ED TECH TRENDS TO WATCH IN 2017

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Judging by the interests of Campus Technology readers, 2016 was a year defined by innovation and change. As new learning models threatened to dismantle traditional higher education, colleges and universities looked for ways to better serve students: new learning spaces, more engaging learning materials, lower-cost textbooks and more. All the while, IT leaders monitored the ed tech trends and challenges that would impact teaching and learning throughout the year. Here are the CT stories our readers turned to most in the last year.

1) 9 Ed Tech Trends to Watch in 2016
We asked four technology and innovation experts to discuss the hottest trends in higher ed tech. They obliged, opining on everything from accessibility and competency-based education to wearables and virtual reality. (Don’t miss this year’s watchlist on page 20.)

2) Top 10 Education Technologies That Will Be Dead and Gone in the Next Decade
In our 2016 Teaching with Technology survey, faculty members offered their predictions on what the future holds for technology in teaching — including what hardware and software will bite the dust.

3) Research: College Students More Distracted Than Ever
According to a study published in the Journal of Media Education, students tend to check their digital devices an average of 11.43 times during class for non-classroom activities. The most prevalent form of distraction: texting.

4) 7 Things Higher Education Innovators Want You to Know
We shared insights from a panel of higher ed leaders grappling with the challenges of student success. Top themes from their discussion included data analytics, digital learning content and college affordability.

5) 10 Tools for More Interactive Videos
Part of our “Faculty Innovation Toolkit” in our June issue, this story offered 10 apps to help make lecture videos more engaging for students.

6) The Price Is Still Right: 15 Sites for Free Digital Textbooks
CT first amassed the top sources for free digital textbooks in 2013. Here, we collected an updated roster of resources that offer quality learning content without a high price tag.

7) 6 Major Barriers Impeding Technology Adoption in Education
In our annual analysis of the New Media Consortium’s Horizon Report, we looked at the most substantial tech-related obstacles to education.

8) Will Unbundling Kill Higher Ed as We Know It?
We talked with Ryan Craig, founding managing director of private equity fund University Ventures, about how the unbundling of traditional degrees could destroy all but a handful of colleges and universities.

9) How to Go Textbook Free
The University of Maryland University College no longer expects any undergraduate to spend money on textbooks. The conservative estimate of student savings is somewhere north of $10 million per year. Here’s how UMUC achieved an amazing goal.

10) Designing Learning Spaces for Innovation
How do you go about creating a space to support collaboration, creative problem-solving and innovation? Here, two universities shared their experiences. CT
LITERACY AND LIBRARIES. Nearly all librarians (97 percent) believe information literacy contributes to workforce success and more than four in five (83 percent) say it affects college graduation rates, yet 44 percent think their library does not support information literacy as much as it should, according to a recent survey from ProQuest. The company polled more than 200 librarians from university, community college, high school and public libraries. Among the findings: Only 21 percent of librarians surveyed said their users recognize information literacy’s effect on lifelong success, and 91 percent said they rely on one-on-one in-person consultations to reinforce literacy skills. Read the full story online.

SMARTPHONES UP. Consumer smartphone sales will rebound this year after hitting a three-year low in 2016, according to an Accenture survey of 26,000 consumers in 26 different countries. Increased shipments will be pushed by device refresh schedules, better security, improved performance and new features, according to the report. Demand for wearables such as smartwatches and fitness trackers, however, will remain sluggish owing to high prices and concerns about privacy and security around personal data. Read the full story online.

AR/VR TRAINING. Lehman College, a liberal arts college that is part of the City University of New York (CUNY) system, unveiled plans to build a training facility for virtual/augmented reality skills. As part of the college’s School of Continuing and Professional Studies, the Interactive Digital Center will “support the training of new VR and AR professionals as well as support the development of VR and AR applications that will assist in teaching Lehman’s students,” according to a prepared statement. Lehman partnered with EON Reality, a VR services company, to build the new center on its satellite campus CUNY on the Concourse. Read the full story online.

A CRACKDOWN ON CODING. Arguing that coding bootcamps are poorly regulated and have skirted state oversight for years, the Texas Workforce Commission is cracking down on the popular alternatives to brick-and-mortar institutions. It has sent letters to a handful of organizations like DevMountain and Austin Coding Academy, informing them that they are operating without proper certification, in violation of Texas law. Read the full story online.

IOT MARKET GROWTH. A forecast from International Data Corp. estimates that the total worldwide spending on the Internet of Things (IoT) will reach $1.29 trillion in 2021.
trillion by 2020. According to the market research firm’s Worldwide Semiannual Internet of Things Spending Guide, that represents a compound annual growth rate of 15.6 percent over the 2015-2020 forecast period. Much of that spend will go toward hardware — the largest spending category throughout the forecast, followed by services, software and connectivity, according to IDC. Read the full story online.

MAKING TOGETHER. A four-year project at Pepperdine University (CA) will work to establish a network of 12 makerspace clubs in the United States, Europe and Africa. Led by Eric Hamilton, professor and interim associate dean of education at the university, the effort received a $1.72 million grant from the National Science Foundation’s Advancing Informal STEM Learning program. Student participants in the makerspace clubs will work collaboratively with counterparts from other U.S. and international project sites. The teams will be tasked with “creating digital assets — videos, games, short subject films and computer programs — designed to help their peers learn science and mathematics,” according to a university statement. Read the full story online.

THE WALKING DRUNK. A student team from Worcester Polytechnic Institute (MA) has developed a new mobile app that can detect a person’s blood alcohol content within 90 percent accuracy on average, helping individuals determine whether they are too drunk to drive. The AlcoGait app analyzes a person’s walking pattern before and after consuming alcohol, looking for anomalies that could signal impairment. Users can either check the app or AlcoGait will alert them with a text message when they have exceeded the legal limit. Read the full story online.

IOT RESEARCH. A new center at the University of Southern California aims to apply the real-time data generated by the Internet of Things to teaching and learning. Created through a partnership between the USC Rossier School

PRODUCT ROUNDUP

The HoloLamp portable augmented reality projector can create optical 3D illusions on any surface. Read the full story online.

The HP ProBook x360 11 G1 Education Edition rugged convertible laptop can withstand a drop from approximately 30 inches high, or the average height of student desks. Read the full story online.

E Ink has introduced a 42-inch ePaper display — the largest commercially available active matrix ePaper module. Read the full story online.
of Education and the USC Viterbi School of Engineering, the Center for Human-Applied Reasoning and the Internet of Things, or CHARIOT, “aims to bring education and engineering together in a way that will help educators gather real-time data about how students are learning and how teachers should personalize instruction for each student,” according to the university. At the heart of the research is the idea that the Internet of Things’ network of devices and sensors can help evaluate students’ cognitive engagement and emotions; the resulting data can then be used to provide personalized, just-in-time learning interventions. Read the full story online.

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When Harvard kicked off OpenScholar six years ago, little did it realize the impact the website creation project would have on the university — and the academic world at large.

Gary King, director of Harvard’s (MA) Institute for Quantitative Social Science (IQSS), would get requests from faculty and staff for help to build websites, which would end up costing thousands of dollars — “sort of ridiculous,” he said.

So members of King’s team began studying scholarly websites. What they learned was that the websites were “structurally identical,” even if they did have unique looks. “They all have a CV; they all have a list of classes; they have a list of papers; they have a picture and a bio. They’re all exactly the same,” King explained. Yet every faculty member would want his or her own look and feel, graphic design and URL.

At the same time, he noted, website proposals from outside companies would describe how the project would require building “the entire stack, from the hardware to the operating system to the content management system all the way on up to the graphic design.” And every “slice” in that stack “was identical for everybody.”

That’s when it struck the team: Why not build one system
OPEN SOURCE

that had the same set of website operations for everybody, but would allow each faculty member to overlay a different graphic design like a “veneer”? That approach would allow people to gain their customized looks while saving IQSS a fortune, said King.

When the application was done, IQSS also realized it could work across the whole university, “or pretty much all of academia,” King recalled. And just like that, OpenScholar was made available for free to any Harvard department, center, academic project or group on campus. It has served a diverse array of website needs, such as the university police department, the Harvard-Radcliffe Choruses and the soft robotics toolkit project.

The endeavor has created “well more than $100 million in value” for the university, according to King. And because OpenScholar has been picked up by other institutions too — among them, Princeton (NJ), the University of California, Berkeley, the University of Massachusetts Amherst and the University of Waterloo (Canada) — the value-add just keeps growing.

Keep Track of the Momentum

King’s $100 million estimate of OpenScholar’s value may seem pie-in-the-sky, but he is quite clear about how he calculated that amount.

OpenScholar shares its metrics, which are updated in near real time. If you go to the website home page, you can view continually changing counts of how many sites have been created that day and how many active websites are online in total, among many other numbers. For example, as of Jan. 19, a total of 7,330 websites were fully running on OpenScholar — for free. (That total doesn’t include those sites built and abandoned for the purpose of experimentation.)

King contrasts that with the typical cost of a hiring a third-party firm to build those websites. “Web development firms still come to our door, and they still say, ‘Hey, let’s sell you our services,’ and we still see these proposals for $200,000 or $300,000,” he noted. So the team compiled a list of web development firms pitching to the university and called them to find out their pricing for creating “the least expensive” versions of the websites being developed with OpenScholar. “Then we just multiplied [that] by how many we created ourselves.”

King won’t say that OpenScholar has saved the university that much money, because some of those websites may never have been created in the first place. Still, use of the platform has propagated in unexpected ways. Early in the introduction of OpenScholar, King’s team would work with various faculty members, staff and project coordinators to set up the sites. “We allocated money so we could create 10 sites over the next two months,” he recalled.

What ended up happening was that “various student organizations got together and created the most beautiful sites that were far better than the ones our staff was creating. And they’d do it overnight without speaking to anyone.”

Reach Out for Help

Like many universities, Harvard is highly decentralized. Before OpenScholar launched, numerous departments and projects had set up websites, thereby individually forming the “public face” of the institution in dozens and dozens of guises. The result, according to King, was an ecosystem that was “completely incoherent. You didn’t know when you were on a Harvard website.”

To remedy that, IQSS quickly brought in the Harvard University IT organization, HUIT, as well as the university’s Public Affairs and Communications department, to create a cross-departmental team focused on digital communication, web development and service delivery.

Harvard Web Publishing, as it’s known, now operates OpenScholar and also works with institutional clients to develop or redesign websites. The communications group oversees style standards, such as making sure the distinctive Harvard crimson is coherent across websites. IT figures out the infrastructure aspects, such as where to host the sites, which currently lay claim to about 235 GB of disk space.
Pursue Simplicity (It's Difficult)

OpenScholar provides a collection of default or “pre-set” website structures for different purposes — labs and research groups, projects and centers, administrative departments and so on — that are themselves customizable through “themes” and the use of widgets to define color sets, layout and functionality. The upshot is that people don’t have to know programming to work with OpenScholar. They go in and fill out forms and pick choices from menus. “What you see is what you get, basically,” said King.

But the site also offers a lot of documentation — an almost overwhelming amount, King admitted, suggesting that he’d like the technology “to be like a refrigerator. You plug the dam thing in and you use it.” Then again, he noted, “Your refrigerator is solving a task that is massively simpler than a faculty website.” That means the user has more to learn. “But we’re working really hard on making it so [that] on more and more parts you don’t ever need to go read the documentation.”

“Open” Means Total Transparency

While IQSS still oversees development of OpenScholar, King emphasized that oversight doesn’t equate to control. “It’s not really control,” he said. “We’re all trying to achieve the same thing.”

As an open source project, OpenScholar also needs to accommodate the input and influence of all the other stakeholders, including other universities that have chosen to adopt the application for their own purposes.

Facilitating decision-making and maintaining a reputation for openness takes a two-prong approach. First, OpenScholar tries to “make all of our processes and decisions completely open,” said King. It publishes a publicly available roadmap that shares new features, bug fixes and current initiatives.

Second, it runs a community site that allows people to vote ideas under consideration up or down. Visitors can view the voting of a given item by community member and even drill into a change log to see when and why a given vote may have been changed.

People at outside universities “can’t call us and say, ‘You have to do this,’ because we don’t work for them. But they can ask,” noted King. “And it’s great when they do because they often have great suggestions.”

Minimize Disputes but Don’t Bury Them

Because OpenScholar is backed by Harvard’s money, internal users need to have a say too, said King. “How do you manage all these people to do different things? We make everything completely visible.” Then users can drill down into the roadmap and figure out what constraints the development team is under. “If they have suggestions at that point and they’ve figured out all the detail stuff, and they tell us that in their considered opinion we should do this thing rather than that thing, fine, we’ll probably do it.”

More importantly, however, the roadmap and community processes encourage people to trust the OpenScholar team, said King. “We all want the same great product. It’s a much better approach than keeping everything secret.”

When hard decisions need to be made that might “get people upset,” there’s no governance council or stakeholder vote that takes place. It comes down to the human element, and particularly King himself. “That’s my job,” he acknowledged. “If the faculty member wants to have a big screaming match, that’s fine. I go visit them.”

Although the roadmap minimizes the fighting, it doesn’t eliminate the feature begging altogether. In those situations where “people really want something,” King added, “We have to see how many people will that improve the lives of and what other things we have going on.”
a plan, then there’s a deadline. And if there’s a deadline, you might not meet it. And if you don’t meet it, then you could get embarrassed. You might lose budget,” he explained. “So I tell the team, ‘That’s OK. Sometimes people don’t make their deadlines. It’s not going to be a deadline anyway. It’s going to be a goal. And if you can’t make the goal, that’s going to be for some reason. We’re going to deal with the reason. But we’re going to make it open.”

It took a long time before the staff believed him. “I explained that it’s actually in their interest. They will have more latitude to make rational decisions rather than furiously running around trying to deal with some screaming client. It seems to actually work pretty well.”

**Distinguish Change by Impact**

OpenScholar, built on [Drupal](https://drupal.org), includes all the bells and whistles of a website: search, custom domains, the ability to add apps and widgets, social media integration, built-in site analytics, drag-and-drop layout. Since every site is unique in some regard, changes to the underlying components could have dramatic impact on the public-facing sites — or not.

Handling changes is a balancing act with several maneuvers. Some types of changes affect aspects behind the scenes in the administrative operations, such as what editor is being used by the website creator to type in and manipulate text.

Other changes affect some small aspect of the website for the greater good, such as upping the resolution of the icon representing a PDF file. That kind of change was made by the development team and rippled throughout all of the sites. “If you didn’t really want that, that’s a bummer,” said King, not at all sounding like he’d lose sleep over it.

A third category affects website behavior or appearance, and those types of changes are strictly opt-in. For example, a new feature will be created that allows the website author to download citations from a bibliography in different formats. “If you don’t want that, don’t add it. That’s fine,” said King. “But if you want it, it’s now available.”

**Push for Openness to Promote Quality**

When the OpenScholar group decided to make the code available to other institutions, there was a bit of resistance among some members of the development team. After all, now other people would be looking at the code and, presumably, judging its quality for themselves.

“I pushed them on that very hard,” King stated. The reason: He believed the development process would be improved. “If you make it open source and other people are going to look at it, then you’re going to make it better. You’re going to document things. You’re not going to put bugs out there because you know they’re going to call you. You’re going to ruin your day if there’s something out there that doesn’t work. By giving things away it actually raises the standards.”

Besides, King noted, by allowing as many people as possible to set up their own websites, the mission of the university — and all universities — is being served. “The purpose of the university, in a sense, is the creation, preservation and distribution of knowledge,” he noted. “What better way in the modern era to distribute knowledge than to have a website? What better way to preserve it than to make it public? And what better way to create knowledge than by distributing the results of your prior work and interacting with the people who see it?”

King still hears about vendor proposals to build institutional websites that come in at several hundred thousand dollars. Because Harvard is a highly decentralized university that’s well funded, he pointed out, people may go third-party “out of ignorance.” But, he asserted, “It’s a stupid thing to do. You’re literally wasting money.”

When he finds out there’s a proposal on the table, he’ll kick into action and make his own pitch: “Hey, if you want to do this, that’s fine. However, there’s another way. And by the way it’s free.” Typically, he added, “They’ll keep their $250,000.”

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Redefining Literacy in the Digital Age

Technology and digital media are changing the meaning of literacy and creating new challenges for teaching and learning.

THE LITERACY CHALLENGE here in the United States has been with us for some time. Several sources indicate that the percentages of adult illiteracy have not changed in 10 years:

- The Huffington Post notes: According to a study conducted in late April by the U.S. Department of Education and the National Institute of Literacy, 32 million adults in the U.S. can’t read. That’s 14 percent of the population. 21 percent of adults in the U.S. read below a 5th grade level, and 19 percent of high school graduates can’t read. The current literacy rate isn’t any better than it was 10 years ago.

- According to the National Assessment of Adult Literacy (completed most recently in 2003, and before that, in 1992), 14 percent of adult Americans demonstrated a “below basic” literacy level in 2003, and 29 percent exhibited a “basic” reading level. Additional statistics from the Literacy Project Foundation reinforce the reality and extent of the challenge.

- Additionally, ProLiteracy provides a percentage breakdown of the areas of illiteracy and emphasizes the impact of unemployment and poverty on the issue.

While these statistics are powerful, it is important to realize two issues:

1) There are many challenges that impact illiteracy, not just general education; and

2) There are currently many different types of literacy and so the scope of the challenge has increased and is not being fully assessed or evaluated.

We hear K-12 teachers say on a regular basis that literacy remains a huge challenge for their students. We also hear college instructors talking about how current students seem to have graduated from high school and cannot read or write well. Often, college classrooms and online groups have to spend time addressing literacy skills as well as content. While there are many economic and educational factors involved, it is clear that a collision of conventional and digital literacy has both challenged and redefined what literacy should be and just how it must be taught in any curriculum.

Literacy Skills: Conventional and Progressive

As we likely all realize, the conventional idea of literacy concerns reading and writing. For generations, we have focused on the reading and writing skills of students through the entire educational process. More recently, though, linguistics has influenced the literature to include listening and speaking as key literacy skills (e.g., see the work of the Hanen Centre, a nonprofit organization focused on children’s
21ST CENTURY SKILLS

litacy issues). As linguists (Krashen, 1987, 1988 and others) have made us aware, language skills must include all four of the literacy skills — reading, writing, listening and speaking — in order for adequate language “function” to be achieved. That is, the acquisition of language use is critical over the learning of passive grammar and structure. The accuracy of language is influenced still by reading and writing; however, listening and speaking are essential for fluency. Fluency in a language is influenced by all four skills and, in turn, influences the overall understanding or meaning. Theorists have provided ample research data to demonstrate that understanding must be reached if language has been appropriately used: The innate reason for language is to exchange meaning (Chomsky, 1957, 1988). Additionally, if listening and speaking have been focused on more than reading and writing, then language accuracy is lacking.

The growing challenge over the last several decades is that new technology and various new media have altered how meaning is constructed — how language is used, and therefore, what literacy involves. Socio-economic differences have also influenced who has access to the tools that are changing these realities. While everyone is experiencing these changes, not everyone has access to the technology that supports the new skills required. This has resulted in the generational and social gaps growing faster — not only between those who have technology and those who do not, but also between literacy and language and, ultimately, the transfer of meaning itself. Along with the conventional generational differences between what is current and what is passed, we now also have a growing difference in the exchange of information and what is understood. Language is to be used appropriately, however, rules of appropriateness and accuracy are changing, and what may seem to be lacking in conventional terms is indeed the “new norm” in many instances. With that is also the reality that those changing rules are continuing to change and at an even faster rate.

Ultimately, if we are trying to evaluate literacy using old rules, old functions and old meaning, we are really not evaluating literacy as it exists now.

Applied Skills

We now have younger students who can decipher meaning from short visual cues, modified text and only when the media are mixed. That is, long scrolls of text are not read, but hotlinks are used to web out the logic and to create an understanding that is not dependent upon conventional literacy skills but a new literacy that exchanges meaning differently and, as such, uses language differently. In addition to various “threads” or logical flow of information, “multi-view” provides a multilayered schema of information that necessarily must be processed simultaneously in order for any kind of understanding to be reached.

In a 2009 article, I discussed the challenges to teachers and students — and thinking or cognition as a way in which some of this growing gap may be closed. Additionally, there is a generational gap that is growing between students and teachers, and learning outcomes are often still based on older uses of literacy rather than current skills. This means that most students disengage and drop out of the learning process, preferring opportunities that suit the skills they have. Unfortunately, those opportunities often still require formal education that depends on conventional literacy skills. Therefore, I would suggest that we do not have true data on literacy as we are essentially “comparing apples and oranges,” so to speak.

General Lack of Understanding

What is becoming clear is that increasing numbers of students do not have the skills required to understand conventional information sources and media, and older generations of people do not understand newer informational environments or exchanges. So, when folks are encouraged to “read” websites, that is not happening by individuals on either side of that gap. Books are increasingly of the “e” variety; however, they are still linear and text-based. Most current students do not like to use e-books and prefer conventional textbooks — analogous to how, when visiting a museum, patrons prefer environments within which the antiques are displayed contemporaneously. In other words,
what students are really saying is not that they prefer print copy books, but that if the style and flow remains in a conventional style, then please use the conventional tool.

However, current students prefer information in completely new and “mixed” formats, rather than in stylized books of any sort. Each generation has different literacy skills, unable to process information the same way. We’re increasingly becoming people who only watch and listen — a characteristic reminiscent of medieval times. Gone is the view that it has to be written or printed in order to be a valued source. Currently, if it is heard or seen, then it has value. A great example of this is the smartphone’s increased usage for all life contexts and to capture instances to share with the world.

So what does current or new literacy look like? What does it involve and how can we bridge some of these growing gaps in processing and understanding information?

New Literacy
I do not pretend to provide exhaustive answers in this short article, but I would suggest that we accept the realities before us and create and develop new ways to validate information and to adequately communicate and debate. We must value ways of thinking over linear text and provide ways to evaluate understanding in terms of its innovation and flexibility — even for conventionally “highly regulated” professions. Additionally, as conventional jobs are diminishing and new jobs are emerging, we cannot and should not continue to evaluate literacy and learning as before. New emerging jobs will require new skills, and education should be pushing forward rather than trying to regain something that existed previously.

For example, it is likely that new jobs will not require task-based skills, but rather critical thinking and problem-solving skills — not to solve problems of the past, but to solve new problems emerging from new uses of technology and new realities. Therefore, new literacy should also include innovation and flexible and adaptable solutions. If we continue to validate literacy and understanding using only standardized evaluation based upon current and past knowledge and practices, we will continue to fall short in terms of preparation and actually in literacy skills. Alec Ross (2016) suggests: “Today’s youth who will enter tomorrow’s workforce will need to be more nimble and more familiar with the broader workings of the world…. Tomorrow’s labor market will be increasingly characterized by competition between humans and robots. In tomorrow’s workplace, either the human is telling the robot what to do or the robot is telling the human what to do.” (p. 247)

Of course, “today” and “tomorrow” are highly generic terms. The gist, however, is that change is happening quickly and we are all trying to make sense of it. While it is a given that technology has completely changed much of society and it is increasingly changing practices and norms, it is not a given that educational content, processes, assessments, applications etc. are changing anywhere near quickly enough to meet societal changes or, as Ross points out, global markets and employment changes.

Rather than focus on illiteracy only, we must evaluate education itself and its view of the kind of world students will have to address. Issues of global poverty, global communication and markets continue to require our attention as well as socio-economic marginalization of communities here in the U.S. I would suggest, however, that if we can rethink the impact of new technology and future technology, we have the potential to include more people in the dialogue if we realize in time that the dialogue has changed: It is not about illiteracy as much now as it is about regression. I encourage all educators everywhere to become learners again and to be willing to redefine and value the skills we all need for the future.

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References
Quality instructional videos require a balance of content, design, teaching style and more. Here are six factors to consider.

1) Sound-to-Silence Balance

Sound-to-silence balance is the ratio of talk to empty space on the soundtrack of your video. Tools like Camtasia and Captivate show the soundtrack as a display of the visible waveforms, which makes it easy to see this balance at a glance without listening to the content itself.
Beginning instructional design students often try to record their videos from sketchy outlines or vague, fragmentary scripts. They are not quite “winging it” — but are not fully prepared either. Turning such scripts into training content requires a lot of thinking on one's feet and choosing specific words during the recording process, which results in many pauses of varying length. Too many such pauses can make your work sound tentative, unauthoritative and boring.

Even with a solid script or a strong outline of detailed talking points to take into a recording session, I find that about 40 percent of my first-take soundtrack ends up on the virtual cutting room floor. When I need to sound extremely confident and fully professional, the delete key is my best friend.

I go through every second of every instructional movie and ruthlessly eliminate filler words like “uh” and “so.” Of course, any statement that has too much potential for confusion or misapprehension has to go. Often, I can just eliminate the problem bit of sound and make a visual adjustment to the screen display that will convey what I wished to say. Just as often, I decide that nothing is lost by simply cutting the awkward portion.

The most common loss of sound content by far is the pauses that happen when I am searching my mind for the perfect word to express a concept. Even when I am very comfortable with the material and have taught it many times before, this can result in as much as 10-20 percent loss of the first-cut product length. (I’m 64, and it would probably be a little less if I were younger!)

Some students and early-career designers take a brute force approach to this problem. They simply scan the waveforms on the soundtrack and cut almost all dead space between waves, even before actually listening to what is being said. This certainly speeds up the editing process, but there are two problems with this approach. The first is that sometimes you are demonstrating a procedure on the screen and it actually...
takes some silent time either for you to execute a step or for your computer to respond. If you cut the silence out of the audio, you will also be cutting out the video where the work is taking place.

This leads to another debate about whether a recorded demonstration of a computer task should take place in real time or accelerated time. Accelerated time can be very helpful as long as audience members fully understand that they are looking at and hearing accelerated time. For example, there is no need for an audience to watch you type a complete sentence or more. If you show them the first few keystrokes and the last few, they will understand that you also typed what was in the middle. If you are demonstrating a compile process and the computer needs to chug along for four or five minutes, there is no need for your audience to stare impatiently at a thermometer completion bar for that time. Just mention that you are skipping ahead and coming back when the process in progress is complete. Like a good television chef, you can put your casserole in one oven and immediately take a fully baked version out of another.

The second problem with mechanically eliminating pauses from the soundtrack is that the audience needs a certain amount of time between statements to process what is going past. If you eliminate too much of the silence in between bursts of speech, the result can be breathless, rushed and difficult to absorb. Students will find themselves having to listen to your video with a finger on the pause button, always trying to catch up to you. It takes practice to trim a soundtrack to the perfect balance point so that it has a confident brisk pace, but still seems relaxed and in control.

2) Visual Context-to-Detail Balance

Visual context-to-detail balance is the control of how often your video editing tool is zooming in and zooming out. Some video tools, such as Camtasia’s Smart Focus, allow the software to make these decisions for you, based on the movement of your on-screen cursor, but the top-end instructional designer will always want to control location and magnification precisely and, therefore, manually.

Just as in sound-to-silence balance, it is possible to damage the effectiveness of your presentation by erring in either direction. If you are constantly zoomed in to the small details, your audience may lose the context of how the element that you are demonstrating relates to the rest of the screen.

Visual context-to-detail balance practice has been somewhat subject to fashion over the years. It used to be considered good practice to zoom all over the place every few seconds, concentrating first on one element and then another. In recent years, good practice has shifted to a more stable and less dizzying approach, with more full-screen views and fewer screen-focus adjustments. This is partially because the on-screen annotation tools, like animated arrows and boxes, have become so much more sophisticated and easier to use. You can now focus more easily on a single screen element even when the whole screen is in view, provided the element is not too tiny.

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ers are more comfortable with the layout of graphical user interfaces, and so can take advantage of the detailed views more without losing context.

One compromise is to move *through* full-screen display on the way from one detail to another. For example, imagine you are demonstrating an application and need to focus on a detail in the lower-right corner and then another in the upper-right corner. Instead of just panning from lower-right to upper-right (which doesn’t establish that you are on the right-hand side of the screen at all since the whole screen is never seen), you can go from the lower-right detail to a full-screen view first. After a few seconds of full-screen, you can then move to the upper-right detail. Then you will have established the relative position of both detail elements. As with every option, this technique has its cost. You are clearly doubling the amount of zoom movement every time you move through full-screen on the way to another detail, but it may well be worth it to keep a novice audience in context and on track.

### 3) Feature-to-Application Balance

This is the balance between showing program features in the context of the entire application and giving specific examples of their use.

One of end of this continuum is the feature/function/benefit (FFB) approach, popular in the early days of computer software instruction. It could be summarized as, “It has this, which does that, which allows you to achieve this type of task.” FFB is extremely popular in the training provided by hardware and software manufacturers who wish to showcase all the features that their product has and their competitors’ products lack. Such training always highlights the latest wrinkles and gizmos, even if only a small percentage of the training audience has any use for them.

FFB tends to be very encyclopedic and often systematically goes through every option in the main menu structure. It can be dull, but also very useful, since it can create a conceptual picture of a software product that facilitates recall. Once we have this schema in mind, we are more likely to remember that a certain function exists, even if we are unclear on just how it is used. Then there can be a second wave of “just-in-time” learning, where we actually go back, find the function in the product, access the help files and learn to really use it to accomplish meaningful work.

The opposite of FFB is the threaded scenario approach. Imagine several important product functions as beads that are threaded on a string of a single integrated project. The focus here is on the project, not on the software tool. The order in which features are introduced is determined by when they are needed in the project, and each feature is only explored to the extent that the project requires it.

This approach is often used early in a training program as a “quickstart.” The student gets to see what a product or feature can do in a realistic context first through one example of its use. Only later does he or she get to thoroughly learn how the feature works and its many permutations.

High-quality threaded scenarios can be tricky to do well. The whole idea is for the project to be realistic and for the program functions to be used as they typically would be in practice. But what happens when some important functionality just isn’t needed for a given project? Rather than leave it out, scenario authors often do something wildly atypical just to give the missing functionality some exercise. A little stretching of normal good practice for this purpose is OK, but if the project gets too far away from the real-world use of the product functions, the whole exercise can become very artificial.

The criticism of FFB is that students’ understanding becomes a mile wide and a quarter-inch deep. They have an idea of how the product does many things, but little or no practical experience in using it to do anything well. The criticism of the threaded scenario is that students become a mile deep but a quarter-inch wide. They can execute one amazingly impressive project very quickly because they are given all the steps, and because the project has been carefully engineered to avoid many complications that would
naturally occur if the students were attempting even a considerably simpler project on their own. But the transfer value is limited. When students try to do their first independent project on their own, they discover there is a lot more to this than meets the eye.

In the end, each approach is incomplete without some components of the other. Skillful designers learn just how much of each to use and when. Again, the level of the audience is a primary determinant. If you are providing version upgrade training to a seasoned group of technicians already familiar with a technical product, a largely FFB approach might be the shortest line between where they are and where they need to be. If, on the other hand, you are trying to get a group of novices interested in the possibilities of using a software product that is largely new to them, a quickstart to demonstrate its value in relation to their needs might be a good idea. It might make them more attentive to a more comprehensive presentation of the functionality later on.

4) Balance Between Framing/Assessment and Substance

The old military training model had three parts:
1) Tell them what you are going to tell them.
2) Tell them.
3) Tell them what you told them.

Today we call this framing and it is supported by David Ausubel’s classic Advance Organizer model. Having a sneak preview graphic at the front-end and a review graphic at the back-end of a step-wise training segment is often a fine idea. This practice can go to several levels, with these “bookends” appearing not just at the start and end of a presentation, but also at the start and end of sections and subsections. The extreme form is signposting, where you interrupt the flow of information to say “We have just completed x and before we go on to major topic y; we need a little more information about function z, which we touched on earlier.” Signposting is like a visit to Disney World: “You have now left the Sahara Exhibit and are entering the Rainforest. Turn right for Crocodile Pond, and left for Hippo Heaven.”

Of course, even a technique as useful as this can also get out of hand, particularly when you are under time constraints and are dealing with a more creative topic rather than a systematic one. Some students can be resistant to what they consider to be a mechanical approach. They don’t want a “school-ish” presentation. They just want the “meat-and-potatoes” of the content as fast as you can serve it up.

A related way your presentation can go off the rails is by an excess of formative assessment, or assessment along the way. Programs like Captivate and Storyline do a fine job of checking on student knowledge in the course of a presentation — which leads some instructional designers to divide the content into tiny bits and assess progress constantly. That can be both annoying for the audience and irrational from a retention point of view. The fact that you still remember and can apply something you learned 10 minutes ago does not mean it is part of your toolkit for life. It is best to stop for formative assessment only when a solid grip on the previous material is essential to make sense of the new material that will be coming up.

5) Personality Balance

Personality balance is how much of yourself as an individual you choose to express in your instructional video. The starting point of this balance is usually determined by the personality of the instructional designer, especially when that designer is also the on-screen “talent” in the video.

Some naturally shy designers/presenters tend to appear on-screen as excessively wooden and formal. This is especially true when they are primarily subject-matter experts rather than performers. They fail to convey their enthusiasm for the subject matter even when it is quite strong. They leave the audience asking, “If my instructor is so minimally invested in this product, why should I be any more so?”

On the other end of the spectrum, extroverted presenters can forget that it’s all about transferring marketable skills and
Online Learning

not really about how adorable they are personally. They can float off topic, tell too many stories from personal experience, use too much colorful language to convey simple points, and basically get lost in their own glory.

The ideal tone for most presentations is that of a clearly competent and enthusiastic professional who is visibly excited about the great stuff he or she has to share, and is delighted to be the one who is sharing it. Once this persona is established, the talent gets out of the way and lets the subject matter be the star of the show.

But this is not always the right balance, depending on subject and audience. For example, I teach one course I call “Getting and Keeping a Professional Job With Instructional Design Skills.” This soft-skills course is all about what I have learned in my career, and is loaded with personal anecdotes and examples of what I have experienced. In this case, a more instructor-centered approach is a good fit.

6) Balance Between Training Solutions and Non-Training Solutions

As an instructional designer, you will need to decide not only how to design but when to design. When a project is proposed, you need to determine whether the objective your organization wishes you to achieve is actually a candidate for training at all.

Imagine a help desk at a mid-size organization. There is a protocol in place that defines the eight steps that are supposed to take place every time a trouble call is filed. Management has determined that the protocol is not being followed, and requests online training to cover the eight steps and the importance of following protocol.

Before you type the first word of a project plan, it would be very wise to spend some time down at the help desk. You might discover that the compensation of each technician is based on their competitive ranking for how many calls they...
process in a work week. As they are currently organized, there is a price to be paid for not processing enough calls and no price to be paid for handling them quickly with little respect for the protocol. If respecting the protocol is really important, there is a problem — it’s just not a training problem.

Now that we see the importance of getting the six factors in balance, we can close by considering just how that is done:

It has often been reported that the spaceship that went to the moon needed to have its course evaluated and corrected by technology every few seconds. Without these myriad corrections, it would have hurtled off into trackless space. A major design project is like that, with countless corrections to be made along the way. You need to find a test group that is very much like your target audience. (It is a mistake to test your emerging learning product with a room full of subject-matter experts.) Once your test crew is in place, use them early and often as new pieces of your training product are developed.

At first, you will find that your efforts to get one dimension of the project in balance will tend to throw other aspects out of balance. Eventually you will discover the sweet spot where the product is as good as it can be, and further tinkering will not lead to improvement. That is when you call it done.

Richard Rose is associate professor, director of instructional design and technology at West Texas A&M University.
The education technology forecast for 2017 could perhaps be described in a single word: change. “We’re now on an exponential pace of technological change,” Daniel Christian, adjunct faculty member and senior instructional designer at Michigan’s Calvin College, told CT.
“Several technologies continue to converge, new forms of human-computer interaction are gaining visibility and traction, and more. The next few years will be interesting indeed!”

We asked a panel of five higher ed leaders from across the country, including Christian, to assess education’s top tech-related trends for the coming year — from artificial intelligence to Generation Z. Here’s what they told us.

Virtual/Augmented/Mixed Reality

Daniel Christian: We are on the precipice of major changes in how we interact with our computing devices. Numerous companies with deep pockets — including Apple, Google, Facebook, Microsoft, Sony and others — have been researching and investing in new forms of human-computer interaction (HCI) such as augmented reality (AR), virtual reality (VR) and mixed reality (MR). The consumer-based products from these companies have already significantly influenced the types of hardware and software that institutions of higher education have used to deliver their learning experiences.

But to give you another idea of how potentially huge this entire area is, let’s look at Magic Leap. Magic Leap is a privately owned company that hasn’t really produced anything for us to purchase — yet. But already, Magic Leap is valued at $4.5 billion! These new forms of HCI will likely have an enormous impact in the near future — significant changes in how we use and interact with computing devices.

This prediction is all the more compelling when we think about combining AR/VR/MR with cognitive computing and artificial intelligence (AI) technologies (such as machine learning, deep learning, natural language processing and chatbots).

Some thought-provoking questions include:

- Will remote workers be able to be seen and interacted with via their holograms (i.e., attending their meetings virtually)? What would this mean for remote learners?
- Will our smartphones increasingly allow us to see information overlaid on the real world? (Think Pokémon Go, but putting that sort of technology into a vast array of different applications, many of which could be educational in nature.)
- How do/will these new forms of HCI impact how we design our learning spaces?
- Will students be able to pick their preferred learning setting (i.e., studying by a brook or stream or in a virtual Starbucks-like atmosphere)?
- Will more devices/platforms be developed that combine the power of AI with VR/AR/MR-related experiences? For example, will students be able to issue a verbal question or command to be able to see and experience walking around ancient Rome?
- Will there be many new types of learning experiences, like what Microsoft was able to achieve in its collaboration with Case Western Reserve University [OH]? Its HoloLens
product transforms the way human anatomy can be taught.

Time will tell, but we should expect to see some major product announcements in 2017, with continued enhancements — and new affordances — to follow in the next few years.

Marcie Powell: The potential of Magic Leap is tremendous for education particularly if it can deliver on what it promises. We can expect many institutions will partner with companies like Magic Leap, VRTUL or Microsoft and/or use third-party apps to implement virtual and mixed reality.

Extensive costs for VR design and development drive the need for collaborative efforts. This is highly indicative of the types of partnerships we will see trending in 2017. The example Daniel gives, Case Western Reserve University, demonstrates a collaboration with the Cleveland Clinic and Microsoft to create active multi-dimensional learning using holography.

Fortunately, we will also see the development of more affordable high-quality virtual reality solutions. Augmented reality is already much more affordable and allows us to see computer-generated content such as graphics, video, sound or GPS data over the real environment. Ecogotchi, for example, is an AR game developed by the Salzburg University of Applied Sciences [Austria] that teaches about sustainability, the environment and living green. Whether using AR for a gamified course or to acclimate new students to campus, the trend will continue into 2017.

Artificial Intelligence

Christian: Those of us working within institutions of higher education need to put AI, machine learning and deep learning on our radars. Also, we need to keep pulse-checking where natural language processing (NLP) is being integrated into applications. For example, NLP is already used in personal assistants such as Siri, Cortana, Alexa and others. One has to wonder: What are the teaching and learning implications when NASA unveils a new “skill” for Amazon’s Alexa that lets you ask questions about Mars? And let’s not forget that IBM’s Watson, with its cognitive computing, continues to make inroads within the world of higher education as well.

Powell: The trend toward using AI in higher education will be multifaceted. We must prepare students for careers in or to work alongside the AI industry. We will also see universities finding ways to use AI to streamline processes and save money.

A good example of this is Deakin University in Australia. It used IBM Watson to create a 24/7/365 online student advisory service to improve the student experience. This resulted in a 5 to 10 percent reduction in inquiries managed by staff, with more than 30,000 questions answered by AI in the first trimester. With the amount of time saved, the staff was able to handle the more complex questions.

We should also expect AI to be used for learning and assessment. Tools like the Virtual Learning Assistant developed by Cognii enable universities to provide students with one-to-one tutoring. Using natural language processing, machine learning and cognitive computing technologies, Cognii allows for open-response questioning, instant feedback and conversation until the student masters the concept. It then provides instant scoring at human-level performance.
Gerard Au: Our campus operates a 24/7 Technology Support Center and partners with Blackboard Student Services to provide technical support during evening hours. While the center provides most basic desktop and LMS support, it does not provide support for other offices such as financial aid, admissions, parking services, advising, etc.

With AI and machine learning technologies becoming more mainstream, campuses can leverage these technologies to provide 24/7 assistance to all user groups in many different campus offices. Through the use of natural language processing, systems are able to understand and answer most common questions and provide users with just-in-time responses.

In addition, the need to prepare computer scientists, engineers and cybersecurity students to develop and secure these technologies will grow at a very rapid pace and could be challenging to higher education. These programs often require a significant amount of resources to support.

Gaming and Simulation
Susan Aldridge: Gaming technology is fast becoming an immersive and interactive tool for teaching and learning. To be sure, gamification makes it possible for students to actively learn by doing — both individually and collaboratively — through repetitive and thought-provoking practice, within a safe and multisensory environment, designed to simulate real life.

These virtual game worlds provide a unique opportunity to apply new knowledge and make mission-critical decisions, while identifying obstacles, considering multiple perspectives and rehearsing various responses. Likewise, they typically incorporate some sort of immediate feedback or reward system, which studies have found stimulates the release of dopamine in the brain — a neurotransmitter known to increase motivation and engagement. Moreover, as the technology improves, it is being rapidly deployed for designing educational games and simulations in just about any discipline you can name.

To give one example, Drexel University’s College of Nursing and Health Professions collaborated with Tata Interactive Systems to develop a simulation-based learning solution for online students pursuing a certificate in forensic trends and issues in contemporary healthcare. This program is designed to provide healthcare professionals with the requisite expert knowledge and practical skills to conduct comprehensive, sensitive and legally sufficient clinical assessments in the aftermath of violent crime. And it incorporates sophisticated simulations to ensure that students have plenty of opportunities to translate classroom skills into real-world practice.

For instance, a 3D virtual crime scene, complete with multiple “clues” and continuous feedback, empowers students to conduct a vulnerability risk assessment. There are also realistic simulations that reinforce effective strategies for interviewing victims and offenders to elicit details of the crime, along with a playback feature for reviewing and improving performance.

Blockchain and Credentialing
Christian: Blockchain becomes highly relevant to institutions of higher education when it’s discussed around the topics of credentialing and badging. (Steven Norton provides a useful definition of the technology in his Wall Street Journal article, “CIO Explainer: What Is Blockchain?”) In essence, Blockchain could become the technology that enables learners to maintain lifelong, cloud-based learner profiles. Such profiles could constantly amass credentials and badges from all kinds of institutions and programs (whether brick-and-mortar or digital/virtual/online). A potential em-
ployer could use an automated bot or spider to search these web-based profiles in order to find its next freelancer or employee.

Already we can see where this could take off in Microsoft’s purchase of LinkedIn in 2016, which had previously acquired Lynda.com in 2015. If a person takes certain courses at Lynda.com, his or her LinkedIn profile reflects this. Microsoft’s push into artificial intelligence could easily play into creating a marketplace where employers are matched up with qualifying/competent employees. Institutions of higher education will likely be one of the common sources that “feed” data into these profiles.

Adaptive Learning

Phil Ventimiglia: Georgia State is making significant investments in adaptive learning in 2017. We are in the process of leveraging open educational resources (OER) as learning materials in combination with adaptive courseware for many of our core undergraduate classes, such as economics, history, political science, chemistry and biology. Adaptive materials enable students to learn in a “choose your own adventure” format, where they can interact with information at their own pace and discover individual learning pathways. The goal is to meet each student’s personalized education needs and support student learning, with the assistance of automated and predictive course feedback that is available to students as well as instructors.

Powell: We will definitely see an increase in integrating open educational resources to enrich courses. Now that we are at a point where we can take the data collected and apply cognitive science with algorithms, we can create individualized learning paths in new and unique ways.

A forerunner to watch is Osmosis, developed by two Johns Hopkins University [MD] medical students. Using their backgrounds in neuroscience and computer science, they developed a web and mobile learning platform with an intelligent formative assessment system that is now being used in hundreds of medical schools.

By knowing a student’s schedule and course materials, the system recommends content and generates quizzes. If a student has a class next Tuesday on myocardial infarction, the system will text a link to a video that prepares him or her for class. After class is over, it sends a quick quiz to see what the student learned. Based on his or her answers, the system adapts the learning by providing links to OER or other content that reinforces the concepts.

We can expect Osmosis to expand its platform across other disciplines in 2017.

Internet of Things

Au: While Internet of Things (IoT) technologies grow exponentially and are widely used in the consumer field, there is still a lot of untapped potential for higher education, particularly in the area of smart cities and smart campuses.

While some infrastructure systems such as sprinkler controls and light controls are already internet-connected, many are not. Parking space notification/monitoring systems and building alarms are a couple examples of how campuses can improve operations. In addition, future iterations of IoT will have more intelligence built in; there will be less human interaction to “turn on/turn off” something, or have something pre-programmed.
Combining IoT technology with different APIs or web services, one can issue sequential commands to perform complex tasks that once required many human interactions. On our campus, faculty are working with students on creating and securing a cellular network-controlled rover to use for emergency exploration, such as to assess the aftermath of an earthquake.

**Powell:** As the trend toward the Internet of Things grows in 2017, we will see higher education continue to adapt or create IoT degree and certification programs to meet the changing job market. A couple of examples fall under the IoT subcategory of “new intelligent things,” such as drones and robots.

It is projected that by 2025, there will be more than 100,000 drone-related jobs. This will drive program development similar to the way hacking drove cybersecurity degrees in the last decade. Institutions like the Unmanned Vehicle University [AZ] are already addressing the market by granting doctorate and master’s programs in Unmanned Systems Engineering and a certificate in UAS Project Management. We can expect institutions to look for opportunities to increase enrollments as Amazon launches its “drone highway in the skies.”

**Christian:** The Internet of Things — or the Internet of Everything (IoE), as some like to call it — will likely have an enormous impact on our world. Though it will take us a few years to get there, there will be an increasing number of machine-to-machine (M2M) based communications — from the connected devices in our homes and cars, to our wearable devices, to the infrastructures within our cities, to the devices used in industry and manufacturing. (Thus, courses that address how to develop/program such devices and glean the resulting data from them will be increasingly in demand.)

As an example of where M2M-based communications could come in handy within higher education, picture a faculty member walking into a classroom. The systems within that room sense who walked in and instantly implement that particular faculty member’s personalized/customized settings for that learning space: The lights automatically dim down, the screen drops down, the projector comes on and the appropriate course appears in the LMS.

Or, from the students’ perspective, will video-enabled beacons — such as Estimote’s new Mirror product — enable students to pre-load their content for a class discussion, and then when they come into an active learning classroom, an app would be launched which could then present their content to the nearest display?

**Digital Literacy**

**Ventimiglia:** While previous generations first experienced technology at work and then found ways to make use of technology in their personal lives, today’s students first experience technology for entertainment and social communication. This path to technology leaves a gap between students’ perceived ability and the skills employers expect from graduates. To increase digital literacy at Georgia State, we are incorporating lessons that encour-
age students to solve real-world problems using available
technologies across our core undergraduate curriculum. For example, learning in an English composition course how to create a blog and read basic web scripting, or learning in a history class how to visualize and map information that explains the impact of demographics on an event. The intent of this integration is to help students become self-directed learners, who know how to find up-to-date information and put together available technologies to create new solutions, in whatever field they enter after graduation. Additionally, offering opportunities such as hackathons, maker sessions and opportunities to digitally publish outside of class provides students ways to further grow the digital skills they learn in class.

**Christian:** The ability for today’s students to craft rich, multimedia-based communications is becoming increasingly important. Visit any well-trafficked website and you will likely find such communications (and evidence of the skills that created such content). Also, students who can create such content and post that content on their WordPress-based blog can then become their own TV station, their own radio station, addressing a global audience. While this is nothing new, I’d guess that there is a low percentage of our faculty members who are currently integrating assignments into their courses that require students to create such media-rich content and communications. The issue is not just that faculty would need to find the time to get trained on how to create such content themselves, but also that they would need to develop the ability to accurately grade such content.

**Generation Z**

**Au:** The technology expectations of mobile natives (Generation Z) are much different from previous generations, including millennials. While everything “on demand” is key, concerns over privacy have diminished. Generation Z prefers to have their digital experience tailored and have useful information presented to them according to their behaviors, past experiences, etc.

While this ties into other topics such as Internet of Things and artificial intelligence, it portrays a fundamental change in how higher education must deliver services to incoming students. These changes would affect a wide range of campus operations, ranging from dining services (how students would order meals from their mobile devices), to account or computing resource provisioning (receiving all software or virtual desktop resources based on course needs), to course enrollment (the expectation that students’ schedules and required courses are all sorted out for them).

**Ventimiglia:** As students’ technical expectations increase, we’re experimenting with virtual desktop infrastructure to provide the technical tools and software they need at scale. Providing access to computing as a service can leverage the decreasing cost of ubiquitous lightweight computing devices, such as smartphones, tablets and notebook computers, while providing students powerful computing environments that they can reach from anywhere.

**Learning Inside and Outside the Classroom**

**Ventimiglia:** Formal and informal learning spaces are going through a fundamental redesign as we look at how student learning extends outside of the classroom. Our
Formal classrooms are becoming increasingly collaborative spaces as we develop more digital learning content for students to consume outside of class and as we flip the in-class learning experience. We are moving away from traditional lecture spaces to interactive spaces with flexible and movable furniture and collaborative technology, such as multiple large-screen displays that enable students to work and learn as teams.

Outside of class, informal campus learning spaces continue this theme of interactivity and collaboration. Makerspaces with digital creation tools — such as 3D printers, virtual reality headsets, circuit boards and more — are being created so that students from every discipline can apply what they learn through collaborative building experiences outside of class. For example, at a new makerspace now underway at Georgia State, students will be able to do everything from exploring innovation and invention by creating technical prototypes to developing VR experiences that provide deeper insight into historical events, in order to better understand and analyze elements of their studies.

Aldridge: Another tool for informal, collaborative learning — robotic telepresence — facilitates an experience that is flexible, seamless, immersive, interactive and personalized. While online education is still, for the most part, asynchronous or self-paced, a growing number of online instructors see the added value in connecting distance learners with their on-campus counterparts for synchronous group discussions, projects and other hands-on activities.

This robotics-enabled approach is particularly beneficial when it comes to providing virtual experiences that would normally require a physical or onsite presence, as is the case for online nursing students who need to master certain clinical competencies. To meet that challenge, Duke University’s [NC] School of Nursing is using telepresence robots to engage advanced-practice online nursing students in high-fidelity, lifelike clinical simulations.

Manufactured by California-based Double Robotics, these devices are built on a giant wheel caster with an adjustable pole; an iPad mounted on top; and videoconferencing software to enable communication. Students use their tablets, computers or smartphones to remotely control the device, maneuvering it around the room while panning or tilting its screen in basically any direction.

And by creating a virtual physical presence, online graduate students now have a unique opportunity to develop their coaching, problem-solving and communications skills, as they furnish clinical guidance in patient care to onsite undergraduate nursing students.

IT Support and Training

Ventimiglia: Technology is becoming so widespread in helping provide effective learning solutions that it is difficult to say what is instructional technology and what is simply instruction. At Georgia State we’ve recently opened a center that spans support across the spectrum of faculty needs, from exploring teaching techniques to using digital instructional tools to engaging in scholarship and research. The center is co-supported by Faculty Affairs and our instructional support and technology teams to provide seamless assistance across the faculty experience. We’ll continue to expand the services offered to streamline the faculty experience there in 2017.

Christian: We need an entirely new paradigm for how content is created and delivered within higher education. Over time, we have loaded up professors’ plates with one expectation after another (i.e., teaching, advising, doing re-
search, attending departmental and/or committee meetings, creating and delivering content, etc.). But we rarely remove anything from those plates — and students’ expectations are increasing. For example, let's consider that students are often exposed to rich, interactive media and games. We expect that faculty members should also be delivering that kind of material. But they might not have the time, talent, background or interest to create such content. Can we expect faculty to keep adding more skills to their plates?

No, we’ve reached the end of that line — the end of that paradigm. We must now move toward implementing a more team-based approach, in which multiple specialists contribute to the production and delivery of the learning experience. And we need to do it very soon: New entrants continue to come onto the post-secondary landscape, and they will begin to address the gaps (i.e., the unfilled needs) for a new generation that’s accustomed to high-production-value content and engaging experiences.

**Powell:** I agree with Daniel: It takes a team. Incoming students continue to be more technologically demanding with high expectations. Likewise, faculty can’t continue without understanding new technologies and getting proper support. With the complexity, we should expect a trend toward creating or further enhancing innovation centers and offices of teaching and learning, to handle the rapidly changing technology needs of faculty members. The innovation centers provide a way for faculty to get their hands on new technologies to better determine what will work in their courses or programs. The teaching and learning centers provide the hands-on development support.

**New Learning Models**

**Christian:** New technologies have historically had an impact on employment and the workplace: They have forced people to reinvent themselves, to adjust to the realities of the changing marketplaces. In the next several decades, people will increasingly have to reinvent themselves multiple times throughout their careers, and extremely quickly! They will need to come away from their learning experiences with skills that will be immediately marketable/applicable. Yet the systems of accreditation that we have in the United States (for institutions of higher education) are inhibiting us from keeping up and being as responsive as people need us to be.

We will need to:

- Rethink and change our accreditation systems to be far more responsive to peoples’ needs;
- Offer less expensive options;
- More effectively and strategically use a variety of technologies;
- Change the way we teach and how our student teachers are being taught; and
- Consider moving toward team-based methods of creating and delivering content — including the use of students on such teams.

Those of us working within higher education must do our part to ensure a just society, where people of all backgrounds and socio-economic standings can obtain the responsive, up-to-date educations that they need to quickly reinvent themselves — over and over again. CT
CAMPUS TECHNOLOGY
2016 IT SALARY & JOB SATISFACTION SURVEY

This year’s survey of higher education IT professionals showed earnings that are mostly looking up in a segment beset by lingering frustrations that probably won’t go away any time soon. By Dian Schaffhauser

IT PEOPLE in higher education sit at an interesting juncture. They continue dedicating themselves to support and delivery of services that have seemingly always been there — e-mail, websites, wireless. Yet, they also keep one hand firmly on new technologies that are enabling innovations in the learning business. That’s a tough combination of responsibilities to juggle — yet, from what we’ve seen, most do it well.
What’s that worth? In this year’s Campus Technology salary survey, the average salary across all types of institutions and every kind of IT role imaginable was $77,808. The highest salary reported by a respondent was $224,000, made by a chief technology officer in California. The lowest was $22,000, earned by a help desk staffer in Missouri. The median (that number that falls exactly between the highest salary and the lowest one) was $71,173.

With those kinds of extremes, pay is a sore spot. However, it appears that other aspects of the job help balance out the grief (as you’ll see shortly).

The individuals who choose to work in this industry come across as both dedicated and disgruntled. We heard from people all over the country who told us, “I really enjoy working in IT in higher education,” as one systems administrator in Michigan did, or “This is an exciting time for e-learning and for technology in higher education,” as an IT manager in Texas declared. We also heard from less positive folks, such as the systems administrator in Washington who wailed, “Rising needs and costs, lower budget,” and the technician in Florida who murmured, “Slow to change, slow to meet client change requests, and slow to realize potential in new technologies.”

Overall, respondents paint a picture of an occupation that’s beset by frustration with top leadership and shrinking IT budgets but softened by co-workers they enjoy, hours they appreciate and benefits that can’t be beat.

### Average Salaries

The average salary this year for those working in IT organizations within public institutions was $74,390, within a few hundred dollars of last year’s average of $74,021. The median was $69,400, a bit higher than last year’s $66,000. For people at private not-for-profit schools, the average salary was $83,441, considerably higher than last year’s average of $75,771. The median there was $75,000. (For information on private for-profit institutions, see “Working in For-Profit Schools,” page 34.)

At the top end of the salary range are the C titles: chief information officer, chief technology officer and chief security officer (see Figure 2, page 31). The average among those roles at public universities and colleges was $113,494, and the median salary was $110,000. That’s considerably less than what was earned at private not-for-profits by individuals with comparable titles, where the average was a whopping $165,657 and the median was an even higher $174,000.

The average salary for people holding director-level titles in public institutions dipped from last year’s $105,090 to this year’s $96,400. At not-for-profits this year’s average salary for IT directors hovered at $96,000, within a tenth of a percent of last year’s $96,098.

The lowest average salary earned by IT workers went to those involved in providing help desk or tech support. At publics, the average salary for help desk jobs was $57,503, an increase from last year’s $49,141. At not-for-profits it was $46,400, a drop from last year’s $52,636.

In between the CIO and help desk are a multitude of other jobs, with their own average salaries. Figure 3 (page 31) shares details for those titles that had sufficient response for us to be confident in the numbers.

No matter what the title, however, some respondents lamented what they perceived as overall low salaries in the education segment. “Depressing that I make 60 percent of what colleagues in similar for-profit organizations make,” said a systems administrator at a not-for-profit in Massachusetts. “Also sad that I have no hope of promotion or significant raise or even job title change anytime in the foreseeable future.”

A business intelligence analyst at a Washington univer-
sity observed that salaries within public institutions “are tied to classifications and schedules — very rigid system.”

Another respondent railed against the gender gap in salaries. Although the Campus Technology survey doesn’t ask about gender, a technical support professional at a not-for-profit in Pennsylvania suspects there is “still a tremendous inconsistency in salary for women vs. men in the same job role, especially in education.”

Higher education IT “is plagued” with income inequality, added a systems analyst at a two-year public college in North Carolina, and that’s having an impact on the level of service that can be delivered. “At my location many staff members are being paid in excess of $10k less than market value for the jobs that they perform. This is slightly offset by a positive culture and environment, but it keeps us from maintaining top-tier talent and provides a revolving-door effect.”

Forecasting Raises in 2017

The expectations for getting a salary bump in the new year depend on whether you work in a public institution or a private college. At the publics, only four in 10 people (42 percent) said they see raises on their horizons. However, at private not-for-profits, which have a bit more latitude, that’s reversed: Six in 10 (60 percent) reported that they do expect to receive raises. (See Figure 4, page 32.)

Promotions are expected to be few and far between. Only 8 percent of respondents within public and private not-for-profit institutions predicted that they would officially receive new titles in the coming year. However, that
doesn’t mean they won’t be gaining more responsibilities or working harder.

“Challenging to stay relevant, obtain new skills while still responsible for supporting existing applications,” complained one tech support professional at a four-year public school in West Virginia. “Usage increases and systems [are] more complex, but support staff numbers stay fixed.”

“Condensing of job duties and limited budgets increase my workload. I spend two to three hours after my children [go] to bed to keep up with my workload,” grumbled a trainer at a four-year public university in New Jersey.

Job Experience and Duration
A solid three-quarters of respondents have been in IT for more than 10 years, whether at publics or not-for-profits, compared to 72 percent in 2015. A slight majority (51 percent) of respondents from publics have been at their current institutions for longer than 10 years, while 75 percent of respondents from private not-for-profits boast that tenure. (See Figures 5 and 6, page 33.)

Perhaps it’s a salary that won’t budge or a lack of promotional opportunities, but a hefty number of IT people are looking for their next opportunity. A full 20 percent of individuals employed at the public schools and the private not-for-profits asserted that they expect to leave their current employer for a new position elsewhere in the coming year.

These kinds of turnover rates won’t surprise some readers. “IT in higher ed is often a stepping stone to other work outside the educational sector,” suggested one IT manager at a private not-for-profit in Texas. “We’ve probably turned over 60 percent, with most people moving on to corporate work.”

Another respondent, an IT director at a not-for-profit in Vermont, noted that it’s “too hard to hire good help. Can’t pay them or retain them.”

Outsourcing is Entrenched
A new question on this year’s survey asked people to tell us about the likelihood of outsourcing in their IT organizations. All types of schools reported using outsourcing to some extent, but it’s more common at private for-profits; 41 percent said their operations already or expect to hire outside service providers to deliver IT functionality. At public institutions, only 17 percent reported the same. (See Figure 7, page 33.)

And, as one might expect, the topic generated a number of perspectives. Outsourcing is viewed by some as a “dangerous path for an institution to take,” as an IT manager at a public two-year college in Arizona expressed it.

“People who outsource badly will re-learn the lessons already learned by many others before them,” warned another IT manager, this one working at a private not-for-profit institution in Missouri.

Other respondents were more circumspect, neither positive nor negative. “As everywhere else, there are cyclic fashions in outsourcing and in-house efforts,” explained an IT manager at another private not-for-profit in Missouri. “Each has advantages; either can be done well or poorly.”

An IT professional handling learning management system administration in Colorado at a public four-year university pointed out that outsourcing can also mean taking applications to the cloud, “which removes some of the pain of server maintenance from us, but requires us to change how we view and apply security.”

That kind of shifting around of priorities can prove a boon, added an IT director at a public institution in

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**FIGURE 4**

**PROSPECTS FOR SALARY GROWTH**

A majority of respondents at private institutions expect to receive a pay increase next year.

<table>
<thead>
<tr>
<th>Do you anticipate receiving a raise within the next 12 months?</th>
<th>[Salary Survey]</th>
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<tbody>
<tr>
<td><strong>PRIVATE NOT-FOR-PROFIT</strong></td>
<td>40%</td>
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<tr>
<td><strong>PUBLIC</strong></td>
<td>60%</td>
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<tr>
<td><strong>PRIVATE NOT-FOR-PROFIT</strong></td>
<td>58%</td>
</tr>
<tr>
<td><strong>PUBLIC</strong></td>
<td>42%</td>
</tr>
</tbody>
</table>
Outsourcing storage and other services frees up staff to pursue impact projects, which in turn leads to feeling invested and responsible for positive change on campus.

Positive Outlook and Job Satisfaction

When asked to share their outlook for the future of IT in higher education, most respondents expected more of the same — whatever that happens to be (see Figure 8, page 34). Those working for public institutions were slightly more optimistic; 42 percent forecasted “healthy growth,” compared to 35 percent who expected continued stability. They were also the most pessimistic; 2 percent foresaw “doom in the near future,” compared to 0 percent of privates predicting that. Yet the shadows looked longer at the private not-for-profits; only 29 percent expected healthy growth; half anticipated continued stability.

For the most part, survey participants are happy with their jobs (see Figure 9, page 34). More than three-quarters (78 percent) said they were overall satisfied or very satisfied. The three most satisfactory aspects of their positions within higher ed were the hours they work (82 percent of respondents said they were satisfied or very satisfied with that); the co-workers they have (81 percent); and the benefits they receive (80 percent).

Physical comfort and equipment were also high in the rankings; 73 and 72 percent of people reported satisfaction in those areas, respectively.

Seventy-one percent of respondents said they were happy with their supervisors and 69 percent expressed contentment with their commutes.
Top Complaints

Of course, there were plenty of complaints too. The three areas on the job that bothered respondents last year are the same ones that bug them this year: salary, upper management and department budget. A third of survey participants (31 percent) said they were either unsatisfied or very unsatisfied with their pay. Even more (34 percent) said the same about their IT budgets. A quarter of people (27 percent) reported unhappiness with “top brass.”

Dissatisfaction with budget and clueless administration was also the primary theme for many of the comments people contributed in their survey responses. “IT is continually called to cover more areas and to do more without any increases to budgets,” bemoaned an IT director at a private not-for-profit in New York.

The CIO for a public two-year institution in Minnesota agreed: “Budgets continue to decline to the point where we struggle to refresh our technology and our staff.”

“Overall, poorly treated, underappreciated, underpaid, and not enough professional training, respect or any concern at all for employee morale,” summarized an IT manager with a public four-year institution in Ohio.

The biggest “disconnect,” added an IT manager from a private for-profit institution in Massachusetts, “is that clients (and campus leadership) don’t always have a great understanding of the complexity of IT, so it is hard to get...
them to spend what is needed to fully staff [or] support it the way it really should be."

"Higher education needs to control spending in only one area to solve its budget woes: top executive compensation," suggested a project manager at a four-year public institution in New Mexico.

"Sadly, senior leadership on my campus places no value on information technology, choosing instead to view it as a necessary evil," concluded an IT director at a public institution in Oklahoma.

What the Near Future Could Bring

As one survey respondent, a systems administrator in New York, put it, the “new and shiny” draws most of the attention in the tech industry, while operational support is often taken “for granted.” Such is the lot of the IT professional working in many industries. The difference with higher ed, however, is that there’s so much more at stake than mere profit.

Technology not only sustains the back-office business of the university or college, but it also serves as a beacon for students, drawing them to the institution in the first place, providing new mechanisms to keep them engaged and helping them succeed with their learning.

Yes, the job is becoming more complex and more important. “We are no longer just maintaining the nuts and bolts at all times,” noted an instructional technology and

WORKING IN FOR-PROFIT SCHOOLS

According to the National Center for Education Statistics, private for-profits dominate, making up 47 percent of all postsecondary Title IV institutions. Full disclosure: We don’t come anywhere close to that kind of representation in our survey responses. In fact, people who work for private for-profits made up just 6 percent of the entire respondent pool this year. For that reason, we’ve separated out this section to provide individuals working in that sector some insights about their prospects.

This year, average salary at for-profits was $84,584, a good $10,000 higher than the average for IT professionals at public institutions. It’s also higher than last year’s average for for-profits: $76,370. Salaries ranged from $200,000 for a C-level officer with more than 11 years of experience working in Connecticut to $30,000 being earned by a director of IT with a similar amount of experience working in Minnesota. The median salary was $82,500, satisfyingly higher than the medians at either of the other two types of institutions.

Private for-profits appear to have higher turnover: Only 28 percent of respondents in that sector reported being on the job at their current employers for more than 10 years, compared to 52 percent of those at public institutions and 75 percent at private not-for-profits. In fact, 36 percent of people in for-profits have 10 or fewer years of experience in IT altogether, a third higher than those in the other two types of schools. In addition, 36 percent expect to leave their employer in the coming year.

Whereas only four in 10 people working in public institutions expect raises in the coming year, three quarters of respondents in the for-profits (77 percent) anticipate raises. Respondents at private for-profits were more likely to expect stability in the next 12 months (59 percent) compared to the other types of institutions; a larger number (9 percent) also predicted “unbridled growth and opportunity.”

That optimistic outlook seeps into other aspects of work too. More than a quarter of people (27 percent) in the for-profit sector said they anticipated getting promoted over the next 12 months. “IT in higher ed is a rich and growing field,” crowed an IT manager at a four-year private for-profit in Connecticut. “Technology ... is so pervasive; it’s a great environment to work in.”

However, warned another, you have to stay nimble. “If you’re not in the right spot, you can find yourself out of a job soon as things shift to the cloud,” said one application development manager working at a for-profit in Illinois. “Being in mobile development and building tools the students use on a daily basis puts me in a much different spot; but I can see the landscape around me changing drastically as budgets are cut and things are moved to the cloud.”
design manager at a four-year public school in Maryland. “So many services and projects require a broad understanding of the institution, integration with several units and a lot more project planning and data analysis. IT is the underpinning of so much of the operation and growth of the institution.”

Yes, as another instructional technologist at a two-year community college in California observed, “IT is underestimated, underfunded and overlooked.” And yes, it’s led by a leadership that may be good or may be bad, she added. But ultimately technology makes up “the future of every occupation, every classroom and every part of our lives.”

Without the work you do, without the work done by IT professionals in every school across the country, higher education would be a very different experience today.

A tech support specialist at a tiny school in Michigan understands this pivotal role that tech plays, and this person is nowhere close to giving up fulfilling the role that IT can play in the learning business. “We are a small college with less than 300 students, so technology is not like Michigan State; but we do try to give students the best we can. Could it be better? Sure, and maybe someday it will be. But I feel that technology will always have its place in education.” CT

Dian Schaffhauser is a senior contributing editor for Campus Technology.

SALARY SURVEY

Campus Technology polled its readership between September and December 2016. We put out an open invitation to IT professionals in higher education, incented them to participate with a $250 Amazon gift card as a prize for one randomly selected winner, and promised confidentiality for respondents. The survey was advertised on CampusTechnology.com and in newsletters, as well as in e-mail promotions to our subscriber list, with recipients asked to encourage colleagues to participate as well.

We received 466 completed surveys. Ineligible responses were manually culled from the survey results. (For example, multiple K-12 IT staffers responded to the poll, as did faculty members, outside vendors and other non-IT staff and administrators. We also culled for unrealistic salaries — most probably entered as typos. The final tally for qualified respondents was 377, of which 63 percent were from public colleges and universities; 31 percent were from private, not-for-profit colleges and universities; and 6 percent were from for-profit post-secondary institutions.

Geographically, the survey had representation from 48 states, with regions roughly tracking the Department of Education’s own regional data for post-secondary institutions located within the United States. The exception was the New England region, which had about 5 percentage points more representation among our respondents than it does in ED’s data.

The breakdown in student body size was: 0-499: 2 percent; 500-999: 3 percent; 1,000-2,499: 11 percent; 2,500-4,999: 14 percent; 5,000-9,999: 16 percent; 10,000-19,999: 20 percent; 20,000-29,999: 14 percent; and 30,000 and higher: 20 percent. An institution’s enrollment size didn’t seem to be a major determinant for salary average: The averages varied only by about $5,300. People with IT roles at institutions with fewer than 10,000 students averaged $77,592; those in schools with between 10,000 and 19,999 students averaged $75,568; and those with enrollment larger than 20,000 students averaged $80,902.

The survey consisted of 15 questions, almost all of which were mandatory. A final open-ended question asking for additional comments was optional, though more than one-quarter of the qualified respondents chose to add their input, which we’ve included as quotes throughout the article.
How a Bike Race Led to Experiential, Personalized Learning

When the 2015 Union Cycliste Internationale Road World Championships came to the Virginia Commonwealth University campus, the university embarked on a networked, multimedia, trans-disciplinary exploration of the event — creating a unique learning experience for students.

VCU Associate Professor of English and Special Assistant to the Provost Gardner Campbell, project lead, explained why the bike race was a good venue for learning: “The project was not just the experience of a sport-

The Great VCU Bike Race Book project gave students an opportunity to learn by doing and a chance to become “authors,” producing content curated into a virtual book.

seized the opportunity to offer students a unique learning experience, using the race environment as a giant learning lab.

As the 2015 UCI Road World Championships race sped through town, VCU could have told students to hunker down in their apartments for a few days of independent reading. But leadership on campus recognized the event’s potential for offering students a week of focused learning in a real-world environment. Faculty responded enthusiastically with an array of 25 web-connected, truly experiential courses. Students chose from a wide range of topics, from gender studies to physics, all of which tapped the race environment for learning. The resulting project was a networked, multimedia, trans-disciplinary exploration of the UCI event.

**Special Section**

2016 CT Innovators in Depth

Meg Lloyd

**Category:** Teaching and Learning

**Institution:** Virginia Commonwealth University

**Project:** The Great VCU Bike Race Book

**Project lead:** Gardner Campbell, special assistant to the provost and associate professor of English

**Tech lineup:** Adobe, Apple, Bepress, Canon, Feedly, FeedWordPress, Nikon, Reclaim Hosting, Sennheiser, Slack, Sony, WordPress, WP Engine

**THIS PAST academic year, Virginia Commonwealth University was faced with a huge logistical challenge — a world-class international bike race routed through town would disrupt local traffic patterns and supply lines and potentially throw the campus into chaos for a week. But VCU made an innovative strategic choice: The university**

*THIS PAST* academic year, *Virginia Commonwealth University* was faced with a huge logistical challenge — a world-class international bike race routed through town would disrupt local traffic patterns and supply lines and potentially throw the campus into chaos for a week. But VCU made an innovative strategic choice: The university
Students and their peers were co-creating knowledge with their professors. It's a true example of using multiple technologies to create one final product, and the students' efforts could well result in their work becoming a permanent part of the university's intellectual and cultural heritage.

breaking down silos, bringing together instructors and departments that rarely had the opportunity to enjoy the advantages of cross-disciplinary collaboration.

The particular technologies used were many and diverse. Campbell noted that the project called on just about every available piece of technology on campus — rattling off a few of the more common ones, including Adobe, Apple, BePress, Canon, Feedly, FeedWord-Press, Nikon, Reclaim Hosting, Sennheiser, Slack, Sony, WordPress and WP Engine. But what truly mattered was the university's strategic decision to commit to a week of courses, the support of faculty and the enthusiasm of students.

For the faculty, the project had the effect of becoming something more, having to do with the possibilities of human accomplishment and the commitment it takes to get to your goals. Our students saw around them, as they were pushing themselves in the context of their own intensive courses, world-class athletes who were committing their hearts and minds and bodies to excellence.”

Furthermore, the project was a chance for students to become authors: Students worked to produce content to be curated into a virtual book and archived in the university's scholarly repository, “Scholar's Compass.”

“What we wanted to do with the metaphor of the ‘book’ was to lift students’ eyes and aspirations higher,” said Campbell, “with the idea that their work could be preserved, as a curated digital publication, in the university’s scholarly repository and thus become part of the history of the event itself.”

Almost like crowdsourcing the development of educational materials, students and their peers were co-creating knowledge with their professors. It’s a true example of using multiple technologies and multiple constituents to create one final product, and the students’ efforts could well result in their work becoming a permanent part of the university’s intellectual and cultural heritage.

For the faculty, the project had the effect of...
A Mobile Personal Assistant Tuned to Student Needs

In an effort to help freshmen manage the college transition, the University of San Diego created a smart personal assistant app designed to help students prioritize and track their tasks.

Category: Student Systems and Services
Institution: University of San Diego
Project: Insight Mobile App
Project lead: Avi Badwal, senior director, enterprise technologies, information technology services
Tech lineup: Apple, Ellucian

**EACH FALL,** IT leadership at the University of San Diego used to observe new students struggling with the transition to college. Freshman would go from the safety of high school life to the stress of managing homework assignments, extracurricular activities, personal tasks and more on their own — perhaps for the first time.

To help students cope, Senior Director of Enterprise Technologies Avi Badwal (project lead) and Vice Provost and CIO Chris Wessells worked with campus developers
to create the Insight Mobile App: a smart personal assistant app that allows students to prioritize and track their tasks. The app is designed to be specifically relevant to USD and its systems, according to Wessells: “Generic personal assistants aren’t very effective for our students, because they are not tied in with our Student Information System or our Constituent Relationship Management System,” he said. “To do something more powerful, we connect Insight with those two systems.”

USD’s underlying SIS is Banner Student (Ellucian XE), and its CRM is Salesforce and TargetX. Through those systems, Insight is able to tap into a wealth of custom, personal data such as class rosters, class details, instructors and class locations. Because of the predominance of Apple phones on campus, USD developed Insight for the iOS platform.

Students receive nudges and alerts to their mobile devices based on their existing data. End-of-semester analytics allow them to see where their time was spent throughout the semester, and how that has impacted their grades and performance overall. And given the artificial intelligence built into Insight, the more a student uses the app, the more targeted and personalized services he or she will receive.

“There is a trend at universities, generally, to personalize services — and mobile is, right now, a big part of that. There are going to be more applications around learning and the day-to-day business of the university that will have to be tailored to the individual,” Wessells pointed out.

Use of the Insight app on campus is solid. USD’s graduate and undergraduate student population totals more than 8,250, and within the first year the university has seen more than 2,800 students using Insight (based on downloads from the app store). Also within the first year, the app has seen more than 100,000 completed tasks — everything from using the time tracker to entering a personal task and completing it, checking an assignment, responding to a push notification, or entering an emotion on the emotion tracker.

Insight will continue its emphasis on personalization in the context of offering high-quality services. As Wessells explained, “Personalization is not just an individual using technology. It’s about making sure there are people there, in the right places and at the right times, to address the needs of the individual student, and having a holistic view around the student.”

Meg Lloyd is a freelance writer based in Northern California.

Insight helps University of San Diego students track their assignments and manage time spent on tasks.

CALL FOR ENTRIES: 2017 IMPACT AWARDS

Have you made your mark on the practice of technology in higher education? We want to know about it! The new Campus Technology Impact Awards will honor exemplary colleges and universities that are making an extraordinary impact with technology on campus, doing important work in the service of teaching, learning, administration and operations. A successor to the 12-year history of our Innovators awards, the new award program serves to broaden the scope of that recognition, to include both cutting-edge and well established projects. Our goal is to highlight projects large and small that have had the greatest impact on the institution and on the higher education community.

Application deadline: April 10. For more information, go to campustechnology.com/impact.
What happens when you mix a high-end technology sandbox loaded with ample, cutting-edge digital media tools and production facilities with some of the world’s brightest students and most innovative faculty? To find out, we talked with Andrew Phelps, founder and director of the Rochester Institute of Technology’s Center for Media, Arts, Games, Interaction and Creativity (MAGIC) and MAGIC Spell Studios.

CT: Why did you start MAGIC Spell Studios at RIT, and what does it do?

Andy Phelps: In my prior academic days, I was the founder and director of RIT’s games school, the School of Interactive Games and Media. We were doing a lot of things in games, and in what we termed “new media” — which is sort of the fusion of design thinking with technology.

One intriguing thing about that work was that increasingly, none of the faculty were necessarily in the right homes. We had a games program that grew in a college of computing; we had a new media program that was trying hard to straddle a college of computing and a college of imaging arts and sciences (which is our art school); we had folks running over to the college of business to try to take entrepreneurship and digital marketing courses; and we had a “digital humanities” effort coming out of liberal arts.

RIT had what amounted to a kind of hodgepodge across campus in trying to make all this work. And everybody says “multi-disciplinary,” but very few actually do “multi-disciplinary” very well.

I had a number of talks with the president, with the provost and with others on campus, and we came to this idea of trying to move the research and development function away from being placed simply at the department level. Instead, we were going to create a center that cut sideways through all of the things that were happening at the university. Then, we would seed it with resources so that people had some incentive to play. It’s not an uncommon model, but we looked at it and said: “We’re creating the center, providing the space and we’re using some campus resources to get people engaged and crossing multi-disciplinary lines.”

Hopefully, we thought, people were going to be able to make things — but the question became: What happens to what they make? And that’s where MAGIC Spell Studios was really conceived. If we are serious about facilitating faculty and student work in digital media, a big part of the digital media ecosystem is actually publishing it — putting it in front of the public and having the public react to it.

We looked at our university, and found that it was really not set up to do all that. We had students publishing things into the app stores and then walking away from them. We had multiple groups of people trying to figure out how they were going to do dissemination as defined in their research — but that usually meant writing and publishing a paper or a book about the work, usually without ever publishing the thing itself that they had created.
We decided we want to get our work “out there.” In order to do that, we needed a publishing studio. Publishing and supporting a digital media work is a very involved thing, including dealing with the finances, branding, marketing and first- and third-party relations.… All of this really means you need a place, a center that’s committed to publishing and helping others publish their work; servicing the work once it’s out there; and helping people understand its impact.

So, that’s really what MAGIC Spell Studios does. It’s first and foremost a really different take on what most universities term “technology transfer” or “commercialization.”

CT: When was MAGIC Spell Studios first operational? And when do you expect to see it living in the new home you are building for it?

Phelps: It started in 2013 — that’s when we created the MAGIC Center, and we created MAGIC Spell Studios as a small company within our research center specifically for all of the purposes that I just outlined. The new building that we’re establishing will be online in the fall of 2018.
CT: How do partnerships with companies fit into the mix as you develop, support and build on the work of MAGIC Spell Studios?

Phelps: These partnerships come into play at several different levels and in several different stages, but I can identify four main areas: 1) technology, facilities and infrastructure issues; 2) publication issues; 3) research relationships; and 4) student internships and learning experiences.

Technology, facilities and infrastructure issues: Obviously the things that we are doing are tech-centric, and so that means working with a wide array of technology solution providers. For example, we are working with Cisco and Dell in the design of the new facility and equipment. So that's one level, where we partner with companies to provide the tools and resources we need to facilitate this kind of work.

Publication issues: Beyond technology and infrastructure, we are working with companies on publication issues. For example, recently we were one of the first universities to publish an Xbox game, which our students had started in a class. And in doing that, it meant working with Microsoft and with several different vendors (e.g., Unity) inside Microsoft around the publication process. This involvement is more in-depth than just taking a game engine off the shelf and using it in a course.

Research relationships: Another way we work with companies is through research. We did a project not too long ago with the Experience Design (XD) group at Adobe, where they sponsored one of our groups to think about some of their research questions. They gave us some problems that were interesting to them, and we used what we know about digital media and new media and interaction to think through those questions. We gave them back a series of prototypes — great projects for our students to engage in hands-on, and nice for them to include as portfolio pieces. But also, we provided some real strategic value back to Adobe's own research group in terms of reinforcing or challenging their thinking. A couple of ideas we came up with were "off the wall" enough to cause Adobe to do some important re-thinking.

Student internships and learning experiences: And finally, another way we relate to companies is through experiences we can offer as a northeastern cooperative education university. For example, our students can take a four-year degree, split it over five years, and with the additional time, go out and work in industry. That directly helps our students get job experience and currency, along with lots of other wonderful educational goals, but it also brings industry experience back to us. There's a constant currency in what we're doing: We send students out to all the major places, and they ultimately come back here with new skills and ideas.

CT: What are you creating in terms of resources for the MAGIC Center?

Phelps: Typically in most academic environments, someone's research project will fund a traditional lab around a really specific set of goals and objectives based on the project that funded it. And the only rule in terms of use is that you are not allowed to tell somebody else that they can't use it. The whole point, then, is to create a sort of shared sandbox and invite everybody to come and play with the very best toys. Then you stand back and watch the things that emerge. You have all of these groups, together, with resources like a sound stage, a movie theater, a VR lab, games labs, animation classrooms, incubation space, collaborative partner spaces and more.

The core driver of all of this is that it's all in the same spot. So Geek Heaven is Christmas morning with all the support of those given projects.

But, we stood all that on its head a bit and said, "With some things that are emerging, we just don't know exactly where they are going to go." Digital media keeps reinventing what's possible every couple of years. So for us, the really interesting things are the interconnections — the ways that different fields are, if you will, kind of tripping over themselves and each other.

So we had this notion of Geek Heaven, which was not at all like the traditional lab I described. We try to get everything that we can — everything cutting-edge — and put it all in the same place. The only rule in terms of use is that you are not allowed to tell somebody else that they can't use it. The whole point, then, is to create a sort of shared sandbox and invite everybody to come and play with the very best toys. Then you stand back and watch the things that emerge. You have all of these groups, together, with resources like a sound stage, a movie theater, a VR lab, games labs, animation classrooms, incubation space, collaborative partner spaces and more.

The core driver of all of this is that it's all in the same spot. So Geek Heaven is Christmas morning with all the
technology and all the toys. But we then say, in effect, “Open up all the presents, throw them all over the room, but then let’s see what happens when people start playing in this type of environment and near each other.” We are trying to engineer the “happy accident.”

CT: Do you have to do anything to make sure that all students realize that they “belong” in the lab?

Phelps: We don’t need to do much! RIT students are interesting — and I’ve heard this from students and parents alike — in that they come to us having mastered a very specific game: They’ve “won” high school. These are folks who looked at high school as a system, and they optimized for, and beat, that system. They were able to get all the good grades and the academic standing they needed. And they did stand out and distinguish themselves among their high school peers. So in their high schools they were “different.”

But they come here, and almost immediately, it’s like they’ve found their tribe. They’ve found other people who share many of their interests, and are creative like they are — there is a sudden sense of belonging, which some of them had never really felt before.

So, all we really have to do in regards to the center is to say, “You belong.” Before you know it, they are trying out everything they can get their hands on. All you really have to do to engage our students with a facility like that is to give them a first experience. Crack the door open. These people will come thundering through.

With some students coming from highly structured high schools, there may be some initial trepidation about what the process is. In truth, the only “process” is to “sit down and start making stuff.” Many of these students came from environments where there were a lot of rules. We just have to get them over that hurdle to understand that “There are no rules — do what you came here to do.” CT
Upcoming Events

March 12–15
League for Innovation in the Community College Innovations 2017
San Francisco

March 19–22
The Association for College & University Technology Advancement 2017 ACUTA Annual Conference & Exhibition
Chicago

March 28–31
Digital Signage Expo 2017
Las Vegas

April 7–14
The SANS Institute SANS 2017
Orlando

April 22–25
American Association of Community Colleges AACC 97th Annual Convention
New Orleans

April 23–26
Internet2 2017 Internet2 Global Summit
Washington, DC

May 7–12
The Data Warehousing Institute TDWI Chicago Conference
Chicago

To submit your event, e-mail rkelly@1105media.com.

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