

CIT Report on Fall 2006 Duke Digital Initiative Instructional programs

This report summarizes feedback gathered and lessons learned by the Center for Instructional Technology (CIT) on three formal programs offered by the Duke Digital Initiative in Fall 2006: iPods, tablet PCs, and course video production. This report is divided into two main sections. Section 1 provides a descriptive overview of each of these three DDI programs. Section 2 describes themes that emerged in how these technologies were used and summarizes the benefits and challenges encountered by faculty and students in integrating these technologies in courses based on feedback gathered by CIT.

In addition to the three programs covered in this report, the Duke Digital Initiative also supported a variety of technology infrastructure services including podcasting (DukeCast), classroom capture technologies (Duke Capture), web conferencing (Elluminate), and blog/wiki software investigations. These infrastructure services were developed and are managed and supported by OIT. For more details, please see <http://www.duke.edu/ddi> and <http://www.oit.duke.edu/dms/>.

Section 1 - Description of Fall 2006 DDI Instructional Programs

DDI course support at a glance – Fall 2006				
	Students	Faculty	Subjects (Courses)	Equipment
iPods Widely supported use in a broad range of courses under a clearly defined support program	1470	81	Languages (31) Humanities (17) Social Sciences (22) Sciences (6)	30 GB Apple 5 th generation "video" iPod with Belkin TuneTalk microphone attachment
Video Production Experimental pilot in course video production to determine needs for broader support	132	7	Art History 164 French 76 (6 sections) French 63 Japanese 125 Spanish 106C	Video production kits including miniDV digital videocameras, tripod, and portable external hard drive. Video editing software for students in OIT's Macintosh labs.
Tablet PCs* Exploratory use in select courses	18	2	Chemistry 167L	Lenovo Tablet PC classroom cart for Chemistry

* Ongoing Tablet initiatives in the Pratt School of Engineering and the Department of Computer Science extended Tablet access to an additional 55 students and 6 faculty not included in these totals.

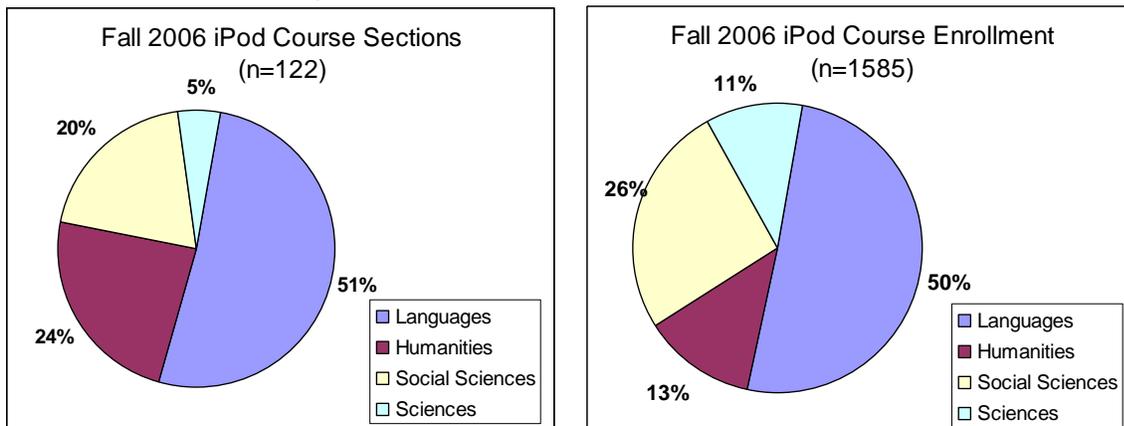
iPod program - Overview

In this third year of support for iPods in Duke courses, many elements of iPod use have become routinely supported as part of the instructional technology infrastructure. Many courses and programs, particularly language and writing-intensive courses, have come to rely on iPods as a standard solution for capturing digital audio and portable playback of multimedia course content. Two significant developments in the Fall 2006 iPod program should be noted.

- 1. The level of course iPod use began to stabilize, with participation levels similar to those in spring 2006.** The devices were used in 76 courses representing 122 course sections, 81 instructors and 1470 students. (Total iPod course enrollment was higher since some students enrolled in more than one iPod course – see figure below.) This usage was comparable to spring 2006 when the devices were used by 72 courses representing 64 instructors and 1424 students.
- 2. The iPod distribution model was modified to encourage student purchase.** Rather than subsidizing the entire cost of student equipment with program funds, a combination purchase/loaner pool program gave eligible students the option of buying an iPod package (iPod + recording attachment) for a subsidized price (\$99) through the Duke computer store or borrowing a similar set of equipment from the OIT help desk. 892 students chose the purchase option in Fall 2006, and an additional 219 students elected to borrow from a centrally managed loaner pool, with over 80% of these students retaining the loaner iPod for the entire semester.

Distribution of iPod use across subjects and programs

iPod use was mainly concentrated in languages and other humanities departments, with half of iPod course use by both number of sections and enrollment in language department courses. Although languages and humanities had the largest participation in terms of number of courses, public policy had the second highest enrollment in iPod courses of any subject area due to participation of some large enrollment courses.



Top 5 iPod course subjects, by enrollment	Subject enrollment	% iPod course enrollment
French	263	17%
Public Policy Studies	186	12%
Chinese	124	8%
Spanish	116	7%
Graduate Studies	107	7%

Continuing evaluation of the iPod program includes end of course surveys of students and reports from instructors. Based on reports from 67 faculty (80% response rate) and 364 students (25% response rate), a large majority of students enrolled in iPod courses (86%) reported substantial use of iPod on either a regular or short-term project basis. In addition, instructors were more likely to use their own iPods regularly than to require regular student use.

Course-related iPod uses reported by students and faculty included:

- Capturing digital audio (interviews, classroom capture, writing conferences, rehearsals, feedback for students or self-recording of oral practice exercises)
- Playback of digital course content (textbook audio, music, video materials, podcasts)
- Classroom presentation of multimedia materials by the instructor
- Capturing audio samples for use in sound editing labs

Faculty reported that iPods contributed to achieving course goals in several ways. A majority of faculty reported that iPods facilitated increased use of multimedia (n=36) and/or increased integration of authentic cultural materials and podcasts (n=22). Faculty noted other benefits such as improved quality of student work, increased time on task, the ability to implement assignments using multimedia content more easily, and more interaction among students and faculty during class time.

When asked in general about barriers to the success of their iPod projects, more than half of the faculty (58%, 39/67) reported some barrier to implementing all of their planned course activities. Barriers cited by faculty included (in descending order of frequency): difficulty in sharing course content with iTunesU, Blackboard, or other servers (n=18); technical problems involving individual pieces of hardware or integration (n=6); inadequate student skills/training (n=5); lack of equipment, resources, or support (n=4); constraints on faculty time (n=4); and problems with copyright or purchasing commercial content (n=3).

For further details on faculty and student experiences using iPods in the classroom, see "Classroom use of technology" below (pg. 6).

Tablet PC Program - Overview

In Fall 2006, DDI supported an expanded pilot program for tablet PCs to provide equipment, software, infrastructure and support for two classes within the Department of Chemistry. CIT and OIT staff also worked closely with an ongoing initiative in the Pratt School of Engineering, which has existing departmental tablet PC resources funded by grants from Hewlett Packard. Finally, the DDI funded a small Tablet PC loaner program to help Duke faculty in a variety of disciplines learn more about how this equipment can support their instruction.

Using DDI program funds, **16 Lenovo tablet PCs were purchased to create a set for classroom experimentation by students.** The planned use for these tablets in Fall 2006 was twofold: to foster improved data gathering from laboratory instruments, and to help students better collaborate in team writing of scientific reports. The instructor reported success using tablet PCs to support team scientific writing. However, existing older laboratory equipment was not compatible with the tablet PCs so the faculty were not able to implement the portion of the project involving data gathering with these instruments.

In addition, DDI provided **expanded technical, logistical and pedagogical support for the expanded use of existing departmental tablet PC pools in engineering.** CIT provided

pedagogical consulting and OIT staff provided technical and logistical support to bolster these projects. Additional professional development support and faculty stipends for a group of seven engineering faculty were provided under CIT's Faculty IT Fellows program.

Using pre-existing tablets, **four tablet PCs were developed into a faculty loaner pool** managed by CIT to provide expanded opportunities for exploration of the potential of this technology. Seven faculty participants in this loaner program received individualized training and consulting from CIT. In some cases faculty merely experimented with the potential uses of the device, and in other cases faculty tried out a classroom activity using the tablet PC in their Fall 2006 courses. Faculty were interviewed by CIT staff about their experiences with the tablets. The majority of participants in the loaner program felt the experience had been valuable and that faculty experimentation with tablet PCs should continue.

For further details on faculty and student experiences using tablet PCs in the classroom, see "Classroom use of technology" below (pg. 6).

Course Production of Digital Video - Overview

DDI supported expanded exploration of technologies and support structures to facilitate student video production projects in courses. In Fall 2006, 20 digital video production kits (miniDV digital videocamera, tripod and portable external hard drive) were purchased and combined with 12 existing video production kits previously purchased by DDI in spring 2006. These DDI-provided kits were supplemented by existing equipment from the language labs and the Multimedia Project Studios to create a total pool of 37 video kits. These kits provided enough equipment to support five fall courses with nine sections total and an overall enrollment of 132 students. The kits were checked out by students on a short-term loaner basis with the West campus language lab serving as the circulation point. CIT provided training, consulting and pedagogical support for faculty in implementing video production projects in these courses. Student training was provided through the language labs and through OIT's Student Technology Services. DDI funding for software licenses enabled the expansion of digital video editing capability to all OIT Macintosh labs

For further details of course video production pilots, see "Classroom use of technology" below (pg. 6).

DDI Program Administration

Cross-functional teams with membership from OIT, CIT, Arts & Sciences Information Science and Technology (A&SIST), and other key partners across campus worked together in implementing the DDI programs described in this report. CIT's role in DDI for Fall 2006 included the administration and management of the DDI iPod, Tablet PC, and course video production instructional programs. CIT staff:

- Developed, publicized and processed structured applications for the use of iPods, Tablet PCs, and video production in courses
- Developed and delivered a full range of standard workshops and custom training sessions for faculty, instructors and IT staff
- Coordinated equipment needs for the use of iPods and tablet PCs, and video production course projects

- Responded to a broad range of requests for information about DDI from Duke faculty, students and external audiences, such as other universities, businesses, other organizations and the press.
- Managed communications with all faculty and students using iPods in fall courses
- Systematically evaluated the impact of DDI programs and services on faculty, students, courses, and instructional programs
- Delivered specialized training for faculty and students in language courses using iPods as part of routine discipline-specific instructional technology support

Additional program support was provided by OIT and departmental IT support units, including:

- Management of vendor relationships with Apple, Lenovo, Belkin and other hardware and software vendors
- Coordination of iPod distribution to students and faculty through the computer store and help desk
- Negotiating details of equipment pricing, ordering and availability (e.g. with Apple, the Duke Computer Store)
- Help desk support for iPods
- Administration of iTunesU to support content distribution for iPod courses and ongoing partnership with Apple, Inc. in development of this tool
- Providing student training on iPods, audio production, video production, and other related topics through Academic Technology Services and Multimedia Project Studios
- Development, testing, and implementation of software images for classroom sets of tablet PCs
- Updates to OIT Macintosh lab software inventory to include digital video editing software in all Mac labs

Classroom use of technology under DDI in Fall 2006

Now in its second full year, the Duke Digital Initiative is a combination of mature programs such as well-tested uses of iPods in courses for playback and recording of digital audio, to more experimental programs such as small scale student video production projects in courses aimed at developing support and initiatives to explore faculty and student use of tablet PCs. It is important to note that even though iPod use in courses at Duke has entered its third year, even that program still has experimental components, such as explorations of academic uses of the video playback capabilities of the device. Based on course proposals and the feedback and reports of students and faculty, instructional innovation across the range of classroom technologies as described in the overview of this report clustered around three thematic areas:

1. **Increasing consumption and authoring of digital multimedia resources**
2. **Integration of student course multimedia projects**
3. **Facilitating classroom presentation and multimedia display**

Theme 1 - Increasing consumption and authoring of digital multimedia resources

Student and faculty feedback on iPods frequently focused on the ways in which this technology spurred increased consumption and authoring of digital media in courses. The use of iPods to capture digital audio has continued to be a standard component of many courses and programs, particularly in languages and writing intensive courses. Digital audio capture remains the most broadly supported course use of iPods, with nearly 90% of designated iPod courses requiring students to capture digital audio. In 60% of iPod courses, both students and faculty were engaged in capturing and sharing digital audio with the iPod and recording attachment.

In the end of semester survey of students enrolled in iPod courses, 82% reported loading multimedia course content onto their iPod. The use of externally produced and original digital media has increased since the inception of the iPod program. For example, in Fall 2006 the integration of podcasts into course content increased from only a few courses in previous semesters to over 1/3 of iPod courses requiring or encouraging students to subscribe to externally produced audio or video podcasts.

Examples of increasing consumption of digital materials reported by students and faculty included:

- Increasing consumption of external podcasts for course use, including video podcasts
- Use of the iPod to show video clips to

Faculty and student perspectives on increasing integration of digital media

“Each day at the beginning of class, I played music through my iPod for the class to introduce the topic for the day and to encourage students to begin thinking about social science as a part of their everyday lives. I also played a couple of music videos that I purchased from iTunes for the class.” – Social science instructor

“It was useful to listen to the weekly podcast, which I had to write a report about. It gave me the convenience to listen to these podcast while walking to class or in the library without having to lug my laptop. Also, it was essential to record our group audio report. On my ipod, I have more podcast than music, because I was able to subscribe to ABC news and business week. Overall, having an IPOD has made me get more involved with current events and business issues.” –ISIS student

“...made it easier for me to present media to my students, and prevented my having to carry my laptop or overheads, etc. to class. I was able to use it not only for audio, but also to show images and films.” - Language instructor

interviewees prior to an interview and then capturing an audio recording of the interview using the iPod and recording attachment

- Student use of the iPod to watch movies or other video clips relevant to readings outside of class
- Students and faculty using the iPod to bring movie trailers to class for presentation and group discussion

Based on faculty reports, iPods played a significant role in **enabling faculty to incorporate more authentic materials and assignments into courses**. When asked about the impact of the iPods on achieving course goals, over 20 faculty cited increased use of authentic multimedia content facilitated by the devices. One instructor articulated the contribution of the technology to his course goals, saying, "The iPods helped me to make the course more interdisciplinary and interactive." Another noted that once students became comfortable with the devices, they "...reached for a wide range of media sources and got exposure to a truly diverse pool of information and opinions." Language instructors in particular reported increased integration of authentic learning materials, and faculty and students noted that the simplified access and increased portability of iPods further encouraged use of these authentic multimedia materials such as music, film, and audio of native speakers.

Student and faculty comments on the integration of authentic digital materials

"[The iPod] opened up a wealth of audio and video opportunities essential to a good understanding of a foreign language." –Student

"The use of iPods contributed to my course goals in that it enhanced students' verbal skills (description of images--photographs, paintings, video clips) and analytical skills (comment and analyses of paintings and movie sequences) ...[and] greater exposure to authentic cultural materials." – Language instructor

"[iPods] contributed by diversifying the types and sources of current event media available as well as allowed for using media sources as supplementary materials outside of class." – Social science instructor

Students found that the multi-function portability of iPods **freed them from location-based resources**. Research has shown that students (particularly Millennials) are highly mobile in their study habits and use of technology¹. Although some students reported that they preferred to complete digital recording assignments using a personal or lab computer, the iPod continued to play an important role for many students with on-the-go study habits. "[the iPod] was better than using a language lab or the Audacity program because I could carry it with me and make a recording when I was in the Bryan Center or in my car..." Another student noted, "This class had listening quizzes for pieces of music where you needed to be able to identify a piece of music after about 20 seconds. Being able to continuously study the listening assignments with the iPod was much more effective than cramming at the media center the night before the quiz."

Student comment on the 'convenience' factor of the iPod as a study tool

"It made doing my listening assignments much more convenient since I could just put everything on my iPod and go wherever I wanted to listen to the music rather than lugging around my computer with the download music. The iPod also helped me to use my time much more efficiently. If I found myself with an extra 20 minutes, I could just pull my iPod out of my bag and do some of my listening assignment instead of waiting until I was home at my computer."

As in previous semesters, faculty and students cited the **convenience of the iPod as an all-in-one recording and media playback device**.

Students reported that the iPod contributed to their ability to easily and efficiently retrieve and

¹ D Oblinger, J Oblinger - Educating the net generation, 2005.
<http://www.educause.edu/educatingthenetgen>

study course materials. One student commented, "Another recording device would have worked, but showing media clips would have been much more difficult." Another student described the iPod as meeting a wide range of needs, describing it as "... a valuable tool because is so versatile. We used it as hard drive and for podcasts, and even used it to record lectures." For instance, this type of kind of integrated use was exemplified by comments such as one students', who notes that he used the iPod to, "...stay up to date with relevant political podcasts as well as...to make recordings for the course."

Faculty and students also noted that the iPod **provided an easy and convenient means for transporting large media files** too large to be stored in existing campus network storage. One language instructor described the iPod as "... a portable source of audio/video files and information that the instructor can play any time ...without relying on technical assistance....the iPod allows the storage of all these pedagogical tools [video clips, songs, and dialogues] in a pocket...."

Issues and challenges from increasing multimedia use

Although they cited many benefits to the increasing availability of multimedia course materials, faculty did express frustration with **copyright and digital rights management issues**. One instructor noted that "copyright issues loomed large when it came to video materials," and another observed that "digital rights management seems to be one of the stickiest issues with no clear solution." One music faculty member noted, "...there was no legal way to make that material available to the students aside from having them purchase the music off of iTunes....A copyright policy that gives greater leniency for educational purposes would have allowed me to assign more music without concern over the students' financial capabilities." Although only a few comments were received on end of semester questionnaires related to these issues, over the course of the semester many faculty involved in the program required support and consulting expertise to develop strategies for meeting course goals while complying with fair use and TEACH Act guidelines.

The increasing challenges of fair use compliance for teachers in the digital age had been previously noted in the assessment of the first year iPod program at Duke. Duke funds were committed in 2006-2007 to addressing this challenge through the creation of the Scholarly Communications Officer position now filled by Kevin Smith who joined Duke in the summer of 2006. With his assistance, strategies to address these challenges implemented have included:

- Individual assistance for copyright and fair use questions from faculty and staff, resulting in 75 consultations in Fall 2006 with 70 individuals, approximately 60% of which involved multiple contacts and/or significant research.
- Weekly consulting sessions between Center for Instructional Technology consultants and the Scholarly Communications Officer to discuss creative ways for faculty to achieve teaching goals while still adhering to fair use guidelines
- A public presentation in October 2006 (*©copyright FAQ: A forum for faculty on copyright in the classroom*) attended by 31 faculty, librarians, and IT staff to discuss copyright and fair use, particularly in reference to teaching with digital materials

At times students seemed to **lack the skills needed for effectively using the iPod**. A range of training and support options are provided by Student Technology Services and the Multimedia Project Studios, but awareness of these services could be increased. One student noted, "... [the iPod] was often more trouble than help because I did not know how to use it well." Another student was also not aware of available resources, saying, "I wish that there were more training with the iPod and recording. I didn't know how to edit." Several students commented that by the

end of the semester they still could not figure out how to create video files in the correct format for iPod playback. Faculty also cited limited student skills as one barrier to implementing iPod course projects as intended. All of the types of training students expressed a desire for were already offered in Fall 2006, so more information is needed about what training or support models could be implemented to ensure that students have the necessary skills for iPod use.

Many iPod uses that were once experimental have become routine, and the ability for students to create and consume multimedia using alternatives to the iPod has increased. Survey results suggest that **in some courses tools other than iPods might be more suitable or cost effective**. Although 84% of students responding to the end of course survey reported that the iPod was at least somewhat useful, about 1 in 7 student respondents reported that they did not find the iPod useful. These students were typically enrolled in courses where the iPod use was described as sporadic or project-based. These students explained that they felt the iPod was used too little or not truly needed (n=28), with some describing it as “a convenience” or “unnecessary addition” to the course. Other students (n=14) felt the iPod was not useful because they preferred to use a PC for recording and/or media playback activities. “I preferred to simply watch/listen to things at my desk computer when I was able to concretely focus on what I was doing.” Students did not always prefer the iPod for recording assignments; one student noted, “I used the recording program on my computer (Audacity) instead of my iPod.”

Finally, some students reported that **iPod use was not sufficiently integrated into some courses to justify requiring ownership**. Among the 42 students who indicated that they did not use the iPod and provided an explanation, their explanations fell almost entirely into two categories:

- Instructor did not integrate iPod use into the course, or integration was very minimal (e.g. used only in one class) (n=18). For example, one student noted, “*There was no formalized plan to incorporate the iPod into our projects or general work.*”
- There were activities using the iPod, but the student preferred to use alternative tools to complete those activities, such as using Audacity and/or iTunesU alone (n=11). For example, a student commented, “*We never really used it - we had one... assignment where we recorded sound on it, but even then it wasn't really necessary.*”

Theme 2 - Integration of student multimedia course projects

In conjunction with the increased use of media in courses, faculty and students also reported increased integration of student multimedia production as part of course activities. While many faculty experimented with the new capabilities of video iPods in delivering existing video course materials, a few took these experiments with video a step further, integrating activities and assignments into their courses which required students to capture and edit digital audio, images and video. Some of these multimedia projects were the product of efforts to redesign an existing course project. In other cases, the instructor's stated goal was to develop and integrate entirely new types of assignments involving student multimedia projects.

Faculty description of a student-produced video podcasting project

“During the first half of the semester, students practiced uploading photos to their iPod, using the microphone attachment, downloading podcasts and audio files, and using their iPod as an external disk device. After fall break, students began intense weekly work on their final projects, with most of their iPod use (storing photo, audio, and video files for lab work/editing) out of the classroom. Students completed their final projects by uploading 10 minute video podcasts to iTunesU.” – Humanities instructor

Examples of student multimedia projects in DDI-supported courses reported by faculty included:

- Social science courses where students captured field interviews and incorporated these into final multimedia presentations
- Humanities and science courses where students produced podcasts, including some with video
- Language courses where students produced video projects as a demonstration of their ability to integrate course concepts, where in addition to digital video capture and editing, students also used their iPods to capture voice-overs to overlay onto their videos

Faculty reported **significant progress toward achieving course goals** by integrating student multimedia projects. A humanities faculty member noted, "iPods allowed me to totally change the format of the major individual project from Powerpoint to iMovie, which allowed students to experiment (often for the first time) with video documentary work and documentary editing/storytelling. The microphone attachment was fantastic for audio documentary work and student project narration, and overall using the iPods on a weekly basis for class assignments and file storage worked very well also." Similarly, another instructor described how the project resulted in a range of positive outcomes, including engaging the students as authors rather than mere consumers of course content. "The use of iPods helps greatly to facilitate getting students involved in creating course content, allows me to broaden the exposure of alternative points of view and complementary materials, expand the class beyond the boundaries of the classroom, and results in increased quality of student work." Little data are available from students at this time about their reaction to these projects, so further efforts will be made this semester to learn more about the impact of these multimedia production projects on students.

Despite the potential rewards, significant **issues related to training, tools and infrastructure for supporting video production remain unresolved**. The current Duke infrastructure does not provide students with network storage space for use in storing working video files, so many students reported relying on portable hard drives or lab computer equipment. Faculty and students using network solutions for video reported problems with long upload times and a lack of adequate storage space to accommodate their needs. Also, the different video output formats and complexities of producing the right type of video files were confusing for faculty and students. Since video iPods were distributed as the standard equipment, students and faculty in a wide range of courses reported trying to use this functionality, and many of these courses were outside of the official course video production program support. Some used equipment purchased by departments outside of the DDI program. Based on student and faculty comments, significant support issues remain to be addressed before the infrastructure available would support larger numbers of students and faculty in video creation. Some technical challenges encountered are illustrated by the anecdotes at right.

Technical and infrastructure challenges with video production projects

"There were problems in producing videos in iMovie, exporting the files for DukeCast, having the desired result in the DukeCast download, in other words, in every step of the process....Support for the students mainly came from the multimedia labs. They reported student staff were knowledgeable about some issues, ignorant of many. The students generally figures things out for themselves and used equipment outside of the labs because the lab computers and hard drives were consistently crashing and in bad shape."

'We never exchanged video ...I tried to make iTunesU the default location to post assignments, but each 'round' heard horror stories of students for whom the uploading literally was taking hours etc. despite having an allegedly fast T-1 connection in dorm etc."

"Students who had recorded interviews and tried to put excerpts on their web sites very quickly found that they ran out of server space...We had a very difficult time with the web site projects. Part of the problem was server space, but there were a host of other problems. I paid an RA out of my research fund to help students, but that plus OIT still was not enough for some of the more intransigent technical problems."

Theme 3 – Facilitating classroom presentation and multimedia display

Faculty commonly reported relying on the iPod as a convenient means for bringing presentations and multimedia materials into the classroom. A few faculty simply used the iPod as a more convenient means of displaying PowerPoint, but many reported using the iPod to present a range of audio and video materials.

Tablet PC experiments also demonstrated significant promise for enhancing faculty presentations. Faculty in engineering experimented with several ways the tablet could be used to improve or enhance their presentations, including:

- using the tablet as an 'electronic blackboard', integrating features such as color, motion/animations, and dynamic lecture features such as problem solutions
- developing electronic lecture notes, including the ability to capture the lecture annotations
- receiving and showing student work/ providing dynamic feedback during lectures

Feedback in the iPod and tablet PC programs from faculty who used these tools as an aid to presentation and multimedia use during class was consistently positive. Faculty praised the utility and simplicity of the iPod, reporting that they were able to **more effectively meet course goals by allowing for more flexibility and spontaneity in their presentations** and increasing the overall amount of multimedia used. Similarly, faculty interviewed about their use of tablet PCs reported that the time invested to learn the technology and prepare ahead of time was returned to them through the value of more spontaneous and interactive class sessions. Students reported that these instructor uses of tablets enhanced their learning experience. Students commented on the benefits of these more interactive presentations, citing increased faculty use of colors for highlighting, clearer visibility of writing as compared to the whiteboard or blackboard, and the advantages of having access to a digital record of the classroom presentation for later review. For instance, one student in a course where the instructor experimented with using a tablet for presentation observed that "being able to download professor's class notes; being able to clearly see what he is writing; seeing different color writing and highlighting makes learning concepts easier."

Faculty comments on technological tools' support for flexibility in classroom presentations

*"[using the iPod] gave me more pedagogical flexibility in that I had my entire musical library at my disposal for each lecture."
- Music instructor*

*"I would spend more time initially in preparation time and getting to know the uses of the tablet PC, but the time would be worth it because of the added dimension the tablet PC would add to the classroom by taking a formerly stilted Powerpoint presentation and using it in an interactive way with the students."
- Engineering faculty*

*"Because it is so easy to bring my iPod (and cable) to class and hook it up we listen to music in class more often and sometimes even spontaneously."
- Language instructor*

Faculty reported that **delivering multimedia using the iPod had no negative impact on and in some cases even reduced their course preparation and delivery time.**

Faculty noted that in comparison to other available alternatives (e.g. carrying a laptop to class or burning a DVD of multimedia files ahead of time), the iPod saved them time in preparing files and enabled them to be more spontaneous in their use of multimedia materials.

When asked about the impact on course preparation and delivery, 54% of faculty who responded (n=33) reported no increase in their course preparation time. Of these faculty, 20 described their course preparation and delivery as more efficient or a better use of the same amount of time. These faculty typically commented that they saved time prior to class by not having to prepare PowerPoints or burn a DVD of particular materials in advance, and in-class time was used more efficiently because of a reduced need to switch between devices for multimedia presentation. Several used the iPod to also display traditional PowerPoint presentations, so they reported no longer needing to bring their personal laptop to class. Ten faculty reported increased time investment with a positive return on their investment; only 6 faculty reported that their preparation time was increased and did not feel their increased effort was sufficiently justified by the project outcomes.

Summary

Faculty continue to find the iPods highly valuable across a wide range of courses, and the availability of these devices continues to encourage broader use and creation of digital materials by faculty and students. The increasing availability of externally produced multimedia (e.g. podcasts) has also presented faculty with additional opportunities for integrating multimedia and increasing the level of use of authentic materials. Although the integration of multimedia authoring assignments is still relatively nascent compared to the broad adoption of digital audio recording and playback, this area is also beginning to spread beyond the initial group of adopters. Faculty use of tablet PCs as presentation devices also has shown promise, and continued exploration in this area may yield additional information about how these devices can support faculty innovation. Challenges remain to be addressed in areas such as support for increasing levels of video use and video production, student training, and creating a more seamless infrastructure for sharing multimedia content.

Reduced course preparation effort for using multimedia

"...helped to streamline my lecture delivery. Instead of switching between 4-5 cds in each class, I simply set up a playlist containing the necessary music...." – Music instructor

"...much simpler to play audio, video, and picture content from one device as opposed to using a CD, a DVD, and transparencies/printouts" - Language instructor

"It allowed me to generate more in-depth responses to student writing since it saved me the time of writing my comments" –Writing instructor

"... I was not able to get off the ground as many uses as I'd hoped. I feel I am still in the middle of a large learning curve. On the other hand, inspired by availability of digital technology, I turned to the internet and to my own audio and visual materials more often than I used to, and brought these to class. I believe these greatly enhanced the students' learning experience and their learning about [the target language's] culture. Having an iPod I could easily hook up to the in-class system was a DREAM come true! - Language instructor