

# Empowering Students and Instructors: Reflections on the Effectiveness of iPads for Teaching and Learning

Anastasia S. Morrone, PhD, Associate Dean, Learning Technologies,  
Indiana University-Purdue University Indianapolis

John Gosney, Faculty Liaison, Learning Technologies,  
Indiana University-Purdue University Indianapolis

Sarah Engel, Communications Specialist, Indiana University Bloomington

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- » **A faculty learning community is an excellent means of testing the usefulness of iPads in teaching and learning.**
  - » **iPads were found to increase student engagement by providing innovative and creative learning environments, despite the effort required—of both students and instructors—to make adjustments to the technology.**
  - » **Successful iPad initiatives depend on effective, scalable support models for both pedagogical and logistical support.**
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At the dawn of the personal computer, it was unclear what the device would mean for teaching, learning, and personal productivity. We are seeing a similar dynamic with the rise of devices like the Apple iPad. These tablets call for purposeful experimentation to see how mobile technology might be used in teaching and learning and in updating established educational models to engage today's students. In this ELI Brief, we describe the findings from three Indiana University (IU) faculty learning communities that spent the 2010–2011 academic year studying the effectiveness of iPads for teaching and learning.

## Faculty Learning Communities at IU

The primary goal of a faculty learning community (FLC) is to explore a specific topic area or theme as it relates to best practices in teaching and learning. This goal is achieved by providing safe, supportive communities wherein members can engage in research, scholarship of teaching and learning, and service to explore new approaches to teaching. In fall 2010, one interdisciplinary FLC convened on the Indiana University Bloomington (IUB) campus, and two FLCs convened on the Indiana University-Purdue University Indianapolis (IUPUI) campus; the first consisted of faculty from various schools and departments, while the second comprised faculty from various healthcare

disciplines and the IU School of Medicine (IUSM). (For a timeline of the project, go to <http://www.iupui.edu/~jgt1/iPadFLC/implementation.jpg>.) These FLCs focused on how the iPad can:

- Promote student engagement in the classroom, the lab, or the field
- Assist small-group idea creation and sharing, as well as search, analysis, and representation
- Provide access to and manipulation of digital content, including e-books

As FLC members developed ideas for utilizing the iPad inside (and outside) the classroom, providing opportunities for students to explore the device became essential. (For information about the program, including abstracts for individual projects, go to <http://uits.iu.edu/page/azxr>.) To help facilitate class experiments, iPad “kits” (one per campus) were made available for shared use by FLC members. These kits consisted of 25 32GB Wi-Fi iPads (the same configuration as the iPads given to each FLC member) scheduled for classroom use by each FLC member, typically for two or three concurrent class sessions. (See the sidebar for details on the FLC Support Model.)

Each iPad kit was configured with a base set of apps that offer general utility regardless

## The FLC Support Model

The IUB and IUPUI centers for teaching and learning and the IUSM Office of Information Services and Technology Management provided scheduling and support and configured the iPad kits with various apps requested by FLC members based on their respective teaching goals.

Managing iPads in a shared context presented challenges from both user and administrative perspectives. While sharing the iPad kits alleviated a potentially risky investment in new technology (purchasing individual iPads for every student), it also meant kit sharing by multiple students in different courses. To ensure student work did not persist between users, teaching center consultants factory reset and reloaded every iPad after each use, returning each device to its original, out-of-the-box state. This is currently a manual process that requires handling each iPad and takes approximately 1.5 hours per kit.

As IUPUI IT consultant Ron Alcasid concludes, “While this solution is manageable within the scope of the FLCs, should the iPads see wider use, we might consider investigating enterprise mobile device management solutions such as MobileIron to reduce turnaround time between each use.”

of the context in which they were used. The set differs on each campus, but generally includes a selection of the following:

- AirSketch (for presentations, whiteboard sketches, and annotation)
- GoodReader (a PDF reader and annotator that includes sync capabilities)
- Dropbox (for syncing and sharing files online and across computers)
- Groupboard (a collaborative whiteboard for drawing and chatting in real time)
- Whiteboard Free (for sketching and sharing pictures, ideas, and other visuals)
- Keynote (a presentation tool, complete with animated charts and transitions)
- Twitter (for reading, sending, re-tweeting, and quoting tweets)
- Adobe Ideas (a digital sketchbook)

Focusing on the collaborative nature of the FLCs, education professor Joshua Danish described the experience as a chance “to explore the potential of the iPad in meaningful ways, to experiment with multiple apps, gather feedback from peers, and generally pilot these ideas with less of a resource burden than had I been doing this individually.” As one IU FLC member noted, the FLC was “an excellent opportunity to collectively explore the potential of the iPad in small-scale, resourced pilots.”

## Major FLC Findings: A Personal Device Used in a Collaborative Fashion

The IU research highlighted several key benefits of iPads, as well as some notable challenges. Among the benefits were greater levels of student engagement and collaboration, opportunities to cultivate new kinds of learning environments and activities, and the ability to extend learning opportunities outside the classroom, which is particularly advantageous for the health sciences. The challenges included having to learn to use the new tools and ensuring activities were appropriate for the functionality the iPads provide.

Perhaps the most significant finding from the FLCs had to do with taking a device designed for personal use and “sharing” it among instructors (i.e., FLC members) and students via the iPad kits. As fine arts professor Leslie Sharpe reflected, the iPad has a tendency to lead to opportunities for professors and students to learn alongside and from one another, given that “early adoption of new media for any use requires a sharing community of learners and an open and inquiring mind as to what kind of creative experience can result from emerging technologies.”

## FLC Findings: Benefits

### 1. Enhance Student Interest and Creative Exploration

For FLC members, the iPads have created teaching opportunities to “move important learning activity, historically perceived and experienced by students as tedious, to more enjoyable [experiences],” as noted by one instructor. For students, the hands-on activities and discussions facilitated by the iPads make learning “more fun and change around the usual [didactic structure of the typical lecture-based classroom] by add[ing] an element of creativity that has been lacking,” according to another faculty member. The importance of this change cannot be overstated, as a learner’s interest in learning tasks often relates to engagement and motivation.

Students interested in learning tasks also tend to spend more time and effort on them. A fine arts professor observed that students “who research what is possible on the media, rather than just expecting it to behave like media they already know, fare better and challenge themselves more.” In fact, instructors who incorporate time for students to experiment independently with iPad functionality and who then structure activities around the use of the iPad find that students are “very engaged and quickly start identifying ways to use the iPad,”

noted a tourism management instructor. Essentially, more experience leads to more confidence, a more realistic sense of what can be done, and more creative outcomes.

Across the board, FLC members reported that the iPads create a collective sense of fun and exploration. In addition, some students became so intrigued and excited by an application's potential that they completed outside, unassigned learning activities independently and voluntarily, letting the technology guide them deeper into the subject matter.

## 2. Facilitate the Creation of Innovative and Effective Learning Environments

In the classroom, the iPad helps forge closer connections between student and professor—unlike other technologies, such as PowerPoint and other lecture aids, the iPad does not tie a professor to the lecture podium. Instead, it promotes movement, circulation, and close-up interactions. As one biology professor pointed out, iPads have the capacity to “bridge the gap between student and instructor, creating more active discussions and more thoughtful reflection.”

A geological sciences faculty member found that this enhanced atmosphere also extends to the lab, as noted by student survey responses:

- “I enjoyed using a different medium of technology. If nothing else, including the iPad made everyone more excited, in a better mood, and more revved up to complete the lab.”
- “It was very helpful and made the labs more interesting. This allowed me to stay focused throughout the lab.”

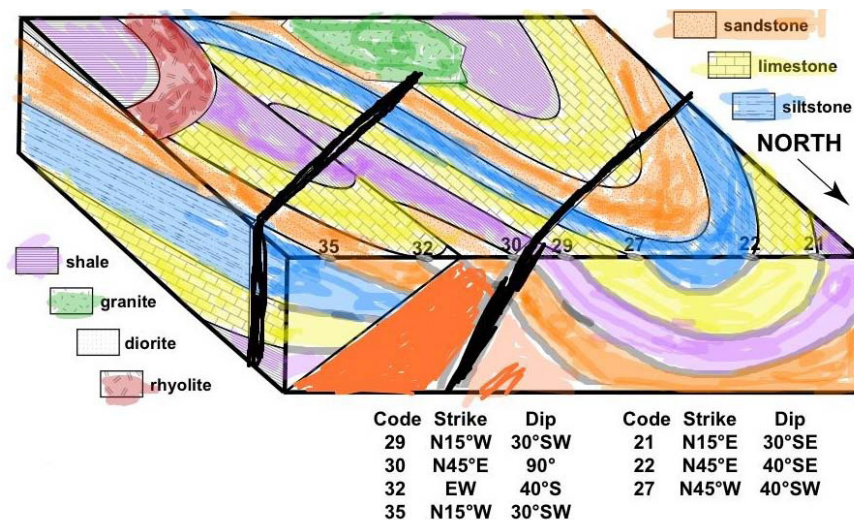
Figure 1 shows an example of a geological map students created using iPads.

## 3. Facilitate Visual Representations and Active Learning

Why is the iPad so engaging? In large part, its form and “cool factor” have the ability to draw people together. Also, by promoting active learning, the iPad helps students feel more confident in their learning after participating in technology-driven activities.

In some ways, it might simply be “easier for students to huddle around the screen or pass iPads back and forth in ways that are not easy to do with a laptop,” said an education professor.

**Figure 1. Geological Map Compiled by Students**



Source: Dr. Simon C. Brassell, Professor of Geological Sciences at Indiana University Bloomington

However, the iPad's appeal extends beyond the elimination of physical barriers, creating classrooms that are more communal and visual in emphasis and that deliver enhanced capacities for collaborative work.

A fine arts professor found that part of that emphasis stems from the fact that “asking students to do more work in class and in teams fosters a collaborative, active, and sharing environment for learning.” An earth sciences lecturer noted, “Students appear more engaged than in typical lecture sessions, are more willing to work with neighbors, and [overall] seem more inquisitive during the iPad sessions on course topics.” During their first iPad session, her students formed groups and used the iPads to explore three specific sites on U.S. coastlines, using tools on the iPad to pinpoint the sites, connect to tidal data, and describe the coast of at least one site. For the second session, the groups reviewed tidal data using the TideGraph HD app and explored coastal features using the Google Earth app.

This connectedness also stems from flexible reading and writing interfaces, adaptable text and image interfaces, and the speedy online delivery of research materials. Faced with convenient but unfamiliar technology, students become more discussion-oriented and focused on sharing feedback. Similarly, researchers and students in the field are able to create a virtual shared workspace, and, no longer confined to isolated locations, they benefit from iPad-driven collaboration and competition with one another, not to mention more reliable and immediate capture of disparate data.

Several existing iPad apps—such as iThoughts, Mindmash, iBrainstorm, and Popplet—facilitate the creation of a record of what has been said and when, using the iPad’s portability and flexibility for discussion classes (Figure 2 shows an example of iThoughts in action). For students who spend a good bit of time texting, blogging, and providing and consuming updates

of pace with the preferred learning styles of twenty-first century students.

#### 4. Provide Access to and Manipulation of Digital Content, Including Open E-Textbook Content

As one education professor said, the iPad presents a “simple interface and ability to easily draw, label, and manipulate images with little effort.” It is relatively straightforward for students to perform tasks such as drawing connections between concepts, connecting concepts through association with literature, and highlighting known and unknown factors (see Figure 3 for an example of a concept-mapping exercise). Moreover, as several FLC members have realized, this process leads to comprehensive, integrated, and insightful commentary—in other words, work at a higher level than students have achieved in prior years.

An English professor noted, “Having full web connectivity, iPads also have full access to vast quantities of historic literature...scanned or rendered into e-text formats. What is more, they also have capabilities for writing and annotating (using GoodReader, or iAnnotate) that smaller readers do not have.”

Especially for those who do fieldwork, this ability to access digital reference materials anytime, anywhere on an iPad is a significant draw. “I have about 200 books archived on my iPad, including some fairly obscure and expensive scholarly tomes that are useful in a field setting, but that ordinarily I would not lug into the field or endanger my investment in a tropical setting,” said an anthropology professor.

#### 5. Deliver Practical Applications Inside and Outside the Classroom

Unlike laptops, iPads are lighter and less susceptible to inevitable aspects of field and clinical work, such as moisture, dirt, and gravity. iPad use can also help with situational transitions, helping “students transfer the information from lecture into a realistic simulated work situation” and moving “students from passive learners in a traditional lecture method to active learners in the laboratory and subsequent clinical setting” (Figure 4 shows an example of Groupboard).

Additionally, iPads deliver a simplified means of collating documentary field data such as

**“Accidents and experiments can lead to unanticipated results and new ways of thinking—jumping into the deep end of new media usually leads to swimming in new creative waters just as one thinks they are sinking.”**

—Leslie Sharpe, Fine Arts

on Facebook and Twitter, this more closely mirrors how they communicate outside class. Importantly, it also translates into a more visual experience, which makes it easier to follow what is going on.

This visual experience presents a tool for hands-on activities in the classroom and an understanding of spatial concepts, such as features of coastlines or tidal patterns. Additionally, conventional approaches to teaching and learning may appear to be out

Figure 2. Screenshot of iThoughtsHD



Source: iThoughtsHD (<http://www.ithoughts.co.uk/iThoughtsHD/Gallery.html>). © CMS 2011

preliminary analyses, notes, maps, plans, and photos. This has two significant benefits: 1) the more reliable and immediate capture of disparate data and 2) an ability to turn one's focus from monitoring, processing, and curating field data to providing direct assessments.

Apps such as Live Notes provide “a mobile, easy to use, recording feature [for] office-based client interviews or home visits. The app has a feature that allows for “bookmarking” segments of the interview, so [you] can easily locate particular segments for analysis.”

### 6. Tremendous Potential for the Health Sciences

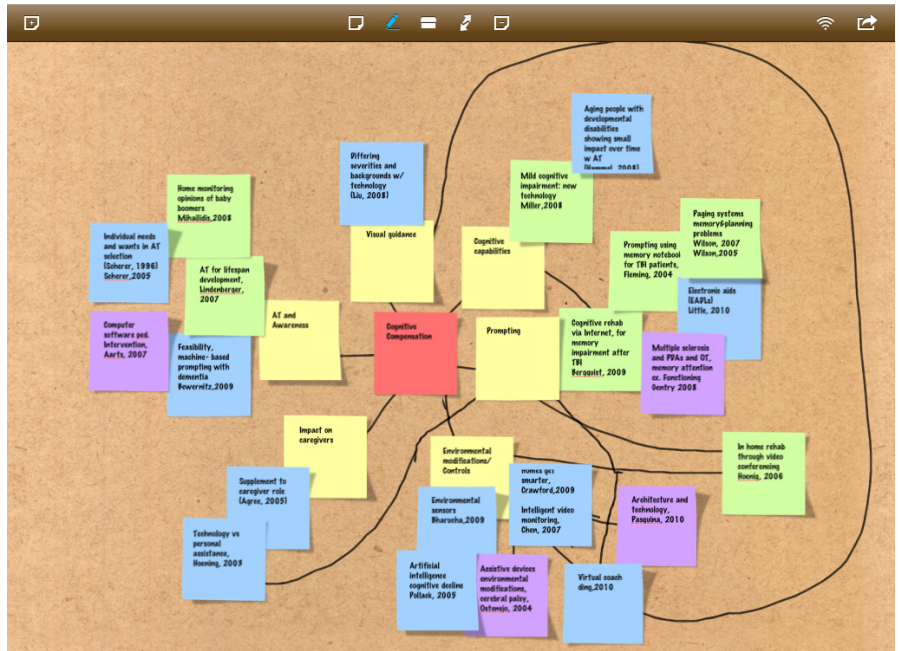
Health professionals—doctors, residents, and trainees alike—require on-demand access to critical information. Depending on the user's specialty or area of study, that information takes different forms. Physicians, in both inpatient and outpatient settings, need to educate and counsel patients about their illnesses.

A professor of clinical medicine found that “the iPad allows resident learners to educate patients by showing them video vignettes of key health topics along with their usual counseling; these vignettes demonstrate the use of patient-friendly language and can also teach the residents themselves.”

For those treating at-risk patients such as adolescents with psychiatric and substance-use disorders, gathering complex information and tabulating it quickly is key to providing motivational feedback and changing a patient's outlook. As a psychiatry professor explained, “The iPad enables trainees to collect drug use patterns in the session with the adolescent using a document that automatically tabulates and compares data to local and national norms. Motivational feedback can be provided immediately.”

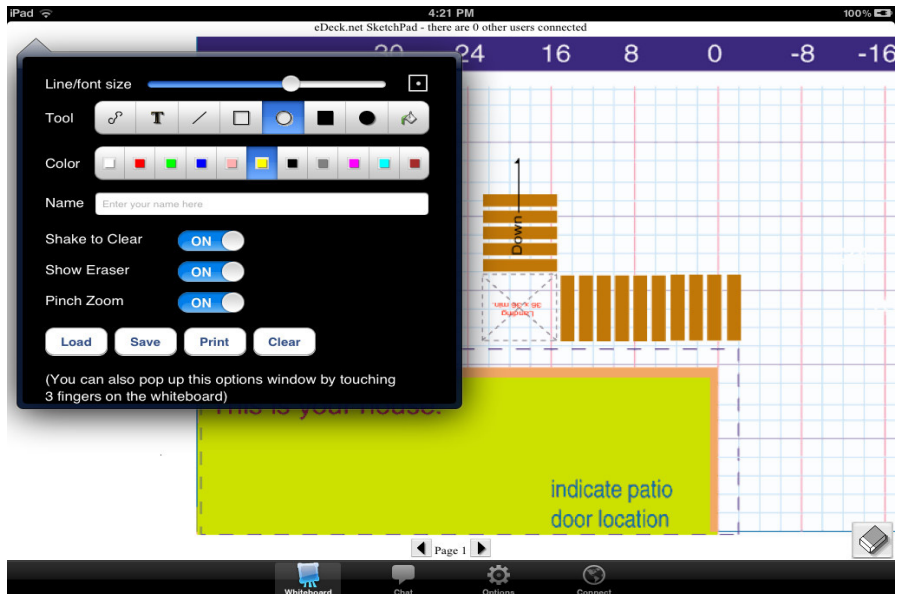
Likewise, for those in training, access to low-risk, hands-on experience makes a considerable difference. For instance, radiography

Figure 3. Concept-Mapping Exercise



Source: Dr. Patricia J. Scott, Associate Professor of Occupational Therapy at Indiana University-Purdue University Indianapolis

Figure 4. Screenshot of Groupboard



Source: iFreeware.net (<http://www.ifreeware.net/download-grouboard.html>). Mobile Network LLC 2012

students often feel anxious and overwhelmed by the complex technical knowledge necessary to successfully x-ray patients. Previous training has included structured lecture formats with visual PowerPoint presentations and game activities. On the other hand, “the iPad enables radiography students to participate in collaborative and comprehensive lab experiments while

promoting critical thinking,” which in turn helps students “transfer the information from lecture into a realistic simulated work situation.”

## FLC Findings: Challenges

### 1. Increases the Student Learning Curve

With their digital lifestyles and constant connectedness, today’s students seem as if mobile devices such as iPads would not intimidate them; however, this may not always be true, even for tech-savvy students. As one student put it, “It’s an easy technology to follow if you have an iPhone or iPod touch.” However, without that experience or the benefit of another student who can share their knowledge, students can easily become overwhelmed by the required technical skills and concerned about their ability to meet expectations. A social work professor noted, “I certainly learned some things along the way in terms of implementation and the anxiety that can occur when students move to using new, unfamiliar technology.”

Time is also a key factor. iPad-driven activities can take more time and require students to familiarize themselves with the device. As FLC members can attest, unfamiliarity can quickly lead to frustration and an unwillingness to further explore the capabilities of the technology. As one student stated, “I’ll be honest, I have no idea how to use an iPad. I found the experience to be frustrating and time consuming ... [I’m not convinced it assisted my learning].”

### 2. Increases the Burden on Instructors

FLC members found that using the iPad in teaching and learning contexts undeniably requires advanced planning and greater time commitments upfront and throughout student iPad explorations. In many cases, it also requires more hands-on assistance. Admittedly, many of these issues arise because, rather than using the iPad as a personal device, FLC members are trying to use it in a collaborative fashion.

To avoid iPad technical glitches, instructors reported it necessary to test the iPad in its intended setting, setting up Wi-Fi on every student iPad, connecting to IU’s Sakai-based learning management system (the Oncourse collaboration and learning environment) in advance, and carefully constructing elements to avoid disruptions such as conversion issues that arise when one attempts to use an iPad app in combination with outside software. In the classroom, FLC members also found that students expect more device-specific instruction and hands-on demonstration. Likewise,

outside class, they find students want more face-to-face time with the instructor and the iPads due to the learning curve.

E-mail access has also been a bit of a stumbling block, as students attempt to connect to a multitude of Internet service providers. One professor offered this creative solution: “Prior to the activity, I set up a course-specific Gmail account and ask that it be added to each iPad as the default e-mail account. As a consequence, the students do not need to use their personal accounts on a shared device, and everyone gets exactly the same set of instructions.” Taking a long-term, expansionary view, an IUPUI IT consultant also noted, “An enterprise mobile device management solution could eliminate the need for users to perform networking and e-mail tasks, so they can get on with classroom work.”

This need to test in relevant spaces, both physical and online, has as much to do with having time to derive new instructional approaches as it does with learning to anticipate the bugs that often appear when any new technology is introduced. FLC members also quickly realized that being able to connect to wireless was not a given, as connections could prove spotty or too slow. Likewise, apps themselves sometimes include glitches and require careful progression through exercises or a willingness to try out another app for the same purpose.

Ultimately, when requiring iPads for class activities, instructors need to adapt quickly—particularly in light of issues with connectivity or apps—and have backup plans ready to deal with both disruptions and distractions. As the university librarian conceded, “Largely, students [are] on task and focused on the work, but when they [are] done with the activity, they start to check e-mail and play with apps.” Of course, that might not always be detrimental if it increases their familiarity with the device and offers them chances to explore and learn about new apps. Furthermore, most students believe that in many cases their laptops or notebooks are just as good as iPads. In a sense, students expect instructors to walk them through how new media delivers demonstrable improvements over previous methods.

### 3. Provides Less Functionality (but More Promise) Than Laptops

Students are not the only ones questioning whether iPads will prove to be suitable laptop replacements. One professor admitted, “While I am excited about the future potential of the iPad, I have yet to identify an activity that would not be similarly successful using student

laptops, the laptop cart, or other readily available tools with fewer challenges.” Table 1 summarizes key concerns of FLC members and students about the iPad functionality.

### FLC Member Conclusions

As with any new technology, there are obstacles. Given the release of the iPad2 (which includes new functionality such as front- and rear-facing cameras) and emerging competition from other mobile tablet manufacturers, FLC members anticipate a gradual lowering of current barriers. Technical issues will be resolved as the technology improves; familiarity issues will disappear as students become more comfortable with the technology; and productivity issues will diminish as new and better apps are developed and/or identified.

As one iPad FLC member noted, we cannot overstate the need to “live with the iPad, to take it home, to play with it, and to become familiar with how it works and how the apps work so that in the classroom it quickly becomes a learning tool rather than the focus of the class session.” Along with better apps, better documentation for apps, and better organization of the iTunes Apps Store, pervasive connectivity—free from wireless idiosyncrasies and network latencies—is also a must (and 3G and 4G are desirable). In fact, the 3/4G-configured iPad2 approaches, if not exceeds, a well-configured laptop. Other desirable “extras” include styluses, screen cleaning cloths, Bluetooth keyboards, and an iPad charging station/cart.

Pervasive teaching and learning with the iPad requires a scalable support model. The eight-member FLCs have relied heavily on the IUB Center for Innovative Teaching and Learning, the IUPUI Center for Teaching and Learning, and the IUSM Office of Information Services and Technology Management. The question remains how an institution can provide

**Table 1. Concerns about iPad Functionality**

iPad Concern	Comment from FLC Members/Students
Touchscreen interface	I could not imagine composing papers or conducting extensive research on the iPad. The interface and keyboard would slow me down significantly during writing and research.
Require as much care as laptops	While iPads are more portable, they require as much care as laptops—students are not willing to just toss them in a book bag like they would a less expensive, less theft-worthy learning tool.
Problems connecting to the web	Student enthusiasm wanes—and often plummets—when connection issues arise. An earth sciences lecturer noted that this made all the difference between a successful first iPad session, marked by student enthusiasm, and an unsuccessful second iPad session, marked by student frustration.
Straightforward on laptop... not so on the iPad	FLC members and their students specifically mentioned saving and sending procedures, e-mailing and posting documents, and exporting and uploading files. As a geological sciences student concluded, “They were just a little difficult to operate, especially since everything we used them for could have been done manually or with other tools.”

sufficient, effective, and efficient support—the perennial question with all new technologies.

While many activities described in this paper could be accomplished with more traditional technology, or even no technology at all, both students and iPad FLC members have been energized by the challenges and the possibilities that teaching and learning with iPads presented. Interestingly, the ultimate FLC takeaway comes back to using the iPad not as an individual, media-consuming device but rather as a collaborative device that has the potential to foster deeper learning and engagement and increase motivation. “The iPad has allowed us to experiment with novel, but realistic, modalities to improve the education of our students.”

Today’s students learn best when they have the opportunity to work directly with data, can harness the power of representations, make connections of all kinds, and collaborate with each other and the instructor—and the iPad encourages that across-the-board connectedness. For IUPUI health sciences FLC members in particular, iPads present opportunities for on-demand feedback and real-world applications, for more informed decisions and a higher quality of care.

The EDUCAUSE Learning Initiative (ELI) is where teaching and learning professionals come to learn, lead, collaborate, and share in the context of an international forum. Members benefit from the expansive emerging technology research and development that takes place collaboratively across institutions. To learn more about ELI, visit [educause.edu/eli](http://educause.edu/eli).