

A Standards-Based Technology Integration Path at Towson University

[David Wizer](#) & Patricia Ryan
Towson University

Abstract

This article illustrates the path of the College of Education at Towson University to successfully integrate technology within coursework and thereby meet national technology standards. This discussion includes details about specific required instructional technology courses and a faculty development project that supports the ongoing use of technology throughout the teacher education program. A mentor/protégé faculty development model has been employed to assist university and school faculty to gain needed skills and abilities to integrate technology in teaching. A majority of the full-time university faculty has participated in this faculty development with technology process. As an outcome, teacher education students are experiencing widespread use of technology throughout the curriculum, including their internships within partner schools.

This article presents information and resources about the College of Education at Towson University, specifically the technology integration efforts within the teacher education program. The program meets the National Educational Technology Standards for Teachers (NETS*T; International Society for Technology in Education [ISTE], 2002) by requiring all teacher education students to take two instructional technology classes, ISTC 201 and 301, both of which specifically incorporate the Maryland Teacher Technology Standards (which are based on the NETS*T guidelines). In addition, an integral part of the teacher education program is the Technology Integration Project (TIP, two federally funded grants), which help all faculty members in the College of Education (COE) integrate technology standards into a wide range of methods and foundations classes.

Background: The Teacher Education Program

Since 2000 the mission statement of the COE at Towson University has included technology. The mission of Teacher Education at Towson University is to inspire, educate, and prepare teachers and education specialists as facilitators of active learning for diverse and inclusive communities of learners in technologically advanced environments. This recognition has been accompanied by investments in technology that extend the capacity of every faculty member and student to connect with an infinite variety of resources and tools for teaching/learning, as well as the faculty development necessary to use and model technology.

The Towson University COE has restructured the teacher preparation program to include a more integrated approach to infusing technology into the framework of courses. The redesign increased the use of technology in teacher training and varies instruction strategies based on student learning needs. In most programs in education students are required to submit assignments in digital format and create electronic educational technology teaching portfolios. Many courses require the students to participate in online class sessions allowing the shared intelligence to be distributed via the use of technology.

Instructional technology and other education courses take place in state-of-the-art computer labs where the learning environment is enticing and exciting. Given the array of hands-on experience faculty members have had with the facilities, they are comfortable incorporating advanced technology tools into the curriculum to improve teaching and support learning.

The most popular use of instructional technology at Towson University is the web-enhanced course. The web-enhanced instructional design of courses at Towson University is often created using Learn Online (a Blackboard, Inc., product). The faculty and students make use of telecommunications for academic communication to prepare students in the teacher education program to use technologies effectively and appropriately to communicate information with peers, instructors, and the community in a variety of formats. Faculty consistently plan effective learning opportunities supported by technology. Digital cameras produce images to be included in online portfolios. Digital video segments reveal faculty and student perspectives on the distinctive teaching and learning culture that is part of the Towson University COE. Students learn to access and evaluate technology resources to support research projects.

Standards-Based Program

Teacher education students were first required to take both technology courses ISTC 201 and 301 as part of their graduation requirements in fall 2000. The first group of approximately 500 students completes their coursework and graduate in May 2004. The majority of the teacher candidates at Towson University are developing various kinds of electronic portfolios to show evidence of their ability to meet the NETS*T (guidelines). The online teaching portfolios demonstrate the students' abilities to effectively integrate multiple technology tools into specific content areas. The students are also required to submit a companion print portfolio showing mastery of the newly acquired instructional technology skills.

An online matrix provides a summary of the COE aim to prepare teachers who will be delivering instruction in technology -enriched settings and hyperlinks to specific teacher

candidates' work samples. The information describes and substantiates the degree to which course assignments, activities, and experiences meet each guideline. For more information see <http://pages.towson.edu/pryan/isteaward/description.htm#documentation>



Figure 1. Photo from a preservice teacher's online teaching portfolio.

For nearly five years the COE at Towson University has been involved in an organized systematic program of faculty development with technology. For four of those years the COE has received funding from the federal government under the Preparing Tomorrow's Teachers to Use Technology (PT3) program. The purpose of this program is to enhance the skills of faculty to integrate technology into teaching with preservice teacher education students.

The COE has been a direct recipient of two PT3 awards. The college has also been a partner with the Maryland State Department of Education in its 1999-2001 PT3 Catalyst grant.

Over half of the college's instructional technology faculty members were involved in the process of developing the Maryland Teacher Technology Standards (MTTS) and carefully aligned them with the NETS*T standards. By fall 2001, most education faculty members were starting to integrate the MTTS into their curriculum. The Technology Integration Project (TIP) grant website is <http://www.towson.edu/tip>.

Learning Environment

The majority of the instructional technology courses take place in four computer classrooms. These classrooms have 30-35 up-to-date computers or laptops that are connected to the Internet and contain a variety of software. Additionally, there is an educational technology center located on the same floor as the classes that contains an additional 30 computers (both PC and MAC) on which students can work out of class. This center is staffed with technical support personnel who are available to help students. The center also contains a library with reference books and resource books on education, technology integration, and proceedings from professional conferences. In addition to the computer classrooms, most COE classrooms have a teacher workstation with a computer and projector device. Many of the classrooms also have three to four computers. There are many roll-carts with computers and projectors that can also be placed in rooms as needed.

Grant personnel are also on hand to assist faculty members in a variety of ways—most specifically, those interested in taking part of the formal PT3 grant work with a mentor and grant personnel to integrate standards-based projects into their curriculum.

Standards Assessed

The ongoing focus of the COE TIP grant is to make certain that faculty members are successfully integrating technology within their teacher education courses. Project staff collect and analyze evaluation data in these categories to determine that faculty within our teacher education program are effectively integrating technology within their teaching: Project Planning Sheet; Meeting Logs; Pre/Post- Project Technology Skills

Assessment; Classroom Visits; and Post - Project Reflections. For a complete list of the grant requirements and data collection tools see <http://wwwnew.towson.edu/tip/links.htm>.

The project includes two full-time staff members dedicated to overseeing the TIP grant, monitoring each faculty member, making classroom visits, and ensuring that the technology standards are addressed and projects are successfully implemented.

In addition to the Technology Integration Project, teacher candidates at Towson University are assessed on their abilities to meet the NETS*T guidelines. For example, to assess student learning, a scoring rubric is developed prior to the technology enhanced lessons to inform students of the expectations to achieve the same goals. Students are then able to explore and work together to help one another to meet the set goals, in such a way that is most meaningful to them. The assessment is not only an assessment of the students' work, but also an assessment for students, to help them reach their personal learning goals. The following links to scoring rubrics are the types of assessment used at Towson University that helps students determine what they need to do and how best to move toward their goals.

Online Assessments

Through these instructional technology courses we have created numerous assessment resources and companion examples that are available online.

For more information on teaching portfolios see:
<http://www.towson.edu/~pryan/301/rubriconlineteachingportfolio.htm>.

For additional information on course project rubrics see:
<http://pages.towson.edu/jkenton/istc301/rubrics.html>

For resources on web page and media development projects see:
<http://www.towson.edu/~bsadera/istc301/projects.html>

For more information about online research portfolios see:
<http://www.towson.edu/~pryan/201/researchportfoliorubric.htm>

Field Experiences

Teacher education students are required to participate in two extensive field experiences (internships), one being a full semester in length and the other for half a semester. Over 50% of the experiences now occur within our professional development school (PDS) sites. The Towson University PDS network consists of over 50 schools in seven school districts within the Baltimore metropolitan area. These PDS sites are schools that have housed 52 different technology integration projects over the last 5 years. Part of the TIP process involves teachers within these PDS sites demonstrating their technology integration project to Towson University interns.

A Towson University faculty member organized a field experience during spring 2003, with 15 teacher candidates who facilitated technology enhanced learning activities for fifth-grade students in a local school. The field experience aimed to support an inquiry approach to teaching and learning about science in the field for elementary school teachers, students, and preservice teachers. The following website provides a detailed

look at the plans for the Integrating Technology into the Elementary Science Curriculum: Keeping It Real in the Field project. For more information see <http://pages.towson.edu/pryan/science/>

Examples of Student Work

The National Educational Technology Standards for Teachers have been seamlessly woven into the course design of many courses in the COE at Towson University. The following link provides a matrix of nearly 100 teacher candidates' online teaching portfolios showing evidence of mastery of ISTE NETS*T.

For more resources see <http://www.towson.edu/~pryan/301/studentportfolios.htm>

Another link provides access to 11 portfolios. For more information see <http://www.towson.edu/~bsadera/istc301/portfolio.html>.

The following websites provide links to examples of technology in the curriculum evaluations and lesson plans created by Towson University Students:

<http://www.towson.edu/~wizer/501/3.htm> and
<http://www.towson.edu/heartfield/lessons/12.html>.

The following link provides a matrix of nearly 100 students enrolled in the course Using Information Effectively in Education. The student work samples, compiled in an Online Research Portfolio, demonstrate efficient use of online information resources to meet needs for collaboration, research, productivity and publication. For more information see: <http://www.towson.edu/~pryan/201/researchportfolio.htm>.

Faculty Development

The Technology Integration Project began in 1999 through PT3 funding as an effort to help college of education faculty develop technology skills and integrate standards-based technology projects in their curriculum. There are five short-term project goals, which include to

1. Become proficient users of technology and to model effective applications of technology integration in the classroom.
2. Prepare preservice teachers to use and teach with technologies.
3. Improve the quality of the teacher education program at Towson University by improving and revising existing courses.
4. Align curriculum and field experiences with state and national standards.
5. Incorporate standards into teacher candidate electronic portfolios.

Faculty participants are rewarded with monetary stipends for successful project completion. The intention is that faculty members become proficient users of technology to enhance the quality of their teaching and the preservice teacher education experience throughout the COE.

Interested faculty members apply each fall and are paired with a mentor (another faculty member with extensive technology integration experience) who helps guide them through the process of framing and implementing a technology project into their courses. TIP matches project mentoring goals to many of the goals noted in the research. A recent literature review on faculty technology mentoring programs highlighted common

elements in a range of mentoring programs, including individual technology assistance, creating collaborative relationships, and providing mutual rewards and benefits (Chuang, Thompson, & Schmidt, 2003).

It is noteworthy that in this review two faculty members were not paired for these technology-learning partnerships. Our TIP grant employs faculty peers as mentors and protégés, which has made an effective team in supporting technology integration and enhanced instruction. Grant personnel also work with the pairs to ensure that they are incorporating the MTTs into their projects.

Another underlying concept behind this project is to create a community of learners within schools, across the campus, and among the many involved within the grant activities. A cadre of small communities has been created within the university classrooms via online discussions and interactions. Three early protégés in this grant (Wheeler, Wilson, & Berkeley, 2001) highlighted the strengths of building an online community for enhanced reflection and discussions in an article published in the *Journal of Early Childhood Teacher Education*

The COE was awarded a second PT3 grant in 2001 for 3 years and used it to expand this program to include more K-12 teachers in nearby public school districts in Baltimore, Harford, and Howard counties (within the Towson University Professional Development Network) who are also interested in integrating technology into their curriculum. These teachers work directly with Towson education student interns and give them further opportunities to see and participate in effective technology integration. Also, the College of Sciences and Math and the College of Liberal Arts faculty members who teach education students have also been involved as part of the TIP grant.

University-based faculty members can further their technology knowledge and skills by working with the Center for Instructional Advancement and Technology (CIAT). This campus resource supports excellence in teaching and learning by providing Towson University faculty members the opportunity to investigate and apply sound learning theory and technology to instruction. They provide individual faculty training for those who may want to learn additional skills or supplement what they do with their mentors.

Professional Development: Outcomes

This program has had a definite impact on the overall teacher education program at Towson University. Teacher education students are required to take two classes that deal directly with technology integration and standards. They are also exposed to faculty members in their other methods courses who are effectively integrating technology and demonstrating how they can use technology in their future teaching. In addition, as they complete internships, they often work with K-12 teachers who have participated in the TIP project and are integrating standards-based technology programs in their own classrooms.

The number of full-time faculty members involved in teacher preparation in the COE is nearly 70. The number of full-time faculty members integrating standards into their teaching is 41. In addition, 19 full-time faculty members in other colleges at Towson University who work with teacher education students are integrating standards into their teaching. Finally, we have 32 successfully completed technology integration projects with 64 teachers through 4 years in our PDS network. All participants are required to report which of the MTTs (standards) their projects address.

The TIP has provided an opportunity for Towson University faculty members to create and integrate exemplary standards-based technology projects into their teaching. Those

participating as protégés (faculty members who have no or limited experience with technology) reported learning and integrating many new technology skills into their teaching. The results of the project indicate that protégés significantly enhanced their technology skills in 12 of 21 items that were on the assessment (note significance at .05 level or less). The project staff independently rated seven of these items as vital skills to be learned in this project. All seven of these items are skills in which the protégés demonstrated significant improvement. The skills noted as vital include general computing, word processing, Internet, e-mail, online instruction, presentation, and web page software. Additionally, mentors (other faculty members) have indicated that their own technology and teaching skills have increased as a result of participating in the project.

The TIP works with faculty in the COE, as well as the College of Science and Math and the College of Liberal Arts who have a significant number of preservice teachers in their courses. Seventy-five percent of faculty members who have applied to be part of the program have been accepted. Seven faculty members from the College of Liberal Arts and 12 faculty members from the College of Science and Math have participated in the program thus far. Representatives from the College of Liberal Arts and the College of Science and Math both sit on the grant's advisory committee that meets on a regular basis to discuss technology developments.

Technology Integration: Summarized

At the end of spring 2003, over 75% of the full-time teaching faculty in the COE has participated in the TIP grant as either mentors or protégés. Over a thousand preservice teachers have been impacted by this grant. A high percentage of faculty members have also worked with CIAT to develop technology projects that enhance instruction and meet state technology standards. In addition data was analyzed on the instructional impact of the integration project. For protégés, 100% indicated that the project would have an immediate instructional impact. For the mentors, 82.6% indicated that the project would have an immediate instructional impact.

Faculty members teaching the ISTC 201 and 301 courses are required to include the specific MTTs their course addresses in their syllabi and discuss how these standards are being met as the course progresses.

Faculty protégés who successfully complete the TIP grant are also obligated to note these standards in their course syllabi. From the beginning students are exposed to the standards and start to see how their teachers integrate them within their courses and can start to think of ways they can integrate the standards in their own future courses.

In summary, teacher education students are experiencing widespread use of technology from early methods courses throughout the program until the final internship in schools. We see these future teachers as conversant with a robust range of technology and media that will enhance teaching and learning of content and communications with future students. Based on this path toward technology integration in a teacher education program, these elements are central to progress: one-on-one mentoring, monetary incentives for faculty, up-to-date hardware and software infrastructure within classrooms and offices, and project and university staff members to support project goals.

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Contact Information:

David Wizer, Ph.D.
Dept. of Reading, Special Ed. & Instructional Tech.
Towson University
e-mail: wizer@towson.edu

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