The Role of Web-Based Activities in Mediating Student Interaction and Engagement in Four Teacher Education Classes

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Abstract

This study looked at the role of the integration of online activities in overall course satisfaction and interactive learning experiences in a web-enhanced, traditional teacher education course. Data were collected over two semesters from two graduate and two undergraduate classes. The analysis demonstrated that a majority of the students held positive views of these learning experiences: student-centered flexible learning environment, student-student interactions, and the connection between web-based activities and face-to-face (FTF) learning. These findings suggested that integration of online activities into traditional teacher education courses can shift some of the power, authority, and control from the instructor to the learner while providing the interaction and connection that are central and valuable to traditional classrooms.

Keywords: web-based activities, online discussion, engagement, interaction, connection, student satisfaction

Introduction

Teacher education is entering into a new era with respect to student engagement. One of the goals of this era is to prepare teacher candidates for interaction and engagement in all levels of learning (McCombs & Vakili, 2005). Yet in traditional settings, particularly with large enrollments, the interaction between the teacher educator and the teacher candidates is highly circumscribed and usually voluntary (Cowan, 2006). Most teacher candidates only participate in the learning process when they are assigned to work in teams or groups and required to submit a paper or project together. Although the traditional setting does allow for more face-to-face (FTF) interaction between students, this doesn't necessarily mean that the interaction takes place between students—it is normally led by the teacher educator and purposefully integrated into the course in order to make sure it happens in a constructive manner. Also, in a FTF class, generally the whole class proceeds through the course content at the same pace, regulated by the teacher educator. This teacher-paced classroom occurs regardless of the interest, prior experience, or scheduling demands of the students. Such a rigid mode of learning may impede student engagement (Lin, 2010).

To address some of the concerns inherent in the structured F2F environment, more and more faculty are adding web-based supplements to their traditional courses, and universities are investing significantly in course management software, expanded networks, and training and support capabilities to introduce Web enhancements to traditional courses. However, many faculty who teach traditional courses use the CMS only for making course documents available, keeping to a structure based on giving information and testing, rather than seeing the online environment as an opportunity to completely overturn their teaching methods into collaborative or cognitive models (Sharma, 2007). As a result, these online tools may be reduced to uninspiring content presented in a linear text-based format. Such transposed lectures and extensive text-based content mimic the "education-is-equal-to-transmission" model that is prevalent in traditional classrooms (Garrison & Vaughan, 2008). It does little to model or indoctrinate pre-service teachers into the practice of collaboration and social interaction (Clark & Mayer, 2007). These issues clearly set demands for developing new pedagogical models, tools, and practices to support collaborative learning in traditional environments (Cowan, 2006).

Theoretical Framework

Today, teacher education is greatly influenced by and largely reflects the tenets of social constructivism (Lin, 2010). The social constructivist approach is based on the assumption that individuals learn by constructing their knowledge through interaction with others. Knowledge is not presented to the

individuals, but emerges from active dialogue where people create their own learning paths and knowledge (Palloff & Pratt, 2007). Vygotsky (1987) viewed socialization as fundamental to the learning process. In this process, individuals construct and reconstruct their own meaning system through interaction with others. Learning is viewed as a transformative process which takes place in a social setting (Swan, 2005). This active view of learning focuses on how people learn together in different groups. Interaction, in the sense of a 'sustained two-way communication among two or more persons for purposes of explaining and challenging perspectives' (Ferguson, 2010, p.574), is inextricably linked with learning. In two experimental studies conducted by Zhang (2005), for instance, participants performed better and had higher levels of satisfaction in a fully interactive e-learning environment than those in a less interactive environment.

Learner-Learner Interaction

The social constructivist approach to teaching involves a high level of student-student and student-instructor interaction to enable students to construct their own knowledge (Stahl, 2005). Garrison and Arbaugh (2007) stated that there was a dual purpose to the educational experience. The first was to construct meaning from personal perspective and the second to refine and confirm this understanding collaboratively within a community of learners. Learning was recognized as being a complex process, involving both internal and social constructions that were mediated by learner interactions. Moore (2007) delineated three levels of learner interaction—student-to-content, student-to-instructor, and student-to-student. It is the last type of interaction—between one learner and another, individually or in groups, and with or without the presence of an instructor—that has become an important dimension in learning, because it facilitates collaboration and deeper learning (Lin, 2010). In an increasingly resource-stretched higher education environment, the cornerstone for successful learning is promoting learner-to-learner interaction (Garrison & Vaughan, 2008). Effective interaction requires not only the careful design of learning activities, but more importantly, the empowerment of the learner to engage collaboratively with others (Amrein-Beardsley, Foulger, & Toth, 2007).

Researchers (e.g. Guldberg & Pilkington, 2006) found that learner-learner interactions in online discussions and group work were likely to lead to the development of the critical thinking and problem-solving skills indicative of the 'reflective practitioner'. The shared discourse and common notions of what constituted good practice helped create a safe interaction space for the students. Mäkitalo-Siegl (2008) emphasized that knowledge construction took place when learners adjusted their own cognitive knowledge structure to the current context by co-constructing their knowledge and concepts with their peers. When learners are engaged in collaborative activities, they belonged to a community of learners, sharing common understandings with other learners (Stahl, 2005).

Web-Based Activities and Learner Interaction in Traditional Classes

Web-based learning has become increasingly popular in traditional classes to enhance teaching and learning. Studies show that web-based activities such as online discussion can be an effective tool to foster collaborative learning (Mäkitalo-Siegl, 2008), provide more productive use of class time (Alkharusi, Kazem, & Al-Musawai, 2010), as well as enhance active and engaged learning (McCrory, Putnam, & Jansen, 2008). Menchaca (2008) found that discussion could lead to interactive and collaborative learning experiences, which were more congruent with achieving higher-order learning outcomes. To motivate students to read assigned materials as well as to get them interact with each other, Lineweaver (2010) designed an online discussion assignment as a required component of a conventional cognitive psychology course. The students who completed online discussions reported a better understanding of lectures and feeling more prepared for an exam immediately after lecture than those who didn't. Findings supported the notion that online discussions could be an effective tool in conventional courses. Alkharusi et al. (2010) also found that when students were more involved in discussions and interactions, they became more comfortable with the learning of course materials. Unlike FTF sessions, online discussions allow learners to take time for reflection, to accumulate data, and to gather references with which to substantiate their positions (Menchaca, 2008). Because a computer conference is independent of time and place, discussions are available 24 hours a day and 7 days a week. Work is done at a time that is convenient to the user and fits into their personal schedule (Andresen, 2009). These benefits, when effectively integrated into traditional courses, can enhance and mediate interactive learning and student engagement (McCrory et al., 2008).

Need for the Study

In the past, extensive research has explored the possibilities of supporting collaborative learning in traditional classrooms using web-based tools, but these outcomes are mixed. Some studies pointed out the advantages of integrating web-based activities into traditional classes (Ausburn, 2004; Lim, Kim, Chen, & Ryder, 2008; Lineweaver, 2010). Some (Andresen, 2009) found that an asynchronous discussion forum can generate the critical dimensions of learning found in the traditional classroom, but it has limitations as well. Some showed that students were unsure that they were helpful to enhance their academic performance (McCrory et al., 2008). Some researchers (e.g., Jackson & Helms, 2008) had concluded that integration of web-based activities made no differences in student learning, because weaknesses of both online and FTF learning can still exist in a hybrid or web-enhanced course. Thus, it's still not clear whether integrating online activities into traditional courses will increase student interaction and engagement. Given the rapid advances and near ubiquity of social mechanisms for mediating interaction via the Internet, there is a need for new knowledge for understanding the social nature of online interaction in overall learning activity and learner satisfaction. Specifically, there is a need to know how well this new learning method impacts the students' learning experience, i.e. are students' attitudes towards this technology positive or negative? The current study addresses the need by looking at the effect of integrating online activities on overall course satisfaction and interactive learning experiences in four web-enhanced, traditional teacher education classes.

Method

Context of the Study

This study took place at a small state university in Northeast USA. The researcher was also the instructor of an elementary teacher education course—Child Development. Child Development was a foundation course required for elementary teacher candidates seeking initial teacher certification. The course was taught for two semesters with two classes per semester, one at undergraduate level, another graduate level. Altogether, four classes of students took the course between Fall 2008 and Fall 2009. Because this course was highly lecture-intensive and theory-laden, the author faced the challenge of engaging students in a subject that many consider to be both dry and intimidating. She was searching for ways to make better use of the classroom sessions and, at the same time, to redistribute more of the learning activities outside class. One solution was to create web-based activities in which students were asked to participate in online discussions and group projects that intended to engage them in collaborative learning experiences outside class. The web-based activities used in the four classes were as follows:

Online discussions. For each class, three threaded online discussions were given to replace seat time. Although students were asked to participate in the discussions during the normal class time, the discussion links were normally available for a whole day (12 hours) to provide flexibility. Thus, both synchronous and asynchronous discussions took place, depending on when a student was online and how many students were online at the same time.

Online group projects. In addition to online discussions, online group projects were developed as homework sets, done outside class time. These included: a) online reading summary, in which students were asked to work in small groups to find, summarize, and evaluate an assigned reading related to the chapters being covered. The purpose was to increase students' understanding of a child development issue and to provide opportunities for interactive and collaborative learning experiences beyond normal class time; b) online case study, in which students worked in online discussion groups to collaboratively solve case studies on child development, defending their viewpoints using theories they had learned. The results of their views were further discussed when they meet in FTF classes.

The online component of the four courses made use of the Angel Course Management System (CMS). The design of the courses required students to exhibit sustained, active participation both in class and online. It was anticipated that students would be more deeply invested in the course with the course content enhanced through the Angel component.

Participants

All students (82 in all) in the four classes were invited to participate in the study. The survey was distributed online to each class at the end of the semester at the same time the students were completing the university's Course Opinion Survey online. The response rate ranged from 83% to 100%. Altogether, 75 students from four classes responded to the Web survey. The survey included student demographic data as well as their attitudes toward technology integration in the course. In addition, 20 students from the

four classes were selected to participate in the interview. Most of the undergraduate participants were traditional students between the ages of 17-21. The ages of the graduates were more varied, ranging from traditional to nontraditional (22-44 years old). Gender and race/ethnicity background were less diverse. A majority of them were White, female students.

Validity and Reliability

Merriam (2001) asserts that academic rigor is attainable in case study research. Unlike experimental designs where validity and reliability are accounted for before the investigation, rigor in a case study derives from the researcher's presence, the nature of the interaction between researcher and participants, the triangulation of data, the interpretations of perceptions, and rich, thick description (Merriam, 2001). To enhance the validity and reliability of the study, the researcher was also engaged in participant observations by observing student Web postings and online group work. Finally, careful case analysis was conducted by examining and reexamining the data to identify samples which displayed variation or contradicted the overall interpretations. These added to the 'triangulation' of the data and enhanced the validity of this work.

Results

Analysis of the survey data showed that most of the participants (89%) felt comfortable with the use of Angel CMS. One participant related the opportunity to participate in the online activities to the national teacher standards by stating:

> I believe that web-based activities should be used in more courses. Technology is always changing and teachers should be up-to-date so that they can help their students…This is the 21st century; we need to become more technologically savvy. This class's use of technology was a great experience that I have not been able to experience before. It helped me learn more effectively.

Henry tried to provide indication that other members of the class had also enjoyed the courses by stating: "I felt I learned more through the online discussions than in class lectures and I'm sure many other students in the class felt the same way." Emily, a graduate student, contemplated her learning experience of integrating child development theory from the book with the inquiry projects online: "The web-enhanced instruction made for better hands-on learning situations, and helped me better comprehend the practical applications of the theories in the text book".

However, about 11% of the students were frustrated with the online component (i.e., Angel) of the course. These students made comments such as "I am not that good with computers so I could definitely live without Angel." Some students didn't like technology because of different learning styles. Kelly said, "I am not a fan of doing work over the Internet. I work better with notes in front of me than looking at the computer screen. I also have slow typing skills for physical reasons, which are unlikely to improve".

Despite the diverse backgrounds and different comfort levels with technology, participants in the four courses were almost unanimous in describing the benefits of the integration of web-based activities into their learning. Among them, 81% indicated that online discussions enabled them to develop more in-depth and thoughtful discussions and ideas, 87% agreed that the connection between what they did online and in class was clear, and 75% stated that involvement in joint projects online was fun and satisfying. In addition, 78% of the students indicated that the ability to interact with a variety of people, in and outside of class time, is a key component for success in this course.

From the interview, it was clear that online discussion and group work were perceived as an enhancement for learning by many students. A graduate student expressed her satisfaction by stating that:

> I really enjoyed the online discussion because it was student-centered and gave me opportunities to apply my knowledge of child development to "real-world" problems. Many times I read all of the issues and gave deep thought to them before actually responding to them.

Another graduate student, Jack, stated that the online discussion enabled him to be more engaged in their learning when it was integrated with the class activities. To Jack, integrating the online discussion with the FTF instruction helped him enjoy studying the course because of the variety of formats.

Overall, 77% of the students participating in the study recommended that other instructors should consider integrating online formats into their classes and that other students should consider taking web-enhanced classes. These findings indicated that students were generally satisfied with their learning experience

when the online activities were integrated with the FTF instruction. In addition to traditional FTF meetings, the unlimited access anytime anywhere online benefited students in several areas: a) student-centered flexible learning environment; b) student-student interactions; and c) connections between web-based activities and FTF learning.

Student-Centered Flexible Learning Environment

A key theme that emerged from this integration of web-based activities was the use of different strategies to accommodate diverse learning styles. "It was a nice change from being in the class all the time", Jim said. One undergraduate student said in the interview that:

> I learned more through the online discussions because there was no pressure involved in agreeing or disagreeing with other students. Through the online discussions, opinions and ideas were easily viewed and understood. I was a lot more active during the online discussions than I was in class.

In particular, students who tended to be shy in traditional classroom environments liked the asynchronous communication channel more than those who were vocal and active in classrooms. For instance, Sarah mentioned that, while it was difficult to ask questions in classroom situations, she felt relatively comfortable asking questions of the instructor via email: "I'm a shy student. I cannot raise my hand in class and ask a question. I can't ask and participate in class discussions at all. If I felt anything was difficult, I emailed her and asked her".

Jennifer commented that the mixed method provided flexible time structure as one didn't need to come to class sometimes and one learned to adapt to different learning environments: "I thought it was good, because sometimes you don't need to be in class so to have a mix was nice. Also it makes you comfortable with different ways of learning". Cathy also noted that the flexible learning environment helped her see different aspects to learning, which was also helpful for her learning about different teaching strategies in this elementary foundation course:

> Web-enhanced instruction was really helpful because I was able to see two different approaches to teaching that includes in the classroom and online class. You were able to see different aspects of learning, whether to explain yourself online or doing activities in the classroom. Having a web-enhanced class was a great way in learning child development this semester.

Student-Student Interactions

When asked about what they liked best and what they liked least in this Child Development course, 87% of the undergraduate students mentioned online group work to be the best and the traditional test to be the least. Nikki, an undergraduate, said in the interview:

> I like the group component of the class, and having the opportunity to work with one another to collaborate and enhance the learning experience. What I like best was the online work. I think in the future we can have more online class time for discussion and homework. It's beneficial when we have a discussion online and come to class with a further discussion about the topic. What I like the least is the test. I don't think a lot of people learn from memorization. They don't take the necessary actions to read the actual content of the question, just memorization.

Similar to Nikki who preferred learner-learner interactions, Jerry thought that he learned more from conversations with peers than from going over study guides online:

> I was very appreciative that the documents and discussions were online. I feel that the online discussions allowed for well thought-out conversations that really allowed each person to give their thoughts, opinions, and reflections. I feel that the study guides, although comprehensive, did not allow me to adequately prepare for the exam. I felt the online group activities did that much more efficiently.

Furthermore, some students indicated that integrating web-based activities with the FTF classroom sessions was a good way to encourage participation. Jim emphasized that:

> The discussion in a way forced me to participate, so I had to know the materials. In class, it's easy to find your way through. With discussions online, you have to be there to participate or you don't get any credit. I learned because of that.

In addition, students stated that they could apply their own thoughts and ideas to what they were learning rather than having to listen to what the other students had to say. One student responded:

> Being actively involved in discussions online and not having to "fight" to get time to speak in class

> helped me express my ideas better. Sometimes I did not have the opportunity to talk in class, being online gave everyone a fair chance. I was able to ask questions I never would in class.

However, not all students benefited from interactions with the peers online. Nancy said that although she can appreciate student-student interactions, she was someone who would thrive on one-on-one instruction with more individual attention from the instructor: "I really enjoyed the way this class was taught and the web-enhanced instruction was good, but I am a student that benefits best from one on one".

Also, compared with the graduates, undergraduates who were freshmen were more inclined toward learning from each other than working alone. An undergraduate student said, "I liked that I could easily find all of the information online. But I didn't like how I had to learn the information on my own for the tests". In contrast, none of the graduate students interviewed had expressed dissatisfaction with working alone in preparing and taking tests, although they also liked learner-learner interactions.

Connections between Web-Based Activities and FTF Learning

When asked about whether or not they thought the different components—FTF and online learning—were connected, most students responded with a positive affirmation. Students perceived that all the components provided a balance between FTF and online learning and also a balance between responsibility and flexibility. Ann commented, "Online work and class work flowed seamlessly together. I enjoyed the diversity and mix of the two; it made the class more enjoyable". Fred confirmed: "There was a clear connection between the activities performed both within the physical classroom and through the Angel component of the course. Related discussion material was covered, information was traded, and coursework was similar".

While the majority of the participants were satisfied with the course structure, some students didn't find any connections; instead, they saw two separate courses and felt overwhelmed. "I didn't find a clear connection between what we're doing online and the class. Like I said in the previous the Angel work load was very extreme", Sandy said.

> Several students mentioned that there should have been a better integration between the online discussion and FTF learning. For instance, John, an undergraduate, held an ambivalent attitude toward the online component. He liked the flexibility in scheduling but not the learning part:

What I liked best about the online activities in this course was, to be honest, the opportunity to not attend a physical class and still receive credit for attendance (as long as there was participation). What I disliked about it was the inability for one to gain a better understanding of a concept discussed or questioned during online discussions, should they have problems. I will stray off course a little more and not be as productive in group work in class. It is sometimes easier for one to comprehend subject matter when they are both seeing and hearing the material being taught/presented to them, and that is lacking in the web-enhanced instruction occasionally.

Like John, Katie had a degree of ambivalence towards the Angel component. She liked the resources put in Angel but didn't think the online discussions were beneficial to mastering the course content: "The online discussions were engaging, while not necessarily helpful in mastering course content due to the impersonal nature of the discussions. The readily available lessons and resources provided within the Angel component were, however, helpful".

Cathy also provided a different perspective. While there were ways to synchronously and asynchronously interact with the instructor and classmates via synchronous chats and discussion forums, she felt the limited capacity of the integration of the online learning format. She perceived that the online communication method was not as effective as the traditional classroom approach which allowed instant feedback and peer interaction:

> I was probably less satisfied than others just because I like student–teacher interaction and interaction with my peers…If you had questions about something while doing the projects online, you could not raise your hand. You have to email. So I personally prefer having regular classes as opposed to online learning . . . When you are in class, somebody might have questions that you did not even think of. They ask the questions in class and you feel that, "Oh, that's a good question."

Discussion

The purpose of this study was to examine the role of the integration of web-based activities in an elementary teacher education program, and how the integration improved student interaction and

engagement. Data collected during Fall 2008 and 2009 from four courses revealed that a majority of the students had positive view of the integration of web-based activities into their learning. Most of them spoke highly of these learning experiences: student-centered flexible learning environment, student-student interactions, and the connections between web-based activities and FTF learning. These findings were consistent with prior research which suggested that integrating web-based activities into traditional courses can have the potential to support social constructivist notions of the development of knowledge building communities (Lineweaver, 2010; Mansour & Mupinga, 2007; Riffell & Sibley, 2005). Most importantly, the findings suggested that a better learning environment can be built through designing web-based activities that emphasized interactivity and connectivity (Davies & Graff, 2005; Lineweaver, 2010; Sharma, 2007).

Interactivity. In regard to the interactivity of the courses, the study found that students liked to learn through interactions and that incorporation of web-based activities may contribute to higher levels of class interactions. In particular, undergraduate students who were freshmen were more likely to respond positively to the interactive learning experiences and to show dissatisfactions with noninteractive learning experiences such as preparing for and taking tests. They found it easier to understand the child development theories and issues when they were in the groups instead of working alone. It seems that learner interactivity is more important for younger students than for older, mature ones. Therefore, it is reasonable to suggest that faculty design more collaborative learning activities in lower-level undergraduate classes. Further, for faculty struggling with student participation in class discussions or with generating responses from particular groups of students, they may consider using web-based courseware as a tool in ways that can increase interactions, in particular, student-student interactions that are often lacking in traditional lecture-intensive courses. For instance, faculty can present questions that students are required to answer prior to class meetings, and to send them online after class to contribute to topics that need more in-depth reflections. Well-designed online learning also demands that learners accept increased responsibility for their learning. Integrating the distinct strengths of FTF and online interactions may well optimize collaborative performance.

Connectivity. As found in the study, a majority of the students were satisfied that the online components were well connected to the FTF learning. One powerful tool that may connect two different learning environments is the discussion forum. This tool has the potential to link the two different teaching environments together: on one hand, the traditional FTF setting that provides verbal, synchronous interactions among students and instructor; on the other, the online systems that learners and faculty use to communicate through written expressions in virtual time with or without social cues. It seems that increased connectivity could be achieved, for instance, by bringing to class some online postings from students and discussing them further with the class in traditional environments; or, the instructor could ask students to continue discussing online what they have been working on (e.g., a group project or an article discussion) in FTF classes. As was suggested by Summers, Waigandt and Whittaker (2005), when reaching a consensus, it may be advantageous for groups to meet FTF; when discussing a complex case that requires reflection and negotiation, it may be better accomplished through an online discussion forum. When the two environments are thoughtfully integrated, the educational possibilities are logically multiplied (Vaughan, 2007).

However, the study also found that a small percentage of students were frustrated during the online activities and did not benefit as much from them as the others. This finding is not surprising considering the diverse learning styles. For students who have low comfort level with technology, for instance, they may feel more challenged when working online. One suggestion is to give orientation of the Course Management System at the beginning of the semester, in one to two sessions at a computer lab; another suggestion is to team up these students with ones who have higher technology skills. For those who feel frustrated because of the heavy workload, faculty needs to consider the amount of assignments given. Any examination of the use of online activities outside class time must also include the caveat that engaging students in this type of e-learning activity can add hours of reading to the regular course load, or distract students from other equally or more important course work. On the part of the instructor, online discussions and group activities can require considerable time and effort to review the submissions; on the part of the students, this could become two separate courses with increased amount of workload. Thus, deciding the proper amount of work should be one of the key decision factors when developing the learning objectives and required student discussion activities in web-enhanced courses.

Conclusions/Future Studies

This study has documented the potential of using web-based activities to enhance and supplement traditional classroom teaching. The web-based activities provided students with opportunities to interact

about class topics and the text outside of class, create their own examples, explain key concepts in their own words, and apply course material to their everyday lives. In this way, it used technology to increase interaction among students, increase engagement in learning and established a learning community outside of the classroom, while allowing individual contributions to be identified and evaluated. These findings suggested that integration of online activities into traditional teacher education courses can shift some of the power, authority, and control from the instructor to the learner while providing the interaction and connection that are central and valuable to traditional classrooms.

However, as a small-scale case study research conducted in one institution, the generalization of the findings is limited. Future research should validate these findings using larger samples at multiple sites. For instance, the role of the online activities in student learning could be compared by age, gender, traditional student versus nontraditional student groups, and race or ethnicity. Factors such as student motivational levels, learning styles, personality profiles, communication styles, and other individual differences that may affect students' satisfaction and success in web-enhanced traditional teacher education courses, should also be investigated. It is important to recognize the role of the use of online activities to supplement, enrich and enhance traditional instruction. More importantly, it is essential to continuously investigate not only its role but also factors influencing the satisfaction and interaction.

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