Web 2.0 for the Online Graduate Student: Technology Immersion for Both Curriculum and Residency

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Abstract

Technology integration has emerged as the ultimate critical educational challenge for the twenty-first century. Although many universities tout technology immersion in strategic plans, reality suggests that faculty often serve as the key change agents. As online programs increase exponentially, technology best practices become essential for fully integrating Web 2.0 learning opportunities. A twelve-year review of a graduate online program's successful adoption of technology highlights three such best practices: strategic imperatives, embedded technology infrastructure, and program technology infusion plans.

The introduction of technology across college campuses is not new, but the impact of emerging Web 2.0 technologies may be remembered as one of the most profound changes for all academic institutions during the initial years of the twenty-first century (Batson 2009). Web 2.0 takes the basic Internet as a communication device and successfully transforms its various applications into shared human experiences. Web 2.0 enables all users to share creatively (pictures, YouTube videos, games), work collaboratively (blogs, wikis, mash-ups), and network globally (Facebook, Linked-in, Second Life™). As others have suggested, Web 2.0 is a huge phenomenon that is very difficult to define succinctly (Mareguesan 2007).

Universities also recognize that in today's education and working environments, *technology literacy* is a requirement (VanLengen 2011). As part of the No Child Left Behind Act of 2001, technology literacy was defined as "the ability to responsibly use appropriate technology to communication, solve problems, and access, manage, integrate, evaluate and create information . . . and to acquire lifelong knowledge and skills in the 21st century" (SETDA 2011). *Technology integration* is viewed as the application of technology literacy and can be thought of as "the incorporation of technology resources and technology-based practices . . . (which) include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods " (U.S. Department of Education 2002). Perhaps even more relevant and compelling is the assertion that "integrating technology is what comes next after making the technology available and accessible. It is a goal-in-process, not an end state" (U.S. Department of Education 2002).

Technology immersion does not seem to be clearly defined in the literature. In fact, a uniform definition of immersion that is unrelated to language acquisition is not readily available. Basic dictionary definitions of immersion refer to "the action of immersing someone, deep mental involvement, and the state of being deeply engaged or involved" (Dictionary.com 2011). E-definitions state, "Immersion is the state of consciousness where an immersant's awareness of physical self is diminished or lost by being surrounded in an engrossing total environment" (Wikipedia.com 2011). The rationale for technology immersion, based on these definitions suggests that total integration and commitment to the integration and infusion process is necessary.

The immersion of technology into a university's core pedagogy signifies not only striving for academic competitiveness, but also awareness that traditional eighteenth-century bound face-to-face education is being transformed—with or without our tacit consent and approval. Education is moving away from learning approaches founded on simple information sharing to one that relies on networking and other interactive technologies (Schaller and Allison-Bunnell 2003). The new teaching paradigm integrates discovery and experiential learning, while distancing itself from the traditional lecture-bound classroom (King 2011, Friere 2007). Graduate faculty does not differ from other level instructors when confronting technology. They face opportunities and challenges in aligning teaching approaches and encouraging both student engagement and multidimensional learning in the twenty-first century (Hewitt et al. 2010).

Yet, how many universities have been successful at bridging the chasm between technology availability, integration, and immersion? Are universities innovative enough to meet the technology demands of online graduate students and incorporate Web 2.0 technologies? Are there examples of strategic plans that focus on technology immersion? This article reports on a successful technology immersion initiative in a graduate online program at a small, urban university.

Managing Technology Strategically through Faculty Change Agents and Web 2.0 Course Delivery Options

Strategic plans establish future direction and activity for contemporary academic institutions. These plans often are recognized as a tool for establishing differentiation among competitors and highlighting areas for major investments. In the mid 1990s, senior leadership at a private urban university deliberately instigated, as part of the university's strategic plan, a technology initiative. The university committed itself to technology at the very early stages of the technology integration boom in higher education and became one of the very first campuses to supply students with laptop computers, to reach 100 percent wireless access on campus, and to issue desktop computers to science majors. The university recognized that technology could provide a distinct advantage to students when they enter the job market, so including Web 2.0 technology from the minute they applied to the university was a natural step. Web 2.0 technologies have enabled faculty and student interaction and collaboration to reach the next level.

Although it primarily benefited the undergraduate population, graduate students also have benefited in the past twelve years. In 1997, the university's strategic plan created The Teaching, Learning, and Technology Center (TLTC) through the merger of the former academic computing and media centers (see Table 1). One of the primary objectives of the TLTC is to provide special faculty support in their use of technology in teaching. It is accomplished through targeted services, as well as internal grant programs that are administered by the TLTC and delivered through multiple teams (TLTC 2011).

Table 1. The TLTC Infrastructure Teams

The Teaching, Learning, and Technology Center
The Instructional Design Team provides pedagogically sound support to faculty on the integration of technology into the curriculum. All of the TLTC's six instructional designers hold master's degrees in instructional technology or a related field.
The Digital Media Team supports the faculty in the creation of digital material for their courses, such as videos, web pages, animations, etc. The TLTC has five full-time digital media specialists.
The Classroom Support Team supports the technology used by faculty in the classroom. All eighty general-purpose classrooms at the university have built-in audio and video projection systems and other technologies. Other equipment that faculty may use includes VCRs, cameras, etc.
The Computer Training Center (CTC) provides training to faculty and students on the use of the university's standard software suite, which includes Microsoft Windows®, Microsoft Office®, Blackboard, Lotus Notes, etc. The CTC has two full-time technology trainers.
The Student Technology Assistant (STA) Program provides specially trained students to assist faculty with their use of instructional technology. The TLTC employs an average of thirty STAs each semester who work on various academic technology projects.
Curriculum Development Initiative (CDI), now in its eleventh year, provides significant multi-year funding to academic departments able and willing to undertake technology-enabled redesign of required core courses to improve student learning. Typical CDI projects involve teams of faculty and technologists, are two to three years in duration, and have an overall project budget of between $30,000 and $75,000. Current CDI projects underway include projects involving undergraduate courses and universal proficiency infusion of the new core curriculum.
Faculty Innovation Grants (FIGs) are small (typically less than $5,000) one-year grants to individual faculty to help support the technology used in the courses they are teaching.

Faculty institutes are intensive three- to four-day immersions in the effective use of technology to support teaching and learning. Institutes are typically held twice a year during the summer and winter recesses. For the past two years, the TLTC Summer Institute has expanded to include a series of weekly one-day workshops—the TLTC Summer Series—held throughout the summer to help faculty learn new technologies and make effective use of those technologies in their Fall classes.

The Teaching, Learning, and Technology Roundtable (TLTR) holds regular meetings that include faculty, administrators, and technologists. The TLTR serves as a discussion forum on the potential benefits and pitfalls of instructional technology and serves as an advisory committee for the instructional technology decision makers.

Online learning initiatives include courses for the Virtual University, the College of Arts and Sciences, and the School of Business. These courses follow the Quality Matters guidelines.

The University Mobile Project recognizes that the evolution of mobile technology will enable more opportunities for collaboration, community building, and communication. The initiative extends the pillars of our successful Mobile Computing Program of access, support, and curricular integration for these emerging devices. The project realized increased faculty response to the "call for proposals" and mobile devices were integrated as part of the course curriculum.

TLTC staff administers all initiatives designed to promote and support the effective use of technology in teaching and learning throughout the university's academic programs. Despite the strategic initiative and TLTC outreach efforts, not all instructors have embraced the emerging role of digital technology in their classrooms and online teaching. Building a core set of committed faculty from the early adopters can help diffuse digital technology across departments and various programs.

Recruiting Faculty as Digital Technology Change Agents

Building on the myriad of opportunities available from the TLTC programs, graduate faculty (for both on-campus and online formats) were encouraged to apply for a Faculty Innovation Grant (FIG). This grant was awarded to investigate simulation options using the virtual world, Second Life. Virtual worlds are excellent examples of current Web 2.0 learning opportunities. They offer a learning option that enables an individual to immerse themselves via an avatar (virtual body) in a specially constructed environment known as a virtual landscape. Second Life is the most widely known virtual world and although it looks like a video game, it is entirely different given the multiple opportunities for creativity, situativity, and interaction (Hewitt et al. 2009a). As a direct result of this participation and involvement, several beneficial outcomes occurred:

- Faculty awareness and knowledge of interactive simulations increased.

- A new Web 2.0 activity was uniquely integrated into a graduate online course.

- Positive student satisfaction precipitated the development of a second virtual world activity for another course continuing the infusion of technology further into the curriculum.

- Other instructors developed the expertise and collaborated on two articles, a book chapter, and multiple presentations (Hewitt 2009, 2011; Hewitt, Spencer, and Ramloll 2008a, 2008b; Hewitt, Spencer, Ramloll et al. 2008; Hewitt et al. 2009a, 2009b, 2010; Hewitt, Spencer, Ramloll, and Twal 2008a, 2008b; Hewitt, Spencer, Mirliss et al. 2008)

Encouraging exploratory Web 2.0 activities and designating incentives will facilitate faculty support and develop technology champions. Providing linkages for technology innovation and publication opportunities can be essential to establishing faculty as change agents for curriculum infusion.

Embracing Web 2.0 for Graduate Online Instruction

For academic programs challenged to meet the expectations of online graduate students enrolled in professional programs, Web 2.0 course delivery options have emerged as a primary instructional strategy in a rapidly changing educational environment (Batson 2009). Web 2.0 refers to the second phase of the Internet evolution. Web expert, Murugesan (2007) states, "Web 2.0 harnesses the web in a more interactive and collaborative manner, emphasize peers' social interaction and collective intelligence and presents new opportunities for leveraging the web and engaging its users more effectively." Web 2.0 technologies have altered the learning environment through accessibility, consumer-friendliness, interactivity, networking capabilities, real-time learning opportunities, and collaboration that helps gather collective intelligence. Experts concur that newer Web 2.0 applications, such as Myspace, Flickr, and YouTube, were previously unimaginable as learning tools (Murugesan 2007, Franklin and van Harmelen 2007). Traditional online learning platforms have expanded to accommodate chats, wikis, blogs, video sharing, and virtual worlds, all of which increase student-to-student and student-to-faculty interactions. Even more importantly, social media sites have elevated network building and sharing capabilities, which can be tailored for individual courses to facilitate communication and learning. Table 2 presents common Web 2.0 tools useful for graduate online pedagogy.

Table 2. Web 2.0 Tools

Web 2.0 Tools

Tool	Definition	Examples
Blogs	A blog, short for web log, is a system that enables a single author, or group of authors, to write and post ideas, suggestions, and comments in journal style. Readers then can add comments to the posts. A blog can be private, open only to a faculty member and one student(s), or open to the public.	http://www.movabletype.com/ http://wordpress.com/ http://www.blogger.com/
Wikis	A wiki is a system that enables one person or more to build a body of knowledge in a set of interlinked web pages, using a process of creating and editing pages. A wiki is a simple web-based collaborative-authoring (or content-management) system for creating and editing content. It enables anyone to add a new article or revise an existing article through a web browser. Users also can track changes made to an article. The term wiki is derived from the Hawaiian word *wikiwiki*, which means fast or quick. A wiki is easy to use for the consumer.	http://www.wikispaces.com/ http://www.wetpaintcentral.com http://pbworks.com/
Social media sharing	These services store user-contributed media and enable users to search for and display content. Besides being a showcase for creative endeavor, these services can form valuable educational resources and teaching tools.	http://www.youtube.com/ http://www.apple.com/ http://www.flickr.com http://www.slideshare.net/ http://www.deviantart.com/ http://www.scribd.com/

Social networking	These systems enable people to network together for various purposes. The web sites are used to connect people who share personal or professional interests, place of origin, education at a particular school, etc.	http://www.facebook.com http://www.linkedin.com/ http://secondlife.com/ http://www.elgg.org/
Collaborative editing tools	These online tools enable users in different locations to collaboratively edit the same document at the same time.	http://docs.google.com http://www.gliffy.com/
Mashups	A mashup is a web page or web site that combines information and services from multiple web sources. Web mashups combine information and/or complementary functionality from multiple web sites or web applications. A web mashup server lets you connect, collect, and mash up anything on the web.	http://maps.google.com/ http://advertising.yahoo.com/ http://www.readwriteweb.com/

Source: Adapted from a report, "Web 2.0 for Content for Teaching and Learning in Higher Ed" by T. Franklin and Mark van Harmelen, 2007.

Developing a Technology Infusion Plan to Meet Online Graduate Students' Needs

In today's digital environment, online graduate students demand a synchronized, relevant, and consumer-friendly learning experience. Individuals seeking an advanced degree expect a seamless and positive academic experience, from initial inquiry through admission and acceptance, to bursar and registration interactions (Roman 2010). Grad students do not expect to wait for any academic services and often transfer that demand into course expectations as well. Due to their limited physical access to campus services, online graduate students often expect constant online access to faculty for coursework and advising. For these advanced students, the primary goal is to enroll in a program that offers a usable curriculum with the content delivered in an effective, timely, and personalized venue (Quality 2011).

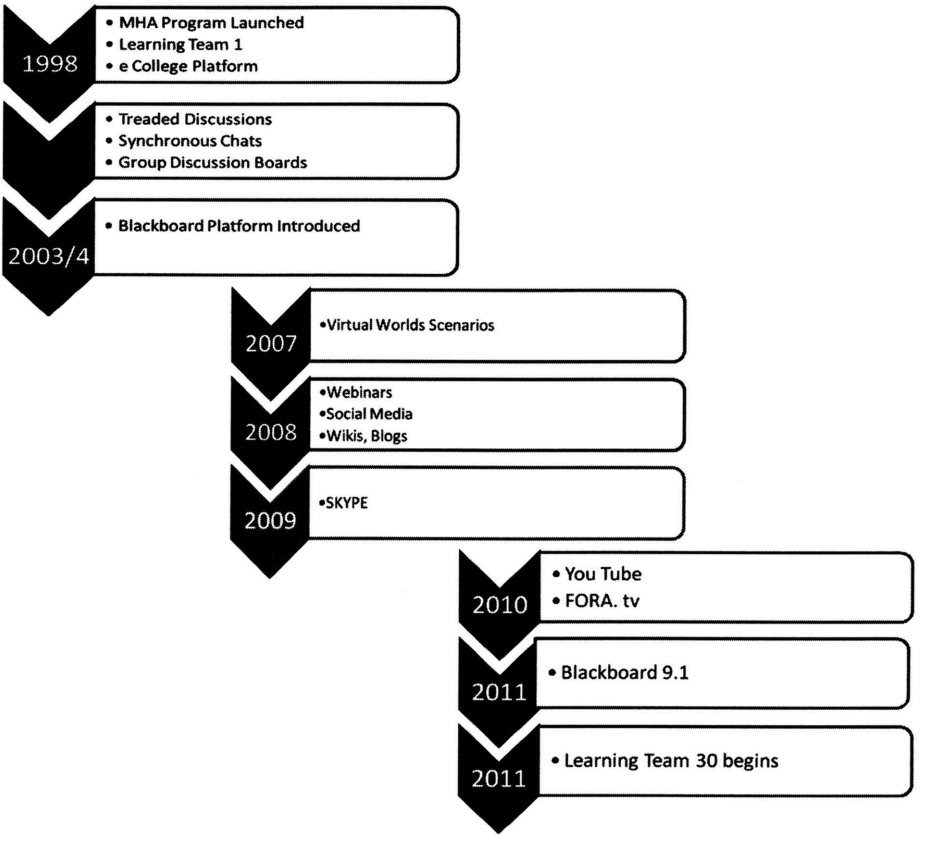
University graduate programs face an additional challenge if they offer niche professional degrees to attract students who are seeking credentialed programs for competitive careers (Seton Hall University, Professional Studies 2011). These types of graduate degrees typically need to meet accreditation standards in addition to satisfying student expectations. Often the accreditation standards require a certain number of face-to-face instruction hours (Association of University Programs in Healthcare Administration [AUPHA] 2011). Programs respond by offering on-campus residencies of varying lengths, content, and timing. For example, one model requires

students to complete five-day capstone experiences at orientation, mid-residency, and graduation (Seton Hall University, Master of Healthcare Administration 2011). During each of these residencies, students complete a three-credit course. The advanced planning and coordination to implement each residency requires multiple individuals, as well as, group communication. At the same time, faculty members teaching residency courses provide students with pre-assignments, syllabi, course readings, and knowledge assessments. Typically, these online programs are designed to be completed within a two-year framework, which puts additional pressure on faculty to use available digital technology for the facilitation of communication, learning, and advising. The faculty continually seeks technological strategies that can increase efficiency and improve productivity in program delivery in order to fulfill both online student needs and wants and accreditation requirements.

Technology Adoption and Integration Activities

To meet these educational demands, a professional graduate program at an urban university gradually adopted available technology into the curriculum for their online students. Figure 1 shows the technology integration timeline from 1998 to 2011.

Figure 1. The 12-year Technology Adoption Timeline



During this timeframe, program faculty progressed from technology adoption through integration and eventually to infusion with TLTC's assistance and the gradual development of a technology infusion plan.

Development of a Technology Infusion Plan (TIP)

The development of a program-specific TIP emerged gradually, but the impetus was hastened with the rapid diffusion of social media as part of the Web 2.0 technology phenomenon over the last few years. It became clear that for optimum graduate instruction, faculty should adapt only efficient, effective, and user-friendly technology for course instruction. Components of a TIP included establishing technology criteria and developing a model for technology integration.

Technology Criteria

A primary goal for this online, professional graduate program was to increase management competencies by developing skill-building scenarios. Skill-building scenarios are learning activities designed to help students increase their decision-making capabilities. In a typical skill-building scenario, students study a problem-based case, analyze the situation described, and propose an appropriate solution. These types of scenarios emphasize the communication and decision-making skills expected of healthcare managers and administrators. Given the plethora of digital technologies available and appropriate for both on-campus and online instruction, faculty developed four academic criteria for adoption eligibility. The technology must meet these criteria:

- Offer a real-world activity for students.

- Permit asynchronous and synchronous collaboration among students on campus and in various geographical locations.

- Apply basic course concepts in a problem-based learning format.

- Introduce complex systems in a systematic and user-friendly way.

To illustrate an application of these criteria, a recent example shows how one faculty member addressed the teaching issue of using static case studies when real-world events offered a richer and more timely learning opportunity.

Real-world health events offer excellent teaching opportunities for graduate faculty to introduce essential course concepts and skills. However, the development of a traditional, narrative case study based on current events requires significant time and input, which often delays availability, and the teachable moment is lost. Virtual worlds, a Web 2.0 technology, offer immersive learning environments that can be quickly manipulated to mimic a real-world health situation. Applications based on this interactive technology have the potential to enable students to substantively increase their knowledge and participate in immediate problem-solving applications (Joly

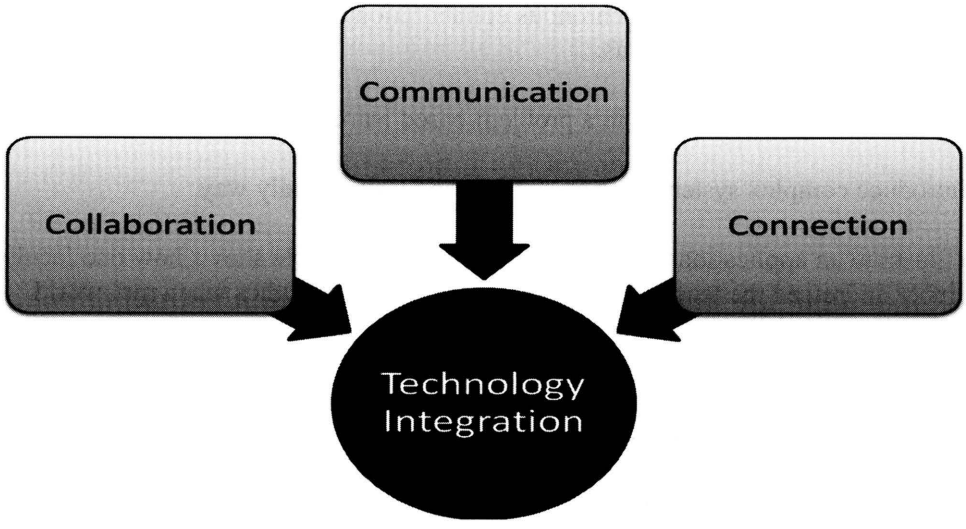
2009). Using the virtual world platform, Second Life, faculty created a scenario based on the recent Gulf Oil Spill in the Gulf of Mexico (Hewitt et al. 2011). The case study focused on the impact of this catastrophic environmental disaster on the quality of life for local communities. Students completed environmental health research, created avatars, and developed Second Life presentations based on their assigned community health role. These virtual world presentations integrated findings from the recently released Institute of Medicine's report on "Assessing the Effects of the Gulf of Mexico Oil Spill on Human Health" (Institute of Medicine 2010).

Without the virtual world scenario, a significant amount of time would have passed before these graduate students would have been exposed to and learned from this real-world event. Course faculty was able to transform a real-world event into a case-study learning opportunity within a few weeks, and Web 2.0 technology satisfied the established criteria.

Technology Integration Model

Graduate instructors face the same dilemmas as other faculty in keeping up with the latest Web 2.0 technology. The demand for constant updating and skill enhancement can be alleviated by regular technology instruction. However, many instructors have recognized that the rapid development of Web 2.0 digital technology has presented an information overload dilemma. To simplify the process of technology integration and to help prioritize which technologies to pursue, a simple technology outcome classification system emerged through informal department discussions (see Figure 2).

Figure 2. The Technology Integration Model



With the technology integration model, only three levels of technology classifications were developed. They were *connection* (reaching out and networking with others), *communication* (sharing resources and ideas), and *collaboration* (working effectively and productively with others). Common Web 2.0 technologies were categorized as follows:

- *Connection:* PirateNet (web portal), Pirate Island (virtual world), MHA Facebook page
- *Communication:* SKYPE, blogs, YouTube
- *Simulations and collaboration:* wikis, Second Life

As the TLTC introduced each new Web 2.0 technology for use, it was placed into the appropriate category for infusion into the curriculum.

To illustrate the adoption of a new communication technology tool, faculty discussed several options including the use of Facebook and webinars. After the decision was made that SKYPE satisfied all current communication needs for both faculty and students, the faculty implemented the Web 2.0 tool following a phase-in process beginning with faculty and then diffusing to students on a course-by-course and learning-team basis. The following is a brief description of the process.

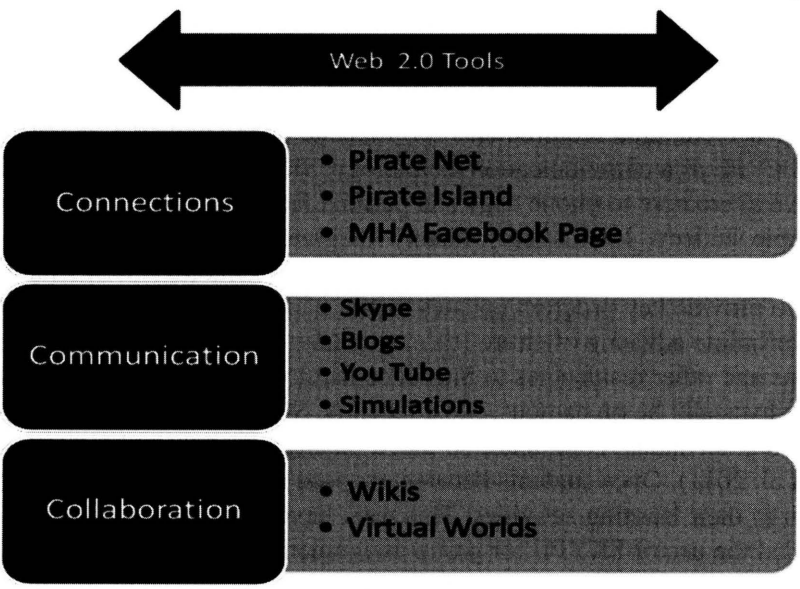
To meet the accreditation requirements for graduate online advising, the faculty opted to adopt SKYPE as a communication technology. SKYPE is an easy-to-use and inexpensive alternative to phone calls and permits faculty to simultaneously interact with multiple students. Interestingly, faculty integrated SKYPE into their communication activities before students adapted the technology. Originally, SKYPE was used to provide key program updates to non-campus adjunct faculty. Then, it was adopted for online advising of entire learning teams. Next, it was integrated into orientations and other residencies to introduce faculty and their courses when they could not physically be on campus. Most recently, SKYPE was used as part of a presentation at an annual conference so that a faculty member could participate (Hewitt et al. 2011). Once students became exposed to the technology, they were quick to infuse it in their learning activities. This went beyond simple class communication and included the use of SKYPE for group assignments. At the graduation residency, SKYPE was used to enable students who were physically unable to attend to present their capstone papers while their colleagues listened and provided feedback.

Over the past few years, an infusion model(s) has been adopted as a pedagogical strategy to integrate reading, writing, and other core proficiencies throughout college curriculums using real-life problems and situations as a learning framework. This infusion model provides guidelines and strategies for total technology integration embedded deep within a curriculum as opposed to a learning philosophy that emphasizes an across-the-curriculum perspective. This strategy appears to be appropriate for the integration of technology into online graduate curriculums that also include mandated campus residencies.

Completing the Web 2.0 Technology Immersion

The amount of activity necessary for curriculum immersion is dependent on the type of technology being introduced. Integrating technology innovations into an established online graduate program with residencies requires a process of experimentation, phase-in implementation strategies, and 360-degree feedback assessments. For example, the integration of the virtual world scenario required development of student learning goals, pre-SKYPE calls, student preparation lectures on Blackboard, a discussion board, and guided practice with faculty supervision. All of these activities occurred before the actual mid-residency learning experience took place. Following the learning activity, faculty then administered multiple assessments including a debriefing session, post-activity questions, and a post-course survey (Hewitt et al. 2009b). A primary goal for technology immersion is to increase the students' sense of discovery and engagement by providing challenging alternatives to face-to-face learning. Figure 3 presents the Web 2.0 tools now immersed in the graduate online program.

Figure 3. Web 2.0 Tools: A Technology Immersion Example



Addressing Challenges, Best Practices, and Continued Learning

Although many implementation barriers occurred on the journey to technology infusion, a retrospective review suggests they appear similar to issues linked to any technology adoption process. These challenges can be sorted into three major groups: resources, skills, and technology evolution.

The issue of limited resources at the university, department, and faculty level for technology purchase, instructional design, and delivery remains a common dilemma. However, this situation was mitigated for faculty through the systematic offerings and support of the TLTC. As previously discussed, integrating technology innovations into an established online graduate program with residencies requires additional time and expertise by faculty and support personnel. Incentives and special compensation for technology innovations should reflect the true cost of effort and activity needed for success and desired faculty engagement.

Addressing the issues of student expertise and their technology adoption rates proved a diminishing challenge over time. The advent of broadband usage decreased many technology complaints previously reported by students. Although Web 2.0 familiarity seems pervasive in the undergraduate population, returning graduate students may have limited awareness or application knowledge of the latest innovations available. The level of students' inexperience places additional demands on faculty and technology support professionals, requiring course timeline flexibility and the need for an array of instructional materials and activities (including guided practice sessions). Some students also have started expressing concerns about security and privacy issues given the interactive nature of social media. Academic programs will need to assess the security environment within the context of university guidelines. This assessment targeting digital privacy may need to be accelerated as Web 2.0 and social media become further embedded in daily and academic communication.

The rapid and continuing digital technology explosion of the twenty-first century threatens to overwhelm the individual faculty members who struggle to remain technologically competent with their students. Clearly, the third major challenge for technology infusion was the response to the ongoing technology evolution. Our twelve-year timeline dramatically reminds all instructors and administrators that technology implementation plans must be accelerated and adoption rates of appropriate digital technologies increased to maintain even a status-quo position. Technology personnel who serve as reference points and support for individual departments may lose focus if not guided by a clear university technology strategy. Faculty members also face the dilemma of prioritizing time spent on learning new technologies applicable to teaching versus other required and rewarded scholarship activities.

These three challenges of securing resources, developing skills, and managing further technology infusion demand both immediate and long-term strategies. However, lessons learned from the previous twelve years serve to enlighten both individual program responses and more multifaceted technology initiatives.

Best Practices

Best practices are often defined as processes or activities that are proven, effective, and efficient, along with successful outcomes. This article concludes with recommended technology infusion best practices that are both replicable and flexible for other academic programs considering similar activities. These best practices focus on both the

university level and individual faculty practice and include strategic imperatives, embedded technology infrastructure, and program technology infusion plans.

- **Strategic Imperatives:** First, commitment to technology at the university level appears essential for communicating its importance as a valued instructional tool and a priority for learning. Strategic plans, which are openly communicated and usually designed for multiple years, can underscore the importance of technology infusion across the campus and for individual curriculums. Faculty awards and recognition increase the visibility of a strategic technology initiative and contribute to a campus norm of desired engagement and participation.

- **Embedded Technology Infrastructure:** Second, developing a single organizational entity responsible for both technology promotion and implementation aids in the accessibility and credibility of technology campus-wide. The use of Learning Center Support Teams enables individual faculty to develop personal rapport with technology support personnel and encourages longer term and more complex innovations. This organizational flexibility also supports a more personal tailoring of delivery services in order to meet faculty needs.

- **Program Technology Infusion Plans (TIP):** The third best practice is not at the institution level, but instead originates within an individual degree program and involves the development of a technology infusion plan. Online graduate programs with face-to-face residencies experience unique pressures to meet student technology demands. Faculty may unknowingly develop heuristics for technology implementation that can be codified and further developed into useful plans. This article describes and provides examples of the use of two TIP components created to meet one program's special needs. Both the technology criteria rubric and the outcome classification model have helped ease the adoption and accelerate the use of Web 2.0 innovations.

Two of the identified best practices, strategic planning imperatives and embedded technology infrastructure, exemplify the need for initial institutional leadership. The development of program specific technology infusion plans highlights the role that individual programs can adopt to facilitate technology innovations.

Recommendations for Continued Learning

This article reports on a graduate online program's efforts to infuse technology within its curriculum and residencies. Current ad hoc evaluation efforts have been limited to assessing Web 2.0 technology as a single activity or as part of course requirements. Although students report positive experiences and high satisfaction, rigorous evaluation studies with appropriate methodological comparisons are necessary before universal applications can be made. Student variables of current technological expertise and graduate expectations need to be examined for technology integration insights. Initiatives at the university level can assess the rate and scope of technology infusion across colleges and departments.

Conclusion

At a private, urban East coast university, technology has been a primary component of the institution's academic mission. A strategic plan to invest significant resources in digital technologies for faculty and students via a teaching and learning technology center resulted in technology infusion within a graduate online program with required residencies.

A twelve-year review of technology adoption revealed rapid adoption of Web 2.0 innovations using a curriculum infusion model. Individual programs and faculty continually receive encouragement and instructional design support to add new digital technologies into their diverse programs. Implementation barriers, such as limited resources, level of skill development, and the explosion of technology, are discussed in detail. Best practices for technology integration presented include the use of strategic imperatives, embedded technology learning centers, and program-specific technology infusion plans. Recommendations for additional research highlight the need for evaluation of technology infusion at both the department and university level.

The teacher-centered learning paradigm of the past two centuries has been replaced by a web-based, interactive model. To maintain academic competitiveness, other urban/metropolitan universities can easily develop a technology immersion plan based on their mission statement and directly aligned with their strategic institutional goals. Key components should include a clear timeline for technology implementation, commitment of resources, and empowerment of faculty change agents as Web 2.0 champions. Our twenty-first century students are already there; incremental change must be replaced by strategic technology immersion.

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