level 4, an example might have been:

> "The classroom experience I had last week has completely changed how I view my role in the classroom," or "Before I had actually taught a lesson, I viewed students more as…, and now I see it entirely differently. I find that I am having to re-evaluate how I will approach teaching in the future." The key to being coded at Level 4 was an indication of a shift in thinking and a philosophical explanation of the newly formed belief.

Procedure

After we developed the assessment tool Framework of Four Levels of Reflection for Teacher Education, we prepared student reflective papers for analysis. We converted both end-of-the-course papers and blogs into digital formats before they were coded. We arranged blog entries by the same author in chronological order in a single document.

Next, we fine-tuned the reflection assessment instrument in a pilot stage to increase the consistency of raters' coding. Each of the four coders received the assessment instrument, had a discussion about the description of the four levels of reflection, and asked any questions for clarification at that time. After the coders independently coded five writing samples, they met to discuss the results as a group until consensus was reached regarding which DoR code each writing sample deserved. With feedback from the coders, we made minor changes to the DoR assessment tool. Most of the changes were strictly to clarify verbiage within the category. Additionally, coders helped to reorganize the reflection descriptors into smaller subcategories, which described specific preservice teacher issues (see the Appendix, p. 133).

The pilot process also helped the coders to agree on specific coding criteria. The first criterion was that if a piece of writing exhibited any aspect of higher-level reflection, then it would be coded at the higher level. Therefore, the overall DoR level was based on the highest level of reflection identified at any point in a paper. However, because the five blog posts were written as separate writings, the coders gave each post its own DoR

code. The highest DoR code among the five was considered its overall DoR score. Thus, we followed the method recommended by Kember et al. (2008) to code at the paper level rather than at the text segment level. This helped the inter-rater reliability of the coding process, because although coders may not have agreed on a specific text segment, after discussion they could always reach 100% agreement on an overall DoR score. For the blogging assignments, we included response posts from peers in the document that we gave to the coders, but the coders did not assign them DoR codes. If the author of the blog responded to the instructor or to a peer who had commented on his/her post, the coders considered this response an extension of the same post and used it to determine the DoR code that should be assigned to the entire entry.

Second, coders agreed to label text segments with the categories and subcategories found in the reflection assessment tool while they were reading. We decided that writing both a reflection number and letter in the margin after a text segment would aid discussion if overall codes did not have 100% agreement.

All four coders read and assigned DoR codes to the 67 pieces of reflective writing. Then they met as a group to compare the scores. If the overall DoR score was not unanimous, the group discussed individual text segments. After discussion, the group always reached full agreement. Similar methods have been used in other studies (e.g., Gulwadi, 2009).

Results

Once the coders agreed on the DoR score for each piece of reflective writing, we compared the DoR and length of writing were compared between those who wrote papers (n = 24) and those who posted to blogs (n = 43). Furthermore, we looked for relationships between DoR codes assigned to blogs and number of responses from instructors, peers, and the blog authors.

Frequency of Depth of Reflection
Table 1 displays the frequencies and percentages of preservice teachers in

Table 1. Levels of Depth of Reflection (DoR) for Paper Writers Compared to Bloggers

Writers	Level 1: Nonreflection	Level 2: Understanding	Level 3: Reflection	Level 4: Critical Reflection
All writers (N = 67)	10. 4 % (*n* = 7)	67.2% (*n* = 45)	22.4% (*n* = 15)	0%
Paper-writers (*n* = 24)	16.7% (*n* = 4)	75.0% (*n* = 18)	8.3% (*n* = 2)	0%
Bloggers (*n* = 43)	7.0% (*n* = 3)	62.8% (*n* = 27)	30.2% (*n* = 13)	0%

the overall sample who received each of the DoR codes as well as the frequencies and percentages for those who wrote papers or blogs. The second DoR level, Understanding, was most prevalent for both blog and paper reflections, with 75% of papers and 63% of blogs reaching Level 2. Thirty percent of blogging preservice teachers were assigned codes at Level 3 (Reflection), compared to only 8% of those who wrote papers. The Nonreflection level (Level 1) was evident in 7% of the blog reflections and 17% of paper reflections. No preservice teachers received a DoR code at the highest level, Critical Reflection.

Blogs vs. Papers
The average DoR code for the overall sample was 2.12 (*SD* = .56). The average DoR for bloggers was 2.23 (*SD* = .57), whereas the average DoR for those who completed papers was 1.92 (*SD* = .50). DoR was significantly greater for preservice teachers who completed blog entries compared to those who wrote papers, *t*(65) = 2.26, *p* = .027.

Word Count
The bloggers wrote an average of 2,053.72 words (*SD* = 760.56), whereas those who completed papers wrote an average of 3,161.50 words (*SD* = 929.90). This highlights a highly significant difference between the total words written by both groups; paper writers wrote more words than bloggers, *t*(65) = 5.27, *p* < .001.

A comparison of DoR levels and word count showed no significant correlation, r(65) = .02, *p* = .88. Non-significant correlations between DoR levels and word count were also observed when examining only paper writers (*r*[22] = .14, *p* = .52) and when examining only bloggers (*r*[41] = .25, *p* = .10).

Frequency of Blog Responses
For preservice teachers who completed blog entries, there was a significant negative correlation between the number of instructor responses (*M* = 1.95, *SD* = 1.36) and the average DoR (*M* = 1.69, *SD* = .41) across all entries, *r*(41) = -.36, *p* = .018. There were, however, no significant correlations between overall DoR levels and the number of peer responses (*M* = 11.09, *SD* = 4.04), the number of author responses to their own blog posts (*M* = .49, *SD* = .96), or the number of instructor responses (*M* = 1.95, *SD* = 1.36), *r*s(41) = .01, -.21, -.05, *p*s = .94, .17, .77, respectively.

Discussion
In this study, we were investigating whether blog reflections would show a greater DoR than end-of-the-semester paper reflections. Our results indicated that not only do preservice teachers reach a greater DoR in blogs, but they do so by writing fewer words. These findings answered both our first and second research questions.

These results indicate that reflections posted to blogs over the course of the semester are more effective than final papers for reflective assignments. One explanation for this difference is that the extra practice with reflection required at regular successive intervals makes reflections deeper (Xie & Sharma, 2008). If this is the case, then multiple short paper assignments could produce more reflective writing compared to one-time final papers and equally reflective writing compared to blog assignments. However, the use of blogs may be preferable for other reasons, such as providing a peer audience for the reflections, saving ink and paper, or saving time for both preservice teachers and instructors in writing and reading the assignments (the blogs were 1,000 words shorter than papers

on average). Alternatively, another explanation for why blogs may have been more reflective was because they chose their topics of reflection, whereas their counterparts who completed final papers were assigned specific reflection topics. Assigning specific topics for blog reflections may eliminate their advantage in producing reflective writing. A third possible explanation for the differences in reflection is that preservice teachers who wrote blogs knew that they would have an audience of peers, whereas those who wrote reflective papers knew that only the instructor would read their writing. Writing for an "external audience can profoundly shape" what is written and even what students may allow themselves to consider writing (Boud, 2001, p. 15). Therefore, future research should explore the processes that mediate the differences in reflection produced by blogging assignments and reflective papers.

The purpose of the third research question was to highlight any relationship between DoR and the number of student or instructor responses to blog posts. We did not find evidence that more peer responses foster greater DoR. In addition, we did not corroborate the finding that peer responses are related to less reflection (Xie & Sharma, 2008). If peer responses dramatically change the DoR, then this effect may be conditional on the content of the responses.

The greater number of instructor responses to individual blog posts that were written at a lower DoR level may hint at instructors' tendencies to respond more frequently to students who are struggling with their reflections. In other words, instructors may have felt a greater need to encourage students whose reflections were less thorough. This technique may have helped students who were writing at lower DoR levels early in the semester to achieve higher levels after they received instructor feedback, as the number of instructor responses was uncorrelated with the final reflection scores when based on the highest reflection code across all blog entries instead of individual blog posts.

Implications

The interactive writing community that Donald Finkel worked so hard to create among his students is now accessible technologically. The ease of posting reflections on blog sites replaces a trip to the library to put papers on reserve; however, the purpose of writing remains the same. Students must think about the power of writing as " 'thinking on paper,' not just as a means to report the results of their thinking, but as a means to extend, develop, refine, and crystallize their thinking." (Finkel, 2000, p. 79). Future teachers should approach their writing as a way to examine their thinking and clinical experiences. The reflective process should challenge preservice teachers' own thinking, misconceptions about teaching and learning, and the thinking of their classmates.

As teacher educators, we need to be mindful of the writing assignments we give to our students as they complete their clinical experiences. If the sole purpose of the assignment is to create a record of accountability, then writing at a nonreflective level is acceptable. It is our assumption, however, that writing needs to move beyond a description of classroom experience and should show evidence of thinking at a higher DoR. None of the preservice teachers in this study achieved the highest level of reflection, emphasizing the importance that we "teach—not simply assign—reflection, if we want preservice teachers to become more reflective" (Spalding & Wilson, 2002, p. 1415).

The results of our study lend evidence to the idea that providing preservice teachers with opportunities to reflect systematically and publically among their peers via blogs increases their depth of reflection. To tap into the full potential of blogging, instructors should discuss with preservice teachers the purpose of writing. Before implementing blogging as part of a course, instructors might consider providing and discussing the reflection assessment tool used in this study, as well as examples of appropriate, high-quality posts and response posts, in hopes of fostering higher levels of DoR.

Most of the preservice teachers in this study reflected at an Understanding level, at which their writing merely confirmed what they learned in their coursework. Although this connection is crucial, creating reflective environments via blogs may help shift from an audience of one to an audience of peers. This, in turn, has the potential to provide preservice teachers with a place where they feel comfortable admitting their weaknesses and insecurities. Instructors can create environments in which future teachers use the writing process to examine their own assumptions about teaching and learning and turn lessons learned into effective teaching practice.

Author Notes

Darci J. Harland is the assistant director of research at the Center for Mathematics, Science, and Technology (CeMaST) at Illinois State University. Her educational experience ranges from undergraduate and graduate education and biology courses to high school and middle school English and science courses. Her research interests include the influence of personality on online and face-to-face classroom participation, the use of digital media as a tool for reflection, the long-term impact of scientific research performed by high school and undergraduate students, and the level inquiry in on-to-one laptop classrooms. Please address correspondence regarding this article to Dr. Darci J. Harland, Illinois State University, Center for Mathematics, Science, and Technology, Campus Box 5960, 210 W. Mulberry St., Normal, IL 61790. E-mail: djharland@ilstu.edu

Joshua D. Wondra is a graduate student in social and quantitative psychology at Illinois State University. He worked as a research assistant at the Center for Mathematics, Science, and Technology during the summer of 2010. His current research interests are social psychology interventions, motivation, effective behavior, and empathy. Please address correspondence regarding this article to Josh Wondra at joshwondra@gmail.com.

References

Boud, D. (2001). Using journal writing to enhance reflective practice. N*ew Directions for Adult and Continuing Education, 90*, 9–16.

Davis, E. A. (2006). Characterizing productive reflection among preservice elementary teachers: Seeing what matters. *Teaching and Teacher Education, 22*, 281–301.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process.* New York: DC Health.

Finkel, D. L. (2000). *Teaching with your mouth shut.* Portsmouth, NH: Boynton/Cook Publishers, Inc.

Freese, A. R. (2006). Reframing one's teaching: Discovering our teacher selves through

reflection and inquiry. *Teaching and Teacher Education, 22,* 100–119.

Garcia, M., Sanchez, V., & Escudero, I. (2006). Learning through reflection in mathematics teacher education. *Educational Studies in Mathematics, 64*, 1–17.

Gulwadi, B. B. (2009). Using reflective journals in a sustainable design studio. *International Journal of Sustainability in Higher Education, 10*(1), 43–54.

Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching & Teacher Education, 11*(1), 33–48.

Hramiak, A., Boulton, H., & Irwin, B. (2009). Trainee teachers' use of blogs as private reflections for professional development. *Learning, Media and Technology, 34*(3), 11.

Kember, D., Jones, A., Loke, A., Jan, M., Sinclair, K., Tse, H., et al. (1999). Determining the level of reflective thinking from students' written journals using a coding scheme based on the work of Mezirow. *International Journal of Lifelong Education, 18*(1), 18–29.

Kember, D., McKay, J., Sinclair, K., & Wong, F. K. Y. (2008). A four-category scheme for coding and assessing the level of reflection in written work. *Assessment and Evaluation in Higher Education, 33*(4), 369–378.

Killeavy, M., & Maloney, A. (2010). Reflection in a social space: Can blogging support reflective practice for beginning teachers? *Teaching & Teacher Education, 26*(4), 7.

Kuzu, A. (2007). Views of pre-service teachers on blog use for instruction and social interaction. *Turkish Online Journal of Distance Education, 8*(3), 34–51.

Lee, H.-J. (2005). Understanding and assessing preservice teachers' reflective thinking. *Teaching and Teacher Education, 21*(6), 17.

Lee, I. (2007). Preparing preservice English teachers for reflective practice. *ELT Journal, 61*(4), 321–329.

Luehmann, A. L., & Jeremiah, F. (2009). How can blogging help teachers realize the goals of reform-based science instruction? A study of nine classroom blogs. *Journal of Science Education and Technology, 18*(3), 275–290.

Martindale, T., & Wiley, D. A. (2005). Using weblogs in scholarship and teaching. *TechTrends, 49*(2), 55–61.

Palloff, R., M., & Pratt, K. (1999). *Building learning communities in cyberspace.* San Francisco: Jossey-Bass Publishers.

Richardson, W. (2009). *Blogs, wikis, podcasts, and other powerful web tools for classrooms.* Thousand Oaks: Corwin Press.

Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education, 5*, 319–332.

Sheperd, C., & Hannafin, M. (2009). Beyond recollection: Reexamining preservice teacher practices using structured evidence, analysis, and reflection. *Journal of Technology and Teacher Education, 17*(2), 229–251.

Smyth, J. (1989). Developing and sustaining critical reflection in teacher education. *Journal of Teacher Education, 40*(2), 2–9.

Spalding, E., & Wilson, A. (2002). Demystifying Reflection: A study of pedagogical strategies that encourage reflective journal writing. *Teachers College Record, 104*(7), 1393–1422.

Stiler, G. M., & Philleo, T. (2003). Blogging and blogspots: An alternative format for encouraging reflective practice among preservice teachers. *Education, 123*(4), 9.

Tan, A. (2006). *Does scaffolded blogging promote preservice teacher reflection? Examining the relationships between learning tool and scaffolding in a blended learning environment.* Unpublished Dissertation, Indiana University, Bloomington.

Wassell, B., & Crouch, C. (2008). Fostering connections between multicultural education and technology: Incoporating weblogs into preservice teacher education. *Journal of Technology and Teacher Education, 16*(2), 211–232.

Welch, M., & James, R. C. (2007). An investigation on the impact of guided reflection technique in service-learning courses to prepare special educators. *Teacher Education and Special Education, 30*(4), 276–285.

Wong, F., Kember, D., Chung, L. Y. F., & Yan, L. (1995). Assessing the level of student reflection from reflective journals. *Journal of Advanced Nursing, 22*, 48–56.

Xie, Y., Ke, F., & Sharma, P. (2008). The effect of peer feedback for blogging on college students' reflective learning processes. *The Internet and Higher Education, 11*, 18–24.

Xie, Y., & Sharma, P. (2005). *Students' lived experience of using weblogs in a class: An exploratory study.* Paper presented at the Association for Educational Communications and Technology.

Yang, S.-H. (2009). Using blogs to enhance critical reflection and community of practice. *Journal of Educational Technology & Society, 12*(2), 11–21.

Yost, D. S., Sentner, S. M., & Forlenza-Bailey, A. (2000). An examination of the construct of critical reflection: Implications for teacher education programming in the 21st century. *Journal of Teacher Education, 51*(1), 39–49.

Appendix

Framework of Four Levels of Reflection for Teacher Education

Level	Nature of Reflection	Reflection descriptors
4	Critical Reflection Critically reviews assumptions, and a new conceptual framework is formed.	a) Teacher (and/or student) roles are critically analyzed. b) Experiences are used as examples for a fundamental shift in thinking, committed to changing practice. c) Reflection is internalized, showing evidence of a change in perspective over a fundamental teaching belief. d) Connections between lesson effectiveness, and teaching methods may include dissatisfaction with existing frameworks, but must also explain new framework.
3	Reflection Course content or clinical experiences frame content and help shape philosophy and determine future practice.	a) Teacher (and/or student) roles are analyzed, exploring possible reasons and explanations for experiences. b) Experiences are used to evaluate content of the course, in attempt to determine application for future classroom. c) Reflection is personalized; addressing affect on teaching philosophy or specific future teaching practices. d) Strong connections made between lesson effectiveness and teaching methods while providing alternative methods for improvement.
2	Understanding Coursework content or clinical experiences are described in light of course content; correlations made between teaching methods and effectiveness.	a) Teacher (and/or student) roles are analyzed, giving reasons for actions taken, but with limited justification. b) Experiences are used to support and/or explain course content. But reflection might be trite, cliché or generalized. c) Reflections are rationalized based on personal experiences/ observations d) Connects lesson effectiveness w/ teaching methods
1	Nonreflection (Descriptive) Coursework content or clinical experiences are described without trying to understand it.	a) Teacher (and/or student) roles are reported and described. b) May voice frustration or excitement but without forming a view and trying to understand experiences or connect it to course content. c) Responses are interpreted in light of personal worries and previous experience. d) Weak or no attempt to connect lesson effectiveness w/ teaching methods. (Weak = Less then 3 statements)