

A Linked Learning Community: Connecting the Introductory Educational Technology Course and the Diversity Course for Preservice Education

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Abstract:

Teacher education programs are required by their accreditation agencies to include teaching methods to assist students with special needs and to effectively integrate technology into teaching. Because of the large and increasing number of special needs students and students who are second language learners, assistive educational technology is growing in importance. A pilot program connected instructional technology into the teacher education program in a new way. It involved a linked learning community of students enrolled in an instructional technology course and a course in teaching diverse populations united under the theme of learning in a diverse and technological world. The learning community project involved a group of students immersed in education in the changing world. Discussion and assignments built on the theme, preparing students to be leaders in their teacher education program and their profession.

Teacher education programs are required by their accreditation agencies, such as Interstate New Teacher Assessment and Support Consortium (INTASC) and National Council for Accreditation of Teacher Education (NCATE), to include teaching methods to assist students with special needs. The National Council for Accreditation of Teacher Education (NCATE 2002) standards require that preservice teachers learn to teach students with special needs and that preservice teachers use technology as a tool for teaching and learning to help all student learn. One standard states:

Teacher candidates reflect a thorough understanding of pedagogical content knowledge delineated in professional, state, and institutional standards. They have in-depth understanding of the subject matter that they plan to teach, allowing them to provide multiple explanations and instructional strategies so that all students learn. They present the content to students in challenging, clear, and compelling ways and integrate technology appropriately.

NCATE standards require new teacher graduates to "apply effective methods of teaching students who are at different developmental stages, have different learning styles, and come from diverse backgrounds." INTASC (1992) states, in the Model Standards for Beginning Teacher Licensing, that the teacher "knows about areas of exceptionality in learning--including learning disabilities, visual and perceptual difficulties, and special physical or mental challenges." NCATE and INTASC both expect teacher candidates to "understand language acquisition; cultural influences on learning; exceptionalities; diversity of student populations, families, and communities; and inclusion and equity in classrooms and schools." Here, exceptionality is defined as a physical, mental, or emotional condition, including gifted/talented abilities, that requires individualized instruction and/or other educational support or services (NCATE 2002).

Professional organizations including the International Society for Technology in Education (ISTE) have standards for all teachers and administrators regarding assistive technology (ISTE 2000). ISTE teacher technology standards include (II) Planning and Designing Learning Environments and Experiences and (VI) Social, Ethical, Legal, and Human Issues. Following these standards, teachers should have the ability to plan and design effective learning environments and experiences supported by technology. Teachers should also be able to design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. Teachers should apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities in order to facilitate equitable access to technology resources for all students (ISTE 2000).

Growth in special needs populations in schools and regular classrooms

In the 1992-1993 school year, 6% of children in the US were in federally supported ESE programs, up from 1.5% 15 years earlier. The number of disabled students participating in regular classrooms rose by 10% from 1992 to 1997 (McCann 1998). Because of the large and increasing number of special needs students with disabilities, assistive educational technology is growing in importance for ESE specialists and regular MST classroom teachers. During the past 10 years, the percentage of students with disabilities served in schools and classes with their nondisabled peers has gradually increased. In the 1997-98 school year, US states reported that between 94.7 and 97.8 percent of students (depending on age) with disabilities were served in schools with their nondisabled peers, compared to four years earlier when only 43.4 percent were included. As the percentage of special needs students served in an inclusive setting with nondisabled students rises, the number of special education and regular teachers prepared to provide an inclusive environment must also increase (US Dept. of Education 2000, US Dept. of Education 1996).

Currently forty-two percent of all public school teachers have at least one LEP (Limited English Proficient) student in their classes (NCES 2002). Nationally, the number of students enrolling in school ESOL programs has increased steadily in recent years increasing 109% from 1985 to 1995 (TESOL Pressroom 1997). As an example, in Florida between the 1998 and 1999 school years, the ESOL population served by the school system increased from 143,000 to 168,000 (Hoffman 2002; 2000). Adding to the effect of this growing population is the fact that only thirty percent of public school teachers instructing LEP students have received training for teaching LEP students, and fewer than 3 percent of teachers with LEP students have earned a degree in ESL or bilingual education (NCES 2002). Typically, ESOL students are children who come from economically disadvantaged households, and they are far less likely than their native English-speaking classmates to arrive in school with technology skills. In fact, the National Telecommunications and Information Administration reports on the digital divide in "Falling through the Net" that about half as many minority households have computers as white households (NTIA 2000).

With the growing focus to address the needs of all students, including those with disabilities, inclusion is a component of school restructuring agendas (McGregor & Vogelsbert, 1998). The inclusion model has become the current education classroom standard. Consequently all teachers, not just the special education or ESOL teachers, have a need be trained and prepared for the inclusion of special needs students in their general education population. Lipsky and Gartner (1996) define inclusion as "the provision of services to students with disabilities, including those with severe impairments, in the neighborhood school, in age-appropriate general education classes, with the necessary support services and supplementary aids (for the child or the teacher) both to assure the child's success - academic, behavioral, and social - and to prepare the child to participate as a full and contributing member of the society." Teachers must be prepared in the instructional setting to adapt instruction for an individual by changing one or more aspects of the material being taught, such as the method, amount, evaluation, assistance, environment, and material (Beninghof & Singer 1995).

Elementary and secondary students with disabilities have special needs that may hinder their ability to participate fully in science and mathematics instruction if accommodations are not made. Secondary students who spend more time in regular education and vocational classes have greater access to general education curriculum, higher expectations for performance, and more positive school outcomes. Students with disabilities make up 11% of students in grade 4, 9% in grade 8, and 5% in grade 12 in 1996. These special needs students take fewer science and math courses, have lower average high school grades in math and science, and have lower achievement scores than those without disabilities (NSF 1999). Measures need to be taken by educators to ensure that underrepresented groups have improved opportunities to participate in science and math. Instructional methods need to be updated to better accommodate alternative learning styles. Teachers should modify and adapt materials and learning to allow for the participation of all students (Clark 1999).

ESOL students face challenges of assimilating into a new culture, learning a new language, and learning subject matter in a new language. For these children technology is a tool that has the potential to help them meet content standards, and it is a pathway to employment and further education. Not only can educational technology provide tools especially designed for the language development and content area learning of ESOL students, but technology in ESOL classrooms can also begin to close the digital divide for these students.

The federal Individuals with Disabilities Education Act (IDEA) and its 1997 amendments make it a requirement that schools educate children who have disabilities, in general education classrooms whenever possible, and that as part of their IEP plan assistive technology devices and services must be considered. Because of such laws current and upcoming teachers are in need of additional instruction concerning assistive technologies. Based upon this knowledge general teacher education programs should be designed to include content related to inclusion concepts, including assistive technology.

Assistive technology tools can make a significant difference for students with disabilities (Rose & Meyer 2000). Assistive technology tools can allow access to information and activities that otherwise are inaccessible. An added benefit is that the tools can also make information and resources more available even to those who don't have a disability or have not yet been identified as having a disability. The exceptional education teachers are not the only ones who need awareness of assistive technology, regular teachers are now likely to encounter inclusion or mainstreamed special needs students, and the purpose for using the technology is to allow and support the student in the general student population. In order for the learning, language and technology gaps to be closed, teachers of special needs children need effective integration methods along with expanded access to technology equipment and resources for the specific needs of their students.

Joining educational technology and diversity education in teacher preparation

Collaboration in teacher education is necessary for preparing teachers for increasingly diverse and challenging classrooms and schools (Miller & Stayton, 1999). Collaboration across disciplines is the core of the program described here. Students planning to enter teacher education programs in the state are required to take courses in Introduction to Education, Teaching Diverse Populations, and Introduction to Educational Technology at the freshman or sophomore level. While these courses typically share the broad theme of education, they have not before at this university been linked in any explicit way, although all education majors take the courses. This year, a pilot program offered a linked learning community of teacher education students enrolled in instructional technology and a course in teaching diverse populations united under the theme of learning in a diverse and technological world. A class of freshman with intended education majors concurrently took the two courses, sharing their experiences with each other. Discussion and assignments built on the theme, preparing students to be leaders in their teacher education program and their profession. Online course management in *Blackboard* enhanced both courses.

In the technology course, students learned about technology applications while learning about diversity. They used the web to research cultural, ethnic and social groups, and to apply web evaluation tools to the sites they encountered. Students used threaded discussion to debate multi-cultural issues. The diversity course required students to create and present an electronic presentation on a diversity topic. Students documented their visits to diversity events and organizations using digital cameras, and then they learned to create multimedia presentations using their own media. An important feature of the semester was a class trip during which the students toured a school for the deaf and blind and area sites of historic significance to African-American and Hispanic groups. The students documented their experiences using *AlphaSmart* word processors, and digital cameras. Students also recorded guest speakers, including a former KKK member. At the end of the semester, student groups presented their work at a regional diversity conference.

The students' culminating product for the technology course was to produce a WebQuest that met standards in a content area while addressing a global theme. In publishing the WebQuests, students used the web as venue for communicating outside their institution to the wider education community (NRC 1999), and they created an electronic portfolio showcasing their accomplishments in both technology and diversity. Each skill learned in the technology course built toward the theme of the WebQuest. The students investigated a wide variety of topics in their culminating WebQuests, including Sign Language, Slavery and Mark Twain, and the states Historically Black Colleges and Universities.

Table 1. Technology linked to diversity in undergraduate teacher education

Component	Technology aspect	Diversity aspect
Culture	Learning web search and evaluation techniques locating resources for learning about specific cultures	Online implicit attitude test
Theory and models	Comparison of education theory and instructional design models	Comparison of models of development of multicultural attitudes
Personal development	Electronic portfolio documenting progress as a technology-using educator	Paper describing development regarding cultural sensitivity and identity
Cross-cultural experience	Electronic documentation of cultural experience	Paper describing cultural experience
Field experience	Teaching a technology skill	Volunteer work in a community agency
Study of an ethnic group	Using web skills for online research on a group, and multimedia skills for creating electronic presentation	Developing and presenting presentation on group for diversity conference

Student performance and satisfaction

The overall performance of the students in the linked class exceeded the performance of students in a concurrent identical non-linked class. The same instructor on the same schedule with the same expectations taught the non-linked class. The only differences between the two classes were the students in the linked class were primarily freshman (N=15), while the students in the non-linked class were predominantly sophomores (N=22); and the linked class had a diversity theme in its activities. The students in the linked class finished the course with a cumulative average grade of 3.87 on a 4-point scale. The students in the non-linked class had a grade average of 3.43. The difference is not statistically significant, but is meaningful when comparing freshmen who outperformed sophomores. Traditionally, the freshman choosing linked courses have lower incoming high school GPAs and standardized test scores than those who take the same course a la carte.

The students' responses on the university's Instructional Satisfaction Questionnaire (ISQ) did statistically differ between the two classes. The questionnaire asks 23 questions using a 5-point Likert scale in which 5 indicates strong agreement, 4 indicates agreement, 3 indicate neutrality, 2 indicates disagreement, and 1 indicates strong disagreement. All questions are worded in a way that makes 5 the most positive or desirable response. Fifteen of the questions assess the students' satisfaction with the course, and eight assess the students' satisfaction with the instructor. The average of the responses across the 23 questions for the students in the linked course was 4.85, and the average for the students in the non-linked course was 4.73 ($p=0.033$).

In addition to the university satisfaction questionnaire, students in the linked course completed a questionnaire focused specifically on their experience in the linked courses. The questionnaire included 25 Likert-scale questions, using the same point scale as university ISQ. When combining Strongly Agree and Agree responses, as compared to Disagree combined with Strongly Disagree responses, students were overwhelmingly positive about their experience. Among the most favorably rated aspects of the linked classes, 77% of the students felt the linked classes assisted their adjustment to college life, and that they developed a meaningful connection with their instructors, and 69% felt that the linked classes helped them to develop strong friendships and sense of community among their peers. The strongest negative responses were that 46% of the students would not recommend a linked class to other freshman, and 35% felt the linked classes were not a valuable learning experience.

Conclusion

Immediate data and experience suggests that the students selecting linked courses in their major are able to reach a very desirable level of performance and satisfaction with the experience. In addition to formally assessed measures, the students gained very practical experience integrating two aspects of their education, and were able to apply their new technology skills immediately. Follow-up study will indicate whether students having participated in the linked

technology and diversity courses continue to use their knowledge and continue to have positive attitudes toward their skills as they progress in their educational programs and careers.

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