

Summary of DDI Instructional Programs, 2006-2007

Prepared by Yvonne Belanger, CIT

The Center for Instructional Technology and the Office of Information Technology co-sponsored several instructional programs under the Duke Digital Initiative in 2006-2007. These programs included course support for iPods, tablet PCs, and student video production projects. This report contains a brief synopsis of these programs and their outcomes based on surveys, focus group interviews, and direct observations and reflections of IT staff (see Appendix B for details). The summaries in this report were prepared with assistance from Samantha Earp (CIT), Kevin Davis (OIT), and Andrea Novicki (CIT).

Overall outcomes and trends in DDI Instructional Programs

Instructional programs supported by the Duke Digital Initiative in 2007-08 resulted in three primary outcomes:

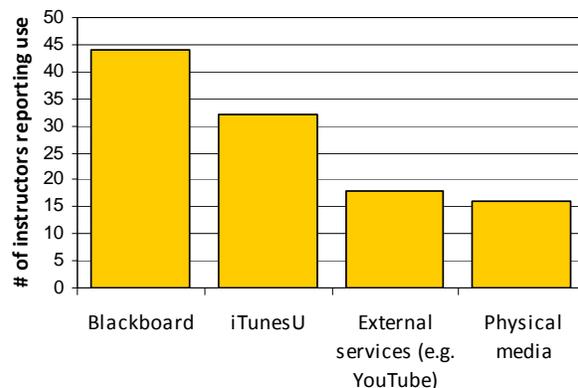
- Increased consumption and authoring of digital multimedia resources, including significant growth in the use of podcasts as a source of course content
- Successful and increasing of tablet PCs and iPods for enhanced classroom presentation and multimedia display
- Broader use of multimedia for major student course projects, resulting in reports of increased student motivation, more integration of original source materials into student work, greater use of authentic cultural materials, and better overall quality of student work

Increased use of multimedia and demand for multimedia support services

The wide availability of iPods and increased availability of digital video equipment increased authoring and sharing of multimedia content by faculty and students. This interest in multimedia also resulted in growing demands for systems and services to support multimedia use such as server space; systems that enable easy access to multimedia for course use; audio and video editing software; and assistance in complying with copyright law. Blackboard disk space usage doubled from September 2005 to September 2006, and doubled again from September 2006 to May 2007 (approaching 1 terabyte). Based on an analysis conducted in Fall 2006, most of the growth in Blackboard disk space usage is attributable to DDI-supported courses.

Faculty reported creating more multimedia content such as film excerpts, guest speaker videos, and review materials such as flash cards. Podcasts were more widely used as course content than in previous years, with students in 51 courses reporting that they subscribed to an audio podcast and in 20 courses reporting course-related use of a video podcast (“vodcast”). Instructors and students used a variety of systems for sharing media files (Figure 1). Most faculty reported using multiple systems to deliver and share multimedia course content since no one system met all of their needs.

Figure 1 - Course usage of systems for sharing multimedia



Successful and increasing use of tablet PCs and iPods for enhanced classroom presentation and multimedia display

A large majority of faculty reported high levels of satisfaction in their use of tablet PCs and iPods for improving classroom presentations.

Tablet PCs supported richer presentations by enabling faculty use of color, highlighting, and annotation of course material. In addition, instructors noted an improvement in classroom dynamics through facing their students while presenting with the tablet rather than facing away while using a black- or whiteboard. The ability to present and capture live pen-stroke annotations on slides or diagrams enabled faculty to deliver presentations that both they and their students found to be more effective than other delivery methods.

Many faculty also reported that iPod was a valuable tool to enable them to easily transport and present multimedia materials. Connecting their iPod to the installed classroom A/V system, faculty were able to switch easily among prepared PowerPoint slides, audio, video, and image files for presentations and many preferred this alternative to bringing personal laptops to class or using installed systems for playback of physical media.

Broader integration of student multimedia production projects

Increasingly, faculty integrated student multimedia course projects that go beyond traditional final paper assignments. Examples of multimedia products resulting from 2006-07 DDI courses included:

- Podcasts as a critical reflection on class readings and discussion
- Podcasts to demonstrate second language proficiency
- Short film adaptations of Jane Austen novels
- Original short films based on characters from French literature
- Audio clips of oral interviews for student portfolios
- Short video public service announcements targeted at Duke undergraduates
- Brief video documentary reflections on a service learning experience
- Japanese radio and television dramas to reflect language skills and cultural understanding

Changing the format of major student assignments from written essays to multimedia products has, according to faculty, resulted in several positive effects. Faculty have reported increased student motivation, more integration of original source materials into student work, greater use of authentic cultural materials, and better overall quality of student work. Faculty exploring the integration of these projects have found that multimedia assignments need to be carefully structured to ensure student success; frequently, these technology-intensive course projects require extensive advance planning, in-class training and ongoing technology support for both faculty and students.

Detailed program summaries and outcomes of three specific programs supported by DDI (iPod program, Tablet PC faculty and classroom loaner program, and student course video production program) begin on page 3.

DDI Instructional Support Plans for 2007-2008

For the 2007-08 academic year, the Teaching and Learning component of the Duke Digital Initiative will build on the successes of the programs that have been implemented thus far and will continue our efforts to support best practices for incorporating digital technologies into teaching and learning. This component includes continuations of the programs described above as well as exploratory investigations into emerging technologies.

The iPod program will continue its transition to scalable operational support. For the coming year, undergraduate students who do not have equipment sufficient to carry out course activities will have access to loaner equipment; Duke will also continue to provide iPod equipment to instructors and faculty teaching undergraduate courses. Our Tablet PC program will build on the experience gained in the last year by expanding the number of Tablet PC semester loaners available for instructors for class presentation and note taking use. Finally, our student course video project support will expand the number of digital video

production kits available for checkout on campus, and we will continue to provide training and consultation for instructors who wish to incorporate video-based assignments in their courses. CIT and OIT will continue to deliver training for faculty and students that enables them to make the best pedagogical use of the features of these technologies.

Ongoing efforts to identify and evaluate emerging technologies that have the potential to support innovative instructional activities will continue. Given the pace of technology, we anticipate identifying promising new technologies to explore throughout the academic year and will report on these new initiatives as they are developed. Potential explorations for 2007-08 include virtual worlds, new handheld multimedia technologies such as the iPhone, and exploration of systems to enable Flash-based audio recording via the web.

Summaries and outcomes for iPod, Tablet PC, and Student Course Video Production Programs

For details of the assessment methods used for this report, see Appendix B.

1. iPod Program

The Duke Digital Initiative supported the use of iPods in over 250 course sections for 141 instructors and over 2500 unique students in 2006-07. iPod program participation is summarized in Table 1 and Figures 2 and 3 below.

Table 1 iPod Program Statistics for 2006-07	Sections	Course titles	Instructors	Students
Fall 2006	122	76	81	1608
Spring 2007	135	73	78	1481
Total (unique)	257	123	141	2567

Figure 2 - iPod Course Enrollment

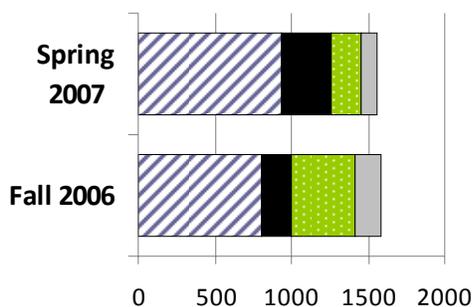
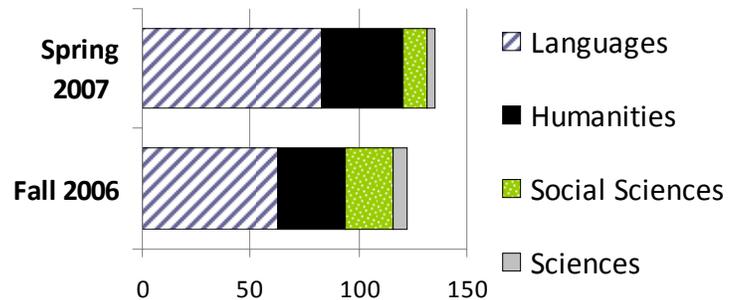


Figure 3 - iPod Course Sections



Faculty reported using iPods as instructional tools for delivering multimedia content during class, including audio content, PowerPoint, images, and video; for recording themselves, their students, or class sessions; and for transferring and storing large files. iPods were most commonly used by students for sharing digital content with instructors and other students, storage and playback of multimedia files, digital audio recording, and listening to course-related podcasts. Approximately half of both faculty and students reported relying on the iPod for file storage and transfer. Podcasts were widely used as course content, with students in 51 courses reporting that they subscribed to an audio podcast and in 20 courses reporting the use of a video podcast (“vodcast”).

iPod Program Outcomes

All but one instructor reported positive impacts on their teaching experience from the use of the iPod; one reported no impact. No faculty reported a negative impact. Most faculty also reported that the iPod was essential (43%) or important (38%) for their course. Benefits of iPod use cited by faculty included:

- Improved quality or increased amount of feedback; support for more effective assessment practices
- Easier or more convenient use of rich multimedia course content
- Improved use of class time, such as increased faculty-student interaction or reduced time spent on course management tasks
- Facilitating student fieldwork or multimedia projects

Based on survey responses from students in Spring 2007 representing 91% of supported iPod courses, most students found the iPod to be essential (34%) or important (37%) for general academic use. Over 90% reported that the iPod was useful for a specific course where it was required; only 6% reported that it was not a useful academic tool for them for course use or general purpose use.

Issues encountered by faculty and students in their use of iPods for academics included confusion over how to create iPod-compatible video files, problems recording at high quality settings such as gaps in recordings and short battery life, and slow upload times for iTunesU course spaces.

Other factors to note:

- Continuing copyright difficulties in spite of help from Kevin Smith, Scholarly Communications Offer

2. Tablet PC faculty and classroom loaner program

In the 2006-07 academic year, the Duke Digital Initiative (DDI) has supported a range of campus experiments in the use of tablet PCs to enhance classroom activities and teaching & learning. Tablet PC use at Duke in 2006-2007 was also supported by the School of Engineering, Hewlett Packard, and the CIT Faculty IT Fellows program.

Tablet PC experiments supported by DDI in 2006-07 included:

- Short term four week tablet PC loans (discontinued after Fall 2006 based on faculty feedback that this loan period was inadequate);
- Semester-long loaners to nine faculty in a range of academic disciplines for classroom use;
- Loans of 'classroom sets' to allow faculty and all students in one course per semester to use tablets;
- Consulting, planning, and infrastructure support for the Pratt School of Engineering's efforts to deploy tablets and software platforms to measure the impact on the undergraduate educational experience.

Tablet PCs were in use by at least 14 instructors of 16 courses in 2006-07 spanning Humanities, Social Sciences, Science and Engineering disciplines (see Appendix A for specific courses and instructors). DDI support for tablet PC experimentation was combined with additional support from the CIT Faculty Fellows Program and by existing Engineering tablet PC carts funded by grants from the Hewlett Packard Foundation.

Academic uses of Tablet PCs

Several faculty used tablet PCs in place of overhead projectors, installed podium computers, or the blackboard/whiteboard. Some faculty also experiment with student use of tablet PCs to create more interactive classroom experiences. Academic uses of tablet PCs in 2006-07 included:

- Faculty use of tablet PCs for enhancing presentations with color, highlighting, and annotations
- Capturing annotated faculty classroom presentations for later student use and review
- Student use of classroom-set tablets coupled with synchronous learning tools like Classroom Presenter to allow instructors to push slides/whiteboards to students' tablet screens and capture student input for immediate discussion in class.

Tablet PC Program Outcomes

Based on reports from faculty using tablets, IT staff supporting tablet users, and quantitative data from the Pratt experiments, tablets have been found to have a significant impact on student engagement and learning. More specifically,

- Use of color, highlighting, and annotation of course materials, coupled with the ability of an instructor to face a class while using their tablet (rather than facing away while using a black- or whiteboard), supported the delivery of more effective faculty presentations. This use case was universally acclaimed by faculty in all DDI tablet pilot programs as well as by participants in the CIT IT Faculty Fellows program.
- Faculty were also able to improving the quality of resources available to students for review and study by capturing and posting their annotated course notes for later review using tools like Ubiquitous Presenter (to capture stroke-by-stroke notes) or PowerPoint.
- The use of classroom-set tablets by students coupled with synchronous learning tools like Classroom Presenter allowed instructors to deliver presentations and pose questions directly to students' tablet screens. This allowed students to respond to instructor prompts of complex problems with tablet sketches that they could submit during class to instructors for immediate review and discussion. As a result, tablet use in these cases improved instructors' ability to provide formative assessment feedback (e.g. by identifying and addressing student misconceptions more quickly). Students who used tablets for this type of in-class activity at Pratt found them a positive addition to the classroom by a ten-to-one ratio.
- Dr. Lisa Huettel and other participants in CIT's Faculty IT Fellows Program (see Appendix A for complete list) carried out a study which found a positive impact of tablet PCs on student learning in computer science and engineering settings; their results are detailed in a co-authored paper currently under review by IEEE for its 2007 Frontiers in Education conference.

Several issues and challenges in the classroom use of tablet PCs were also identified:

- A significant investment of time by instructors before and during class was required to support student use of cart-based tablet PCs. Instructors needed a high familiarity with the technology in addition to adaptation of both lecture materials and teaching style. Without this investment of time and in the absence of intensive support from one's department and fellow faculty, tablet PCs are difficult to integrate into a curriculum effectively.
- The use of tablets for interactive learning such as Classroom Presenter-mediated instant feedback on in-class assignments can have strong benefits for highly complex problems requiring significant student self-work, but interaction with simpler problems or review of handwritten work (such as phonetic writing samples) may still be more simply achieved using chalkboards/whiteboards. Tablets can increase task-time for student in-class work and require instructor focus, and thus are better suited for instant feedback exercises with complex problems, and for classes that are longer than 50 minutes in length.
- In our pilot of student classroom use, faculty would bring a wheeled cart of tablet PCs into a classroom, distribute the devices to students for class use, then collect and store the laptops at the end of class. Faculty reports and staff observations clearly established that this distribution model added a significant time burden to faculty that was unwelcome at best and untenable at worst. For

instance, in order to share tablet carts and to adequately secure these carts between uses, faculty and TAs often had to transport these heavy and cumbersome carts between buildings for each use. The use of shared hardware unfamiliar to the students also meant that faculty needed more in-class support from IT staff to help students solve technical problems with booting and using the tablets.

In summary, tablets were found to be very successful when used as improved presentation devices for faculty seeking an alternative to blackboards/whiteboards or standard laptops connected to projectors for their classes. Tablets also provided significant benefits for combined student-faculty use in classes, but only when three factors are present: (1) a clear and strong benefit from synchronous learning tools like Classroom Presenter that cannot be accomplished via chalkboards/whiteboards, (2) intensive in-class operational/technical support, and (3) support and fellowship from a group of fellow tablet users, ideally within a department.

3. Student course video production pilot program

In 2006-07, support for student video production projects was provided to over 280 students and 12 different instructors for 21 course sections (see Appendix for complete list). Students in course video production projects were loaned video production kits that included miniDV digital video cameras, tripods, and portable 80 gigabyte hard drives. Editing software was provided through OIT Macintosh labs. Training and support for students and faculty, including training in camera technique and the use of editing software, were provided by CIT staff and OIT staff from the Multimedia Project Studios. In most courses, students borrowed cameras from a DDI loaner pool managed through the campus Language Labs for two to four week loan periods to create short films of approximately 10 minutes, usually as a summative final project.

Video works created under this program included a full range of content from documentary style videos to highly creative works involving script writing and significant post-production work. In several courses, these video projects took the place of what had formerly been live performances of students' final projects. In other instances, these projects replaced more traditional assignments such as final papers or were used as a tool for students to document or reflect on a field experience during a service learning course.

Student course video production pilot program outcomes

Staff gathered faculty input on the challenges they encountered in implementing video production projects. Several faculty noted that in restructuring their final project assignment as an edited film rather than a live performance, students produced more high quality projects than in previous semesters. Faculty observed that rather than relying on the high stakes of a one-time live performance, students took advantage of opportunities for reshooting or multiple takes to capture the best possible student performances. Faculty and students responded favorably to improvements in the availability of equipment such as video editing software, made available on 50 stations in OIT's Mac labs for this academic year and additional wireless microphones purchased for Spring 2007.

Issues and challenges reported by faculty and students in course video production projects included:

- The technical details and process of shooting and editing video sometimes consumed more time than anticipated by faculty or students. In some cases, faculty questioned whether the pedagogical value of the project justified the amount of time invested by the students in the projects. However, in several courses acquainting students with the film production process and its complexities and challenges was integrally connected to course goals; in these cases, faculty were excited that their students had these hands-on opportunities to engage in these projects and to gain first-hand experience in the film production process.

- Storage for working video files remains a significant challenge. For short-term projects filmed and completed within a few weeks where original video source files do not need to be archived for later use, current solution of 80 gigabyte portable hard drives for storing these working files is sufficient. However, no solution exists for providing students with this amount of space for a longer period of time to preserve their raw video files in a editable form. Because of this limitation, students cannot plan to use these files for portfolios or research later in their academic careers.
- In spite of popularity of video projects such as FroshLife and increasing popularity of video editing tools for the consumer market, a large majority of students enrolling in these courses had no previous experience in video production. Students needed not only training in the use of cameras and software tools, but also training in planning and carrying out a video project. Multimedia Project Studio and Language Lab staff provided in-class training for all courses; however, many students and groups still required intensive one-on-one support to complete these projects successfully.

At this point, the course video support program is structured to successfully meet the needs of courses in a variety of disciplines where students are engaged in short-term video production projects spanning 2-4 weeks. Additional campus resources or different support models may still be required to support courses and programs requiring continuous semester-long student access to video production equipment, such as in documentary studies or film video digital program courses.

Appendix A: Participants in DDI Tablet PC and Course Video Production Programs

<i>Faculty course use of DDI tablets</i>	<i>Course number - title</i>
Fall 2006	
Todd Woerner & Ann Motten*	Chem 167L. Physical Chemistry Lab
Gary Ybarra ⁺	ECE 27. Fundamentals of Electrical & Computer Engineering
Linda Franzoni ^{^ +}	ME 141L. Mechanical Design
Spring 2007	
Jane Gaines	Lit. 110. Introduction to Film Lit. 117. Political Economy of the Global Image
Connell Fullenkamp	Econ 51D. Economic Principles
Reagan Humber	Italian 63. Intermediate Italian
Claudia Karagoz	Italian 63. Intermediate Italian
Clare Tufts*	French 107S. French Phonetics
Gary Ybarra ^{^+}	ECE 27. Fundamentals of Electrical & Computer Engineering
Linda Franzoni ^{^ +}	ME 141L. Mechanical Design

<i>Other CIT-supported course use of tablets</i>	<i>Course number. Title</i>
Lisa Huettel ^{^ +}	ECE27L. Fundamentals of Electrical & Computer Engineering (S07) ECE 54L. Signals and Systems (F06 & S07)
Kathy Nightingale ^{^ +}	BME8. Biomedical Device Design (S07)
Jeffrey Forbes ^{^ +}	Compsci1. Principles of Computer Science (F06 & S07)
Joseph Nadeau ⁺	EGR75L. Mechanics of Solids (F06) CE133L. Concrete and Composite Structures (S07)
Bob Malkin ^{@ +}	BME 154L. Biomedical Electronic Measurement II (F06 & S07)

* Used DDI classroom set with students

[^] Used Pratt School of Engineering or Department of Computer Science classroom sets with students

[@] Used slate attachments for student computers to simulate tablet functionality

⁺ Participant in CIT Faculty IT Fellows group for 2006-2007

<i>Student Course video production projects</i>	<i>Course number - title</i>
Fall 2006	
Stanley Abe	Art History 164. Chinese Visual Culture
Laura Florand	French 63. Intermediate French Language and Culture
Laura Florand, Deb Reisinger, Sandra Valnes, Franck Dalmas	French 76. Advanced Intermediate French Language and Culture
Joan Clifford	Spanish 106C. Issues of Education and Immigration
Naoko Kurokawa	Japanese 125. Advanced Japanese
Spring 2007	
Anne O'Neil-Henry, Laura Florand, Franck Dalmas, Lesley Curtis, Sandra Valnes	French 76. Advanced Intermediate French Language and Culture
Michele Strano	Public Policy 196S, Section 35. Media Campaigns & Public Policy
Richard Lucic	ISIS 140. Web-based Multimedia Communication
Diana Solomon	Writing 20 (Sections 47 & 52). Austen's Costumes: The Novelist in Theater & Film

Appendix B: Data collection methods and sources

iPod program evaluation

In their third year of academic use, evaluation of iPods in courses is carried out through standardized web reporting by faculty and enrolled students.

All instructors of any section of DDI-supported iPod course were instructed to complete a standard report using an online form. In Spring 2007, report forms were ultimately received from 61 of 78 instructors (78%) about their experiences teaching with iPods, representing reports on 79% of ACES course listings (90/114).

Students enrolled in DDI-supported iPod courses were invited via email and Blackboard announcements to complete an online questionnaire about their experiences using the iPod in formal and informal learning environments. In Spring 2007, 356 of 1481 students responded representing an overall response rate of 24%. The response rate in some courses was much higher; in total, feedback was received from at least some students in 91% of ACES course listings for iPod courses (104/114).

Tablet PC and course video program evaluation

Evaluation of tablet PC and course video production programs are still geared toward understanding factors impacting the successful implementation of these technologies for course use. Most of the evaluation efforts are focused at gathering qualitative reflections on the use of these technologies from faculty, student, and IT staff.

With a combination of support from DDI and CIT's IT Faculty Fellows program, seven engineering and computer science faculty experimenting with tablets studied the impact of tablet PC use in their courses via a survey across 425 students in 11 courses; 52% of enrolled students responded. Designed and coordinated by Dr. Lisa Huettel, this survey gathered data on student reactions to the use of tablets by faculty and (in some cases) by students. Their findings are detailed in an article currently under review by IEEE for publication at its 2007 Frontiers in Education conference. These faculty also participated in monthly meetings with Andrea Novicki from CIT and Kevin Davis from OIT to assess the integration of tablets into their courses.

Faculty experiences with tablet PC use and video production were evaluated using individual and group interviews. All of the faculty participating in the tablet PC short-term and semester loaner programs were interviewed individually by either Margo Evrenidis, CIT Evaluation Specialist or Yvonne Belanger. Group interviews were conducted with seven faculty whose courses incorporated student video production projects. These group interviews included participation from Samantha Earp from CIT and Michael Faber from OIT. Faculty reports were combined with extensive IT staff observations from throughout the Fall and Spring semesters.