ADVANCING SERVANT LEADERSHIP

Texas Woman's University
Office of Technology Annual Report • 2012-2013

CONTENTS

OFFICE OF TECHNOLOGY DASHBOARD

80%
Technology Service Desk
First Call Resolution

1.8x
Increase in
Network Storage

99.779%
Average Uptime for Production
Infrastructure Hosts

143 Physical Servers   Operating Systems 418
2009

113   442
2010

113   463
2011

113   324
2012

Density of Operating Systems to Physical Servers

WHO WE ARE
74 Technology professionals

WHO WE SUPPORT[1]
15,151 Student enrollment (fall)
405 Professors
355 Adjunct faculty
394 Teaching assistants
799 Staff

OUR ENVIRONMENT
3 Campuses
3,805 Desktop computers
851 Laptop computers
476 Tablet computers*NEW!*
173 Projectors
565 Printers
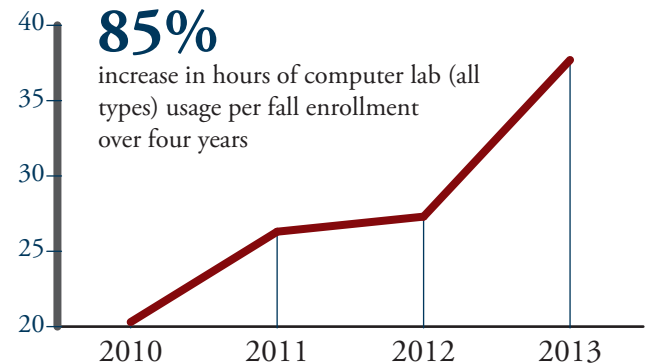
Significant Changes

	2010	2011	2012
Network Storage (TB)	283	326	597
Virtual Servers	442	463	324
Wireless Access Points	170	224	440
Classroom Lab Hours	49,549	71,580	130,959
Open Lab Hours	183,970	182,609	235,181
Kiosk Users	14,420	11,384	8,690

85%
increase in hours of computer lab (all
types) usage per fall enrollment
over four years

As little as a year ago, I aimed to express our value in terms of quantitative metrics. Since then I have relearned what great people like Abraham Lincoln already knew: data can be misleading without context.

Big data is all around; people who throw around phrases like "data-driven decisions" are ubiquitous. The world of IT is especially allured by the promise of gains made possible through quantitative analysis. Such analysis can be helpful, but we have found that the data are better understood when talking with our partners.

In a numbers-driven world, we often lose our focus on fostering relationships. By talking to our partners across the institution, we do much to break down the silos that inhibit collaboration and communication, ultimately delivering a better experience for our students.

We are privileged to have the opportunity to serve our students, faculty, staff, state, and country. Each day we strive to live up to the privilege bestowed on us. After reading this report, I hope you are as proud of the Office of Technology as I am.

Robert B. Placido

Robert B. Placido
Associate Provost for Technology & CIO

TWU Soccer fields have new fiber optic network lines to support Athletic's high-bandwidth needs.

Source: TWU's photostream at Flickr

Graduation stands as a symbol of what motivates the Office of Technology to value servant leadership and what drives its personnel to excellence.

Service Mission: *Defining a Framework*

The Office of Technology has developed servant leadership as one of its core values. Partners across the institution have taken note.

Ease of Collaboration

The shift in values has forged stronger relationships within administrative units and with academic colleagues.

"We have made more gains in technology than ever before."
—Gary Ray, Vice President for Enrollment Services

"There have been better relationships, better communication, and more transparency."
—Camelia Maier, Associate Professor of Biology

"Collaborations are really everywhere; it is not just in academics. What I hear is how helpful the Office of Technology is in almost every sector."
—Bob Neely, Provost and Vice President of Academic Affairs

Democratizing the Decision-Making Process

Maintaining relationships with a growing number of colleagues requires a framework for governance. In March 2013, the Office of Technology formed a committee to improve technology governance at TWU. The guiding principle behind technology governance is

that decisions must be informed by the university community for the purpose of linking technology investments to the university's mission.

The Technology Governance Committee completed its work in three phases. The first phase was to review academic research and practice of technology governance in higher education. The committee considered a variety of approaches and on the basis of their review wrote a draft policy in the second phase. The final phase of the committee's work is underway. The objective is to give the campus a voice in the technology decision-making process.

Continuous Improvement: *Leadership*

Technology is an umbrella word encapsulating telecom, programming, software, desktops, laptops, tablets, conferencing, networking, and custom mobile apps—a host of equipment and tools university colleagues use everyday to create, innovate, and move forward the mission of TWU. Positions in the Office of Technology all require high degrees of technical skill that need to grow as technology rapidly evolves. It is equally important for Technology to support its staff in honing their communication and leadership skills.

The Student Advisory Committee for Technology will help bring a student voice to technology governance.

Students work in new and different spaces increasing demand for wireless network access.

A Communications Umbrella

On the basis of a series of surveys that aimed to measure internal employee satisfaction, the Office of Technology identified two areas for improvement: compensation and communication. The institution has already begun a process for studying compensation. Meanwhile, the Office of Technology started a communication committee and a professional development series on leadership.

Recognition

The Office of Technology's service framework is modeled from the top. Patrice Armor, Manager of Technical Programming, was awarded IT Manager of the Year through the Texas CIO Academy in 2013. She was noted for her dedication, professionalism, and willingness to go above and beyond.

Course content delivered online frees class meetings for discussions that may better develop higher-order thinking.
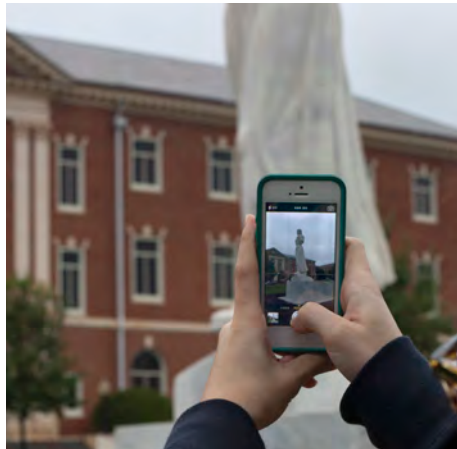
Shrinking technology allows students to engage in new forms of scholarship and creativity.

Partners with Faculty: *Pioneering Assessment*

EDUCAUSE named "Improving Student Outcomes through an Approach That Leverages Technology" as its number-two issue for university IT in 2013. The Office of Technology can only meet this challenge by working with faculty to determine need and realize solutions.

Scalable and Reliable Assessment

In Fall 2012, Dr. Gray Scott and the Office of Technology co-developed a software solution to assess first-year composition. The software allows graders to assess students' essays where each essay is blinded and assessed at least twice by different graders. Roughly a thousand essays are rated at the start and end of each semester. The software, code-named Minerva, opens up many more opportunities for educational research in the humanities. For example, doctoral teaching assistants of composition courses can better experiment with interventions and control groups. Dr. Scott and his students are currently studying stereotype threat mitigation.

"Minerva enables us to measure progress on student learning outcomes more accurately and much more reliably than we had before."
—Gray Scott, Assistant Professor, English, Speech, and
    Foreign Languages

Students regularly use multiple devices in their scholarship and creative work.

Students in Dental Hygiene explore how technology is playing a growing role in every profession and scholarly endeavor.

Tracking Experiences

TWU students are best-served by an academic program and university that is on the cutting edge of technology. This past year, the Office of Technology wrote a customized cloud-based app that allows clinical faculty in Dental Hygiene to chart student experiences in real-time using tablet computers. This software, code named Pioneer Tracks, not only adds greater validity to student experience data but also eliminates countless hours of manually entering and aggregating data for accreditation reports.

"The Office of Technology exceeded our expectations."
—Amy Teague, Assistant Clinical Professor, Dental Hygiene

Electronic Curriculum Vitae

The academic leadership at TWU invested in SEDONA, a self-service web database application that allows faculty members to more easily maintain their CV. Over the last year, the Office of Technology collaborated with a faculty steering committee to implement SEDONA. This project involved 17 TWU graduate students entering 408 CVs over the nine-week summer semester. Training and development support will continue next year for faculty and support staff.

"SEDONA is a great example of IT stepping forward."
—Bob Neely, Provost and Vice President of Academic Affairs

SEDONA is a self-service web database application that allows members to maintain their teaching, research, service, experience, development, credentials, and assessment records. Administrators may use SEDONA to automatically update school web pages; support accreditation; build rubrics to assess learning objectives; customize reports (including CVs); create database queries, web surveys, ePortfolios, and evaluations.

Administrator Evaluations

The Office of Technology worked in collaboration with the Faculty Senate's Administrator Evaluations Committee co-chairs to develop a process for electronically distributing and collecting administrator evaluations.

"That was excellent work."
—Camelia Maier, Associate Professor, Biology & Co-Chair of the Faculty Senate's Administrator Evaluations Committee

Spaces: *Image Is Everything*

The Office of Technology increasingly plays a role in enhancing the university's image from many points of view.

Athletics

When fans, officials, families, visiting teams, coaches, and the media attend athletic events at TWU, they expect Wi-Fi access to the Internet. Those who can not attend expect to engage via live stats and streaming event coverage. To help meet these expectations, the Office of Technology finished a project bringing fiber optic and Wi-Fi access to TWU athletic facilities.

Student athletes rely on technology to promote their accomplishments.

"Technology is a necessary vehicle or mechanism for disseminating our great brand, particularly during national sporting events."
—Jeff Bowerman, Assistant Director, Athletics Marketing and Operations

Commencement Traditions

Commencement stands as perhaps the most revered tradition of the university experience and one with a high degree of visibility. Under the leadership of the Commencement Committee, the Office of Technology brought new resources to better support the technological aspects of commencement.

"The Office of Technology realized there was a role for them in leading the whole technology part—in a partnership sort of way."
—Amy O'Keefe, Director, Commuter & Non-Traditional Student Services

Digital Signage

Digital signs in the Music building attract students' attention to upcoming performances and events.

One sees digital signage almost every day—from billboards to sporting arenas to airports. Its ability to capture and focus the attention of passersby adds new possibilities to those in the impression-making business. The signs are easy to update and thus can convey current information. New digital signage was added in Admissions, Facilities Management, Music Building, Multipurpose Classroom Laboratory Building, Blagg-Huey Library, and in several locations on the Dallas and Houston campuses. The Office of Technology has stepped forward to support digital signage.

"Our new digital signage adds a refined look and high-tech experience when people come into our office."
—Erma Nieto-Brecht, Director, Admissions

Library Archives

The Office of Technology is collaborating with the Library on the Woman's Collection archival project and a digital repository. The collection needed its data migrated to a networked disk array, which is mirrored in multiple locations to minimize the risk of data loss for this important collection. The digital repository will make student posters, theses, and dissertations more accessible.

"We really rely on the Office of Technology to maintain and manage the redundancy and security."
—David Schuster, Director, Library Information Technology & Technical Support

Student Union

The Office of Technology served in an advisory capacity to help renovate technology in meeting rooms within the Student Union. Union directors wanted to make sure technology equipment would be compatible so that students could easily plug in today and tomorrow—maximizing their investment. Students have provided positive feedback regarding the renovations.

"Every step of the way, the Office of Technology played a huge hand in helping."
—Jason Titus, Assistant Director, Student Union

"The Office of Technology helped us make use of limited office space."
—Kyle Voyles, Director, Student Union

Students use technology in the Blagg-Huey Library for knowledge exchange.

Student organizations employ technology as one of their recruitment tools in the Student Union.
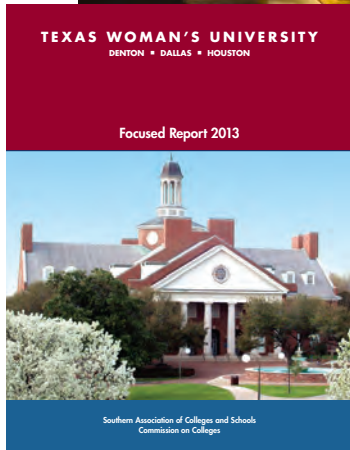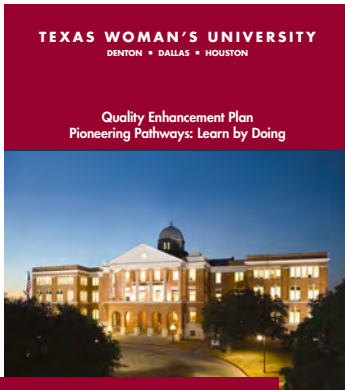
TWU's Quality Enhancement Plan proposal and SACS Compliance Certification reports were built within a technology framework that allowed for ease of document development and navigation.

Academic Research

The Office of Technology collaborated with the Office of Research & Sponsored Programs to offer faculty and students more research software and equipment, including better support for qualitative research.

"The Office of Technology took the lead on getting us needed resources."
—Tracy Lindsay, Director of Operations, Research & Sponsored Programs

Accreditation

The Office of Technology played a role this year in the functional aspects of two significant documents developed for TWU's reaffirmation of accreditation by the Southern Association of Colleges and Schools (SACS). The SACS Compliance Certification report and the Quality Enhancement Plan (QEP) proposal were structured with functionality in mind and were easily navigable using accurate hyperlinking with accessibility components built throughout. The documents made a positive impression on reviewers and other external colleagues.

"The SACS liaison, the SACS off-site committee, and colleagues from other institutions have complimented us on our electronic documents."
—Barbara D'Auria Lerner, Associate Provost for Undergraduate Studies & Academic Partnerships and TWU SACS Liaison

Streamlining Processes: *The Look of Efficiency*

The Office of Technology strives to improve operational efficiency throughout the institution. Solutions that work take time and skill to develop. Technology personnel usually engage with staff who understand the functional side of the process to study how the process works, and then they suggest ways technology can improve the flow.

Transcripts

Building on standards set by the American Association of Collegiate Registrars and Admissions Officers (AACRAO), the registrar initiated a project to transform TWU's official transcript. The Office of Technology delivered a product that was well-received by colleagues inside and outside the institution.

"They successfully translated what I needed and then delivered a product of which we can both be proud."
—Bobby Lothringer, Registrar

Changing Data Structures

One outcome of the transcript transformation project was improving the student system data structures. The improvement resulted in consistent data allowing for a professional presentation. Delivering a quality product with a strong aesthetic is a hallmark of TWU.

"It was a very involved process, and it came out beautifully."
—Sarah Kate Henderson, Assistant Registrar
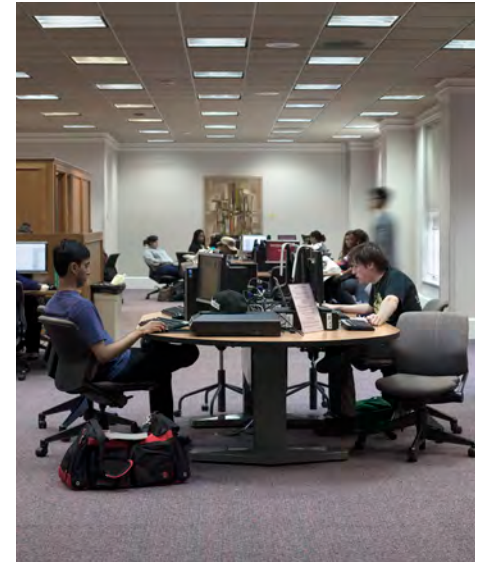
Students use technology to keep up in a fast-paced world of new ideas and information.

Students need a set of diverse technologies for their scholarly pursuits.

Advancement

The Office of Technology helped to redesign the website for University Advancement and to integrate their fundraising and donor management software with other TWU financial systems. The work has resulted in clear benefits. As one example, now anyone can easily make a recurring gift.

"I know I'm not their only client, but I am treated as though I am."
—Philip Trammell, Director, University Advancement

Orientation

Researchers continue to investigate the impact of orientation on student retention and graduation rates; and, while the subtleties of what works may still be in doubt, systematically helping groups of new students navigate roadblocks is fundamental to success. TWU orientations continue to grow in size. With new state testing requirements through the Texas Success Initiative, they also grow in complexity. Last year, the Office of Technology modernized the orientation process by developing a database-driven web application. The application allowed the Center for Student Development to systematically manage orientation data.

"The implementation of this application allowed for us to have a more seamless process."
—Lindsey Hatter, Assistant Director, Center for Student Development

Student Fees

Each year Student Life constituents have to request funding through a student-led committee for the allocation of student services fees. The Office of Technology worked with the dean of students to automate the budget process. Together they were able to reduce the time to create budget requests, ensure their accuracy, and include more detail.

"What I respect about the Office of Technology is that they believe there is always a better way, and then they help make it happen."
—Heather Speed, Associate Vice President for Student Services & Dean of Students

Protecting Research Data

Every institution's Institutional Review Board (IRB) will impress on researchers the importance of protecting personal data. This year the Office of Technology offered a guide on how to protect data stored in a digital medium.

"The quick reference guide will really help research students and faculty."
—Tracy Lindsay, Director of Operations, Research & Sponsored Programs

Online Education: *Going the Distance*

Many students take advanatage of online classes and programs offered at TWU. Technological infrastructure and support services underpin this modern pedagogy. Continuing previous years' efforts, the Office of Technology has worked to forge even stronger relationships with
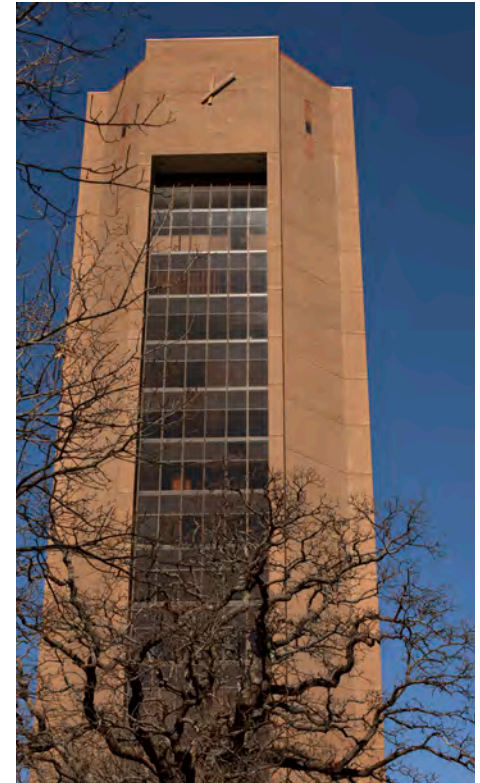
Students recognize the Administration and Conference Tower as a center for many of their technology-supported enrollment services.
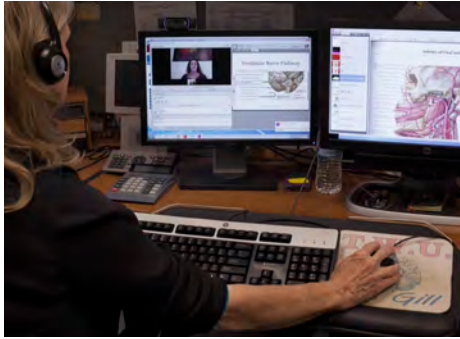
Dr. Cindy Gill teaches anatomy and physiology to speech-language pathology graduate students in her department's TETN distance learning venue using a multitude of technologies.

Tablet computers allow students to interact in online courses wherever networking infrastructure is in place.

the academic services and departments that support online education. TWU faculty and students have reported benefits of greater integration between technology and pedagogical support.

Online Student Billing

The Teaching & Learning with Technology (TLT) department and the Office of Technology worked to develop an automated system for billing distance education students. The report improves efficiency.

"Some of what we can do now is just mind-blowing."
—Lynda Murphy, Director, Teaching & Learning with Technology

Course Managers

The Office of Technology integrated TWU's learning management system with the student system, creating a process that matches faculty and staff expectations for course management. A course manager can now perform essential functions. This particularly benefits faculty working in hospitals and clinics.

"The system now works the way administrators and faculty expect, improving outcomes."
—Bobby Lothringer, Registrar

Distance Partnerships

A new training and support collaboration between the Technology Service Desk, the Learning Technologies Support department, and TLT stands as another example of Office of Technology's cultural shift. The three groups have created a new learning management

system (LMS) oversight committee to open communication channels and to create opportunities for cross-training and joint testing of upgrades.

"This fall was probably one of the better starts of the semester."
—Lynda Murphy, Director, Teaching & Learning with Technology

In the same spirit of collaboration, Office of Technology teams on the Houston and Dallas campuses have worked with TLT to offer joint training sessions on their respective campuses. The collaborative training approach aligns with teaching and learning theories about scaffolding and other strategies for effective training.

Online Tutoring

In collaboration with Teaching & Learning with Technology, the Office of Technology systemized a method for online students to access Smarter Thinking, an online tutoring resource.

"The new process saves money, time, and a lot of frustration."
—Lynda Murphy, Director, Teaching & Learning with Technology

Enrollment Services: *Data Flow*

The growth in applications, admitted students, dual credit students, and financial aid recipients, as well as increased compliance and reporting complexities are challenges that can be partially met with efficiency-focused technology.
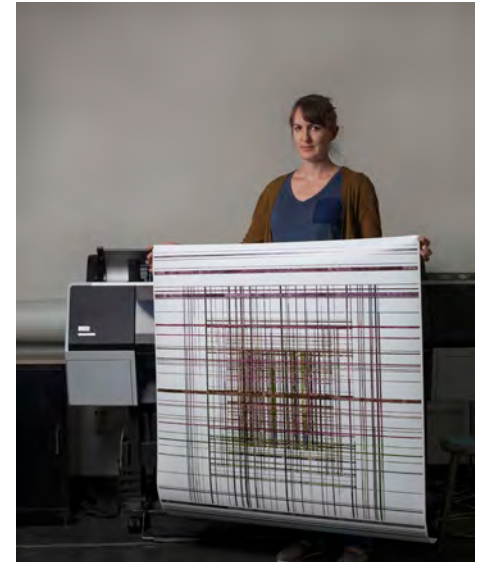
A visual arts student uses technology to express and explore feelings and ideas through her creative scholarship.

15
minutes to close an
incident request in
2012-2013
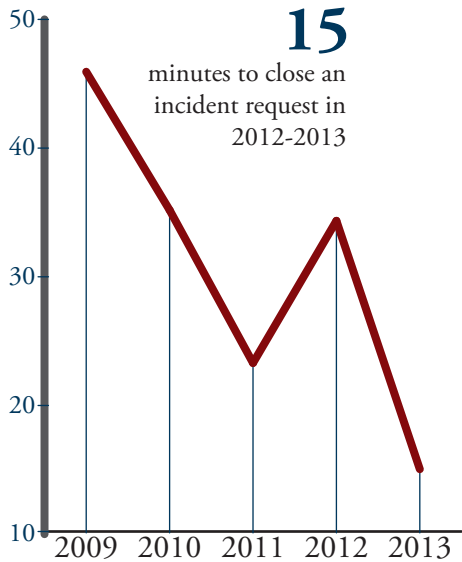
Operational efficiencies gained after the 2011-2012 reorganization are being realized.

Embed Personnel

Enrollment Services and the Office of Technology jointly created a new position to bridge the gap between technical and functional knowledge. This new position is producing numerous benefits, not the least of which is improving data validation processes. Making data consistent at the point of input saves hours of cleaning data for output in reports. The Office of Technology has similar employee partnerships with the College of Nursing and the Office of Student Life.

"By meeting on an ongoing basis, we stay ahead of the curve."
    —Governor Jackson, Director for Financial Aid

Commencement Data

Almost as soon as the deadline passes for students to apply for graduation, the commencement committee wants numbers and names. The Office of Technology helped streamline and automate that process.

"What used to take most of a day can now be accomplished in less than a minute."
—Sarah Kate Henderson, Assistant Registrar
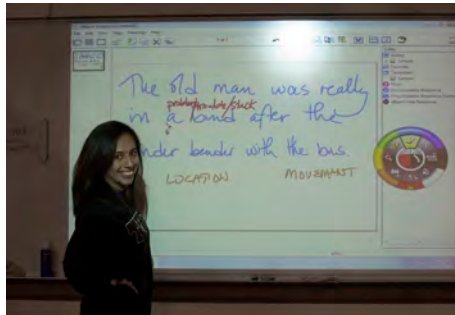
Interactive whiteboards allow instructors to digitize ideas that students present to their peers.

Eliminating Wasted Seconds

Admissions Processing worked with the Office of Technology to create a more efficient data entry process. What used to require nine screens is now accomplished on one.

"The new automation will help us keep pace with the growing demand."
—Jeannie Rickey, Director, Admissions Processing

Data Modeling

The Office of Technology has helped Enrollment Services build on research from the College Board to create a model for retention.

"With IT's help and College Board research, we've been able to develop a model, in which we've moved from a 67% first-year retention rate for freshman to 73% over the last two years."
—Gary Ray, Vice President for Enrollment Services

Transcripts Online

Ordering transcripts is the first of many processes that the Registrar's Office moved online. Online ordering existed before for current students, but the new system also serves alumni and prior students.

"The challenge of using technology to extend our services 24–7 has been a top priority."
—Gary Ray, Vice President for Enrollment Services

1,342
videoconference classes were scheduled in 2013
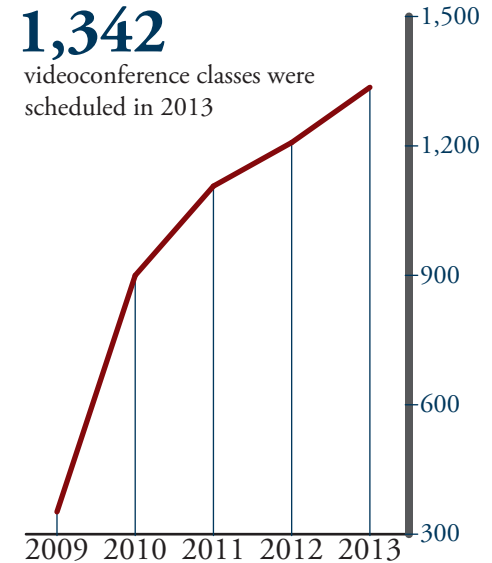
The push to make videoconferencing technology self-service has made it more accessible, and the frequency of its use is growing rapidly.

Technology serves to extend social interaction in modern student life.

Manage Growth: *New Frontiers*

After more than a year of planning and extensive testing, the Office of Technology achieved the final stage of an Oracle database upgrade, known as R12. Already colleagues across the university are realizing the benefits of the new technology.

Manager Self-Service

Manager Self-Service (MSS) is a new module made possible by R12. With MSS, the entire personnel transaction process is now electronic, improving efficiency and data validity.

"Manager Self-Service gives departments hands-on access to be able to do most steps independently."
  —Amanda Noday, Manager, Payroll

Voluntary Benefits

The benefits group in HR worked to set up new voluntary benefits for TWU employees. Previously, voluntary benefits were offered only through one provider; and the process for selecting these benefits was accomplished by meeting with benefits personnel.

"Together we've been able to greatly expand the voluntary benefits options."
  —Angela Cagle, Manager, Benefits

Student Health Services

Student Health Services, the Registrar's Office, and the Office of Technology work together to comply with Senate Bill 62 requiring certain student populations to be vaccinated for bacterial meningitis.

"The Office of Technology has been helpful with getting us reports that we need."
—Zane Santos, Systems Analyst, Student Health Services

Imaging Credentials

The Office of Technology continues to partner with colleagues across the university to help meet new imaging and archival needs. This year one of the bigger projects involved imaging and archiving faculty records.

"The Office of Technology has been very responsive to getting our needs met."
—Colleen Sallee, Coordinator of Academic Budgets & Faculty Records, Academic Financial Services

Classroom Technologies: *The Future Today*

Technology in TWU classrooms and labs helps advance student learning and puts students in touch with technology they will experience in the workplace. Technology solutions in classrooms are needed in all disciplines from the arts to social sciences to the natural sciences.

The portability and security of student medical records relies on technology.

Presentation stations are one answer to the call for more flexibility in the use technology for creative pedagogies.

Technology makes class piano practical. The versatile piano lab technology also serves music theory and composition students among others.

Students recognize the many ways technology enriches learning in the classroom.

Virtual Classroom Experiences

TWU is the first university in Texas with a TLE TeachLive system: a virtual classroom for students in teacher education. It utilizes an Xbox Connect and digital whiteboard to simulate a classroom of students, helping future teachers practice classroom and behavior management in a virtual environment.

"Many of my faculty push the technology envelope."
—Nan Restine, Dean, College of Professional Education

Visual Arts

The Office of Technology met with the faculty in Visual Arts to understand their technology needs, and were able to provide custom technology stations. These stations meet the pedagogical needs of the Visual Arts faculty while also preserving the aesthetic of their historic building.

"The new stations are more streamlined and serve our needs much better."
—Michelle Hays, Associate Professor and Chair, Department of Visual Arts

Biology Conference Room

The Biology conference room has been used for graduate seminars to present articles, research, and even images taken with microscopes.

Past student presentations required everyone to line up to look through the microscope; now the presenters can share their research on a large screen for all to view.

"Students presentations of their research on the large display is much better for their peers."
—Camelia Maier, Associate Professor of Biology

Reading

The faculty in the Department of Reading have developed a classroom pedagogy where they present live content or recorded practices displayed on a projector screen. The Office of Technology listened to the needs of the faculty and supported their innovative pedagogy with custom technology configurations.

"Students in the classroom see the theory adjacent to the practice."
—Matthew Moore, Classroom Technology Coordinator,
    Office of Technology

Supporting a Tablet Revolution

As with the explosion of Wi-Fi equipped mobile devices on TWU campuses, the tablet computer phenomena in classrooms has demanded a significant increase in Technology resources. It is not a direction anyone chose to move in; it is a cultural phenomena and technological revolution that the Office of Technology supports.

284%
increase in hours of classroom computer lab use per fall enrollment over the last four years

Chart: line graph with years 2010, 2011, 2012, 2013 and scale from 2 to 8
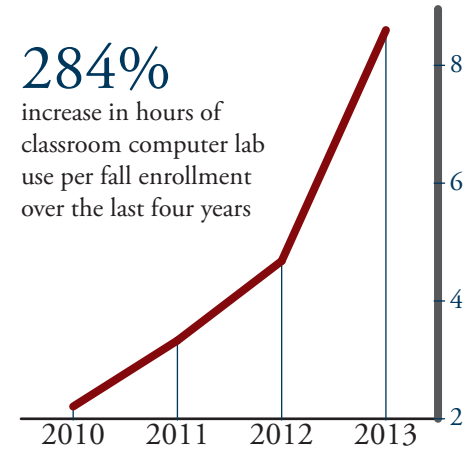
Growth in the use of hands-on computer-based instruction has fueled classroom computer lab demand.

571,005
hours of computer usage in classroom, department, and open computer labs during fiscal year 2012-2013

Chart: line graph with years 2010, 2011, 2012, 2013 and scale from 200 to 600
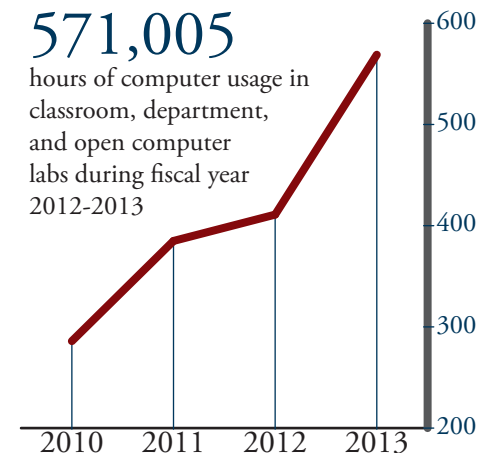
On average, open lab computer use has only increased 15% annually and department labs 29%, but classroom labs have increased 61%.

The explosive growth in student use of tablet computing requires new support and resources.

2,423 classroom support requests in 2012
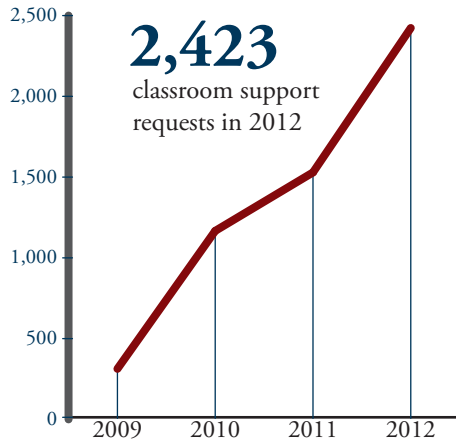
Classroom technology is better used than ever before driving up support requests.

In one example, Teacher Education faculty take tablets into the field to use for assessment of student-teacher experiences. The Office of Technology helped develop a workflow and provided training to support Teacher Education. In another example, faculty are incorporating tablets into their classroom pedagogy for presentations of content in ways never before experienced. For this, the Office of Technology adapted many classrooms for the use of tablets.

"In our classrooms, we focus on making newly integrated technology as simple to use as possible."
—Joe Kondras, Senior Integration Analyst, Office of Technology

Large Lecture Sections

To make large lecture sections effective, technology plays an essential role. For example, Professor Jack Gill creatively employs Tegrity, a lecture capture system, in order to better use the classroom time he has with students.

"Everyone I have worked with in the Office of Technology has bent over backwards to make it work, make it happen, make it right."
—Jack Gill, Professor, Chemistry and Biochemistry

The first two weeks of the fall semester tend to be the busiest of the year for the Technology Service Desk. Since adopting more of the Information Technology Infrastructure Library (ITIL) practices, two metrics have shown significant improvements between 2012 and 2013.

Service: *A Vision Realized*

After transforming the help desk into the Technology Service Desk, an internal committee worked to develop new processes and procedures, and implemented a new incident management system. The new system provides better metrics and more validity for assessments: two critical components to meet the goal of continuous improvement and to provide accurate data for internal and external review, such as SACS accreditation.

Service Flow Chart

The Office of Technology's service structure aligns with best practices in which most service requests are handled by a first-response team (the Technology Service Desk) while on-site needs are passed on to other teams in Client Services and projects are handled by the Enterprise Applications and Technology Infrastructure teams. The new structure is simple. Colleagues no longer have to figure out who to call. All of their needs will be handled from one place.

"The new system makes it much easier to submit a request."
—Lynda Murphy, Director, Teaching & Learning with Technology

"I personally really like the online chat capabilities."
—Mere Maddox, Assistant Director of Student Development and
   Family Services, Housing

Week 1

39%
19.1
↓
11.7
percent

Week 2

49%
18.2
↓
9.3
percent

Decrease in Abandoned Calls

53%
100
↓
47
seconds

48%
77
↓
40
seconds

Decrease in Average Seconds to Answer
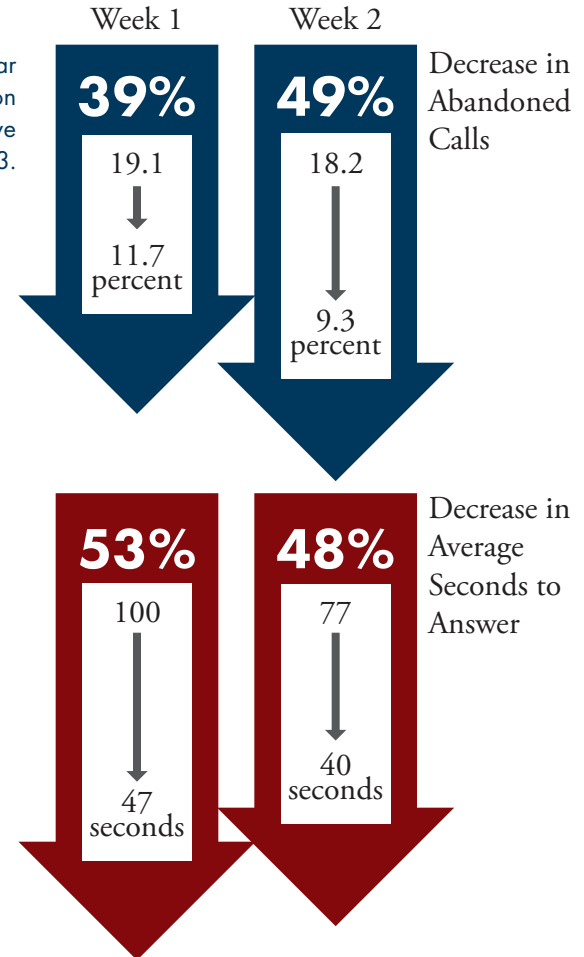
A Model of Service

For colleagues who work with the Office of Technology, there is often a question about how to initiate a request for help or where to ask a technology-related question. The Model of Service diagram attempts to demystify the process: For optimal service, always start with the Technology Service Desk.

Staff Faculty Visitors Students

Initiation

Service Desk

www.twu.edu/service-desk/
servicedesk@twu.edu
footprints.twu.edu
81-3971

wifi access • account login • troubleshooting • Blackboard • ticket status • forms • service outage • classroom technology

Escalation

Escalation

Projects

software purchase • new report • programming • major expense • complex processes

On-site Support

classroom support • phone installation • technology move • projector malfunction • event technology

590

pages were sent to the print server per fall enrollment last year
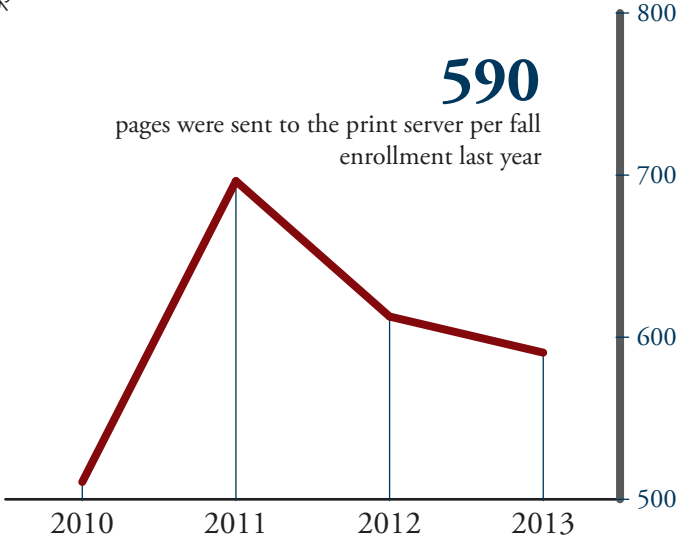
The turning point and movement away from a paper-based culture seems evidenced by the decline in student printer usage.

ENERGY STAR PARTNER

1,743,632
pages sent to the print
server last year were never printed
because of paper-saving technology

only 81%
of pages sent to printers were
actually printed last year
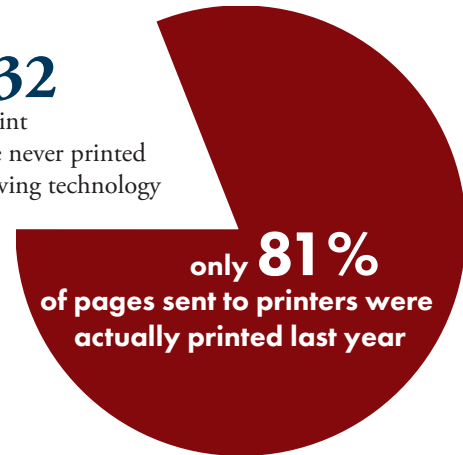
Over the
last four years
technology has saved 9
million print pages from being printed,
almost 25% of the total pages sent.

Environmental Conservation

Demand is increasing throughout the institution for paperless solutions. Over the past two years, the Office of Technology has supported paperless projects for Student Health Services, Athletics, Dental Hygiene, Student Development, the College of Professional Education, Fitness and Recreation, and Human Resources. The Office of Technology has again been recognized by the US Environmental Protection Agency as an Energy Star Partner, part of the Energy Star Low Carbon IT Power Campaign.

"The Office of Technology was crucial in our push to electronic health records. Their expertise and resources were necessary for the software interface and networking requirements."
—Zane Santos, Systems Analyst, Student Health Services

A student is using a print station to confirm that he would like to pick up a printout he sent to the printer. Rather than print every page that a student sends to the printer, the student has to physically walk to the printer and confirm the print job before the printer will print it.

LOGIC AND METHODOLOGY

Decisions: *A Culture of Numbers*

Higher education has developed a data-driven culture. The demand for data from colleagues on campus continues to grow, and much of their desired data are housed within protected systems. The Office of Technology fulfills requests for data while also complying with state and federal regulations and University policies.

Instant Data

SQL reports query live data, so they always return the most current information. To date the Office of Technology has over 1,200 SQL reports. These reports have given colleagues greater independence and autonomy to quickly retrieve the information they need.

"Anytime I need information that is not already in a SQL report, I just ask."
—Rachelle Land, Senior Analyst, Undergraduate Studies

739
dollars of infrastructure personnel cost per operating system instance on TWU servers in 2013

Gartner, 2011

Industry Benchmarks

Microsoft Core IO Server Best Practices Study, 2013

$4,000 / 3,500 / 3,000 / 2,500 / 2,000 / 1,500 / 1,000 / 500

2010   2011   2012   2013

Virtualization allows for multiple instances of an operating system to run on a single physical server. The technology dramatically drove down server cost for the industry. Starting from a much lower mark, TWU still realized benefits from virtual servers.

Reporting

Institutional Research and Data Management (IRDM) and the Office of Technology worked together to automate the Integrated Postsecondary Education Data System (IPEDS) reporting process, the preparation of which used to take weeks. Components of the reports can now be generated in minutes. More importantly, the process is more consistent and reliable.

"In every instance the Office of Technology has helped us with what we ask of them."
—Mark S. Hamner, Assistant Provost, Institutional Research and Data Management
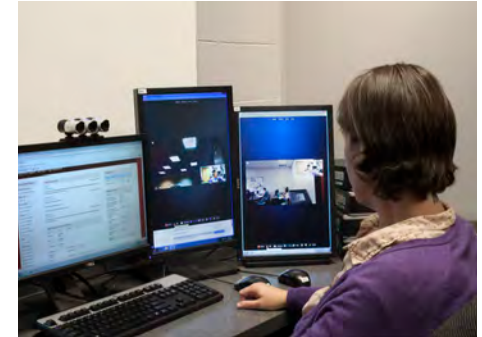
Students with a strong background in technology can work as "virtual assistants" offering quality help in more places using fewer people.

The Office of Technology's salary per student ratio is well below Texas A&M, while their wage ratio is off this chart—at $50.76, it's almost double what Technology spends on wages. Growing the wages category effectively provides more technology jobs for students, aligning with the TWU's history to "learn by doing."

TWU Salaries

TWU Wages

A&M Salaries

Budgeted Salaries and Wages Per Fall Semester Enrollment Fiscal Years 2009 – 2014

2009 2010 2011 2012 2013 2014

November 2012	January 2013	March	May	July	

Winter Break · Spring Break · Summer Semester

Unique Wireless Users — 5,000 · 3,000 · 2,000 · 1,000

A culture of mobile devices is driving a sharp increase in the number of wireless users on the TWU network. The demand for Wi-Fi access has increased nearly 65% at the start of the fall semester compared to the same time last year.

169%
increase in number of wireless access points

400 · 300 · 200 · 100

2011 · 2012 · 2013

The increase is attributed mainly to a project that expands wireless due to student demand.

Network: *Eliminating Points of Failure*

The Office of Technology continuously analyzes the demand for its networking service on TWU campuses and to the Internet.

New Pathways

This year the Office of Technology is working to establish a second path to the Internet. A partnership with the Denton Independent School District, the University of North Texas, Southern Methodist University, and others, is allowing TWU to add a fiber-optic line between Denton and Dallas along a different route from the current line. There is another project that aims to add multiple pathways between buildings on the Denton campus. Having two paths allows the Office of Technology to keep network services available even if one of the network lines were cut.

283 2011

326 2012

597 terabytes 2013

Network storage has increased by over 111% over the last three years. Collaborations such as the archiving project in Woman's Collection, expanded e-mail storage, and others have driven up the need for network storage.

Cloud-based Authentication

While the Office of Technology continues to make strides in keeping the three campuses connected to the Internet, some resources such as Blackboard are cloud-based and only require a connection to servers in Denton for authentication purposes. To keep Blackboard up even if the Internet connection is down, an authentication server was added at the point of TWU's Internet connection. Blackboard will now continue to function off-campus in the rare event that both pathways from the Denton campus to the Internet should fail. The Office of Technology personnel continue to analyze systems: looking for and eliminating single points of failure and working to minimize interruptions in learning for a technology-dependent institution.

A map of the TWU campus network shows the future fallback and current pathways to the Internet.

UNT Denton

TWU Denton

TWU Dallas

DataBank Dallas

Primary ISP Dallas

Internet

Fallback ISP Dallas

Hardy St Houston

TWU Houston

- LEARN - 1Gig
- COGENT - 1Gig
- INFOMART - 1Gig
- AT&T - 1Gig (last mile)
- future connections
- **ISP** Internet Service Provider
- ● Authentication Server for Blackboard + Learn

Viewing Angle

40°

Projector Screen

Visual Angle

2w

a

d

1w

w
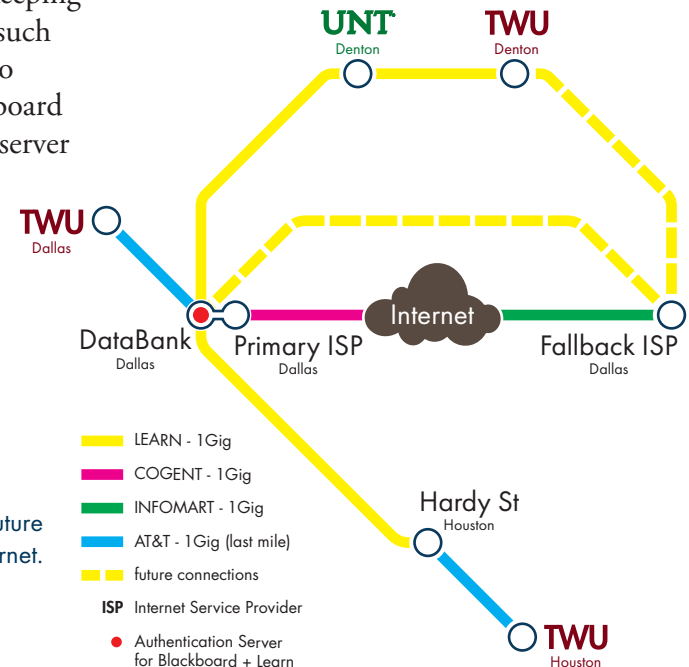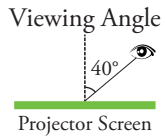
$$a = \frac{360}{\pi}\ \tan^{-1}\!\left(\frac{w}{2d}\right)$$

Screen Brightness

1000 lux	800 lux
500 lux	300 lux
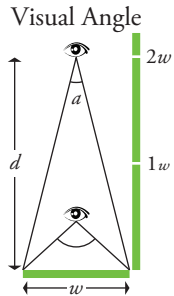
Interaction Effects

d

b
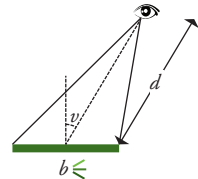
Performance-base Copy Task

Classroom Setting

Predicted Difference Between Copy Task Scores

$$\hat{Y} = -0.03b + 0.30v^2 - 1.01a + 0.87a^2$$

Cutline at 45

No testing in this range of screen widths

Suggested range for 40° viewing angle or less

Screen (b) Brightness

Fixed at 1,000 lux

Viewing Angles (v)

	70° +
	60° – 70°
	50° – 60°
	40° – 50°
	30° – 40°
	20° – 30°
	10° – 20°
	0° – 10°

Number of Screen Widths from Center of the Screen (w)
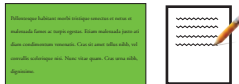
This visual abstract for an article, produced by the Office of Technology, contributes the results of the screen study to the literature.
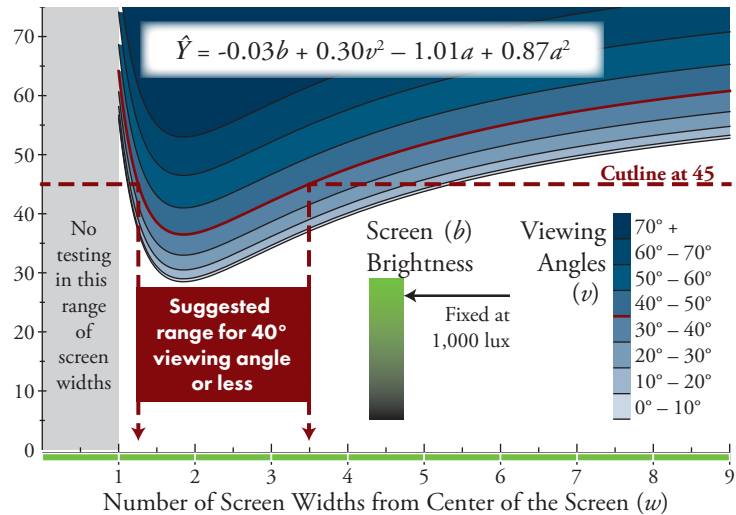
The Scientific Method: *How to Decide*

The Office of Technology has incorporated literature reviews into the decision-making process. When the literature is exhausted, Technology staff employ a variety of research methods, experimental design practices, and data analysis techniques. The results are evidence-based, innovative technology solutions centered around the student experience.

Projector Study

Given a classroom of a certain shape and size with a known peak ambient light from sunlit windows, what size of projector screen and with what luminous capacity would be sufficient to avoid impeding a student's performance? While much has been investigated in gaming, theatres, and watching TV at home, there is a gap in the literature about optimal parameters between the physical components for large display technology and student learning outcomes. The Office

The Office of Technology mapped the results of the screen study onto TWU classrooms and then counted the number of seats in the room that fell outside the optimal range; this number is the missing chair index (MCI). The figure shows an example of the mapping.

Number of Screen Widths from the Screen Center

screen position

No testing in this range

viewing angle

Contour Lines Drawn at Five-Character Increments in Predicted Difference between Copy Task Scores

of Technology felt that classrooms are a different venue with a different purpose and that there might likely be a difference in the optimal parameters.

The Office of Technology designed an experiment with random selection and random assignment, recruiting 201 student participants during the spring. The researchers measured participants' ability to copy text from a screen, a very common task in classrooms. The more words with the fewest errors relative to a baseline measure of copy ability was used as an indicator of optimal conditions. The analysis of results corroborated the research hypothesis. When fixing the projector lumens at 1,000 lux relative to a room with an average 200 lux of ambient light, the optimal viewing angle was within 45 degrees of a straight on view and between 1.3 and 3.5 screen widths from the center of the screen—a different result from preference measures found in the literature.

"We realized how task performance measures would carry value over preference measures for classrooms, and then we found a measure to use."
—Christopher Johnson, Principal Investigator and Sr. Business
   Systems Analyst, Office of Technology
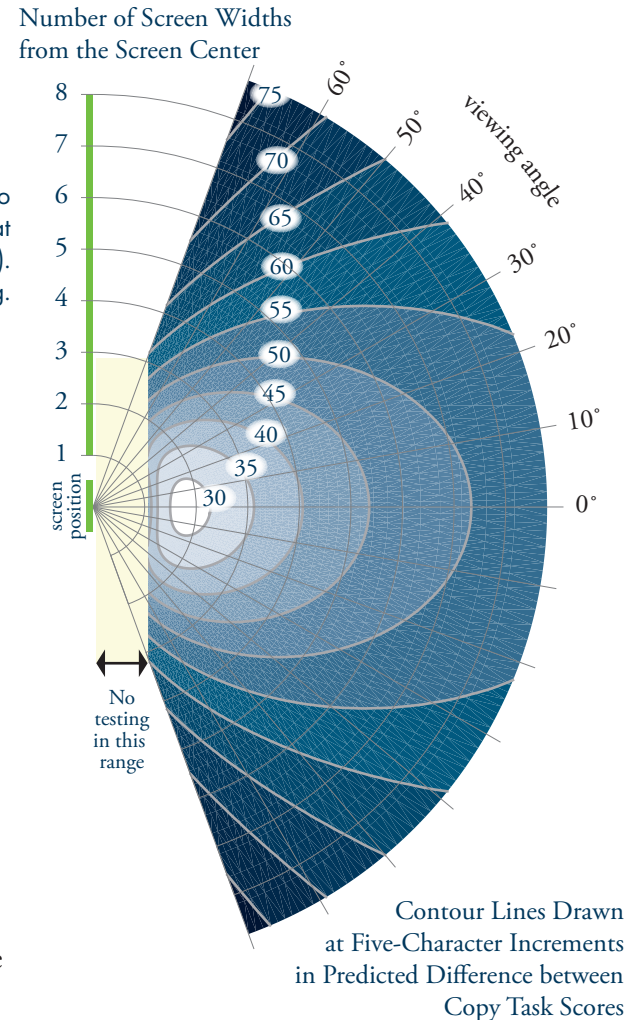
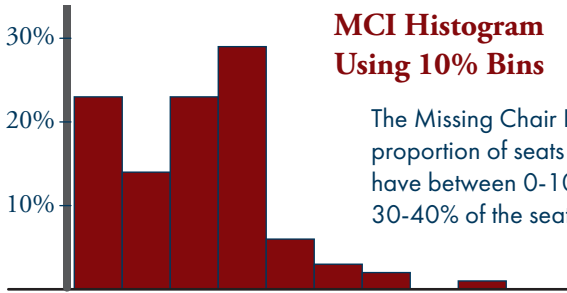**MCI Histogram Using 10% Bins**

The Missing Chair Index (MCI) histogram shows the relative frequency of classrooms with a proportion of seats that fall outside optimal conditions. For example, about 23% of classrooms have between 0-10% of seats fall outside the optimal range; about 30% of classroom have 30-40% of the seats outside the optimal range.

Students need every advantage to learn while in the classroom where frequently the instructor's pedagogy involves the use of projectors.

Missing Chair Index

Each year the Office of Technology remodels a portion of classrooms across TWU campuses, keeping them up-to-date with technology. The results from the classroom projector study were applied to survey TWU classrooms and determine which seats fell outside the optimal parameters. Chairs that were outside the optimal viewing parameters were considered "missed." This year, the Office of Technology added the missing chair index (MCI) as a parameter to its inventory of classrooms. This parameter now factors into the decision of which classroom will be remodeled next.

"This study enables a different kind of dialogue between faculty in the classrooms and the Office of Technology. Now we can better discuss how technology is being used to compliment presentations and how well it is being received by students."
—Matthew Moore, Classroom Technology Coordinator, Office of Technology

Vulnerabilities: *Strengthening the Inside*

Continuously improving a solid security program is a high priority for the state and country. The Texas Department of Information Resource's 2012-2016 strategic plan has security as one of its top priorities.

In one hour on a Friday in August, TWU had 46,000 computers blocked for suspicious activity on its network. One week in late August, the Office of Technology systems processed 680,000 good e-mail messages and blocked close to one million. These systematic attacks are only a portion of the digital security risk. The Office of Technology invited Michael Saylor, Executive Director for Cyber Defense Labs to give a guest lecture. In his talk, he said, "Almost all attacks in 2012 had a web component, and took advantage of a human element."

Raising Defenses

The Office of Technology's security systems provide a hardened shell that virtually surrounds the campus, but firewalls and guarded portals do not address the vulnerability of human error. One step the Office of Technology takes to reduce the risk from the middle is annual information security training. Last year, 1,517 faculty and staff participated in the training.

324
virtual servers in 2013
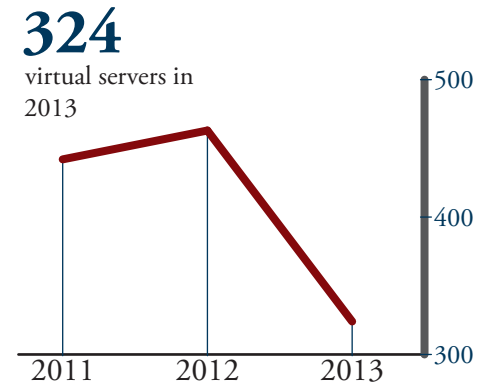
Many virtual hosts running legacy projects were shutdown for enhanced security and improved efficiency.

65 million

e-mail messages received and processed by the mail gateway

= 1 million e-mail messages
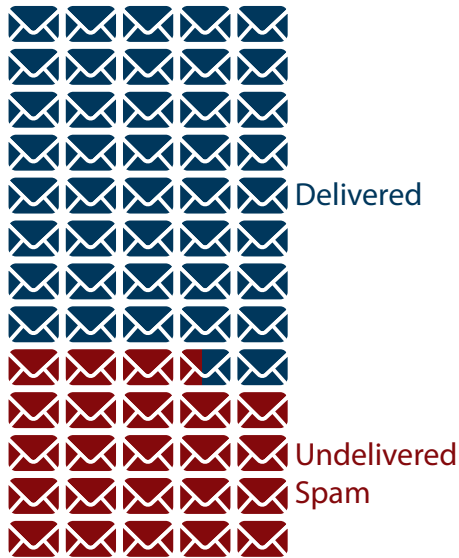
Delivered

Undelivered
Spam

About 35% of the messages received by the mail gateway were flagged as spam and not delivered, saving colleagues time managing their e-mail.

Password Resets

Research shows that password length plays the most significant role in effectively making passwords impossible to guess using password breaking algorithms and databases of pre-cracked passwords (i.e., rainbow tables). Long passwords pose a somewhat significant inconvenience, and so the Office of Technology has followed the lead of other high-profile institutions of higher education in developing a standardized minimum requirement for password complexity and management. The implementation at TWU added requirements for password complexity, length, and a 180-day forced reset. This was a large undertaking that affected everyone.

Traveling Abroad

Traveling overseas presents another set of risks for security. This year the Office of Technology worked with administrative and academic units to create a policy, processes, and pre-configured laptops for use when traveling abroad.

Analyzing Software

The Office of Technology does a risk assessment on every software package purchased. Last year over 400 risk assessments were completed on software ranging from tablet apps to core components for the enterprise financial systems.

Allies: *Securing the Future*

The Office of Technology routinely partners with external constituents to assess security and disaster recovery protocol. Networking with other personnel in security will further ensure threats are kept in check.

Security Testing

To ensure security measures stay effective, the Office of Technology contracted with the Texas Department of Information Resources to perform a security scan of TWU systems. Fishnet Security also tested credit card processing systems to ensure they meet Payment Card Industry (PCI) requirements.

A Security Network

In March, the Office of Technology cofounded a chapter of (ISC)² (International Information Systems Security Certification Consortium), the global gold standard for security system certifications. Through this partnership, the Office of Technology brings a globally-recognized organization to the DFW area.

The fiber optic cables through which all off-campus data flows from Denton to the Internet and the other TWU campuses.

The Network Operations Center (NOC) provides active monitoring of TWU systems and external events that may impact them.

CONCLUSION

LOOKING FORWARD

The process of creating this annual report was full of rich experiences that served to strengthen the Office of Technology's relationships and services. The 2013 year was a great success and this report highlights only a small selection of accomplishments and innovations. With 2013 already behind us, the 2014 year projects are even more ambitious. The word cloud below attempts to illustrate a number of meaningful projects that are underway in 2014.

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PIONEERS

Office of Technology