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# Using Online Scaffolds to Enhance Preservice Teachers' Reflective Journal Writing: A Qualitative Analysis

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Journal writing has the potential to develop preservice teachers' reflective thinking habits and skills. Recently, the growth of computer technology renders it possible for preservice teachers to write journals online. The Professional Accountability Support System (PASS-PORT), for example, allows preservice teachers to write journals about their professional and academic experiences. However, PASS-PORT currently does not have any embedded scaffolds to support their journal writing. This qualitative study was conducted: a) to explore the difficulties preservice teachers have in their reflection writing; and b) to identify the types of computer-based scaffolds that may help alleviate the aforementioned difficulty.

Keywords: Reflective Journal Writing, Reflectivity Level, Reflectivity Development, Scaffolding, Computer-Based Scaffolding

## INTRODUCTION

Recent years have witnessed a sustained emergence of research on and development of computer-based educational systems tailored for teacher preparation. Some of these systems include Knowledge Loom by Brown University, Inquiry Learning Forum (ILF) at Indiana University, and the STAR.Legacy program at Vanderbilt University. Within these systems, a variety of electronic tools are integrated to promote preservice teachers' reflective practice. Some common examples of electronic tools that can promote preservice teachers' individual reflective practice are: E-journals, web logs (blogs), and digital video. Some common examples of electronic tools that can support preservice teachers' social reflective practice include: bulletin boards, chat rooms, listservs, blogs,

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and digital video (Calandra & Lai, 2005). Together with these electronic tools, literature has also indicated that computer technology may provide scaffolding tools to support preservice teachers' reflective practice. These scaffolds include instructional scaffolds (Land & Zembal-Saul, 2003), embedded annotations (Derry, Seymour, Steinkuehler, Lee, & Siegel, 2004), process display, process modeling, reflective social discourse, and prompts (Bean & Stevens, 2002; Lin, Hmelo, Kinzer, & Secules, 1999), to name just a few.

This study focuses on preservice teachers' online, reflective journal writing in the Professional Accountability Support System (PASS-PORT). PASS-PORT (2002) is an assessment system that provides teacher candidates, university teacher educators and administrative staff a tool to gather, demonstrate and evaluate the performance data on preservice teachers and professional teachers during the first three years of their service after graduation. Portfolio building is an integral component of the system. During the portfolio building process, PASS-PORT requires preservice teachers to write reflective journals about their professional and academic experiences, (i.e., their classroom practice teaching experiences). Despite the growing success of PASS-PORT, the first author's conversations with teacher educators who worked with PASS-PORT at a major University in the Southeast revealed that preservice teachers' reflections were often purely descriptive, shallow, unfocused, and lacking in detail. These results, although not unusual from novice teachers (e.g., Hatton & Smith, 1995; Neijaard, Stellingwerf, & Verloopl, 1997; Pultorak, 1996; Surbeck, Han, & Moyer, 1991; Ward & McCotter, 2004), have not been desirable. Moreover, researchers have suggested that a particular emphasis be placed on developing preservice teachers' critical reflection skills, because reflection is effective only when it incorporates moral, political, social, and ethical criteria into the discourse about their practical actions in education (Sparks-Langer & Colton, 1991; Zeichner & Liston, 1987).

## PURPOSES AND RESEARCH QUESTIONS

The first purpose of the study was to explore the difficulties preservice teachers had during their reflective journal writings using PASS-PORT. The second purpose of the study was to explore participants' perceptions of a selected set of prototypical computer-based scaffolds that may assist them. Four research questions guided the study:

1. With what aspects of reflective journal writing do preservice teachers need support?
2. What strategies or scaffolds have teacher educators successfully used in the past to improve preservice teachers' reflective journal writing?
3. What computer-based strategies or scaffolds do teacher educators and preservice teachers suggest to support preservice teachers' reflective journal writing?
4. What are teacher educators' and preservice teachers' perceptions of a set of prototypical computer-based scaffolding tools?

## LITERATURE REVIEW

### *REFLECTION IN TEACHER PREPARATION*

Educational theorists have long recognized the importance of reflection in teacher preparation (Dewey, 1933; Schön, 1987). In recent years, teacher professionalization has become one of the agendas that drive reforms in teacher education at national and/or

state levels. The professionalization agenda for reforming teacher education endeavors to establish a professional knowledge base for teaching and teacher education (Cochran-Smith, 2001). Preservice teachers' ability to reflect is deemed an integral part of the professionalization agenda, and the National Council of Accreditation of Teacher Education (2006) has established standards that call for teacher candidates to demonstrate the ability to reflect.

Reflection is perceived as the "active, persistent and careful consideration of any belief or supposed form of knowledge" (Dewey, 1933, p. 9), and is "deliberate thinking about action with a view to its improvement" (Hatton & Smith, 1995, p.40). Schön (1987) introduced the concept of reflective practitioner, and identified two types of reflection: reflection-on-action and reflection-in-action, both reactive in nature. Reflection-on-action refers to retrospective thinking after the event. This is when the practitioner explores what happened during the event and their motivations and the rationale for acting in a certain manner. Reflection-in-action occurs during the event. It involves thinking about the current experiences, examining the feelings incurred, and evaluating the theories in use. Whereas, reflection-for-action (Killion & Todnem, 1991) focuses more on the desired outcome to guide future action, thus is more proactive in nature. The continuum of reflection-in-action, reflection-on-action, and reflection-for-action makes reflection "a process that encompasses all time designations, past, present, and future simultaneously." (Killion & Todnem, 1991, p. 15)

van Manen (1977) developed a hierarchical model to classify levels of reflectivity: technical reflection, practical reflection, and critical reflection. The first level, technical reflection, is concerned with the application of educational knowledge to attain ends accepted as given. At this level, neither the ends nor the educational contexts are treated as problematic. In the practical reflection level, every action is seen as linked to particular value commitments. The actor interprets his/her individual and cultural experiences, meanings, perceptions, assumptions, prejudgments and presuppositions to better understand nature and quality of the educational experience. In the last level of critical reflection, both teaching and the contexts of teaching are viewed as problematic as the actor tries to incorporate the consideration of political, moral, social, and ethical criteria to evaluate his/her experiences. The three levels of reflectivity parallel the development path of an individual teacher from novice to expert or master teacher (Reagan, 1993). After synthesizing reflection literature, Lee (2005) discovered that educators generally use the terms practical/technical, contextual/deliberative/conceptual, and critical/dialectical/transformative to identify the different domains of reflective thinking, much in align with van Manen's classification.

Research reveals that reflection level in preservice teachers' journal writings was primarily descriptive or technical rather than critical/transformative (Hatton & Smith, 1995; Pultorak, 1996; Risko, Roskos, & Vukelich, 1999). Moreover, researchers have suggested that teacher education programs emphasize the development of preservice teachers' critical reflection skills (Sparks-Langer & Colton, 1991; Zeichner & Liston, 1987), because critical reflection is considered the distinguishing attribute of reflective practitioners (Larrivee, 2000).

*COMPUTER-BASED SCAFFOLDING*

The concept of scaffolding originates from Vygotsky (1978) who called for providing supportive assistance to a learner within the parameters of his/her zone of proximal development. Traditionally, scaffolding occurs through personal interactions between students and instructors. The famous Socratic dialogues are a prime example. Recently, the scaffolding metaphor has been used by researchers to describe features and

functionality of educational software that help users to complete certain tasks (Sherin, Reiser, & Edelson, 2004).

Hannafin, Land, and Oliver (1999) categorized four types of scaffolding strategies in computer-based learning environments: (a) conceptual scaffolds guide learners in what to consider, and help them reason through complex problems and concepts. Conceptual scaffolds can be made available through explicit hints and prompts, and through structure maps and content trees. (b) Metacognitive scaffolds provide guidance on how to think about the problem under study. They can be either domain-specific, such as where enabling contexts are externally induced, or more generic where the enabling context is not known in advance. (c) Procedural scaffolds provide guidance on how to utilize available resources and tools. They orient learners/performers to system features and functions, or aid them while navigating the system. The scaffolds can be achieved by providing tutoring on system functions and features, or by providing a "balloon" or "pop-up" help to define and explain system properties. (d) Strategic scaffolds suggest alternative approaches during analysis, planning, strategy, and tactical decision-making. They can be achieved by enabling intelligent responses to system use, suggesting alternative methods or procedures, providing start-up questions to be considered, and providing advice from experts. Meanwhile, research has demonstrated that computer-based scaffolding mechanisms can be embedded in aforementioned electronic tools to enhance preservice teachers' reflective practice. For example, Lin, Hmelo, Kinzer, and Secules (1999) identified four types of computer-based scaffolding strategies that can support preservice teachers' reflection in technology-enhanced environments: process prompts, process displays, process modeling, and reflective social discourse.

## METHODS

### *DESIGN*

Given the investigative nature of the research questions, the study adopted a qualitative case study approach to gather and analyze data. The four research questions all focus on exploring perceptions or suggestions from teacher educators and preservice teachers. Qualitative case study can yield an in-depth and comprehensive analysis of a limited number of participants in their natural setting (Stake, 1995). Therefore, via one-on-one interviews, we intended to examine participants' perceptions of the difficulties preservice teachers encountered while writing their journals and the strategies teacher educators adopted to support preservice teachers' journal writing. Moreover, from analyzing participants' perceptions of the prototypes, we intended to identify computer-based scaffolds that had the potential to enhance preservice teachers' reflectivity development as evidenced in their journal writings in PASS-PORT.

### *PARTICIPANTS*

The participants were drawn from teacher educators and preservice teachers in a teacher preparation program at a southern university in the United States. The authors followed a purposeful sampling strategy (Creswell, 2005) to select five female teacher educators (See Table 1) and six female preservice teachers (See Table 2) to participate in the study. To ensure a well-represented sample, the authors considered a few factors including teaching experience, grade levels, field of study, familiarity with computer-based learning systems, and ethnicity. For the purpose of assuring anonymity, all names used were pseudonyms.

*Table 1. Teacher Educator Participants*

| Participant | Years of Faculty | Content Area | PASS-PORT Experience (yrs) | Frequency of PASS-PORT Usage | Frequency of Journal Writing Requirement |
|---|---|---|---|---|---|
| Ms. Lake | 3.5 | Instructional Technology | 3.5 | Very Often | Very Often |
| Dr. Muzzie | 2 | Early Childhood Ed. | 2 | Very Often | Sometimes |
| Dr. Barbara | 8 | Social Studies | 3.5 | Sometimes | Very Often |
| Dr. Jimmy | 6 | Science | 3.5 | Very Often | Very Often |
| Dr. Kathy | 3 | Gifted Ed. | 2.5 | Occasionally | Sometimes |

*Table 2. Preservice Teacher Participants*

| Participant | Status | Content Area | PASS-PORT Experience (yrs) | Frequency of PASS-PORT Requirement | Frequency of Journal Writing Requirement |
|---|---|---|---|---|---|
| Molly | Junior | Early Childhood Ed. | 2 | Very Often | Very Often |
| Kerri | Junior | Early Childhood Ed. | 3 | Very Often | Sometimes |
| Sarah | Senior | Math & Business | 3 | Very Often | Occasionally |
| Megan | Master | Math | 2 | Occasionally | Sometimes |
| Nicole | Senior | Language and Arts | 3 | Sometimes | Sometimes |
| Rose | Senior | Early Childhood Ed. | 1 | Very Often | Very Often |

*PROTOTYPICAL SCAFFOLDS*

Through literature review, the authors identified five computer-based scaffolding tools that can be used to facilitate and enhance preservice teachers' reflective writing: question prompts (Bean & Stevens, 2002; Lin & Lehman, 1999), templates (Hoban, 2000), process display (Bell, 1997; Lin & Lehman, 1999), modeling (Gorrell & Capron, 1990; Pedersen & Liu, 2002), and resources (Hill & Hannafin, 2001). The researchers used the software tools *Dreamweaver*, *Visio*, and *Microsoft Word* to develop prototypes of the five computer-based scaffolding tools (see Figure 1 - 4). For the last strategy, resources as a journal writing scaffold, we provided the conceptual framework developed by Colton and Sparks-Langer (1993), first with a brief introduction of its three overarching components, followed by the figure of framework for teacher reflection (p. 48).

*Figure 1*: Question Prompt as a Journal Writing Scaffold

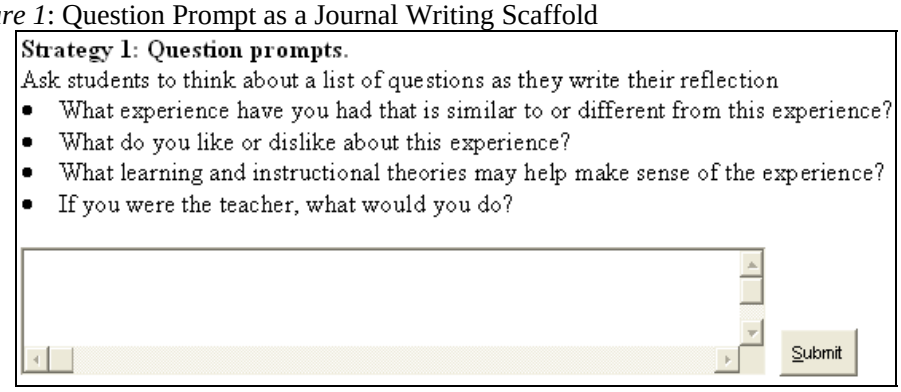



*Figure 2.* Template as a Journal Writing Scaffold

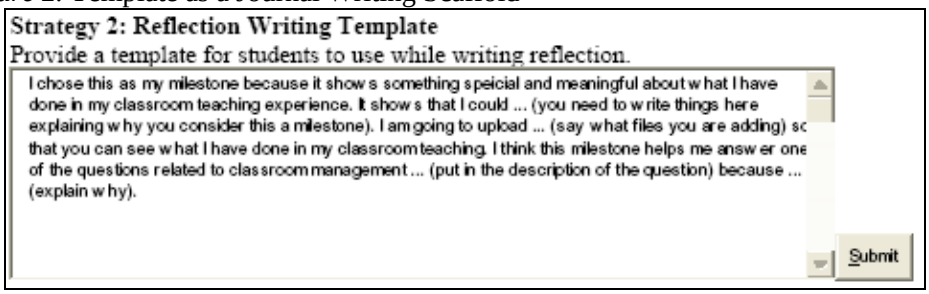



*Figure 3.* Process Display as a Journal Writing Scaffold

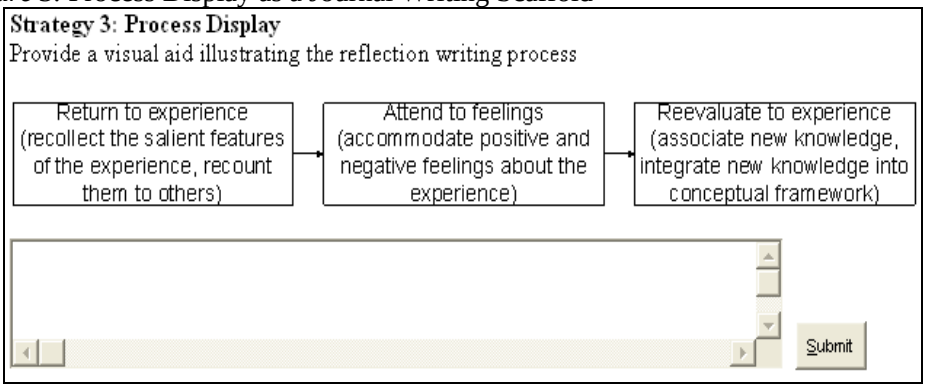
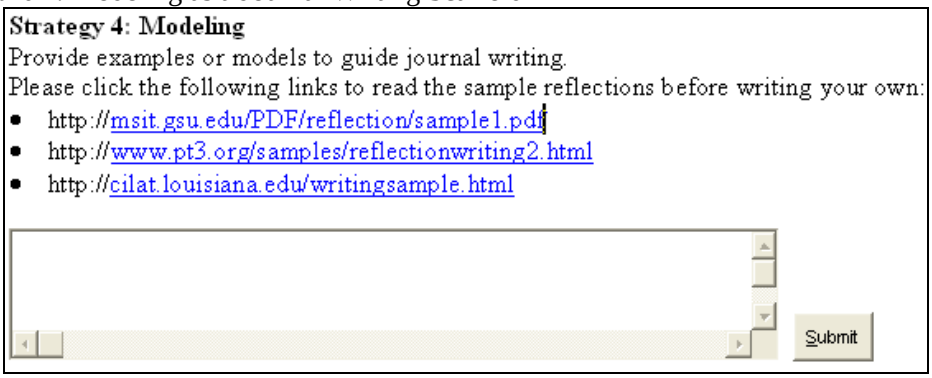



*Figure 4.* Modeling as a Journal Writing Scaffold



*PROCEDURE*

Following an interview protocol to guide the interview process and using a digital recorder, the first author conducted one-time interviews with the participants during two consecutive semesters. The length of interviews ranged from 20 to 50 minutes.

During the interviews, the first author asked the participants to share their experiences with preservice teachers' reflective journal writing, using problems they usually encountered as the context. Then the first author asked them to recollect the strategies and scaffolds that they had used in the past, as well as to recommend what strategies and scaffolds they should have used or would use to help with preservice teachers' reflective journal writing. The first author then handed the participants paper-based prototype of the scaffolding tools, and asked them to imagine that these tools were provided in PASS-PORT to support preservice teachers' reflective journal writing. Then the first author explained to the participants the features of the scaffolds and the journal writing task scenarios, and asked them to address questions such as: "Things you like about the tool", "Things you don't like about the tool", and "What is missing in the tool?"

*DATA ANALYSIS PROCEDURES*

The first author transcribed the interviews, and used qualitative research software NVivo 7 to code and organize the interview transcripts. Miles and Huberman's (1994) three-step technique guided the data analysis. In the data reduction step, the researcher condensed the data through selecting, focusing, simplifying, abstracting, and transforming the transcripts; and then coded all the transcripts. In the data display step, the researcher organized and assembled information into graphs and charts. During the last analysis step, the researcher reviewed and synthesized the findings, and drew conclusions.

## RESULTS

*ISSUES AND CONTRIBUTING FACTORS*

*Teacher educators' perspectives.* Two themes emerged as they related to preservice teachers' reflective journal writing issues.

*Theme 1: low levels of reflection.* The level of preservice teachers' reflective journal writing was often limited to descriptive/technical reflection. According to Kathy, preservice teachers simply recalled their field experiences as opposed to analyzing, synthesizing, and evaluating what they experienced to help them become better teachers. Similarly, Muzzie characterized preservice teachers' reflection writing as surface writing. Her students usually did not provide examples in their writings to explain how their reading and field experiences actually affected them, impacted them, or changed their thinking.

*Theme 2: writing struggle.* Preservice teachers, especially in their freshman and sophomore years, struggled with their reflection writing because they easily lost their thought process during writing due in part to their poor writing skills. For Kathy, reflective writing seemed to prove more difficult for preservice teachers because it was a more advanced skill and entailed more effort than "just telling a story."

Teacher educator participants attributed preservice teachers' poor reflection writing to the following three factors.

*Factor 1: limited understanding of reflection.* Preservice teachers had limited understanding of the concept of reflection and the conceptual frameworks related to reflective journal writing. Moreover, they had little reflection writing experience while in high school, and reflection was thus a novel concept for preservice teachers especially in freshman and sophomore years.

*Factor 2: disconnection between theories and concrete classroom teaching experiences*. Both Barbara and Muzzie thought reflection writing for undergraduate students was very challenging because their education focused more on a theoretical level and they lacked exposure to classroom teaching. Jimmy further associated preservice teachers' maturity level with their student teaching in the following quote:

> … when they get out in the real world, and they're actually teaching real students. This tends to whip them and shake them and get them to realize what's real out there, because we have 180 hours of field experiences that they have to complete. But usually they go in, they observe, they look at it more from a perspective of "this is the work I have to do for this class. This is not real to me yet." When you get to student teaching, it's suddenly very real. And then they know they are going to graduate, they know they are going to have their own class, it's suddenly a reality that [they have to deal with].

*Factor 3: guidance teacher educators provided*. Barbara thought that reflection writing at the undergraduate level was most successful when teacher educators provided students with focused questions.

*Preservice teachers' perspectives*. Two themes emerged from preservice teachers' perspectives on their reflection writing problems.

*Theme 1: struggle in understanding reflection*. Preservice teachers felt they struggled with their understanding of the meaning of reflection, and were at a loss as what to include in their reflections. This was in agreement with teacher educators' perspectives. Nicole's response was representative:

> They never really sat down and discussed with us what reflection writing is or what you should accomplish. They just kind of assume that you knew what it was, and that you knew what you were doing.

*Theme 2: technical and repetitive reflection writing assignments; in most cases, not reflection writing at all.* Nicole's experience with reflection writing was typical. For each of her field experiences, she was required to write about the classroom management issues. Therefore, she had to write how the desks were set up, how the class was demographically composed, and how the teacher enforced rules in the classroom, rather than investigating whether or not she thought the classroom management could be effective.

Three factors contributed to preservice teachers' poor reflection writing.

*Factor 1: little knowledge of reflection and reflection writing*.

*Factor 2: lack of specific requirements and guidance*. The requirements and guidance they received from teacher educators were directly tied to their motivation in reflection writing. For example, Rose felt stressed if her professors did not give her specific questions to answer for the reflection writing assignments. Moreover, if her professors did not provide specific requirements on how deep the reflection needed to explore, she simply did the minimum.

*Factor 3: disconnection between theories and field experiences*. That is, teacher educators failed to ask students to apply the theories to reflect on their classroom experiences. Nicole's comment on the significance of the connection was exemplary:

> Because by reflecting, you are taking what you have learned in your textbook and your lecture courses with the teacher, and you are actually applying it to what you have learned in the classroom, so it kind of makes you thinking in your head and helping you better understand it.

*ADOPTED SCAFFOLDS*

*Teacher educators' perspectives*. The scaffolds teacher educators reported using to facilitate preservice teachers' reflection writing included a) question prompts, b) modeling, c) guidance, d) feedback, and e) the use of a qualitative method.

*Scaffold 1: question prompts*. Teacher educators reported widely using verbal and written question prompts to lead preservice teachers' reflection writing. For instance, Barbara utilized topical question prompts to guide her students' field experience reflection writing, with topics ranging from resources to teach the content, integration of technology, to classroom interactions.

*Scaffold 2: modeling*. Teacher educators also used reflection *examples* to model their students' reflection writing. Muzzie, who partially attributed her students' reflection writing problems to their not being given freedom to think, usually gave them a reflection example in class and critiqued the example with them.

*Scaffold 3: guidance*. Teacher educator participants also gave their students specific and sufficient guidance on how to write their reflections. For example, for each session of her students' field experiences, Kathy specified different elements that her students must examine, including what they must look for, how they should take notes, how they should write it up, and how long the writing needs to be. She envisioned that the reflection writing process is not about reflecting about what they saw, but to utilize what saw to help them critically think about becoming a better teacher.

*Scaffold 4: feedback*. Teacher educators also treated the feedback as quasi-dialogue journals with their students. In the feedback, Muzzie specified what her students did right, and what they needed to improve. Because of the feedbacks, she witnessed more positive changes in the reflection writing.

*Scaffold 5: Qualitative method*. Kathy introduced a qualitative method to help her students with their reflection on their field experience. She taught and required them to separate observations from reflections using a two-column process. In the left-hand observations column, students documented what actually occurred; while in the right-hand reflections column, students analyzed, synthesized, and reflected on their observations. The method helped preservice teachers to be objective while observing, and not to judge based on what they saw immediately, but to get a more holistic picture and reflect upon it later.

*Preservice teachers' perspectives*. The preservice teacher participants were asked to describe the strategies or scaffolds their professors provided. These included a) question prompts, b) guidance, c) feedback, and d) the use of a qualitative method. With the exclusion of modeling, the strategies preservice teachers recollected matched those practiced by teacher educator participants.

## *SUGGESTED COMPUTER-BASED SCAFFOLDS*

*Teacher educators' perspectives*. Teacher educator participants suggested the use of writing prompts and reflection writing tutorials, followed by reflection writing examples.

*Suggested scaffold 1: writing prompts*. Muzzie suggested the use of popup windows or rollovers where a list of question prompts would appear during the reflection writing process. She also suggested using messages embedded within popup windows right before students submit their writing. A message example might read, "Did you remember to do …?" "Did you incorporate … in your reflection?"

*Suggested scaffold 2: reflection writing tutorials*. Tutorials provided in the system on how to write reflectively were deemed to be very helpful by three teacher educators.

*Suggested scaffold 3: reflection writing examples.* Two teacher educators suggested the use of online examples of both successful and unsuccessful reflection writing embedded with critiques to model preservice teachers' reflection writing.

*Preservice teachers' perspectives.* Preservice teacher participants' suggestions fell into four categories. Consistent with teacher educators' suggestions, preservice teachers would like to have web-based question prompts, online tutorials on the concepts and conceptual frameworks of reflection and reflection writing, as well as a few successful and unsuccessful reflective writing samples. If possible, they preferred the samples to be explained and discussed in-class to point them in the right direction. Preservice teachers also expressed the need for more detailed and meaningful reflection requirements and guidelines (this scaffold was not suggested by any teacher educators). Molly specified the need for detailed information on what teacher educator wanted in the reflection to help guide her reflection writing, whereas Nicole preferred to have reflective writing assignments that were parallel with her ability and maturity level.

## *PERCEPTIONS OF THE PROTOTYPICAL COMPUTE-BASED SCAFFOLDING TOOLS*

*Question prompts*. Teacher educators alleged that web-based question prompts had the potential to help preservice teachers start thinking reflectively, focus, and guide their writing process. To make question prompts more effective, Muzzie suggested that question prompts be placed both before and after the reflection writing to remind students to incorporate the required. Preservice teachers all thought question prompts could function as a guide for their writing process. To make question prompts more effective, they suggested that the prompts need to be customized to meet students' different content area requirements, and entail the connection between experiences and learning and instructional theories.

*Writing templates*. Though teacher educators thought the writing templates might be an effective tool for entry-level undergraduate students to cultivate reflective thinking habit, they would not recommend the use of it because they assumed templates go against a central tenet of reflection. That is, reflection needs to be personal and creative. The use of templates might limit, and even stifle, preservice teachers' creativity because the students would be "so conscientious about what they think I want", as Lake put it. Therefore, teacher educator participants suggested that templates be used as an instructional tool to train students on how to write reflections in the classroom as opposed to using it to scaffold the actual writing of their reflections on the field experiences. Preservice teacher participants had similar perceptions.

*Process display*. Teacher educators perceived procedural and visual flowcharts of reflective writing process as potentially conducive and effective because they could help keep preservice teachers' writing focused. Preservice teachers held similar perceptions.

*Modeling*. Teacher educators felt that the availability of both successful and unsuccessful reflection writing samples could help preservice teachers become good judges of reflection writing. Meanwhile, they suggested the writing samples be critiqued by questions including "What's right? Why was it right?" "What's wrong? Why was it wrong?" And "How can it be improved?" However, they were concerned about the potential of plagiarism and were suspicious of the potentially stifling effect brought up with the writing samples. As Lake put it, preservice teachers might "hold too close to the sample. They may use the sample almost as a template." Preservice teachers noted a few benefits of modeling as a writing support. First, modeling was congruent to professors' classroom explanation of a writing sample. Second, it was observed that examining others' writings could help preservice teachers improve their self-brainstorming process. Third, preservice teachers appreciated the idea of making unsuccessful reflection writing samples available. That way, they would have a yardstick to evaluate their own writing. One preservice teacher also expressed her concern about the plagiarism. Moreover, another preservice teacher discouraged the use of modeling as a strategy because she worried the availability of samples might take away the reflective process from the students.

*Resources*. Teacher educators thought the reflection-related resources such as the concepts of reflection, various reflection conceptual frameworks, and reflection writing tutorials were beneficial. First, the availability of the resources could prove to be an excellent addition to their traditional classroom reflection instruction. Second, teacher educators perceived that resources might be nice materials for juniors or seniors, as well as for motivated learners looking for self-tutorials on reflection. Meanwhile, teacher educators admitted that resources might not be appreciated by the majority of preservice teachers, especially for entry or lower level ones. In Barbara's words, "students will be drown in this [the conceptual framework example provided in the interview]. And if it is optional, few will go to it for that."

Preservice teacher participants shared their understanding of the benefits online resources could bring about. First, the availability of the resources could satisfy their growing needs for in-depth understanding of reflection due in part to the increasingly higher expectation on their reflectivity development. Second, they echoed teacher educators' perceptions that resources might be nice materials for more advanced students to better enhance their reflective thinking process, and prove helpful to standardize the use of terminology in their reflection writing. However, because of their lack of classroom teaching experiences, three preservice teacher participants complained that resources, especially the conceptual framework example the researcher provided in the interview, proved too complicated for education majors. In the end, they provided their suggestions on what could be incorporated into the online resources. These suggestions included: A collection of high-order, high-level type of reflection-related thinking questions; examples of reflection writing on field experiences; exemplar writings followed by the reflective conceptual frameworks to make the abstraction of the conceptual frameworks tangible to students; a list of Internet-based resources about reflection, as well as a list of the titles of textbooks that are well established and that explain in details of reflection.

Eventually, participants offered their top three choices for computer-based scaffolds. Question prompts and process display remained the top two favorites, with modeling superior to resources as their number three choice.

## CONCLUSION AND IMPLICATIONS

Technologies can be used as "engagers and facilitators of thinking and knowledge construction" (Jonassen, Howland, Moore, & Marra, 2003, p. 12). Leaders in instructional technology have consistently called for transforming education with the use of technology (Hannafin & Kim, 2003; Jonassen, 2000; Reeves, Herrington, & Oliver, 2004; Reigeluth, 2003). Additionally, the United States Department of Education (2000) claims that electronic networks, digital resources, and computer technology can not only help create stronger connections between teacher candidates, university faculty and mentor teachers, but also provide valuable resources as teacher candidates develop professionally through their student teaching and induction phases. PASS-PORT incorporates reflective journal writing into its interface to allow preservice teachers to develop their reflectivity, a cornerstone of teacher's professional growth. Prior research has suggested that a particular emphasis be placed on developing preservice teachers' critical reflection skills (Sparks-Langer & Colton, 1991; Zeichner & Liston, 1987), the distinguishing attribute of reflective practitioners (Larrivee, 2000). Preservice teachers have had difficulty in the past writing high quality reflective journals in PASS-PORT. In this paper, we have drawn on the voices of teacher educators and preservice teachers to understand and interpret reflective practice using PASS-PORT as a context. Through this discussion, we have sought to identify the types of scaffolds that will prove most useful within PASS-PORT to promote desired levels of reflective writing.

The findings of the current study revealed that teacher educators considered preservice teachers' reflective journal writing in the system often limited to descriptive/technical reflection, consistent with the literature that the reflection levels in preservice teachers' writings were primarily descriptive or technical rather than critical/transformative (Hatton & Smith, 1995; Pultorak, 1996; Risko et al., 1999). At their professional developmental stage, preservice teachers' descriptive/technical reflection usually serves as a useful starting point to address their concern for self and gaining teaching competency, both of which are their most immediate focus (Hatton & Smith, 1995; Ward & McCotter, 2004). For these preservice teachers, "the question is whether these beginning stages of reflection will contain the seeds for deeper reflection later or whether reflection is undertaken as a process that aims for improvement and is open to the ideas of others" (Ward & McCotter, 2004, p. 254). In our case, we would continue to investigate whether computer-based scaffolds can not only help preservice teachers continue focusing on making sense of their concerns for self and gaining their competency in teaching tasks, but also serve as a mechanism for them to spurt and sustain their higher-level reflective thinking ability.

Preservice teachers' poor reflective journal writing in the study was attributed to the following factors, including a) limited understanding of the concept of reflection, b) lack of reflection writing experience prior to college, c) disconnection between theories and concrete classroom teaching experiences, and d) lack of sufficient guidance from teacher educators. The findings also reveal that preservice teachers loathed reflection writings that were repetitive, meaningless, burdensome, and mostly unreflective in nature. This echoed the findings in Pedro's (2005) study in which she raised the question about "the necessity of extensive writing requirements as means of fostering reflection" (p. 63). These findings imply that it is worthwhile for teacher education programs to revamp a curriculum that is conducive to preservice teachers' reflectivity development. Moreover, the findings also challenge teacher educators to expose preservice teachers to the concepts of reflection, the principles of reflective practice, and the various conceptual frameworks related to reflective practice.

This study showed that teacher educator and preservice teacher participants perceived that computer-based scaffolds hold the potential to enhance preservice teachers' reflective journal writing. Out of the five prototypical computer-based scaffolds explored earlier, they ranked question prompts, process display, and modeling as their top three choices, followed by the online resources and writing templates. The ranking of online resources greatly deviated from the enthusiasm participants exhibited during the interview. During the interview, both teacher educator and preservice teacher participants strongly suggested the use of reflection-related online resources to provide in-time, on-demand mechanism to develop preservice teachers' reflection-related knowledge base, and ultimately, to enhance their reflectivity development. The participants' initial interest in online resources echoes the recent resurgence of resource-based learning (Hannafin, Hill, & McCarthy, 2000; Hill & Hannafin, 2001). Despite the mounting benefits reflection-related online resources can offer, its availability was not on the participants' high priority list. This might be interpreted as the accumulated ill side-effects of recent years' increasing prevalence of standards, high-stakes testing and outcomes assessment on teacher preparation. Can we interpret that, due to the assessment- and result-driven mentality, both teacher educator and preservice teacher participants subconsciously chose question prompts, visual writing process display, and modeling as their top priority, because these tools can offer preservice teachers the easier route to tangible success in reflective journal writing in a more efficient way, even though not the most effective way?

## FUTURE RESEARCH

Despite apparent enthusiasm about using computer-based scaffolding tools to support preservice teachers' reflective practice, there is a lack of empirical research, especially quantitative research, which examines how the tools may impact preservice teachers' reflective practice. Clark and Estes (1998) claim supporting evidence is needed to validate educational technology solutions. However, according to Spector (2001), for the many dramatic educational technology applications that exist today, little empirical research is being conducted with regard to their effects on learning. As a consequence, we have little evidence based on which a judgment could be made with regard to the advantages of using specific kinds of technology in various educational settings.

To answer Reeves' (2000) call for socially responsible research in instructional technology, this study served as the initial phase of a long-term research agenda on how to leverage computer technology to enhance preservice teachers' reflective journal writing. In future studies, the authors plan to use design-based research methodology (Wang & Hannafin, 2005) to design, develop and evaluate computer-based tools that scaffold preservice teachers' reflective journal writing. Design-based research is appropriate in our case, because it emphasizes "direct, scalable, and concurrent improvements in research, theory, and practice" (Wang & Hannafin, 2005, p. 6). This approach may create highly-anticipated research-based models and guidelines to inform researchers and practitioners on how to design, develop or implement computer-based scaffolding tools in similar technology-enhanced learning environments.

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