2017 Technology Highlights

A report from the CIO on how campus technology supports instruction, research, and service
A story of advances and achievement

As a campus, we’re making progress in the ways information technology supports the UC Davis mission. This report offers a few stories that illustrate that progress, from efforts to help researchers secure their data, to an inventive program that uses immersive technology to expand the study of drama.

As chief information officer, I’m keenly interested in how we can best amplify and extend this progress. A crucial element is our ability to collaborate across the campus, identify common priorities and themes, and then work together to meet those needs. Synergy will help us achieve our shared goals. Working independently, we individually will never have enough resources for IT to meet the collective challenges of supporting a growing student population, addressing emerging cybersecurity threats, or optimizing the use of administrative computing. But addressing shared needs together—dealing with repeatable, overlapping tasks in a common way—frees IT staff in departments to work on the specialized needs in their areas. This is a formula for progress.

The work in these pages does not necessarily involve Information and Educational Technology. We lead some of these projects. For others, we assist, and for some, we simply admire the innovation. As food for thought, this report also includes a sample of statistics about campus IT, a list of services that can assist faculty, students and staff (with a link to the IT Service Catalog for more information), and a snapshot of how students use technology in 2017.

I want to conclude with this striking photo of a new graduate during commencement for the College of Biological Sciences. This image reminds us why information technology matters—not for its own sake, but because IT supports the research, instruction, and everyday transactions that help individuals, and the campus collectively, achieve the transformative goals that moments like this one represent.

To all our colleagues across the campus: Thank you for helping us support UC Davis.
Robert Blake, distinguished professor of Spanish linguistics, believes strongly in UC Davis Canvas. He was one of the first faculty to start using it in 2016, and is glad to share his reasons, which start with the way the new campus learning management system (LMS) works with video. It is central to how he teaches Spanish.

"Learning a language requires the use of the four skills—reading, writing, speaking and listening," says Prof. Blake, who supervises online language courses, teaches several upper-division courses in Spanish linguistics, and directs the Davis Language Center. Assigning frequent, short videos "really allows you to do oral testing. In languages, that’s crucial. We couldn’t do this before."

Here’s a typical example. He assigns a question to a student, who responds in Spanish on video. Prof. Blake has set up Canvas so it automatically share the student’s response with a number of other students, who then watch the video and add their own comments.

Throughout, Prof. Blake can see all the work—the answer, the comments, and any discussion that follows. This easy use of video allows you to harness time outside of the classroom, so students can work more on their oral proficiency," he says. "From an instructor’s perspective, I’m getting more of their time."

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A top change for 2016-17

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He likes its compatibility with various content formats, such as PowerPoint, PDF, slides, Keynotes, and illustrations. And you can write your own pages with rich text, which is like writing web pages on the fly, which is what rich text is supposed to do.

And then over the course of a quarter, the evaluations of all the work he assigns flow down to the Canvas grading tool (SpeedGrader)—comments from peer reviews, comments he enters, homework results, test scores, more. The tool provides a customizable scoring rubric. He likes the high level of organization.

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And he will aggressively explore other ways to use Canvas. “To teach languages, we have to use all the senses we can,” Prof. Blake says. “To have one place that integrates all this is really liberating.”

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Find more at movetocanvas.ucdavis.edu

From left: Jonathan Martindill, Andrew Holguin, Steve Pigg, Kendra Olmos, Thomas Ryan, Nathan Hatch, Sumiko Hong, Gabriel Parais, and Professor Frank Loge.

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4,000
Number of wireless access points on campus

33,000
Average weekday peak number of concurrent wireless device connections to campus network — up 18 percent from year before

10,066 hours
Average daily # of time available on computers in IET-managed computer labs

1,700
Number of courses using UC Davis Canvas, start of winter term

2 petabytes
Total amount of data storage capacity in campus Data Center

175,000
Malicious contacts blocked (by central campus intrusion prevention system) from campus network daily

30,446 hours
Amount of time people spent watching videos of classroom lectures, recorded by Academic Technology Services video, fall 2016

250,000
Number of sessions (rough estimate) involving public ucdavis.edu websites per day

144,000
Number of active campus computing accounts

4,000
Number of campus phones (VoIP and analog, desk and cell)

7 gigabits per second. Data flowing over main campus connection to Internet (weekday afternoons)

322,529 Visits in 2016 to IT Knowledge Base

25%
Students who have at least one class in a computer classroom

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Service contacts in 2016 to IT Express (phone calls, chats, emails)

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As hacks go, the one that redirected Google search traffic from a popular UC Davis website to pharma-spam pages in Canada last year was short-lived and relatively minor.

Still, it could have been serious, and the way it was resolved illustrates the teamwork the campus is pursuing in information security. The cooperation is expressed both in new programs, and simply by encouraging different parts of the campus to work more collaboratively to protect data—UC Davis’, and their own.

This particular hack surfaced one afternoon when UC Davis information security consultant Jevan Gray ran a Google search using the term “viagra ucdavis.edu.” Universities are constant targets of malicious cyber-attacks, including ones where hackers redirect searches from responsible locations to junk sites. He wondered if that was happening here.

“My search yielded the term ‘Viagra,’ but only for websites in the uc.davis.edu domain,” Gray says. “What about ‘Viagra,’ but only for websites in the uc.davis.edu domain?”

He alerted the administrator, who heeded the warning. The information security office was alerted. Jevan Gray ran a Google search using the term “viagra ucdavis.edu.” Universities are constant targets of malicious cyber-attacks, including ones where hackers redirect searches from responsible locations to junk sites. He wondered if that was happening here.

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He alerted the administrator, who heeded the warning. The information security office was alerted. ‘Whoa,’ the administrator said, ‘I’m going to talk to my colleagues about this.’ They fixed the problem. And then—this next step is important—the administrator talked about the incident at the next meeting of the UC Davis IT Security Committee, so the campus could learn from it.

Other campus tech employees have been similarly open, overriding the more common instinct of saying nothing about such hacks for fear of being criticized. The Information Security Office is working on several programs, some new, to improve cybersecurity. Like the resolution of the spam-phax hack, they require stronger cross-campus collaboration. Here are five of the key initiatives:

- A partnership program. Chief Information Security Officer Cheryl Washington will talk individually with department leaders, to understand their security risks, needs, and common issues. The goal is to build relationships and connections on issues of information security, and to find the best ways to work together.
- Risk assessments. These reviews, already required by UC policy, are likely to gain more importance when the next edition of the UC security policy takes effect. They help departments understand and set priorities for addressing the risks they face, based partly on the department’s answers on the (usually annual) campus Cyber Security Survey. The ISO wants to identify areas with the most risk, and offer help to lower that risk.
- Help meeting payment-card industry (PCI) standards. To the industry, UC Davis resembles one big merchant that processes payments for anything from tuition to lunch. Tough PCI standards cover areas ranging from building and maintaining a security network, and protecting cardholder data, to controlling access and managing vulnerabilities. The ISO is helping campus units meet the standards.
- Vendor contract review. If any unit buys a service or product that requires a contract with UC Davis information security, then the ISO reviews the contract to make sure the data is secured.
- Security Operations Center. The ISO has created a group of information security analysts who look for, analyze, respond to, and help prevent incidents. Gray is one of its members.

There are other programs besides these (community outreach, policy development, and training, to name three), all based on the principle that information security is not just a concern for technologists. “Collectively, we’re not protecting machines. We’re protecting research, reputations, health records, and other private data. That’s why teamwork is vital,” Washington says.

“With a big misunderstanding that cybersecurity is about IT,” she says. “The asset we’re protecting is information. Everyone is involved in this.”

**Direct Connect, stronger wireless: Preparing the network for a varied future**

Picture the campus network as a speedway. At one end you have esoterica like Amazon Web Services (AWS) Direct Connect. At the other end you have the internet of things, extending even to novelties like “smart clothes.” In between you have growing volumes of everyday traffic—research data, homework, emails, transactions of any kind. The campus is building its network to handle all of it. Accommodating the strong growth of wireless use is the major part of the work, and affects just about everyone. Other changes will be more directly valuable for researchers.

A promising connection for researchers

One of the newest features available to UC Davis and UC Davis Health customers is AWS Direct Connect, which provides a 10-gigabit private network connection to Amazon. “We’re in the final steps of putting that in,” says Mark Redican, director of Communications Resources and the Data Center for Information and Educational Technology.

C. Titus Brown, associate professor of Population Health and Reproduction in the School of Veterinary Medicine, already uses AWS extensively “for small-to-medium data analysis projects where our other dedicated compute resources aren’t sufficient.” Direct Connect will “make it faster and cheaper to transfer data to and from our local AWS region.”

“Direct Connect removes some of the major hurdles [to using AWS],” he says. “This is especially true for the burgeoning area of data-intensive biology, in which we have to move lots of large data sets around.”

 Students? Mostly wireless. Staff? Headed there

Most of the network-related work at UC Davis focuses on the wireless side. “It probably occupies our time the most, because of the need and pervasive appetite,” Redican says. “And it affects everyone.”

Two-thirds of campus network traffic is now wireless. Although faculty and staff use both wired and wireless connections, students mostly use the latter, and staff are trending that way. To support the demand, the campus network now has approximately 4,000 wireless access points, up from 2,500 a few years ago. Many personal devices, such as FitBits, use smartphones as wearers’ vital signs.

The new access points are also more powerful than their predecessors, especially in locations with intense demand, including classrooms, lobbies, and popular public spaces like the Coffee House.

Students each bring an average of two to three wifi-devices to campus, and the number of connections per person will grow as more “things” join the network, from monitors, lights, and vehicles, to clothes with sensors that measure the wearer’s vital signs.

Not every added thing requires a direct network connection. Many personal devices, such as FitBits, use smartphones as intermediaries between the device and the network. Still, the volume of data flowing across the campus network is huge. The stream hits 7 gigabits per second via the main campus connection starting around noon on the average weekday, and stays there for several hours before tapering. “If you include our Internet2 and Comcast connections, the total rises to 8.5 to 9 gbps per second,” Redican says. (The Comcast connection provides Xfinity On Campus television programming in residential housing.)

And no one thinks it’s done growing. A year ago, the peak Comcast connection provides Xfinity On Campus television access. Although faculty and staff use both wired and wireless connections, students mostly use the latter, and staff are trending that way. To support the demand, the campus network now has approximately 4,000 wireless access points, up from 2,500 a few years ago. Many personal devices, such as FitBits, use smartphones as wearers’ vital signs.

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**Play the Knave expands the study of drama**

For today’s demonstration, Associate Professor of English Gina Bloom and student Tobi Foley have set up Play the Knave in a room on the second floor of Voorhies.

Tables and chairs are pushed to the wall. They face a large screen and stand still as the game’s lens captures them as avatars, first as stick figures, then as fleshed-out characters in a scene they chose from William Shakespeare’s Coriolanus. Next, Foley and Prof. Bloom act out a fight described in the text. As they read lines from the screen, their avatars mirror their combat—and we get to see one of the ways that Play the Knave, an immersive game, enriches the study of drama.

It draws you deeper into the play. First, it offers options. You choose the play, scene, stage, and avatar. Do you prefer contemporary clothes to Elizabethan? Done. Or if you find it more engaging to be a robot, you can be a robot. If the language is unfamiliar, you can abridge it. That’s useful for middle-schoolers new to Shakespeare, Prof. Bloom adds.

Second, adapting scenes for the game requires students to really understand the scripts and language they work with, says Foley, an undergraduate majoring in German and philosophy. She’s earning credit by adapting scenes from Coriolanus and Taming of the Shrew.

Play the Knave reduces stage fright. Prof. Bloom likes to assign performances to her students. That’s difficult in large classes, but the game offers an alternative that still delivers some of the performance experience. Students are also less self-conscious, and freer to focus on the play, because they face a machine, not a crowd.

Finally, the game gets students thinking about bodies—how bodies move, look, and interact. The body is important to drama, Prof. Bloom says, because it’s how meaning is conveyed, but “it’s hard to think about what a body is. This [game] becomes a clear way to communicate what a body is. Tech is a nice way into this subject.”

Using the campus ModLab

Prof. Bloom directs the Play the Knave project. She started it in fall 2013, using the resources of the campus ModLab, an experimental laboratory for media research and digital humanities. She teamed with Colin Milburn (project co-director), Evan Buswell and Nicholas Toothman (lead architects), Michael Neff (animation research and development), and several graduate students.

She showed it at the Stratford Festival in Toronto in summer 2015 with one scene, and has kept building since then. She has used it in freshman studies seminars, graduate-level teaching, and in courses on pre-1800 literature and history, Shakespeare, and Renaissance literature.

She hasn’t yet released it publicly, although other colleges and universities are interested. She has done 10 installations so far. The latest is Gallaudet University.

Prof. Bloom is not a technologist, but the work has expanded her understanding of how technology can assist her work. “Play the Knave moved me into the digital humanities and arts,” she says, “and I have students thinking about pursuing this field, who hadn’t before.”

Find more at playtheknave.org
IET Information & Educational Technology
(a partial list of services)

- Academic and research programming
- Application services
- Audio-visual engineering
- Cable television
- Classroom technology
- Client services
- Computing accounts
- Computer rooms and management
- Data Center operations
- Database support
- DavisMail
- eduroam (wireless access)
- eLearning Studio
- Enterprise services
- Faculty support
- IAM infrastructure
- Information Security
- Infrastructure systems management
- IT Express Service Desk
- IT Professional Services
- Media lab
- Media production
- Network services and engineering
- Network operations
- Project management
- Quality assurance & business analysis
- Radio services
- Systems administration
- Service Management
- Software Licensing
- Telephone services
- UC Davis Canvas (learning management system)
- uConnect
- Virtual lab (software)
- Web development

Read more about these services, and others, in the IT Service Catalog at itcatalog.ucdavis.edu

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