

Integrating Technology into the Existing Education Curriculum

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Abstract

How can technology be integrated into the existing curriculum for teacher candidates, so they see the real benefits of using technology to enhance and extend the everyday task of teaching and learning? Technology has not only become such an integral part of our daily lives, but elementary, middle, and high schools nationwide are integrating technology into the classrooms at a record pace. Teacher candidates need to be prepared to teach students using the most up-to-date software, hardware, and have a familiarity with a variety of tools available to promote learning in the classroom to prepare students for the future. Our higher education institution has designed a technology plan to address these issues, so teacher candidates are prepared for their field experiences and teaching upon graduation.

Introduction

The world of technology is ever changing and making a difference in how we teach. According to Boroko, Whitcomb, and Liston (2009), "Technology, in its broadest sense, is the knowledge, creation, and use of tools and techniques to control and adapt to our environment" (p. 4). Koehler and Mishra (2008) refer to using new technologies in teaching and learning as a "wicked problem". In addressing technology, in its broadest sense, and the *wicked problem*, the faculty at Franklin College (FC) took a close look at the existing format for presenting technology to the education majors. We asked, "What is the most effective means in educating teacher candidates to keep up with the fast-paced computer-based technology, along with the necessary technology skills and tools to be prepared to teach?" With the constant advances and changes in hardware, software, and applications it is critical that institutions of higher education prepare their teacher candidates for the complexity of teaching and learning using technology integration as an everyday tool. Integrating technology into the curriculum involves infusing the necessary components to extend and enrich the existing course curriculum. The Office of Technology Assessment (as cited in Abdal-Haqq, 1995) indicated that there is "the need to infuse technology, in a coordinated fashion, across the college curriculum, into the liberal arts content areas where students acquire their subject-area skills and knowledge, as well as the education specialties" (p.2). It is much more common to find technology taught as a stand-alone course or courses, rather than infused and integrated into the course sequence of education programs focusing on authentic learning experiences (Wentworth, Earle, & Connell, 2004). After assessing our needs, we decided to establish a committee to work on a technology plan for infusing and integrating technology into all education courses. Our focus was to build on the existing knowledge of teaching and learning technology to help our teacher candidates be-

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come more tech-savvy in the ever changing technology world during their six varied field experiences, education course work, and in their future classroom.

Teaching and Learning Concerns

In the spring of 2006, Franklin College began to take a closer look at the existing use of technology in the existing course curricula. As a result, FC found the need to embed technology into actual practice, as well as present technology via authentic teaching situations. Research shows that infusion of technology should be the goal of institutions (Abdal-Haqq, 1995; Borko et al, 2009; Northrup & Little, 1996). In doing so, we initiated a technology survey to local schools used for field placements, surveyed education majors on technology they felt comfortable using, and assessed the needs of the educational environment. The driving question behind addressing the “wicked problem” was: *What is the most effective method to infuse and integrate technology into existing course curriculum within the education courses to promote authentic teaching and learning?* When first addressing this question, there was only a stand-alone technology course offered to sophomore education majors and only a few education professors used technology in their courses. Being uncomfortable with technology, lack of time to experiment with software and tools, and knowledge of how to effectively integrate technology to meet teaching and learning objectives were areas the education faculty needed to address in order to infuse and integrate technology into our courses. Research shows that several of our concerns are not uncommon among institutions of higher education. According to Don Knezek, ISTE CEO:

Teachers must become comfortable as co-learners with their students and with colleagues around the world. Today it is less about *staying ahead* and more about *moving ahead* as members of dynamic learning communities. The digital-age teaching professional must demonstrate a vision of technology infusion and develop the technology skills of others.

These are the hallmarks of the new education leader. (ISTE, 2008a, p. 1).

At the time of implementation, a Technology Standards and INTASC Standards matrix was created to align the International Society for Technology in Education’s (ISTE) National Educational Technology Standards and Performance Indicators for Teachers (NETS•T) Standards with the FC course offerings at the various levels. The standards were the basis for the transformation of the teacher education program to equip the teacher candidates with technology strategies within course content through demonstrations and application. Freshmen are exposed to basic technology skills and projects that expand as they progress through the program. Sophomores, juniors, and seniors apply technology during six different field placements and through the immersion of technology in their various education courses. This helps to reinforce what is being discussed and applied in their college content and methods courses at all academic levels. There is a “difference between learning *technology skills* and learning how to *integrate technology* into the classroom,” (Wentworth et al, 2004, p. 130). In 2008, ISTE released the next generation of NETS for Teachers which focuses on *using technology to learn and teach* (ISTE, 2008a). According to the NETS•T:

Effective teachers model and apply the National Educational Technology Standards for Students (NETS•T) as they design, implement, and assess learning experiences to engage students to improve learning; enrich professional practice; and provide positive models for students, col-

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leagues, and the community. All teachers should meet the following standards and performance indicators:

- Facilitate and Inspire Student Learning and Creativity
- Design and Develop Digital-Age Learning
- Model Digital-Age Work and Learning
- Promote and Model Digital Citizenship and Responsibility
- Engage in Professional Growth and Leadership (Borko et al., 2009, p. 6; ISTE, 2008b, p.1).

During the process of compiling resources to justify the infusion of technology into the education course content, field placement school corporations were contacted as to what technology tools and skills were expected of new teachers. In addition, Franklin College faculty members attended conferences to further enrich their existing knowledge on how best to infuse and integrate technology into higher education courses. We believe that entering the classroom with a repertoire of technology skills will enhance one's teaching strategies. According to Abdal-Haqq (1995), "The Office of Technology Assessment found that while more than half (K-12 teachers) reported being prepared to utilize drill and practice, tutorials, games, word processing, and publishing applications; less than 10% felt competent to use multimedia and presentation packages, electronic network collaboration capabilities, or problems-solving applications" (p. 2). Information was gathered from various U.S. colleges and universities such as the: University of Maryland, Wabash College in Indiana, Arizona State University, Hope College in Michigan, Vanderbilt University, and University of Virginia to guide our technology integration plan. These schools have been successful in integrating technology into field-based experience by providing authentic teaching experiences in the college classroom and incorporating technology into course assignments. The infusion of technology into college courses has caused the FC Education Department to take a close look at what technology software and training is needed, in order to deliver relevant content in an appropriate and effective manner. The Franklin College Instructional Technology (IT) Staff have remained as consultants for the education professors. Also, internal technology grants have been written by the department over the last two years to purchase software and hardware to equip the education students with the methodology and tools associated with authentic teaching and learning.

Implementation Process

Building instructional technology into the curriculum was critical to the success of technology integration at Franklin College. Planning and implementation began in the fall semester of 2005. The faculty realized the need for infusing technology into existing courses and showed no resistance to implementing technology. But, reservations about their own technology skills, how to best implement technology components, and the amount of time taken from actual class lectures were all issues brought up by faculty. To deal with these reservations, faculty have had on-campus opportunities to become more familiar with software, have attended conferences on technology, and have experimented with integrating technology into existing curriculum through modeling and teaching. In developing appropriate benchmarks for preservice teacher training, several faculty members emphasized the importance of technology integration into course content, field experiences, as well as faculty training. The model in Appendix A illustrates the connections between faculty, students, and field experiences in promoting collaboration and technology integration where teaching and learning are apparent. According to Northup and Little (1996), "Faculty who integrate technology for teaching and learning will not only perform duties more efficiently but also will produce emerging classroom teaching models and strategies" (p. 219).

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Prior to the infusion and integration of technology, a sophomore course/EDU 226-Educational Technology (2 credit hours), was taught by members of the Instructional Technology Department on campus in fifty minute sessions two days a week during the spring semester. As the FC technology trainers were assigned other obligations and concerns about the application of the EDU 226 concepts and skills, the FC education department decided to integrate technology into all education courses. Skills taught in EDU 226 were: Microsoft Word, Power Point, Excel, designing a Web Page, and beginning a Web-Quest. To infuse and integrate technology into every facet of the Education Department's curriculum, program-wide thinking was essential to create a feasible technology plan tailored to our faculties' and students' needs. Two members of the Education Department and a member of the Instructional Technology Team joined forces. We looked at what was being taught in the different courses, the INTASC and NETS•T standards, school corporations technology recommendations, as well as an effective technology plan for faculty and students.

In looking at skills needed for K-12 teachers and INTASC-NETS•T standards, a draft was designed and taken to the education faculty for feedback. Many long discussions were held and adjustments were made to make the plan more suitable for all faculty, course curricula, and students. Since the beginning stages of the technology plan design, several revisions have been made. Adjustments have not been made frivolously.

The decision was made from the onset of the technology integration that it would begin with the incoming freshmen and would continue to build during the students' next three years in the education program. The integration process began in the spring of 2006 with the incorporation of technology into EDU 124-Introduction to American Education taken by all freshmen interested in education as a major. In this course the students are exposed to various methods of research, how to find sources, using the library as a reference, creating a resource list of fifty links, and using a variety of technology components to create a digital storytelling product. During this course the students are exposed to the following technology tools and skills: how to use the library's online database, compiling a resource list using educational sites, using technology as a source for writing assigned papers, and using Movie Maker to create a digital storytelling product. The technology introduced and used in EDU 124, along with the skills obtained, become the foundation to build on in the next three to four years for a student at our institution. The current technology plan (Appendix B) further details what is introduced (*I*), developed (*D*), and mastered (*M*) for the sophomores, juniors, and seniors.

Conclusion

Since the implementation of our new technology plan, adjustments have been made yearly by revisiting what is taught in each course, the course objective(s), and how to better prepare teacher candidates in addressing teaching and learning. Our goal was and is to address the "wicked problem" Koehler and Mishra (2008) discuss in using new technologies in teaching and learning to prepare teacher candidates for teaching. This concept applies to stretching ourselves, the professors, to become proficient with the various components of technology in regards to teaching and learning, too. Teacher candidates need to be prepared to teach students using the most up-to-date software, hardware, and also have a familiarity to a variety of tools available to promote learning in the classroom. Rather than merely focusing on learning

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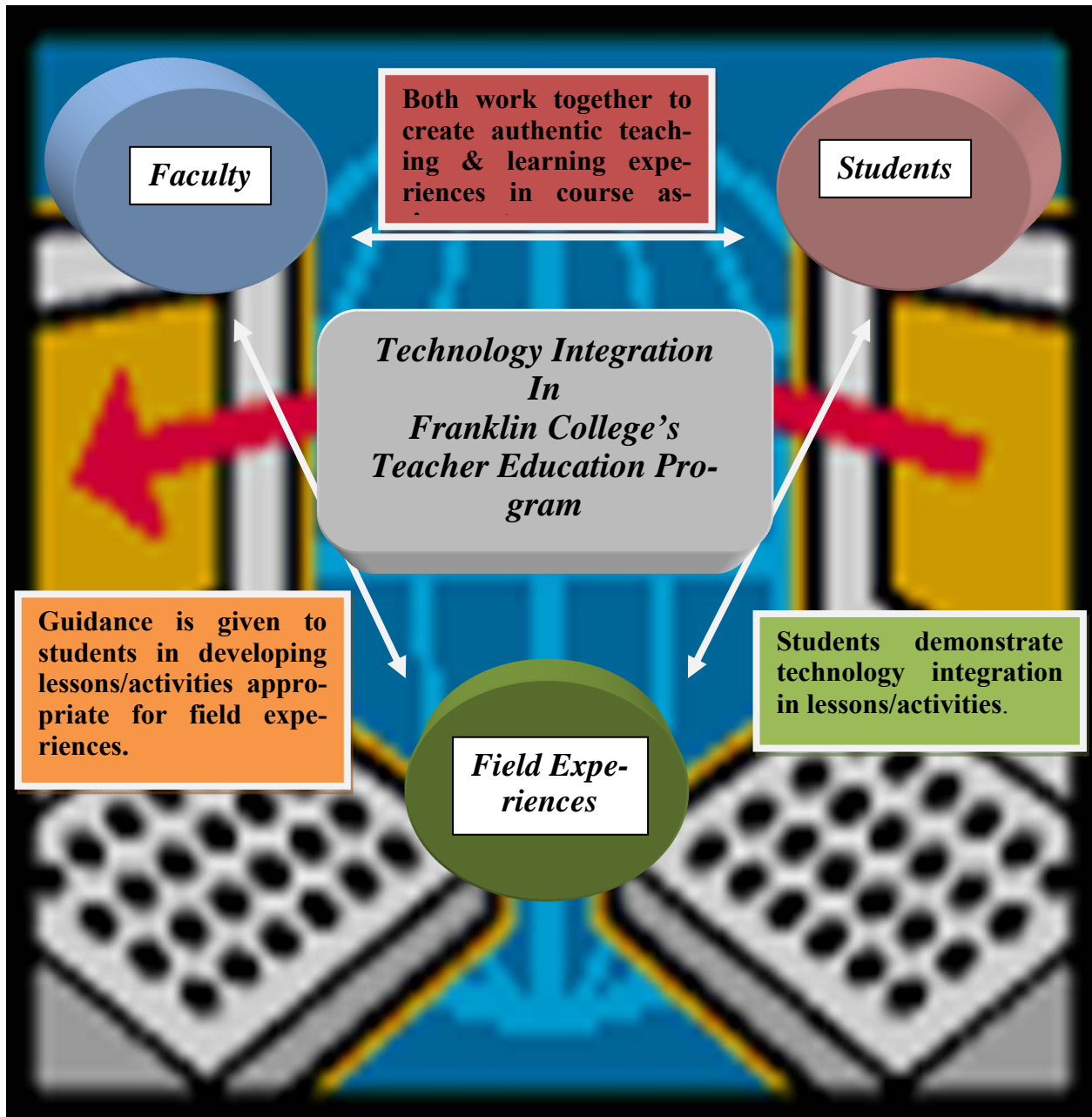
technology skills, infusion of technology is supported with positive ramifications through the integration of technology into teacher education courses (Abdal-Haqq, 1995; Borko et al, 2009; Northrup and Little 1996; Wentworth et al, 2004). Our higher education institution's technology plan has tried to address issues associated with research and feedback from schools and preservice teachers, in order to better prepare our teacher candidates for their field experiences, course curricula, and teaching upon graduation. As we continue to integrate technology, it is imperative that we make sure technology integration is done in depth, not just breadth. The value of using technology in teaching and learning should exemplify why a teacher does what they do and how to do it. Technology has become an integral part of our daily lives, because elementary, middle, and high schools nationwide are integrating technology into the classrooms at a record pace.

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Appendix A:

Technology Integration between Faculty, Students, and Field Experiences



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Appendix B: Technology Plan for Education Courses at Franklin College

Courses	Technology Components: I-Introduced, D-Developed, M-Mastered
Freshmen	
EDU 124 <i>Introduction to Teaching and American Education</i>	<ul style="list-style-type: none"> ▪ Resource File (Word)-<i>I</i> ▪ File Management: Windows Explorer, Memory Sticks, Burning CDs-<i>I</i> ▪ Library Skills: internet searches, databases, copyright info, plagiarism (Daria)-<i>I</i> ▪ Digital Storytelling-<i>I</i>
Sophomore	
EDP 222 <i>Survey of Exceptional Children/Inclusion</i>	<ul style="list-style-type: none"> ▪ Adaptive Technology with Special Needs Children-<i>I</i> ▪ Resource File-<i>D</i>
EDU 222 <i>Child Development and Educational Psychology</i>	<ul style="list-style-type: none"> ▪ Virtual Tours-<i>I</i> ▪ Use of Digital Camera/Video-<i>I</i> ▪ Scanner-<i>I/D</i> ▪ Resource File-<i>D</i> ▪ Digital Storytelling: Windows Movie Maker, Audacity, PhotoStory, Photoshop-<i>I/D</i>
EDU 225 <i>General Methods for Effective Instruction</i>	<ul style="list-style-type: none"> ▪ Gradebook-<i>I</i> ▪ Laptop Computers-<i>I</i> ▪ PDF (Acrobat)-<i>I</i> ▪ Membership in List Serves, Blogs, Podcasts-<i>I/D/M</i> ▪ Whiteboard Technology-<i>I</i> ▪ Web Page Design-<i>I</i> ▪ Document Reader-<i>I</i> ▪ Resource File-<i>D</i>
Juniors	
EFE 300 <i>Fall Field Experience</i>	<ul style="list-style-type: none"> ▪ Résumé (Word)-<i>I/D/M</i>
EDS 326/327 <i>Instructional Strategies I & II</i>	<ul style="list-style-type: none"> ▪ Distance Learning/Angel–Blogs-<i>I</i> ▪ WebQuest (Nvu)-<i>I</i> ▪ Spreadsheet/Excel-<i>I</i> ▪ Laptops-<i>D</i> ▪ Whiteboard Technology-<i>D/M</i> ▪ Resource File-<i>D</i> ▪ Video Conferencing-<i>I/D/M</i>
SCI 334/335 <i>Science & Elementary Teaching I & II</i>	<ul style="list-style-type: none"> ▪ Distance Learning/Angel—Blogs-<i>I</i> ▪ Graphing-<i>I</i> ▪ Document Reader-<i>D/M</i> ▪ Resource File-<i>D</i> ▪ Laptops-<i>D</i> ▪ Spreadsheet/Excel-<i>I</i>
EDE 344/345 <i>Teaching and Learning Literacy I & II</i>	<ul style="list-style-type: none"> ▪ WebQuest (Nvu)-<i>I</i> ▪ Whiteboard Technology-<i>D/M</i> ▪ Resource File-<i>D</i> ▪ Laptops-<i>D</i>

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EDE 365/366 <i>Mathematics Methods for Elementary Teachers I & II</i>	<ul style="list-style-type: none"> ▪ Graphing-<i>I</i> ▪ Excel-<i>D</i> ▪ Resource File-<i>D</i> ▪ Laptops-<i>D</i> ▪ Smart Airliner-<i>I</i>
Seniors	
EDU 415 <i>Human Diversity in the Classroom</i>	<ul style="list-style-type: none"> ▪ Resource File-<i>D</i> ▪ Digital Storytelling, Windows Movie Maker, Audacity, PhotoStory, Photoshop-<i>D/M</i> ▪ Use of Digital Camera/Video-<i>M</i> ▪ Scanner-<i>M</i>
FNA 420 <i>Fine Arts for Elementary Teachers</i>	<ul style="list-style-type: none"> ▪ Garage Band-<i>I</i> ▪ DVDs, Videos-<i>I</i> ▪ Midi Capabilities-<i>I</i>
EDS 422 <i>Teaching Reading in Content Area</i>	<ul style="list-style-type: none"> ▪ Evaluate & Explain WebQuest-<i>D/M</i> ▪ Distance Learning/Angel-<i>M</i> ▪ Resource File-<i>D</i>
EDE 443 <i>Interdisciplinary Unit Planning</i>	<ul style="list-style-type: none"> ▪ LCD Projector-<i>I/D/M</i> ▪ Laptop Computers-<i>D/M</i> ▪ Resource File-<i>D/M</i> ▪ Advanced Word Processing-<i>M</i> ▪ Evaluate WebQuest to match Unit-<i>D/M</i>
EDS 443 <i>Interdisciplinary Unit Planning</i>	<ul style="list-style-type: none"> ▪ LCD Projector-<i>I/D/M</i> ▪ Laptop Computers-<i>D/M</i> ▪ Resource File-<i>D/M</i> ▪ Advanced Word Processing-<i>M</i> ▪ Evaluate WebQuest to match Unit-<i>D/M</i>
EDE 444 <i>Methods of Teaching Elementary Social Studies</i>	<ul style="list-style-type: none"> ▪ Distance Learning/Angel-<i>D/M</i> ▪ Podcast-<i>D/M</i> ▪ Virtual Tours-<i>D/M</i> ▪ Digital/Video/360 camera-<i>D/M</i> ▪ Resource File-<i>D</i>
EDE/S 456 <i>Professional Development and Performance Assessment</i>	<ul style="list-style-type: none"> ▪ Résumés (Publisher)-<i>I/D/M</i> ▪ Brochures-<i>I/D/M</i> ▪ Update all areas of ePortfolio-<i>D/M</i>
EDE 457 <i>Assessment and Evaluation Methods in Elementary Classrooms</i>	<ul style="list-style-type: none"> ▪ Spreadsheet/Excel-<i>D/M</i> ▪ Gradebook-<i>D/M</i>
EDS 459 <i>Methods of Teaching Middle and High School Content Area</i>	<ul style="list-style-type: none"> ▪ Resource File-<i>D</i> ▪ Simulations-Science (only) <i>I/D/M</i> ▪ Document Reader-<i>D/M</i> ▪ Podcasts-<i>D/M</i>

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