

# Perceptions of Beginning Teacher Education Students Regarding Educational Technology

Adam Friedman and Sara Kajder

## Abstract

*This study sought to identify the attitudes and perceptions of students in an introductory educational technology course situated within a teacher education program. Data were collected in the form of anonymous feedback throughout the semester. Findings included: students tended to enter the course with either a good deal of technology knowledge or with apprehension about using technology; students' thinking evolved from conceiving of technology in a generic classroom to a classroom in which they were the teacher; the majority of students had not experienced effective uses of technology in their previous courses; technologies incorporated into the course needed to be reflective of what was available in K–12 schools; and by the end of the semester, students demonstrated technical skills, pedagogical content knowledge, and significant motivation to integrate technology into their classroom.*

At a large mid-Atlantic university, all teacher education students are required to complete an introductory course introducing and modeling content-specific technologies. This course, EDUC 300: Introduction to Educational Technology, is used as a foundation for a continuing strand that is integrated into the coursework and field experiences that follow. Subsequent to EDUC 300, students participate in methods courses that focus on the pedagogical principles taught in this course, while field experiences involve the application of these principles into practice.

Teacher education students in all program areas are required to take EDUC 300. The philosophy behind EDUC 300 is that digital technologies should be used to support content teaching and learning and that preservice teachers should learn about and create technology applications that can be applied directly to their classroom. Therefore, EDUC 300 is not a course solely about proficiency in different technology applications, nor is its focus on pedagogy; rather, it is a combination of the two.

The teacher education program emphasizes using technology as a tool to support teaching and learning, introducing technology tools not in isolation but within the context of content area instruction (Bell & Hofer, 2003; Flick & Bell, 2000; Garofalo, Drier, Harper, Timmerman, & Shockey, 2000). To this end, students enroll in content-specific sections of EDUC 300 (mathematics and science, secondary humanities, elementary, and special education) in order to critically examine subject-specific uses of current technologies. Curricula include digital microscopes, graphing calculators, online digital primary sources, and software for creating digital stories. This study focuses on the secondary humanities and elementary sections.

EDUC 300 is positioned early in the coursework sequence for students in either the five-year bachelor of arts/master of teaching program or the postgraduate/master of teaching program. As a result, the vast majority of students enrolled in the course have no prior field experience and

are just beginning to develop a sense of what they believe as teachers or envision as possible in their own classrooms. One significant challenge and privilege of teaching this particular course involves the capacity of the instructor to lead students to begin to develop their own sense of identity as teachers. This unfolds throughout the timeline of the course, in conversation with the early methods and content-specific courses that students take concurrent with EDUC 300.

This study sought to identify the attitudes and perceptions of secondary humanities and elementary beginning preservice teachers in regards to their views on technology in their future classrooms.

## Review of Relevant Literature

Several models or approaches to technology integration in preservice teacher education have been developed to more effectively prepare teachers. Some programs have taken a skills-based approach, despite research indicating that although the technology-specific course develops basic computer skills, it does not prepare teachers to use technology in a variety of instructional settings (Bertrus, 2002; Handler & Pigott, 1994; Mehlinger & Powers, 2002; Thorsen & Barr, 1997; U.S. Congress, Office of Technology Assessment, 1995; Wetzal, 1993). Student participants in this type of course are typically unable to move beyond the “drill-and-practice” view of technology integration (Vannatta, 2000), as they lack exposure to appropriate models of computer use in content-area specific classroom settings (Farragher, Francis-Pelton, & Reicken, 1997).

Other teacher education programs have sought to integrate technology into content-area courses so that preservice teachers experience technology-rich instruction both as students and as teachers (Vannatta & Beyerbach, 2000). Recent recommendations argue that technology should be integrated throughout the teacher education program to have a positive effect on teacher learning (Cooper & Bull, 1997; International Society for Technology in Education, 1999; Vannatta & Reinhart, 2000; Voog & Odenthal, 1999). These programs provide preservice teachers with a pedagogical content knowledge of educational technology, “understandings for teaching with technology which arise from knowledge of technology as it is applied in classroom settings” (Margerum-Leys & Marx, 2003, p. 27). In this model, preservice teachers (1) observe their instructors model technology integration, (2) are required to develop technology-rich lesson/unit plans, and (3) complete several assignments using technology, culminating both in extremely positive attitudes about technology integration and the development of a constructivist vision of teaching with technology (Vannatta, 2000).

Research has indicated that one course on technology integration does not successfully effect the practice of teacher education students (Beyerbach, Walsh, & Vannatta, 2001; Brent, Brawner, & Van Dyk, 2002; Willis & Mehlinger, 1996), so EDUC 300 is followed by further modeling of technology in teaching methods courses. Following the ap-

proach put forth by Brush (1998), methods faculty members are consulted regarding both the development of the EDUC 300 course syllabus and students' performance throughout the semester.

This method is advocated by Weibe (1995) who argues that preservice teachers should learn technology skills in conjunction with their methods courses. Stemming from his 1998 study of preservice physics teachers, in which content-specific technology "skill[s] and] experience[s]" were integrated into a methods course, Brush argues that as a result of their participation in this course, the preservice teachers felt equipped to infuse technology into their instruction. Vannatta and Beyerbach (2000) substantiate the notion of learning to use technology applications within the context of instruction, as they argue that in order for teachers to integrate technology into their classroom, it should be connected to content as opposed to being presented in isolation. In their study of preservice and inservice teachers, they observed that participants exhibited a greater proficiency in terms of integrating technology when training was within the context of content.

## Methodology

To gain a better understanding of the development of student beliefs and perceptions about integrating technology into their content area instruction throughout the course, instructors made use of anonymous feedback at the conclusion of each class in the Fall 2003 semester. Through a Web-based tool accessible to all instructors at the university, students entered feedback at the close of the class, and anonymous comments were subsequently e-mailed to the instructor. At the conclusion of each class, structured prompts were posed to all of the students, who voluntarily offered responses delineating how they felt about using technology in their classroom or whether or not the specific tools explored in class would be useful to their work. For example, at the conclusion of one class, students were asked how (if at all) they might use digital history resources in their classroom. Subsequent classes concluded with prompts examining potential uses of digital images in their instruction or reflecting on the relative merits of incorporating Web design into content area teaching.

This paper offers analysis of trends and themes identified in the data corpus gathered throughout the semester from both the secondary humanities and elementary sections. There were 42 students enrolled in the two secondary humanities sections of the course. The data corpus gathered from these students included six anonymous feedback postings and a minimum of 12 weblog entries, each received from all of the 42 students for a total of 756 responses. The elementary section had 30 students, each of whom posted anonymous feedback every week, for an additional 450 responses. The data were compiled into two documents (one for each content-specific section) for analysis using grounded theory (Strauss & Corbin, 1998). Analysis occurred weekly as each new set of responses was added to the data corpus. Data were analyzed using open coding, in order to "uncover, name, and develop concepts" (Strauss & Corbin, 1998, p. 102). As students responded to specific prompts throughout the study and new data were collected subsequent to each class meeting, the instructors were able to identify overarching themes emerging from the data, and as a result, were able to note the differing stages of student feedback.

Students in the secondary humanities section also maintained an ongoing weblog (i.e., an online journal) for additional reflection. The weblogs were public electronic journals that the instructor and class peers regularly accessed, read, and commented on throughout the semester. A sample weblog posting required that students respond to a 3-2-1 prompt, listing three "big ideas" that they had gained through the course in the preceding weeks, two "instructional applications" that represented powerful uses of the technologies explored, and one question that needed to be addressed within the remainder of the course.

## Results

Using grounded theory, the instructors developed three assertions describing course expectations and content and two assertions describing student technology use/confidence. Interestingly, the assertions related to technology use/confidence were generated from comments elicited at either the beginning or the end of the course.

Students enrolled in the Fall 2003 semester secondary humanities and elementary sections of EDUC 300 offered feedback and comments that led instructors to identify three stages of development shared across the two sections. First, students tended to enter the course at one of two extremes: either anxious and apprehensive about using technology or confident in their abilities to use computer hardware and software. Very few students fell into a "middle ground." A transition in attitude occurred approximately at midterm, when students began to "think like a teacher." Students moved from referring to "a social studies classroom" to speaking of their own classrooms. They spoke of themselves as teachers, as opposed to the distanced references identified early in the semester. Finally, in the third stage, which was observed in the latter half of the course, students began to conceive of ways to integrate technology into content specific curricula. This was further evidenced as they were challenged to critically select appropriate technologies and instructional strategies and develop a corresponding lesson plan designed to teach specific, standards-framed content. Student responses could be grouped into five assertions that reflected attitudes and experiences concerning technology integration and use in their own instruction.

### *1. Students were eager about the possibility of using technology in their teaching, but were unsure of how to do so.*

At the conclusion of the first class period, students in both sections were asked to respond anonymously to the following questions: "At this point, do you plan to use technology in your classroom teaching?" and "Where are you (in terms of technology abilities/skills)?" Of the 31 comments that were received, the overwhelming majority (30, or 97%) expressed excitement and enthusiasm about using technology in their classrooms. Comments included, "I am actually sort of excited about this class," and "I think that this class will be great!" The class was evenly split between those who had little experience with technology and those who felt fairly comfortable, as the 31 comments were classified in the following manner: 12 (39%) expressed confidence with their technology skills, 13 (42%) described trepidation about their ability level, and 6 (19%) did not comment on their technology skills. Some students spoke of their "technology fears" and responded to the syllabus on the first day of instruction with statements such as, "I am daunted," "I'm feeling a little bit intimidated," "I am technologically dumb," and "I am so uncomfortable with technology." At the opposite extreme, some students stated that they felt "comfortable with computers and technology," and another was "concerned" about feeling already "adept in this field." However, it was unanimous that none of the students were aware of how to use technology in a content-area classroom, as not one student expressed the ability to integrate technology into a K-12 classroom. Although one preservice elementary teacher pronounced that technology "won't do me any good if I don't know how to integrate it and make it work for me as an elementary teacher," a secondary humanities preservice teacher declared that "this class meeting has really encouraged me to want to learn how to fit technology into my future classrooms."

### *2. Students wanted the course to have a direct connection to the subjects they will be teaching.*

Although students may have some general technology skills, such as the ability to burn a music CD, they rarely had expertise with technologies specific to their content area. For example, after the fifth class meeting, the secondary humanities section was asked what they had learned up to that point in the course, and each of the 20 responses described the

acquisition of digital storytelling skills in general and iMovie in particular, which could be used in the English or social studies curriculum. As one student stated: "I have learned to integrate [iMovie] into assignments for a writing or English class." Preservice teachers desired instruction that addressed such use, as the following comments gathered from the anonymous feedback from the elementary section suggest:

- I enjoy the fact that what we are learning is pertinent to me as a teacher and may be implemented in the classroom.
- These digital history resources will definitely be useful when I am a teacher. Using interactive maps, diary entries, and photographs will help bring history alive for my students.
- Using the digital history resources will be helpful to me as a teacher, and to my students as well because it will help me to help the students understand the material better, rather than them just learning facts.
- Digital microscopes are a fun and easy way to explore science.
- I definitely would use these math resources in my classroom.

A preservice elementary teacher commented that these resources will "enable a child to actually experience a portion of history instead of just reading about it," while another felt that the digital history resources would allow the teacher to "create a theme" as s/he could "use the map for math (to measure distances), read the diary to practice reading and writing, [and] understand the environments in the diary in a science project."

As different content-specific technologies (such as digital history sources, Inspiration, Internet-based math software, and digital microscopes) were introduced in the elementary section, students were asked to comment on how they perceived their usefulness in terms of teaching elementary school. Each of these technologies was introduced in a separate class meeting, and as a result, there were 88 comments on these resources. 80 (91%) of these comments described the technologies as useful.

### **3. The majority of the incoming teacher education students had not experienced effective uses of technology in their previous courses (either in K–12 schools or the university) and desired models that illustrate effective faculty/instructor technology integration.**

According to both the humanities students' weblog posts and all students' anonymous feedback postings, the vast majority of this semester's student group could not identify a teacher from their elementary or high school experiences who used technology authentically or powerfully to advance classroom learning. During the first class meeting, students in both sections participated in a poster board activity in which, among other questions, they were asked what they felt they needed to be ready to integrate technology. During the subsequent class discussion, it became apparent that a very small percentage (no more than one or two students in each class) had experienced what they described as effective technology integration in their previous coursework.

In addition to not having participated in effective technology-enriched instruction, students also expressed significant concerns regarding the role of the teacher in technology-infused lessons. Although the role of the teacher was never a specific prompt for the anonymous feedback, 72 anonymous feedback postings were related to this. These postings ranged from "I don't know what a technology-savvy teacher even does" to "Up until this point, I had only used a computer to check my e-mail...I have become somewhat proficient in certain programs [and] have gained a wealth of knowledge about teaching in general."

In terms of technology use in the preservice teachers' future classrooms, one student offered in a weblog post, "I am beginning to see myself as a teacher and in doing so, I look to see what *you* do with these tools." Others closely examined lessons presented in class, offering through anonymous feedback that:

- I'm so glad that we did this exercise because I can see what it looks like in my own classroom now.

- It's so refreshing to see that I can use PowerPoint in a way that doesn't involve monotone lecturing with eyesores of tiny text (preceded, of course, by the initial failure of the computer being used).
- If I have the tools in my placement, I now see a starting place—mostly because of what we do in class.

The epitome of this phenomenon was one humanities student who, because she had not experienced instruction that utilized technology, entered the class envisioning "[her] classroom devoid of technology." However, after participating in EDUC 300, stated that she "cannot imagine a classroom without technology."

### **4. Resources and technologies incorporated into the course need to be current, accessible, and reflective of what is available in K–12 schools.**

Often, schools of education cannot offer students the same level of technologies typically found in local schools. For example, many local schools now have portable carts of laptop computers that can be moved from classroom to classroom. Working in computer labs outside the education school meant that K–12 software typically was not available for these sections of EDUC 300, and there were often technological glitches that inoculated students against use of the technology in the future, as throughout the course, 23 separate, unprompted comments made reference to this. The following comments from the anonymous feedback illustrate some of the challenges students faced:

- As proud as I am of my first technologically challenging product, I hated the technology during the process. The computer was slow, the software uncoordinated, and the assistants didn't know what we were looking to do.
- I was at the mercy of the technology, and it worked against me.
- Three hours in [the library lab] meant two hours of normal paced work and one hour of working to the clock. Is this what teachers do?
- Shouldn't we be able to do this in the School of Ed—somewhere that laboratory staff value what teachers do with these tools?
- Assignments are sometimes difficult to complete because of the shortage of software available in certain labs.
- I miss being in a classroom where you can interact with us in such a different way. I'm not sure now what any of this would look like in my classroom.

Although the preservice teachers in this study expressed frustration with the software and computer labs, they were eager to learn immediate methods of using technology in the K–12 classroom. For example, after class sessions in which Microsoft Excel and PowerPoint were taught, each of the 18 anonymous postings expressed satisfaction that the skills that were taught in EDUC 300 would be transferable to these preservice teachers' classrooms. While one student felt as if Excel "will really be useful as a grading tool," another had positive feelings about PowerPoint, as it was described as "a great way to get the kids engaged and to be able to link to the web appropriately."

### **5. By the close of the course, students identified multiple instructional areas where technology provided a significant additional value.**

At the conclusion of the final class of the semester, the preservice teachers were asked whether they felt EDUC 300 was a useful experience and to evaluate what they learned. In response to this, each of the 39 anonymous feedback postings and weblog posts expressed students' confidence in their abilities to integrate technology into their instruction. They not only felt as if they had learned a good deal, but that the concepts taught were useful and practical.

- Without this class, preservice teachers would not have the opportunity to be made aware of the depth of technology strategies and tools that can result in powerful learning experiences for students.
- EDUC 300 provides a whole new realm of instructional strategies

that build on the theory and understandings being taught in the instruction, assessment, and methods courses.

- The most essential thing about this course is exposure to the various programs that are out there and available to us as teachers in the field. Before this course, I had never manipulated an image in Photoshop, created a movie on Windows MovieMaker, or created a Web site. Taking this course has made me feel more competent using these and other programs and I will definitely be a lot more comfortable using technology in my classroom as part of my lessons.
- The class was definitely VERY helpful. I especially enjoyed learning how to make the movies and the kiosk PowerPoint presentation. I think I will definitely put them to use in my future classroom.

## Discussion and Conclusion

The feedback secured each week from the elementary and secondary humanities sections of EDUC 300 has indicated areas for future program development while demonstrating the course's effect on preservice teachers' skills and beliefs in terms of integrating technology into content area instruction. The data indicate not only development of instructional confidence as teachers who use technology to further instructional goals but also the development of a critical lens through which these teachers will be able to question, challenge, and select appropriate technologies for classroom use. This parallels the results of Brush's (1998) study in which preservice teachers were more confident in terms of their ability to integrate technology into their instruction. Additionally, as Russell, Bebell, O'Dwyer, and O'Connor (2003) summarize, "changing teachers' use of technology requires changing their beliefs about technology" (p. 307). Further, because EDUC 300 was taught in a manner advocated by Flick and Bell (2000), Garofalo et al. (2000), and Vannatta and Beyerbach (2000), in which technology was taught as a vehicle with which to support content and to allow teachers and students to engage in an activity that they might not otherwise be able to, preservice teacher satisfaction with the course supports the model.

This study also validates the argument put forth by Cooper and Bull (1997), ISTE (1999), Vanatta and Reinhart (2000), and Voog and Odenthal (1999) that preservice teachers should have multiple opportunities within their teacher education programs to have firsthand experiences with technology integration. At the beginning of the course, the preservice teachers were excited about integrating technology into their teaching, and at the conclusion described themselves as satisfied with their learning experiences in the course. However, if EDUC 300 is the only course in which technology concepts are introduced, it is possible that they will not recall the intricacies of course content when they begin to teach, and thus be less likely to use it. Furthermore, if students are expected to continue to apply these technology skills in future courses, as Weibe (1995) argues, it could be presumed that the chances are lessened that their initial frustrations will persist. Although EDUC 300 was a single course within the larger teacher education program, it was evident from the anonymous feedback that its effect on preservice teachers was great, as not only were preservice teachers taught various content-specific technology resources and methods to use them within their teaching, but in so doing, students moved from conceiving of a classroom in a general sense to the beginnings of their own teacher identity.

Future research will include study of these students' further development in instructional methods courses and student teaching practice. Further, an instrument for assessing student beliefs and attitudes across instructional sections of EDUC 300 is under development for piloting in forthcoming sections. Additional research will be conducted not only on the changes in students' perceptions but on the actual, practical skills that they bring into the course. Further, we plan to examine how the content-

specific instructional technologies are carried into the lesson plans and activities the students develop in their methods coursework.

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*Adam Friedman is an assistant professor of Instructional Systems Technology at the University of North Carolina at Charlotte. His research interests include technology integration into teacher education as well as the K–12 environment, with a focus on social studies content.*

Adam Friedman  
Department of Educational Leadership  
University of North Carolina at Charlotte  
9201 University City Blvd.  
Charlotte, NC 28223  
(704) 687-8976  
afriedma@email.uncc.edu

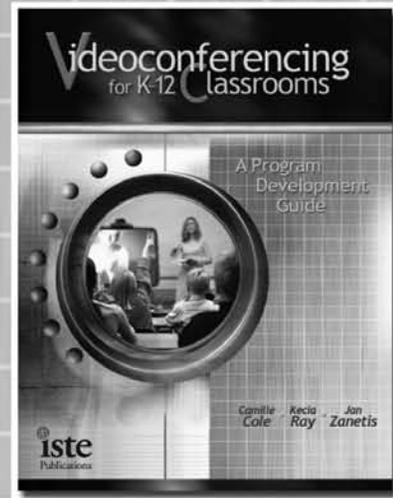
*Sara Kajder is an assistant professor of literacy education at the University of Louisville. Her research interests include examining strategies for preparing preservice secondary English teachers to integrate technology into classroom instruction.*

Sara Kajder  
Department of Teaching and Learning  
College of Education and Human Development  
University of Louisville  
Louisville, KY 40292  
(502) 852-0586  
sara.kajder@louisville.edu

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