

DUKE DIGITAL INITIATIVE

TECHNOLOGY INITIATIVES IN SUPPORT OF TEACHING & LEARNING

The Duke Digital Initiative – 2012 Update

Since 2005, the Duke Digital Initiative (DDI) has sponsored experimentation, development and implementation of new and emerging technologies to explore their effective use in support of the university's mission. The goals of DDI are to promote innovative and effective teaching, to use technology in support of curriculum enhancement, to develop our technology infrastructure and to share knowledge about effective instructional technology strategies.



Program findings and updates

1. **Mobile devices and apps have continued to be a central focus of experimentation.** Centrally-managed pools of iPads have enabled users to flexibly access content, create and annotate text, create and edit multimedia, and explore specialized apps. iPad loans included over 475 short-term exploratory loans from the LINK pool and CIT, as well more than 200 loans for course use.
2. **Interactive polling experiments in 18 courses over the past two years have demonstrated a range of benefits.** Web-based 'bring-your-own-device' polling options have been successfully used by faculty and students to promote effective and engaging presentations and other active learning experiences, while demonstrating some limitations that suggest future areas for exploration.
3. **WordPress at Duke has continued to grow and has become a sustainable part of Duke's centrally supported elearning infrastructure.** This flexible web publishing platform, first piloted with DDI support in 2009 with about 40 sites and under 300 users, is now an enterprise service supported by CIT and OIT that hosts nearly 3,000 sites built by over 9,000 members of the Duke community.
4. **Exploration of 3D video creation and viewing technologies has continued, with interest centered primarily on display of 3D content.** A portable 3D Exploration Station is now available to showcase how these technologies have evolved and to provide faculty and students with opportunities to assess their potential.

5. **Usage of the central multimedia equipment loaner equipment pool has stabilized.** Nearly 3500 loans were made from the LINK multimedia equipment pool, a 10% decrease compared to 2011. This decrease resulted from fewer video camera and web cam loans, likely due to these devices' increasing availability in student and faculty personal computers and handheld devices. Video cameras continue to represent the bulk of the equipment pool, although a relatively smaller pool of iPads was in high demand. During peak periods, over 500 patrons per month borrowed this equipment for a wide range of academic, co-curricular and personal needs.

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Embedded links to online supplementary material are included throughout this report. For print readers, a list of URLs is included at the end of the report.

Mobile and multimedia: Exploring the use of iPads in teaching and learning



Over the past two years, course-based and individual iPad loaner programs have provided opportunities for faculty and students to explore how mobile networked multimedia touch-screen devices and apps can impact teaching and learning.

Primary uses of iPads

The introduction of the iPad 2 and its camera into course-based loaner programs, as well as the continued evolution of the app market and new use cases were the main drivers of innovative use this year.

Through CIT's course loaner program, different applications of iPads in teaching and learning were evaluated in the context of 10 course projects across diverse disciplines (*Table 1, right*). The focus of this year's course iPad program was two-fold:

- Exploring the use of iPads for accessing online interactive materials, eTextbooks and other new media in place of traditional textbooks, coursepacks, and printed materials.
- Testing the iPad2 camera as a replacement for traditional web cameras, video cameras or still cameras for videoconferencing and student-created multimedia projects.

Findings from iPad course use

Course uses are described briefly below. Links to CIT blog articles provide additional details for each project. Course-related iPad use typically centered around three use cases:

1. Combining of iPads and resources to access content
2. Capturing, annotating and editing text and multimedia; and
3. Exploring the potential of mobile apps

Table 1

2011-2012 iPad Course Projects

The Center for Instructional Technology manages a pool of 125 iPads reserved for faculty and student use in courses by application.

Fall 2011

- Chem 43: Honors Chemistry (Steve Craig)
- Markets and Management 161: Marketing Management (Cheryl Lin)
- Documentary Studies 211S: Documentary Writing (Duncan Murrell)
- French 101: Advanced Grammar/Writing Workshop (Deb Reisinger)
- Nursing N442: Sexual and Reproductive Health (Kathy Trotter)
- French 199: Reading for Pleasure (Clare Tufts)

Spring 2012

- Turkish 102S: Contemporary Turkish Compositions/Readings (Erdag Goknar)
- Nursing 529: Clinical Anesthesia Practicum (Sharon Hawks)
- Biology 127: Marine Megafauna (David Johnston)

Use Case 1 - Combining iPads and E-Resources

Faculty and students in two courses tested whether iPads and electronic course materials could fully replace the typical combination of a paper textbook and laptop.

- In Steve Craig’s chemistry course, students successfully used online open educational resources and iPads in lieu of a required textbook, although most continued to rely on the structure and format of the optional print textbook. ([Honors Chemistry without lectures or text – how did it go?](#))
- Cheryl Lin’s marketing students tested the iPad in conjunction with the CourseSmart eTextbook app. Some students disliked the digital textbook experience and reported having difficulty annotating the text; others praised the convenience and searchability (*see student quotes, right*). Students reported that using an eTextbook (or not) would not significantly influence their decision to take a course. ([iPads in Marketing Management](#))
- Sharon Hawks Nurse Anesthesia students used eTextbook delivered via the Kno iPad app, including enhanced features such as flashcards, as well as other electronic course content from online sources. (*see Using medical reference and other apps in clinical education settings, pg. 6 below*)

iPad reactions from students

“I do not like reading the textbook online. It’s hard to take notes because you can’t place them right next to the paragraph. Highlighting is also frustrating.”

“The app makes navigating the textbook much more convenient, including a wonderful ‘search’ tool that makes finding key terms much easier and faster.”

Findings for iPads and E-Resources

- Convenient access to online content continues to be one of the popular and frequent academic uses of iPads. Although accessing internet sites was a common use case, students did encounter difficulties (e.g. with sites that use frames, such as Blackboard at Duke).
- Faculty need to consider iPad capabilities when creating course materials; common file formats for sharing course materials (e.g. PowerPoint .ppt files) do not readily display on iPads.
- Students who used ebooks enjoyed the ability to “carry” multiple textbooks inside one relatively light device, but most still consider eTextbooks a supplement to (rather than a replacement for) a physical textbook.
- Multiple platforms, providers and options left some students confused by the process of obtaining different eTextbooks from multiple publishers using different apps.

“...the experience of using the iPad with a separate, full-sized keyboard is amazing.... Without the separate keyboard, typing is a real drag; but with the keyboard and a good app.... the portability and total immersion in the writing environment made working on the iPad a real pleasure.”

- Duncan Murrell, Writer in Residence, Duke Center for Documentary Studies

Use Case 2 - Creating, editing and annotating text and multimedia

Three projects explored the use of iPads for creating and editing text and media, with and without accessories such as a stylus or external keyboard.

- In *Turkish through Screenplays and Film*, Erdağ Göknağ's students explored iPads to capture photos and video, record audio and annotate screenplays. [Using the iPad to bring Language Pedagogy and Cultural Contexts Together](#)
- In Jules Odenhal's *Theater Production* course, capturing audio and video for social media publishing. [The role of digital media creation in Theater creation, study and teaching](#))
- Supporting academic and creative writing. [iPads in an advanced writing workshop](#) and [Documentary writing – the iPad as a creative tool](#)

“We found iPads very useful for delivering content and for giving feedback on compositions. Students were especially positive about receiving recorded oral commentary, which correlated with a positive faculty experience.” - *Deborah Reisinger, Romance Studies*

Findings for iPads as annotation and media creation tools

- Faculty and students continue to report that writing or note-taking is cumbersome on the iPad using the on-screen keyboard. Most academic users typically prefer an external keyboard.
- The stylus does not appreciably improve the ability to “write” on the screen for most users (to annotate eBooks, for example).
- With or without a stylus, users found annotation of text difficult due to the thickness of the line that is drawn and the inability to create very small handwritten text.
- Existing annotation interfaces for eTextbooks don't yet meet typical student expectations for ease of use; students seek a user experience comparable to the simplicity and flexibility of writing in the margins of a physical textbook.
- The iPad2 cameras are useful for capturing audio and video quickly and easily; the quality of still photographs and videos captured may not be adequate for projects where high definition is desired.

Beyond course use: iPad use through short-term loans

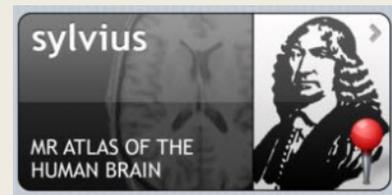
In addition to structured explorations of iPads through course projects, students and faculty experimented with iPads using a first-come, first-served pool of devices available through the service desk in the LINK. Analysis of loan forms from students and faculty indicate that iPads are used to meet a wide range of needs through these short-term one week loans. Examples of the types of use supported by the LINK iPad pool include:

- In-class use (notetaking with graphs and sketches in math and science courses, presentation of multimedia, digital photography display)
- Apps for study and learning (mobile access to language learning, flashcards, quizzes, eTextbooks, data analysis and visualization)
- iPad app development for course projects
- Multimedia writing projects such as lab reports and business plans
- Web conferencing
- Capturing data for field research (surveys, interviews)

Using medical reference and other apps in clinical education settings

The Schools of Medicine and Nursing have been greatly interested in the potential of iPads. In recent semesters, students in Nursing and Physical Therapy have explored various clinical uses of iPads including:

- eTextbook access with the Kno app
- Educational and entertainment apps to facilitate care with pediatric patients
- Multimedia content for patient education
- Medical/scientific reference apps such as Dragon Medical Search, WebMD, Human Atlas, medical encyclopedias, MedAbbreviations, and Epocrates drug reference
- Utilities such as MedCalc or Mediquations
- Specialized tools (Typhon) or notetaking apps for clinical encounters
- Translation tools to assist with patient communication



[Exploring iPads in clinical teaching](#) - Over 60 Doctor of Physical Therapy students experimented with iPads during a two week clinical experience. Students enjoyed using reference apps in educational settings, but found iPads to be more problematic in clinical environments for a variety of reasons including lack of Wi-Fi connectivity in some clinics, infection control policies and the large form factor.

[Enhancing the clinical experience with iPads](#) - Nursing students in Kathy Trotter's N442 course, *Sexual and Reproductive Health*, experimented with iPads for accessing course materials and specialized health information in clinical settings. They found iPads particularly useful for patient education in settings where Wi-Fi was available.

Replacing Textbooks and Simplifying Information Access - Nursing Anesthesia students used eTextbooks via the Kno app along with other course materials on the web. The portability and convenience of eTextbooks was viewed positively, but students expressed frustrated with annotation and highlighting tools. Hawks is continuing the pilot in order to explore whether these frustrations diminish with longer exposure.

Looking ahead: iPad explorations in 2012-13

iPads will continue to be available for short-term use through the LINK. In addition, two primary areas have been identified as the focus of course-related iPad programs in the coming year.

1. Using iPads to engage students in class with course loans for integrating apps designed specifically for use inside the classroom as well as classroom use of iPads in the LINK through replacement of a cart of obsolete tablet PCs with iPads
2. eTextbooks: Producing and Consuming by supporting proposals to build eTextbooks using iBooks Author or similar programs and testing this content in courses

A [complete program description and application information](#) for the 2012-13 iPad course loan program is available on the CIT web site.

3D Explorations

DDI has continued to sponsor explorations into existing and emerging technologies for creating, editing and interacting with 3D digital content. Currently, these programs are focused on presenting these technologies to faculty, students and staff to spark discussion and ideas about their potential for effective and transformative use in teaching and learning.

Updates from 2011-12

- A 3D Exploration Station (*Fig 1, right*) was created as a portable system that could travel to various locations and events at Duke to help staff gather feedback on content and the hardware to deliver that content
- Research continues into equipment and software that might simplify the use of 3D for teaching and learning, including options for mobile glasses-free viewing options such as the iPad i3D app (*Fig 2, right*)
- Campus infrastructure for 3d viewing was added with the opening of the Multimedia Project Studio's new location in lower level Bostock (*Fig 3 and 4, below*).



Figure 1. Steve Toback (OIT) demonstrates 3D viewing on a Samsung 46" LED 3D TV at the CIT Showcase

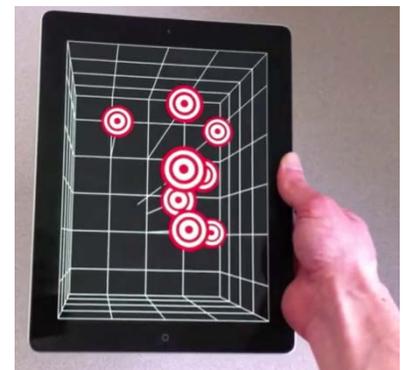


Figure 2. A screen shot from a demonstration video of the iPad i3D app which uses head tracking rather than glasses in a mobile 3D display



Figure 3. The new Multimedia Project Studio in Bostock Library opened in May 2012 with a high-definition 3D display behind the service desk. The MPS has 20 pairs of 3d glasses and sample educational content for group viewing.



Figure 4. During their visit to the new MPS West lab, the Duke Information Technology Advisory Committee (ITAC) tests the high-def 3D video display

Polling and interactive teaching without clickers: An update on Poll Everywhere

Using student-owned smartphones, tablets, computers, and text messaging, DDI has sponsored faculty and student exploration with Poll Everywhere since Fall 2010. Poll Everywhere uses a bring-your-own-device (BYOD) approach to classroom polling and interaction.¹ Using this web-based alternative to physical student classroom response systems, the instructor's computer connects to the Poll Everywhere web site where the responses are collected and displayed. Faculty motivations for experimenting with Poll Everywhere have included ease of use, available features, interest in active teaching methods, simplifying equipment management and concerns over the cost implications of asking students to purchase individual clickers. Duke Digital Initiative has supported these experiments through CIT pedagogical consulting and through the purchase of Poll Everywhere licenses for interested faculty for four semesters (*Table 2, right*). In some cases, faculty used Poll Everywhere extensively; in others, the instructor chose not to use polling after an initial trial. In addition to course experiments, the FroshLife film festival has used Poll Everywhere to tally audience votes.

Classroom uses of Poll Everywhere

- **Spurring class discussion** using multiple choice question prompts or opinion polls and displaying aggregate results
- **Assessing student understanding** using in-class quizzing to gauge student understanding
- **Promoting active participation** by engaging students and avoiding passive classroom environments
- **Surveying students anonymously** to enable students to weigh in on controversial subjects

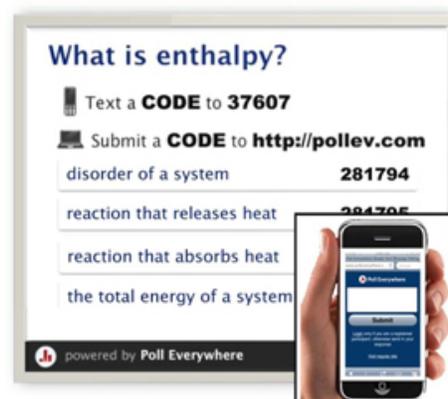


Table 2. DDI supported Poll Everywhere courses, 2010-2012

Semester	Course ²	Enrolled students
Fall 2010	Cultural Anthropology 144	34
	Psychology 11	276
	Psychology 11	257
	Psychology 11	96
	Psychology 101	64
Spring 2011	Biology 102	246
	Psychology 11	166
	Psychology 11	250
	Psychology 165	4
Fall 2011	Chemistry 32	39
	Psychology 11	205
	Psychology 11	203
	Psychology 101	52
Spring 2012	Psychology 11	59
	Psychology 11	199
	ECE 282	35
	Soc 140/Ethics 174	39
Summer 2012	Biology 101	51

¹ Derek Bruff has adopted the industry term BYOD to refer to device-agnostic models of classroom polling ([Agile Learning](#))

² Courses which requested and were approved for DDI funds for a Poll Everywhere license are listed. Licenses are not required for fewer than 30-40 respondents; this free account usage is not tracked by CIT. In addition, at least three other Duke courses not listed here are known to have obtained Poll Everywhere licenses with funding from non-DDI sources.

Based on usage of Poll Everywhere at Duke and the experiences of faculty and students, a number of benefits and drawbacks have been identified that are generally applicable to the use of interactive classroom polling (Table 3).

Table 3. Advantages and drawbacks to BYOD web-based classroom polling

Advantages	Drawbacks
<ul style="list-style-type: none"> • Can be used with distant as well as face-to-face students • Works from the web – no software required • Unlike clickers, does not require a USB RF receiver and allows faculty to use a tablet rather than a laptop for presentation • Typically easier to use for both faculty and students • Doesn't require faculty or IT staff to manage devices (when pools are used) • Students can use an existing device they own and do not need to purchase a clicker 	<ul style="list-style-type: none"> • Students need to have a personal networked device with them to respond with them (phones, tablet or laptop) • Requires sufficient wireless internet access and/or cellular signal in the classroom • Cost for licenses or accounts (although generally lower than purchasing clickers for a single course) • Potential for student distraction using personal device • Potential student costs for text messaging (depends on device usage and plan) • Tracking student responses may require more setup and faculty time

Future directions

The growing availability of tablets and new apps are introducing new capabilities. Future directions that might be explored include:

- New hybrid approaches combine traditional clickers with web-based polling to enable faculty to allow students to use either type of device and combine the results.
- A new tool called Learning Catalytics enables not only multiple choice and open-ended questions but also numeric, algebraic, text or graphical responses from student web-enabled devices (laptops, smart phones or tablets). In addition, this tool can integrate information about students' physical location in the classroom to support peer instruction pedagogies.
- LectureTools is a web-based clicker-like system which combines polling with PowerPoint annotation, student ratings, the ability for students to submit anonymous student questions during the lecture, and lecture capture.
- A variety of classroom polling apps are available for iPads and Android devices. One example is Nearpod, which allows for classroom interaction (requires iPads).

From iPods to iPads: Duke's multimedia equipment pool

From 2008-2011, a multimedia equipment pool managed by the Link service desk grew in both size and popularity. This diverse and popular resource contains over 1100 individual items available for loan including iPads, various types of video cameras, iPods, web cameras, headsets, USB speaker phones and tripods. The equipment in this pool is used by thousands of faculty, students and staff in the Duke community every year. This pool has become a cost-effective means of supporting the growing popularity of multimedia projects across many departments and campus groups as well as independent student projects.

In 2012, the usage of this equipment pool began to decline slightly for the first time. (Figure 5, top right). The primary factor in this decline is a decrease in the number of loans of handheld Flip cameras (which currently represent the largest number of devices in this equipment pool, about 350 devices). Although the number of iPad loans increased, loans of Flip cameras declined from nearly 1900 loans in 2010-11 to just over 1500 loans in 2011-12 (Figure 6, right). The increasing availability of video capture technology to students through handheld devices is the most likely cause of this decline.

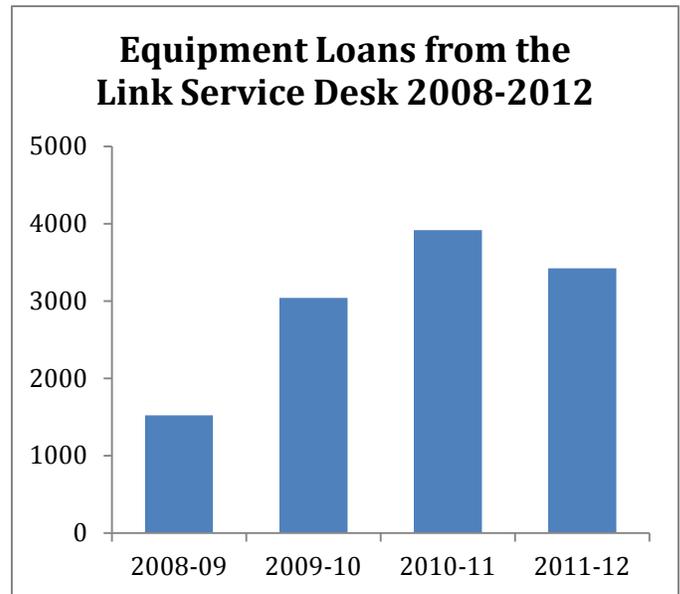


Figure 5.

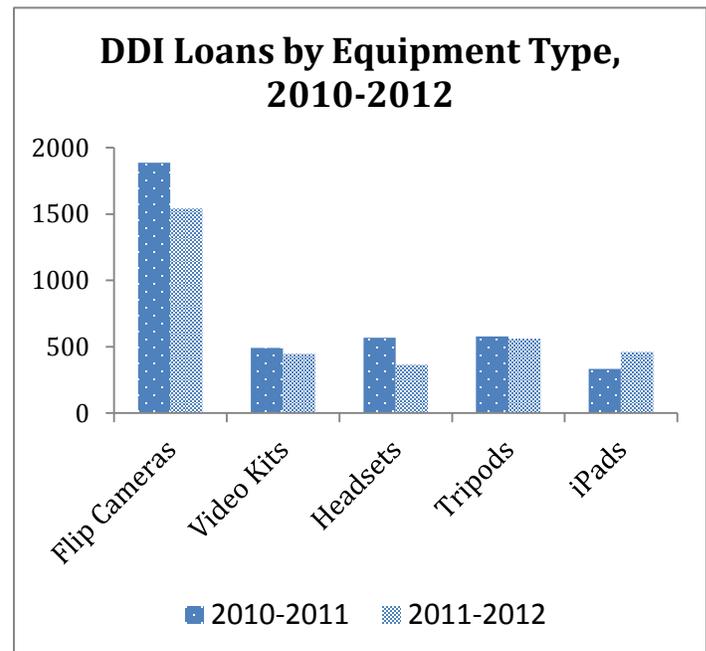


Figure 6.



WordPress at Duke: From DDI pilot to enterprise campus service

The WordPress flexible web publishing platform, first piloted with DDI support in 2009 with about 40 sites and under 300 users, is now an enterprise service supported by CIT and OIT that hosts nearly 3,000 sites built by over 9,000 members of the Duke community.

Although initially popular as a blogging tool, WordPress captured the interest of faculty and instructional technologists with its potential as a social web publishing platform to empower faculty and students interested in moving from consumers of web content to publishers and collaborators.

A variety of factors including general excitement over the potential of social media, early experiments by individual faculty and courses with blogs, and a 2009 visit by Jim Groom from the University of Mary Washington as the [CIT Showcase Plenary Speaker](#) led to a DDI-sponsored WordPress pilot in 2009 with WordPress. The success of a small pilot in Fall 2009 led to expanded use during Spring 2010. During summer 2010, OIT and CIT staff collaborated behind the scenes to transition WordPress from a Duke Digital Initiative pilot project to a production service for academic use. By Fall 2010, WordPress was broadly available, with an emphasis on support for course use. During that academic year, the recommendations from its Duke Digital Initiative pilot phase were fully implemented, and WordPress became available to individuals and groups to create sites for a variety of projects and purposes. During that year, a governance model to guide the evolution of the service was also implemented, as well as a user support model.

At the Duke WordPress site, this [roadmap of WordPress at Duke](#) outlines key milestones in its evolution

As of June 2012, Duke WordPress was home to 2,932 sites created by 9,116 users. These sites support courses, projects and other uses for faculty, students and staff in all parts of campus. Examples of some high traffic sites during the March 2011-June 2012 period are listed below to illustrate the variety of web publishing needs that WordPress meets for the Duke community.

- A soccer politics blog developed from Laurent DuBois's Fall 2009 "World Cup and World Politics" Cultural Anthropology course, one of the original DDI pilot WordPress sites ([Soccer Politics/The Politics of Football](#))
- A Summer 2012 public administration research methods course jointly organized by Duke and Shanghai University
- [Teaching \(and learning\) with Google Earth](#), a site showcasing student work done in Dr. Christine Erlen's Spring 2011 writing course "The View from Above: Google Earth's Impact"
- An Environmental Ecology/NSOE student course project site from spring 2011 entitled, "[Mitigators of Coral Reef Bleaching](#)"
- [Linux@Duke](#), a community site for IT staff to share information and resources
- Duke Behavioral Sciences and Psychiatry [department blog](#)
- [Duke Research](#), a companion to the Duke Research news site
- [The Duke Sakai support site](#)

Index of embedded URLs for print readers

iPad Explorations

- Honors Chemistry Without Lectures or Text
<http://cit.duke.edu/blog/2012/04/honors-chemistry-without-lectures-or-text-how-did-it-go/>
- iPad Use Explored in Fall 2011 Marketing and Management Course
<http://cit.duke.edu/blog/2012/02/linipadf11/>
- Using the iPad to bring Language Pedagogy and Cultural Contexts Together
http://cit.duke.edu/blog/2011/12/ipad_turkish_s2012/
- Using iPads to Explore the Role of Digital Media in Theater Creation, Study, and Teaching
http://cit.duke.edu/blog/2011/12/ipad_theater_s2012
- iPads in an Advanced Writing Workshop
<http://cit.duke.edu/blog/2012/01/ipads-in-an-advanced-writing-workshop/>
- Documentary Writing, Fall 2011: The iPad as a Creative Tool
<http://cit.duke.edu/blog/2012/01/docwrf11/>
- Doctor of Physical Therapy program explored using iPads in clinical teaching
<http://cit.duke.edu/blog/2012/01/dpt-ipads/>
- Enhancing the Clinical Experience with iPads
<http://cit.duke.edu/blog/2012/01/ipadnursingf11/>
- iPad Course Loaner Program for 2012-13
<http://cit.duke.edu/home-2012/ipad/>

3d Explorations

- iPad 3d app demonstration video
<http://www.youtube.com/watch?v=bBQQEcFkHoE>

Wordpress at Duke

- CIT Showcase 2009 Keynote by Jim Groom
<http://cit.duke.edu/showcase/2009/keynote/index.html>
- Duke Wordpress Roadmap
<http://sites.duke.edu/about/roadmap/>
- Soccer Politics/ The Politics of Football
<http://sites.duke.edu/wcwp/>
- Teaching (and Learning) with Google Earth
<http://sites.duke.edu/tlqe/>
- Mitigators of Coral Reef Bleaching
http://sites.duke.edu/environ181s_01_s2011_alq22/home/
- Linux@Duke
<http://sites.duke.edu/linux/>
- Duke Behavioral Sciences and Psychiatry blog
<http://sites.duke.edu/dukepsychiatry>
- Duke Research
<https://sites.duke.edu/dukeresearch>
- The Duke Sakai Support Site
<http://support.sakai.duke.edu/>