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Blending Online Components into Traditional Instruction in Pre-Service Teacher Education: The Good, the Bad, and the Ugly

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Blended instruction, Seven Principles of Good Practices, Pre-service teacher education, Traditional instruction

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Introduction

According to the U.S. Department of Education, 99% of all public schools have access to the Internet, of which 94% have high-speed broadband connections (U.S. Department of Education, National Center for Education Statistics, 2002). *Indeed, just because almost all schools are hooked up to the Internet doesn't mean all students in all classrooms have access to it. The 2006 D.O.E. statistics show a 4.4 ratio of school children to Internet-enabled instructional computers*. The changes in the classroom pose challenges not only for in-service teachers but also for pre-service teachers in that they are expected not only to keep up with advancements in computer technology in the K-12 educational environment, but also to integrate technology effectively into the curriculum (Hofer, 2005; Kay, 2006; Marra, 2004; Pellegrino, Chudowsky, & Glaser, 2001).

Unfortunately, a national survey indicated that many teacher preparation programs, though well-intentioned, fail to teach student teachers the necessary technology skills to proficiently integrate technology into their classrooms as teachers (Moursund & Bielefeldt, 1999). Such failures, according to the Office of Technology Assessment (OTA), are clustered around technology instruction, which teaches about technology instead of teaching student teachers how to integrate technology across the curriculum (OTA, 1995), putting greater pressure on national teacher preparation programs to augment the effectiveness of technology integration in their pre-service courses. If the classroom teachers do not agree with the underlying philosophy of innovative technology curriculum, it is very unlikely that they are ready to embrace technology integration across the curriculum (Barnes, 2005; Ertmer, Ottenbreit-

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Leftwich, & York, 2006-07; Harreaves, 1994). On the contrary, if teacher educators model effective uses of technology as tools for teaching and learning, pre-service teachers are more likely to include technology tools in their future classroom practice (Carlson & Gooden, 1999; Keller, 2002; Zehr, 1997).

Therefore, the purpose of this study is to examine the effectiveness of blended instruction in an introductory technology course for pre-service teachers. Specifically, the study investigated 46 pre-service teachers' perceptions of combining online components into traditional face-to-face instruction. Based on the analysis of the findings, the study identified good practices as well as concerns of using online components as supplements to traditional courses. Lessons for design and implementation considerations were provided for instructors who intend to adopt blended instruction.

Literature

Blended Instruction

Blended instruction is also known as hybrid instruction. As an emerging delivery method, blended instruction combines face-to-face instruction with online instruction in a way that part of the course meetings or learning activities are conducted online (Bonk & Graham, 2005). In comparison, traditional face-to-face instruction is led by an instructor and person-to-person interaction occurs in a synchronous (occurring at the same time) environment (Bonk & Graham, 2005).

Literature has sufficient discussions on different delivery modes. Face-to-face instruction, on the one hand, has the advantage of having an instructor to "guide, correct, and answer questions on the spot" (Lankbeck & Mugler, 2000, p. 5). On the other hand, this approach is sometimes criticized for its lack of learner-centered strategies (Rodes, Knapezyk, Chapman, & Chung, 2000). Online instruction can potentially supplant the more traditional method of teaching via lecture by students learning at any location with an Internet connection (Whitehead, 2002). However, one of the major criticisms of online instruction is that some online courses are often presented in a dry, "page turner" format, with point-and-click quizzes and little pragmatic experience for the students (Singh, 2003). This caveat often results in high dropout rates in classes that are completely online (Young, 2002). For this reason, it is argued that the convergence between face-to-face and online instruction, or blended instruction, has some recognized advantages over traditional and online instruction. For example, blended instruction encourages asynchronous learning, which allows students more time on task, accommodates different learning styles and maintains quality faculty-student interaction in the classroom at the same time (Dukes, Waring, & Koorland, 2006; Marsh, McFadeen, & Price, 2003; Martyn, 2003).

Emerging empirical studies support blended instruction as an effective approach for skill-driven learning – combining self-paced learning with instructor support for knowledge and skill development (Kerres & Witt, 2003). Toledo and Toledo (2005) found this approach effective in helping their secondary education students to understand the contemporary issues related to secondary curriculum and school organization. Martyn (2003) indicated positive feedback when adopting a blended online model for eight institutional classes. Murphy (2002) reported that blended

instruction was particularly useful in some lower-division introductory courses with large enrollments. In addition, blended instruction reduces dropouts and combines different pedagogical approaches with Web-based technologies (Kerres & Witt, 2003).

Coupled with the fact that many institutions are exploring the benefits of both face-to-face and online environments by adopting blended instruction, a recent study indicated that by the end of the decade, the vast majority of courses in higher education will have some Web components in their traditional classes (Kim & Bonk, 2006). With this understanding, the president of Pennsylvania State University, Graham Spanier, recognized blended learning as "the single greatest unrecognized trend in higher education today" and touted it as part of the vision for his university (Young, 2002).

Different learning environments have advantages and disadvantages to suit different learning styles. Researchers have pointed out, however, that the question needing to be addressed is not which delivery mode is superior, rather how can teachers use technologies to enhance students' experience in traditional teaching and learning environments? (McDonald, 2002; Moore & Kearsley, 1996). Ultimately, it is the quality of technology integration rather than the mode of delivery that should be emphasized in any learning environment. Moreover, the learning effectiveness in any environment is simply based on sound instructional design principles and practices (Russell, 1999) and the strategic implementation of them (Murphy, 2002). To this end, a model for using technology to enhance good practices in undergraduate education is presented.

Good Practice in Undergraduate Education

Chikering and Gamson (1987) proposed the Seven Principles of Good Practice in Undergraduate Education. The principles, based on a meta-analysis of 50 years of research on undergraduate education in the United States, reflect an underlying view of education as active, cooperative, and dynamic. Since its publication, the Seven Principles have been widely used as a general framework to guide, assess, and improve college teaching (Graham, Cagiltary, Kim, Craner, & Duffy, 2001; Martyn, 2003).

Ten years after the Seven Principles were published, Chickering and Ehrmann (1996) contextualized the Principles for a digital age. In their article *Implementing the Seven Principles: Technology as Lever*, they discussed some of the most cost-effective and appropriate ways to use technologies to advance the Seven Principles. The following table summarizes the Principles and how technology can be used in college teaching and learning. These principles, along with the practices of technology integration, will be used as a framework to identify good teaching and learning practices in the study.

Table 1: Implementing the Seven Principles: Technology as Lever (modified from Chickering and Ehrmann, 1996)

Principle	Explanation	Technology
1.Encourage Contact between Students and Faculty	This principle considers student-faculty interaction as the most important factor in student motivation and involvement.	With communication tools such as e-mail, live chat, discussion board and video conferencing, student-faculty interaction can become more "thoughtful and safe" in writing than some intimidating situations in a classroom or faculty office.
2. Develops Reciprocity and Cooperation among Students	Good learning is enhanced by good collaboration and the process of socialization in a team environment. Teaching should augment students' higher order thinking and promote knowledge sharing with others.	Communication tools s make study groups and collaborative learning possible without constraints of time and location.
3. Encourages Active Learning Techniques	Students must employ different learning strategies such as discussing, relating, demonstrating, evaluating, and reflecting in order to internalize the content.	New technologies can engage students to employ active learning techniques as they immerse in an interactive environment, which can include electronic libraries, simulating laboratories, and virtual architectural studios.
4. Gives Prompt Feedback	This principle emphasizes the importance of providing students with appropriate and timely feedback. Such feedback should be formative rather than summative so that students can have the opportunities to make improvement.	Technologies can play a positive role in providing feedback. For example, technological resources such as video can be a tool for critical observations for novice teachers.
5. Emphasizes Time on Task	Effective time management is critical for completing learning tasks in a timely manner.	New technologies allow students to study at home or save time spent on commuting to and from campus. New technologies also allow students and faculty alike to make better use of their time when electronic materials are readily available to them at their fingertips.
6. Communicates High Expectations	This principle states that faculty and institutions	New technologies can help communicate high

	should hold high expectations for students.	expectations in multiple ways such as creating sufficient authentic scenarios, presenting conflicting perspectives, or providing paradoxical data sets. In these instances, students feel challenged in their learning goals so that faculty can subsequently communicate their criteria and high expectations for student performance.
7. Respects Diverse Talents and Ways of Learning	Students learn in different ways. Some are good at theories while others are good at hands-on tasks. Regardless of their learning styles, students need to be given the opportunities to explore and demonstrate their talents in a variety of ways.	New technologies can help faculty design their teaching to be more structured for students who need it and more open-ended for students who don't. To this end, student learning is self-paced in order to accommodate different ways of learning.

Methodology

Course Description

The course was delivered as an introduction to technology integration designed for education majors at a southern plains land-grant university. The goal of the course was not only to teach pre-service teachers technology skills, but more importantly, to help students integrate meaningful uses of technology into their teaching practices.

When the study was carried out, this course offered eight classes with about 20 students in each class. Historically, the course had been taught face-to-face. During the spring 2006 semester, the researcher redesigned the course and used blended online components across three classes of the course she taught. Specifically, the course content was carefully redesigned to center on three types of learning materials:

1. **Technology Literacy**: The learning of such technology tools as Microsoft Office bundle (Word Processor, PowerPoint, Excel, and FrontPage) and Inspiration (a visual thinking and learning tool produced by Inspiration Software, Inc.).

2. **Instructional Strategies:** The learning of technology integration into lesson plans across the curriculum.

3. **Educational Environment**: The discussion of technology-related topics such as copyright and Internet safety in educational settings.

The first type of learning, which focused on hands-on technology, was primarily carried out in face-to-face meetings. The last two types of learning were used in both face-to-face and online settings. To enhance the online learning experience, the instructor designed a multimedia environment that included PowerPoint slides, images, online quizzes, study guides, hyperlinks, film clips, and a digital drop box. The online activities included peer review of lesson plans, preliminary data collection of projects, and discussion of current hot topics. In particular, online activities were followed by an elaborated discussion of face-to-face class meeting.

Research Questions

1. Did pre-service teachers perceive improved learning when online components (such as digital materials and online activities) were combined with face-to-face instruction?

2. What teaching and learning practices were most effective when using blended instruction?

3. What concerns regarding blended instruction were identified by students?

Procedure

Blended instruction was introduced to students in the first face-to-face meeting. Several online practices were conducted in the first week on Blackboard, a Course Management System widely adopted at the university. In the second week, when the blended instruction began, the classes met twice weekly, instead of the normal three times, with an online activity that replaced one class meeting. Students were also told that the completion of one particular online activity counted for their face-to-face attendance in that day when they did not have regular class. The blended approach was adopted for 15 weeks in three classes that enrolled 58 pre-service teachers.

Instrument

An electronic and anonymous survey was designed for this study. One particular study shed light on the development of the survey. Items 1 through 8 (see Table 2) in this study had been used with more than 300 students in a longitudinal study by The Pennsylvania State University, where six introductory undergraduate courses were redesigned from face-to-face to online instruction (Harwood & Engel, 2006). These items model the framework of Seven Principles. Items 9 and 10 in the survey were added by the instructor in that the Seven Principles also focused on the importance of giving prompt feedback to students and helping students finish their tasks on time. Moreover, each survey question was followed by an open-ended question, and the study utilized document analyses of online class assignments and course evaluation feedback.

To enhance the content validity, a faculty member who was familiar with pre-service teacher education reviewed the survey in order. Two follow-up focus groups were conducted with the students. Accordingly, the survey instrument was revised based on their feedback.

Participants

After securing Institutional Review Board approval for the survey and study protocol,

the survey was distributed at the end of the course to all three classes. Of the 58 students who were enrolled, 46 completed the survey; 12 were absent from the classes on the day that the survey was taken. As a result, the return rate was 79%.

Of the 46 participants, 30 were female and 16 were male. Forty two (91%) were sophomores and juniors. Although over 75% of the participants said that they had used discussion boards and e-mail in other face-to-face classes, 82% of the participants indicated that this course was their first course in which real lecture time was replaced by some online learning.

Results

Quantitative Data

The findings indicated that students had a positive attitude toward blended instruction in all of the aspects of Seven Principles. Students had the most positive feedback on the improved quality of the course project (80%) and better understanding of the content (89%) (Table 2). Over 60% of the students indicated that blended instruction increased their interaction with the instructor and among students and helped build a learning community. Students valued prompt feedback (81%) as well. However, over half of the students indicated that they were not sure

or disagreed that blended instruction helped them finish their work on time.

Table 2: Students' Perceptions of Blended Instruction.

Survey Item Combined with face-to-face meetings, electronic communication such as discussion board, digital drop box, e-mail, blended instruction:	**5= Strongly Agree** (%)	**4= Agree** (%)	**3= Unsure** (%)	**2= Disagree** (%)	**1= Strongly Disagree** (%)
1. improved the quality of course projects.	17.4	63.0	13.0	6.5	0.0
2. increased understanding of the content.	34.8	54.3	17.4	4.3	2.1
3. improved the quality of my work.	23.9	47.8	15.2	8.6	4.3
4. improved my total course grade.	26.0	39.1	26.0	6.5	2.1
5. increased interaction with other students.	23.9	41.3	23.9	8.6	2.1
6. increased interaction with the instructor.	21.7	39.1	19.5	13.0	4.3
7. increased understanding of my peers' thoughts.	26.0	30.4	26.0	13.0	4.3

8. increased a sense of community	30.4	39.1	21.7	6.5	2.1
9. helped finish my work on time	17.3	34.7	32.6	13.0	2.1
10. gave prompt feedback	30.9	50.0	12.5	4.3	2.1

* Total N=46

Qualitative Data

Qualitative data were collected from the open-ended questions from the survey and from the course evaluations. These data showed mixed feedback regarding blended instruction. While the analysis of the students' written comments indicated that the majority of the students were positive about blended instruction, the analysis showed some concerns and criticism as well.

One area of concern was how the online activities were working to supplement face-to-face class time. One student said (Excerpt 1), "Assignments were vague and things that should have been covered in the beginning were covered after the fact." Another student noted (Excerpt 2), "I got lost in the first few weeks. Didn't know how online activities were accounted for the class time." These comments indicated that students were confused about the process of blended instruction, especially at the beginning of the course.

Another area of concern was that blended instruction increased the workload for a regular three-hour introductory course. One student said (Excerpt 3), "Work load was heavy. Too much for a three-hour class." Another student said (Excerpt 4), "I

thought online activities could give me some free time because I didn't have to go to the class, but I actually had to spend more time studying on those online assignments." Such comments are in line with the results in Survey item 9 (see Table 2), which was, when asked whether blended instruction helped finish students' work on time, nearly 50% of the students were not sure or disagreed.

The other student indicated that the format of online activities could be dynamic. One student indicated (Excerpt 5), "I liked those online activities, but they could be more interesting." Another student wrote (Excerpt 6), "I like online peer reviews, but the instructor could try something different to keep our enthusiasm."

The biggest criticism in this course, however, focused on grading of the online activities. For example, this course asked students to post their lesson plans on the discussion board. After receiving feedback from both the instructor and three peers, students revised their lesson plans and resubmitted to receive more points. The complaint, however, was not the clarity of the assignment or the process, rather students thought they deserved more points after revision. One student said (Except 7), "She critiqued our lesson plans and we fixed it, but still we couldn't get 100. Why?" Another student agreed (Excerpt 8), "Grading was harsh given that we did lots of online work. It was impossible to meet her standards in the rubric to score 100." One student indicated (Excerpt 9), "I like True and False questions. It is black and white. You don't need to worry about whether you can get a fair grade." The fourth student wrote (Excerpt 10), "We had this rubric for our lesson plans, but her grading was subjective. You just couldn't possibly get the top score even though you

had to do all the work." From these comments, students expected a higher grade especially when an online task seemed to require more than just doing the minimum.

Conclusions and Implications

This study investigated the perceived effectiveness of using online instruction as a supplement, or add-on, to a face-to-face pre-service education course. Forty six students who enrolled in three sections of an introductory technology education course completed the survey. The results of the study found that traditional face-to-face meetings were most effective in teaching and learning hands-on technology tools, while online instruction provided a richer learning environment to accommodate various learning styles, personalize individual learning experiences, and reduce lecture time. The results of the study also found that students interacted actively with the instructor and their peers. In summary, the use of technologies in this blended course generated some good teaching and learning practices according to the Seven Principles. Meantime, the study also identified some lessons that might be particular in blended instruction. The following session discussed these lessons and wove them into other studies, thus giving the readers a broader view of using blended instruction in classrooms.

Lessons Learned

Lesson 1. Giving sufficient time for smooth transition from face-to-face to blended instruction.

The results of the study indicated that students found it hard to adopt the blended approach at the beginning. Indeed, learning activities vary greatly in and out of the classroom. For gentle transitions, students required sufficient time and assistance to understand the blended process. In fact, even though many students (76%) may have been exposed to online courses or discussion boards, eighty two percent (82%) indicated that this course was their first in which lecture time was replaced by online learning.

Researchers indicate that blended instruction can be challenging for students to adjust to technology-enhanced independent learning materials, computerized testing, and the shift from instruction from presentation to facilitation can be rough (Ho & Burniske, 2005; Martyn, 2003). As a result, a blended approach requires continuous negotiation with students about the pace of instruction and the acculturation to online learning (Ho & Burniske, 2005). With this in mind, it is suggested that instructors give students sufficient times to overcome the learning curve in the first few weeks. Instructors are supposed to provide explicit and repeated explanations about the model and the process, start small and keep the activities simple, most importantly, they should give students time to practice in the first few weeks (Aycock, Garnham, & Kaleta, 2002).

Lesson 2. Facilitating the change of learning paradigm.

The results of the study showed that students were concerned about their work load and how blended instruction might interfere with finishing their work on time. On the one hand, the students seemed eager and welcomed a blended approach for its flexibility (see results of Quantitative Data). On the other hand, they may not have realized that the blended approach comes with a paradigm shift from instructor-led instructor to self-directed learning (see results of Qualitative Data). The

inconsistency on the part of the students was not unusual. In their blended course project, Aycock, Garnham, & Kaleta (2002) found that many of their students did not perceive time spent in class in a traditional course as "work," but they did perceive that the time they spent online was "work." Their study also reported that students did not actively take responsibility for their learning and did not have strong time management skills.

Thus, it is important for instructors to explain clearly the rationale of using blended instruction and to pay attention to their students' expectations and skills. It is critical for the instructors to help students grasp the real concept of blended instruction, which accommodates different learning styles and self-directed learning. In doing so, students will not mistake blended instruction for release time from traditional class time.

Lesson 3. Constructing meaningful online activities which integrate face-to-face learning.
This blended course provided students with carefully selected online materials, which included examples, cases, scenarios, problems, problem-solutions, electronic articles, video links, and library reserves. In this environment, the delayed-time exchange of conversation allowed students to have time for reflection, enhance the preparedness of the topics, and eventually present their opinions in their writing with in a deeper level of learning (Markel, 2001).

A lesson learned from this course, however, is that the aforementioned multimedia environment would not be readily picked up by students if online activities were randomly assembled. In fact, a blended course could easily become disjointed into a set of stand-alone activities without careful design (Sutherland, Marcus, & Jessup, 2005). If students felt that face-to-face and online components were not well integrated, they could be very critical toward the instructor and the learning in general (Aycock, Garnham, & Kaleta, 2002).

In other words, the online activities should be clear on how activities are connected to the face-to-face learning, what outcomes are expected, and how the end products are evaluated. Another piece of reflection is that the format of the online activities should be dynamic and creative so as to keep students' learning interest.

Lesson 4. Developing effective formative assessment strategies and grading expectations. As mentioned in Lesson 1, students in this course often felt anxious to a new instructional approach, especially in the first few weeks. To reduce the anxiety, one lesson learned from this course is to give prompt and ongoing feedback to students along the semester. Note that feedback can be given both by the instructor and the students. For example, the students in this course improved their lesson plans after receiving feedback from the instructor and their peers. Another way to provide prompt feedback to students was the use of online quiz scoring and grade reports throughout the semester. Such immediate feedback can help identify knowledge deficiencies on the part of the students so that the instructor can close the deficiencies in a timely manner.

Tying what is learned from this course back to the literature, the aforementioned practices fall into the two types of feedback identified in the literature: verification

(simple judgment of whether an answer is correct or not) and elaboration (extensive elaborative and diagnostic information) (Kulhavy & Stock, 1989). Providing both types of feedback is helpful to enhance critical learning and higher order skills.

It is worth noting that the students in this course expected higher or full scores after they revised their assignments. Such expectations may not particularly have direct connections with blended instruction. However, since students may perceive the time they spent online as real "work" (Aycock, Garnham, & Kaleta, 2002), it is important that instructors need to make explicit expectations about grading criteria and outcomes up front. In other words, if the quality of the work, instead of the amount of time spent on the work, justify a final score, it is important to let students know the instructors' expectations up front. Such expectations can often be misinterpreted by some students.

Lesson 5. Reinforcing the value of collaborative learning.
In this course, students' feedback indicated that blended instruction helped increase interaction with peers and built a learning community. From students' comments, it is suggested that instructors keep in mind that online activities should not stand alone as simply self-study materials, which can create feelings of isolation that are characteristic of online learning (Ho & Burniske, 2005). Before or after each online activity, it is important to take time to introduce the activity and have an elaborated discussion of the collaborative project in the face-to-face meetings. The debriefing sessions will help students see the integration of online activities with face-to-face learning, as mentioned in lesson 3.

Lesson 5 is in line with the literature. Researchers reinforced the suggestion of focusing on collaborative learning in education. Moallem (2003) stated that "while learning is ultimately an individual enterprise, the support of a group with a common learning objective can produce a synergistic facilitation of learning by each member of that group" (p. 84). Similarly, Holmes et al. (2001) considered that collaborative learning was "an approach to learning in which students not only construct their own knowledge as a result of interaction with their environment but are also actively engaged in the process of constructing knowledge for their learning community" (p. 1).

Future Studies

Future studies should explore what factors affect the effectiveness of blending online components with face-to-face instruction. For example, the effectiveness of blended learning could be dependent on course level (introductory or advanced), the nature of the content (experimental or conceptual), the purpose of technology education (technology literacy or technology integration across curriculum), or the role of the instructor (instructor-led or instructor-facilitated). Future studies could also investigate patterns of student participation in both synchronous and asynchronous environments. Indeed, a shared understanding of both delivery modes can lay the groundwork for effective blending of face-to-face and online learning.

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