

INFORMATION TECHNOLOGY IN HIGHER EDUCATION 2015

EXECUTIVE
SUMMARY

SURVEY OF CHIEF INFORMATION OFFICERS

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TABLE OF CONTENTS

Introduction	05
Institutional and CIO Characteristics	06
Financial and Budget Planning	07
IT Organization and Governance	10
Consumerization of IT	12
Administrative Computing	13
Academic Computing	17
MOOCs	21
Infrastructure	24
Cloud Computing	27
Big Data	31
What Keeps CIOs Awake At Night?	35
Summary	36



ABOUT THE LBCIO

The Leadership Board for CIOs in Higher Education (LBCIO) Survey is a project of the LBCIO, lead independently by Dr. Michael Zastrocky. When first fielded in 2010, the survey was a joint effort by Dr. Zastrocky and The Chronicle of Higher Education, Inc. Dr. Zastrocky publishes this global survey to provide CIOs with key metrics to help them do the work of managing and planning IT for their institutions.

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INTRODUCTION

The role of the Chief Information Officer (CIO) in higher education has become increasingly complex in the past few years. The position is vital to the institution, requiring CIOs to manage highly skilled technical people who are being asked to stay current with ever-changing technologies while trying to “do more with less.” One member of the Leadership Board for Chief Information Officers in Higher Education (LBCIO) made a comment about security during the Board’s Spring Meeting: it seems “the bad guys are getting smarter, and it is difficult to stay ahead of them or keep up.” Some CIOs this year noted their frustration with their inability to continue to provide more services with budgets that are not in step with demand. While IT budgets in higher education may never have been large, the overall economy, regulations, and changing standards, along with aging technologies from tight budgets the past 10 years, have challenged senior IT leaders. To provide key metrics to help CIOs manage and plan IT for their institutions, the LBCIO conducts a global yearly survey of higher-education CIOs.

Results from the survey are shared only in the aggregate, with no cost to members, and all CIOs who complete the survey receive a copy of the annual report. Survey results are not meant to provide market research or a detailed plan to follow, but simply to tell the story of what CIOs currently are doing and their thoughts about the future. The questions are asked in such a way to make it easy for CIOs to fill out the survey. For example, the survey doesn’t ask for specific budget numbers but asks about budgets in general, with questions such as “Is your IT budget increasing, decreasing, or staying the same?” The responses provide important information for CIOs and other higher education executives without getting into the actual budget numbers, which are often difficult to provide.

To get a complete picture of IT on campuses today, the Leadership Board for CIOs surveyed a broad range of colleges and universities in April and May of 2015, collecting strategic and tactical information on major issues facing higher education CIOs. The survey included questions on topics including:

- Financial and budget information for IT
- Organization and governance
- Personnel and staffing
- Infrastructure and networking
- Security
- Consumerization
- Administrative computing plans
- Strategic planning for IT
- Academic technologies, MOOCs and innovation
- Plans for cloud computing and big data

Dr. Michael Zastrocky, Executive Director of LBCIO, was assisted by the following LBCIO members in the analysis of this year’s survey results: Dr. Ed Aractingi, Assistant VP and Deputy CIO, Marshall University; John Barden, CTO and Deputy CIO, University of Rochester; Maureen Coughlin, Director, Telecommunications & Classroom Technology, Teacher’s College, Columbia University; Dr. Jan Fox, CIO, Marshall University; Dr. Doyle Friskney, CTO, University of Kentucky; Peter Greco, CIO, St. Mary’s College of California; Dr. Vince Kellen, CIO, University of Kentucky; Marcus Kerr, Associate VP and CIO, Texas Wesleyan University; Judy Molnar, Executive Director, Xavier University; Dr. David Rotman, CIO, Cedarville University; Dr. Tina Stuchell, Director of IT and CIO, University of Mount Union; Doug Wells, Director of IT Infrastructure and Operations, Northern Kentucky University; and Ben Zastrocky, Senior Advisor to LBCIO.

INSTITUTIONAL AND CIO CHARACTERISTICS

2015 Survey Respondent Demographics

The 2015 survey was sent to almost 950 CIOs globally, and the response rate was about 20 percent. The survey was conducted for a period of three weeks during April and May 2015.

As in prior years, CIOs from public institutions were the majority of the respondents (54 percent) vs. private, non-profit institutions (43 percent) and for-profit institutions (3 percent). This year the breakout by classification of institutions was as follows:

Research Universities	25%
Doctoral-Granting institutions	19%
Four-year institutions with master's degree	27%
Four-year institutions without master's degree	14%
Two-year institutions	15%

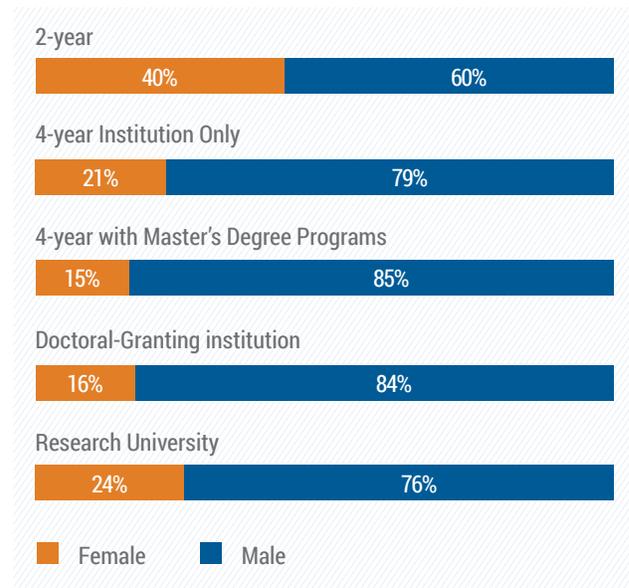
The size of the responding institutions varied, with 27 percent having enrollment of 3,000 students or less, almost 13 percent with 3,001-5,000 students, 16 percent between 5,001 and 10,000, 24 percent with enrollment of 10,001-25,000 students, and 21 percent at more than 25,000 students. The global breakout is as follows: North America, 90 percent; Europe, 8 percent; Australasia, 1 percent; and Africa, 1 percent.

CIO Responsibilities

Consistently over the past four years, CIOs reported their management scope included traditional core responsibilities for supporting administrative and academic applications, programming applications, helpdesk, networking, and telecommunications. What has changed is a growing responsibility for library management and institutional research. As efficiency and analytics increasingly drive the need for cost effectiveness and consistent data, the pressure to place these management responsibilities under the CIO increases. On the other hand, the CIO's management responsibilities in research computing have declined steadily over the last four years. Media services, including video supervision, have declined to 67 percent from last year's increase to 75 percent. A shift to move media responsibilities to the communications area may be due to substantial increases in video usage for social media and marketing, or the decline may be a data anomaly.

CIO Characteristics

The characteristics of today's higher education CIO as typically being a mature male have not changed dramatically over the last four years. Forty-one percent of CIOs are 55 years old or older. Males dominate the field with an average of 77 percent for all institution types, but major differences exist across the spectrum of institutions. The percent of female CIOs is highest—40 percent—at two-year institutions, while lowest—15 percent—at four-year with master's degree institutions.



Research and two-year institution CIOs were older with 50 percent or more in the 55-plus category. Four-year and doctoral-granting institutions had only 33 and 38 percent respectively in the same age category.

Various combinations of education, experience in the role, and knowledge influence CIO professional advancement opportunities. Eighty-one percent of CIOs earned a master's or higher degree, with 25 percent earning a doctorate. The last four years of the survey demonstrated fairly consistent trends in this category. The size of the institution is important regarding the CIO's having a terminal degree. At institutions with more than 25,000 students, 43 percent of the CIOs had a terminal degree compared with only 14 percent at institutions with 3,001-5,000 students. In small institutions with 3,000 students or less, 29 percent of the CIOs had only a bachelor's degree.

FINANCIAL AND BUDGET PLANNING

CIOs at small institutions have stayed at their institution longer than average. Twenty-nine percent of CIOs have been in their role for 15 years or more while 23 percent have been in their current role 5 years or less. In small institutions with 3,001-5,000 students, 50 percent of the CIOs have been in the role of CIO 15 years or longer compared with 29 percent overall, and 71 percent overall have been in their current role less than 10 years. In the next few years, there could be an opportunity for job mobility for younger potential CIOs as increased numbers of retirements in higher education at the CIO level are expected to continue to occur.

Higher Education CIO Succession Planning

The increasing importance and expansion of the CIO role in higher education suggests senior leadership is recognizing the importance of succession planning. The percent of higher education senior administrators who consider CIO succession planning at their institution as highly important nearly doubled over last year. Interest in succession planning is even higher among CIOs themselves, with 37 percent considering it highly important.

Building strong alliances and succession planning are important to CIOs and the institutions they represent. A mentoring system can help CIOs navigate political and technical hurdles they experience as they advance professionally. Those who had selected one or more individuals to mentor based their decision on the mentee's skill sets in key areas. More than 80 percent of the CIOs prioritized management and leadership acumen, high levels of collaboration/knowledge transfer, and intelligence/ability to learn as core skills. Other important skills were collaboration/political skills and business knowledge. Technical skills were important for only 55 percent of those responding. Only 35 percent of CIOs had not identified at least one person they would like to mentor to replace them as CIO.

Essential building blocks of the mentoring process include opportunities to lead key projects and processes with guidance as needed (87 percent), followed by the exposure of the mentee to senior administrative discussions at 85 percent. High levels of collaboration/knowledge transfer were important to 81 percent of the CIOs, and a shared leadership/decision-making model came in at 73 percent. Shared scholarly activities (papers, presentations, conferences) were the least crucial at 19 percent.

As in the last three years, even with all the CIO efforts to train and prepare the institution's next CIO, 39 percent responded that their institutions would recruit externally whether or not a succession plan was in place, and only 11 percent sensed their institutions would promote from within.

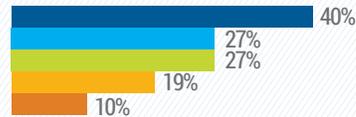
For the fifth consecutive year, "Grown from the prior year budget" was the most common response to the question on current institutional operating budgets (41 percent in 2011, 43 percent in 2012, 47 percent in 2013, and 43 percent in 2014) with 48 percent of institutions reporting that their overall 2015 budget increased from the prior year. Of the institutions that did not experience budget growth, 28 percent reported that their budget stayed the same, down 3 percent from 2014, and 24 percent indicated that their budget decreased, down 2 percent from the previous year.

When asked about next year's budget, 46 percent of CIOs anticipated growth, 33 percent expected budgets to stay the same, and 21 percent projected a smaller operating budget for their institution. These percentages are all within 2 percent of what was expected last fiscal year.

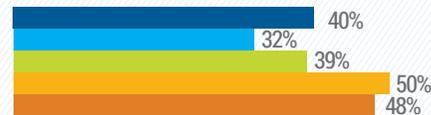
When it comes to the prospect of budget growth, the type of institution does matter. Of the doctoral and research institutions that responded, there was an increase of 48 percent and 50 percent respectively. Forty percent of two-year institutions reported a budget decrease.

Changes to the 2014-15 Fiscal Operating Budget

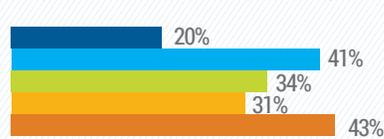
Decreased from prior year budget



Grown from prior year budget



Stayed the same as prior year budget



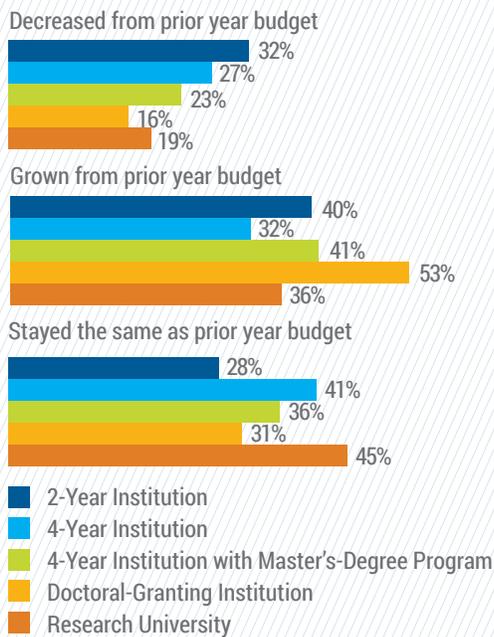
- 2-Year Institution
- 4-Year Institution
- 4-Year Institution with Master's-Degree Program
- Doctoral-Granting Institution
- Research University

Budgets for Information Technology

Much of the new money found in institutional budgets is starting to make its way to IT this year, as slightly more CIOs expect their IT budget to increase (40 percent), rather than stay the same (37 percent) or decrease (22 percent). However, 46 percent expect their operating budget to increase vs. 33 percent expecting it to stay the same and 21 percent expecting it to decrease. This seems to imply that some of those expected increases in the general budget are not going to find their way into IT.

Regarding future IT budgets, doctoral-granting institutions are the most optimistic, with 53 percent of these institutions anticipating growth in their budget next year with only 16 percent expecting a decrease.

Projected Changes to the 2015-16 Fiscal Budget



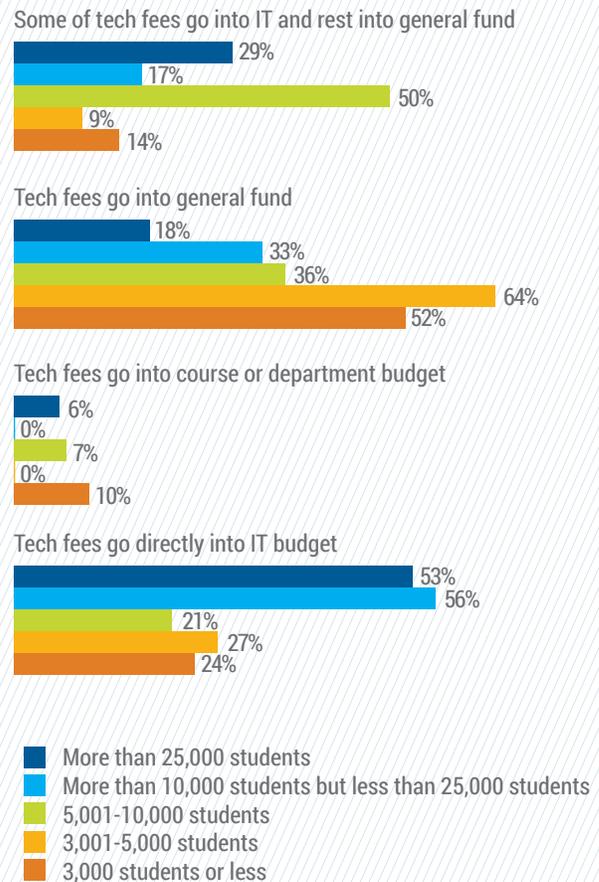
Technology Fees

The practice of charging fees to help cover expenses was applied less frequently to technology this year. In 2015, 46 percent of institutions charged a tech fee, down 5 percent from 2014 (51 percent) but equal to 2013. In 2012, 52 percent of institutions surveyed did not charge a student technology fee. That figure dropped to 50 percent in 2013 and to 45 percent in 2014, but this year it went back up to 49 percent. Those institutions charging a tech fee either charge a single fee (46 percent) or tie it to a specific course (5 percent), while 49 percent do not charge a fee. Many institutions are reluctant to increase student fees which can become a bad PR move.

But the money collected from student technology fees doesn't necessarily make its way into the IT budget. Only 37 percent of institutions reported that student fees went into the IT budget, down 5 percent from 42 percent in both 2014 and 2013. Most of the time these funds went into a general fund (40 percent), up slightly from 2014 (39 percent) and up from 31 percent in 2011. For other institutions, tech fees were split between the general fund and the IT budget (23 percent) or went into a specific course or department budget (5 percent).

While the odds are against a CIO's seeing all of the money collected from a student technology fee ending up in the IT budget, the deck is noticeably stacked against CIOs at institutions with fewer than 5,000 students. At these institutions, the likelihood that all of the money collected will end up in the IT budget is around one in four.

How Student Technology Fees are Used



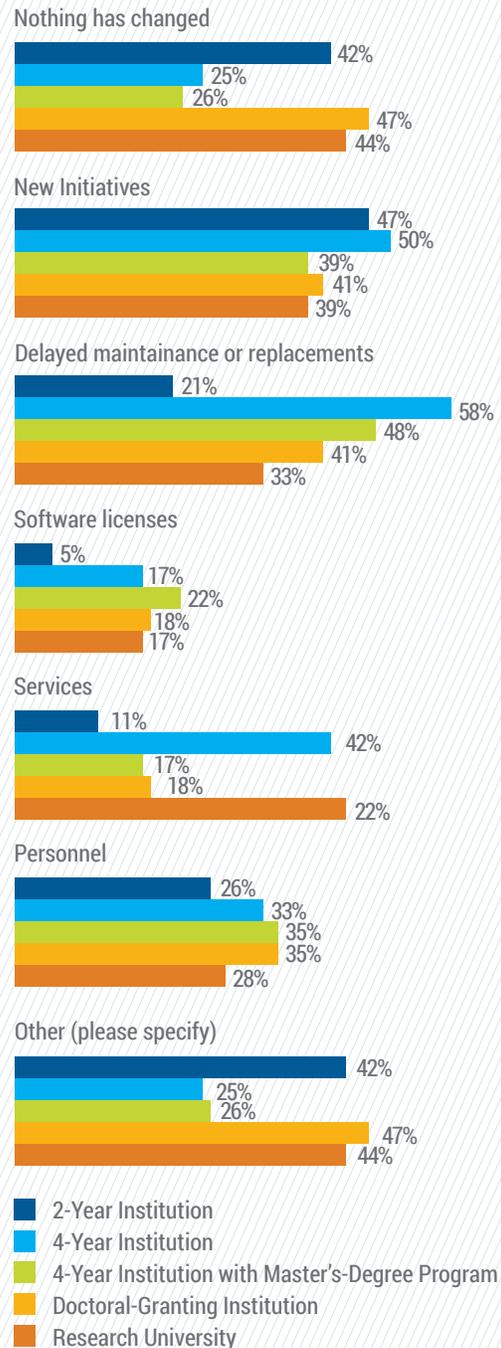
Stretching IT Funding

With only 40 percent of CIOs anticipating an increase in their IT budgets next fiscal year and with an increased demand for services, stretching available funding continues to be a challenge. Institutional operating budgets continue to outpace IT budgets with 48 percent indicating their operational budgets grew in 2015 while only 42 percent of IT budgets grew. The top response to meet the funding challenge in 2015 was through increased efficiencies and more centralization of support and services (78 percent), followed by more use of cloud computing (68 percent), shared services/collaboration with other institutions (51 percent), and greater use of open source (25 percent). Completing the list were the less innovative but sensible strategies of spending less by cutting services (21 percent), finding more money (new revenue) 18 percent, and spending the same amount to do the same things (no new strategies) 6 percent.

For those who had to cut their IT budget, the most frequently selected cuts were in new initiatives (43 percent) and delayed maintenance or replacements (39 percent). Cuts in personnel (31 percent) and services (20 percent) were less popular. Another 38 percent made no cuts. For CIOs planning for no growth or cuts to their IT budgets next fiscal year, renegotiating contracts (56 percent), non-replacement of staff (46 percent), cutbacks in services and support (44 percent), and increased use of chargebacks (17 percent) were the top choices.

For institutions that have had cuts in IT budget from the prior year, the option of delayed maintenance was highest in four-year institutions with no master's degree (58 percent) followed by four-year institutions with master's degree (48 percent). Cutting new initiatives was highest at four-year institutions without master's degrees (50 percent) and two-year institutions (47 percent).

Cuts to the 2015 IT Budget



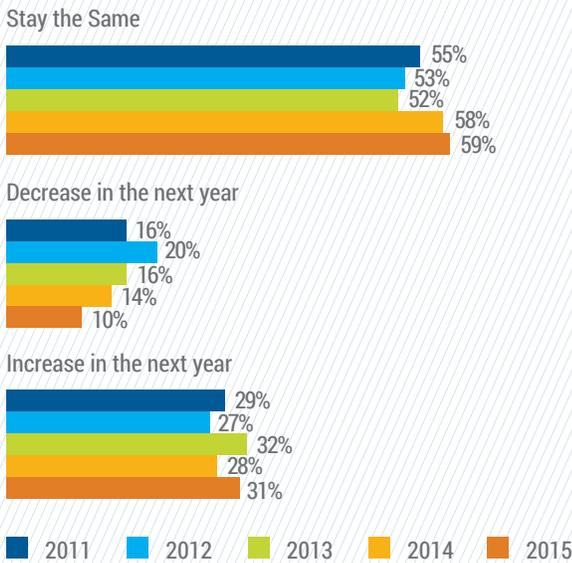
IT ORGANIZATION AND GOVERNANCE

Staffing

Information Technology staffing levels remain in a relatively steady state. While there are hints of economic recovery in many sectors, including higher education, it is only loosely translating into jobs.

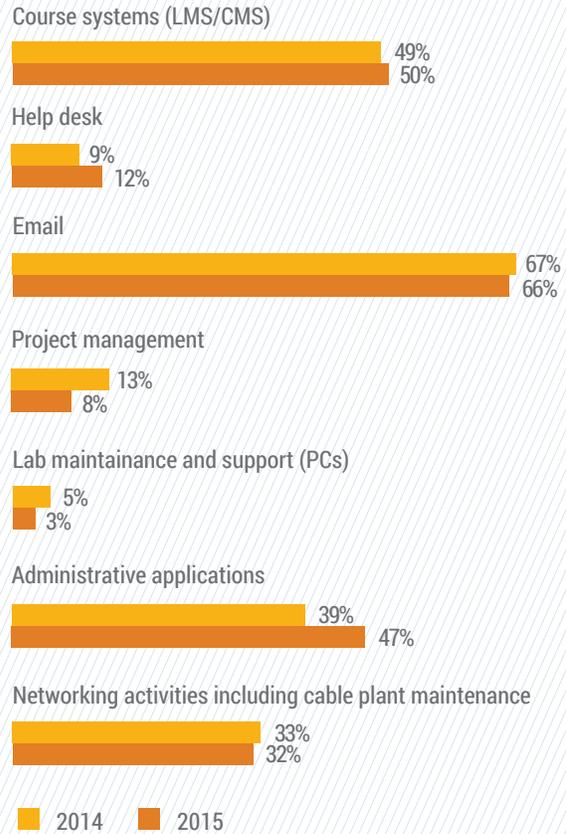
However, there is a modest optimism in expectations. Those predicting future staff reductions have shifted from 20 percent in 2012 to 10 percent in 2015, with the majority predicting staff size will remain consistent.

Projects for Changes in the Size of IT Staff



Growth in use of outside services continues, though at a moderated pace. Sixty-seven percent of respondents anticipate an increase in the use of external providers (down from 74 percent last year) while only 4 percent expect reductions. The most notable year-over-year growth is in the anticipated cloud use of administrative applications, with 47 percent of respondents now outsourcing these to some degree, third behind email (66 percent) and course management (50 percent). These results are not surprising given the significant penetration of specialized cloud applications (i.e., admissions) and movement of Enterprise Resource Planning providers to cloud-based products.

Outsourcing Trends by Year

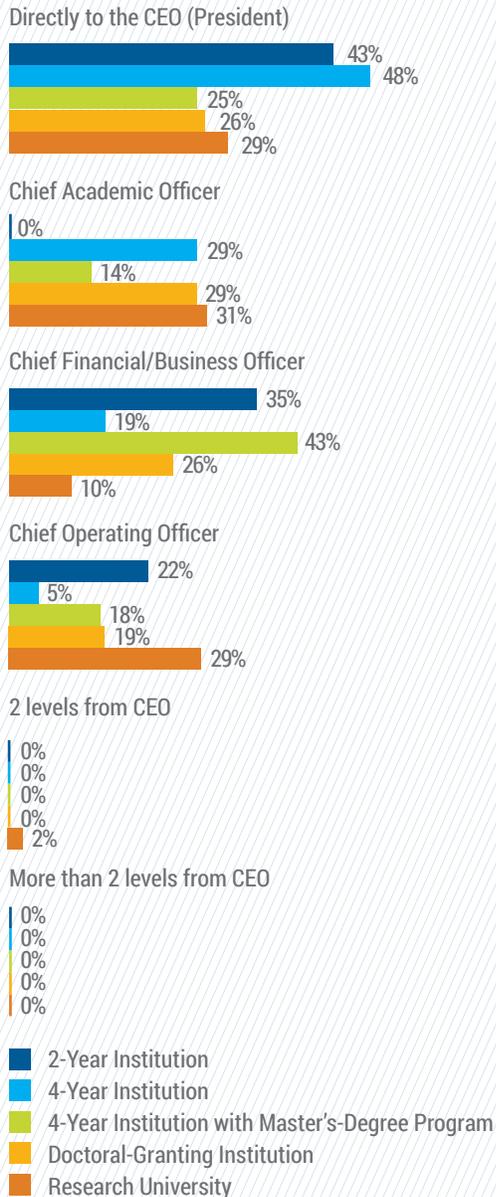


Taken together, these responses may be a reflection of what many CIOs verbally report, which is that the growth of cloud computing is resulting in changing job roles, but is not significantly impacting staffing levels.

The CIO Reporting Hierarchy

CIO alignment continues to vary by institutional classification, with 2- and 4-year institutions significantly more likely to report directly to the CEO than doctoral or research institutions.

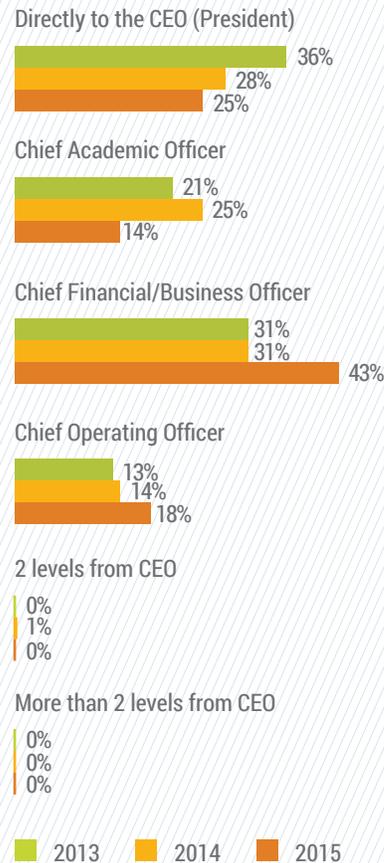
Reporting Lines for CIOs by Institution Classification



This year the largest shifts were in the CIO reporting to the CFO or COO, but these trends only appear relevant for two- and four-year institutions. The reporting relationship at doctoral and research institutions is highly varied, and relatively unchanged year to year.

There is little change in the IT Governance practices at reporting institutions, though there is a slight downward trend in tying budget allocations to IT governance processes. Fifty-two percent report budgets are tied to governance, a number down from 59 percent in 2013. The general response across all questions suggests governance remains an important mechanism of communication and engagement, but other mechanisms are also used to inform and set budgetary authority.

Reporting Lines for CIOs by Year



CONSUMERIZATION OF IT

To paraphrase an ancient sage, today's college and university students seem to live by the philosophy "I connect, therefore I am." Connectivity is an essential resource for life, from the moment students awaken until they retire at the end of the day. Students treat a loss of connectivity as a personal injustice. How are IT leaders in higher education to respond to this demand?

This year's survey results indicate that IT leaders gradually are incorporating support for an always-connected environment as the "new normal" for their operations. For example, 42 percent of the 2015 survey respondents indicated that more staff was needed to support consumerization of IT, down from 57 percent in 2012. An argument could be made that this decline is not due to lessening demand, but to recent reallocation of human resources to support consumerization.

Responses to other questions also indicate a leveling of impact. Forty-one percent of the respondents indicated that consumerization resulted in less IT control than the institutions previously observed. Only 19 percent felt that consumerization increased costs. Again, these relatively low percentages may reflect the success of ongoing efforts to support consumerization.

This year's respondents were slightly less concerned with the impact of consumerization on data integrity and consistency (41 percent compared to prior year values of over 50 percent) but remain highly concerned about encountering greater security issues (92 percent this year). Data integrity and consistency could be influenced by better backend systems that provide reliable information regardless of the end-user's device or access method. However, this broad access opens the door for data leakage and security compromises. For example, a person who uses a desktop browser to access email can hover over an embedded link prior to clicking on it to evaluate the security risk involved. A person viewing the same email message on a mobile device would find it difficult to duplicate the hover behavior.

Bandwidth remains a major concern, as 76 percent of the respondents indicated that consumerization was generating need for additional bandwidth. Many of the devices carried by today's students are "always on," so the devices may consume bandwidth even when the person holding the device is not focused on it.

Falling close behind bandwidth is a concern for integration with existing systems (72 percent). This ranking has ranged from 69 percent to 77 percent over the last four years, indicating a consistent need to provide access to existing systems via a growing array of consumer devices.

As mentioned previously, security concerns showed the highest level of apprehension (92 percent). In addition to designing the technical details of security systems and applications, IT leaders need to focus significant resources on educational efforts (helping students and employees be smarter and safer). One significant aspect of user behavior in today's environment is the tendency to install mobile apps without any regard to security (reference "Cisco 2014 Annual Security Report"):

http://www.cisco.com/web/offer/gist_ty2_asset/Cisco_2014_ASR.pdf

A new survey conducted by the USC Annenberg Center for the Digital Future and Bovitz Inc. found that millennials are more willing than older adults to share personal information:

<http://annenberg.usc.edu/news/around-usc-annenberg/online-privacy-over-findings-usc-annenberg-center-digital-future-show>

This trusting behavior provides easy access for malicious persons. Perhaps as a result of this concern for security, roughly two-thirds of survey respondents express a need for additional training for their IT staff (64 percent this year, 67 percent to 69 percent in prior years) and to hire new staff with different skill sets (27 percent this year, 29 percent to 30 percent in prior years). Each wave of new devices brings additional challenges that IT staff must address.

The continued high level of consumerization raises questions that warrant consideration by institutional leadership. Here are two suggested by survey respondents:

- How can we change our procurement and funding processes to leverage consumerization while facilitating support?
- How do we encourage grant programs to acquire supportable, campus-standard technology?

ADMINISTRATIVE COMPUTING

Some additional questions that relate to consumerization include:

- What device(s) will present the next seismic shift in technology?
- Will the next “big thing” in technology be a service rather than a device?
- How should institutions respond to social media apps that provide anonymous access and raise safety and security concerns in a campus environment?
- Will wearable devices and ever-larger cell phones take the place of tablets, which seem to be declining in popularity? If so, how active should the campus be in providing cell coverage?
- What control should the institution exert on employee mobile devices? Should the institution have the right to wipe these devices?
- What tasks should be eliminated in order to address the increased demands from consumerization?
- What efforts should institutions make to ensure ethical and civil use of technology?
- How can institutions communicate to prospective students the level to which technology is leveraged on the campus?
- How can campus networks be built to support protocols designed for residential use (e.g., wireless connectivity between a mobile device and a television)?

One of the survey respondents suggested an excellent philosophical approach for dealing with consumerization and offered some sobering advice for CIOs:

“We think of our students, faculty and staff as clients. We work well together and use solutions that work for our institution. If an IT shop is getting caught with its pants down because of consumerization, it is the fault of the CIO.”

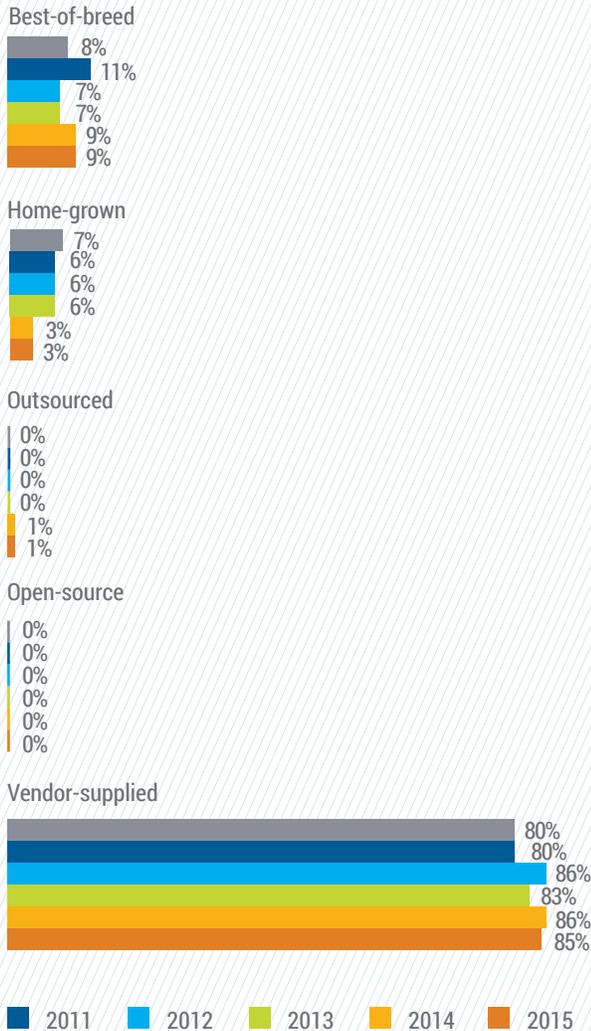
This discussion of the consumerization of IT has avoided the acronym BYOD (bring your own device). The BYOD acronym presents IT in a passive role: you bring the device; we will respond. Perhaps it is time to develop an acronym that portrays IT’s active role as reflected in this year’s survey: leveraging technology to enhance education.

Administrative applications continue to account for the largest segment of the IT budget, and every student, faculty, and staff member on campus uses these systems in some way. This year’s survey sought to gain insight into what CIOs think are the biggest issues facing administrative systems and planning for the future. While many articles and presentations focus on the diminishing role of the ERP, the reality is that higher education institutions still use and rely upon these systems. Changing over to software as a service (SAAS) or cloud-delivered applications is still in the future, according to this year’s survey results. Administrative systems are large and integrated on most campuses and are responsible for managing institutional business processes and transactions, advancing fundraising efforts, as well as providing student systems to support enrollment, grading, transcript processing, and student accounts receivables.

Enterprise Resource Planning (ERP)

Higher education institutions have been increasing their use of vendor-supplied ERP solutions for more than 40 years. They were first put in place to help address problems of running separate systems and maintaining separate databases. Many of these first systems were running business processes, such as payroll, general ledger, or accounts payable. Some institutions continue to use these types of stand-alone applications, but a vast majority of those who responded to the survey (85 percent) use ERP vendor-supplied solutions for their core administrative applications. This is just slightly down from 86 percent in 2014. Core administrative applications include financials, student systems, human resources, and advancement. According to the survey, 9 percent use best-of-breed solutions (which can be a mix of vendor applications and home-grown and/or open-source applications), while 3 percent use home-grown solutions.

Changes to the Types of Core Administrative Applications

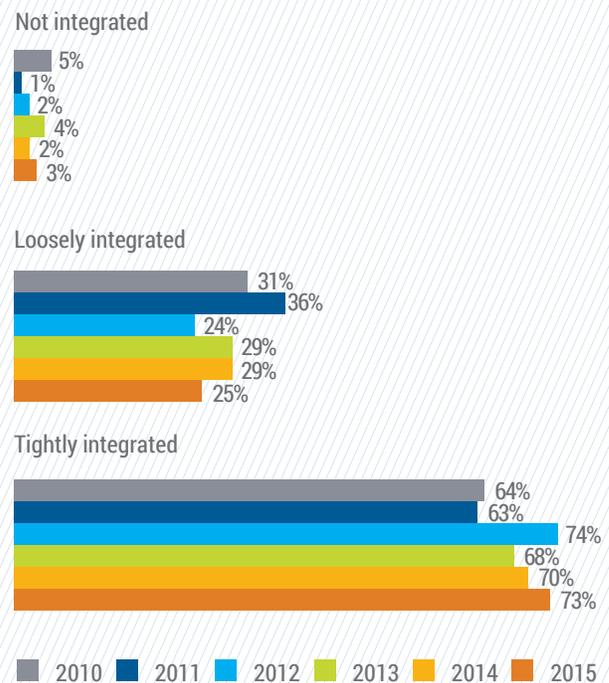


Of those surveyed, 93 percent use vendor-supplied financial systems (up from 86 percent in 2014), 89 percent use vendor-supplied student systems (down from 95 percent in 2014), 88 percent use vendor-supplied human resource systems (down from 91 percent in 2014), and 90 percent use vendor-supplied advancement systems (up from 88 percent in 2014). Only 3 percent use homegrown

financial systems (down from 4 percent in 2014), 8 percent use homegrown student systems (down slightly from 7 percent in 2014), 4 percent use homegrown human resource systems (same as last year), and 4 percent use homegrown advancement systems (down from 5 percent in 2014).

Seventy-three percent of institutions indicated that their administrative information modules were tightly integrated; another 25 percent indicated they were loosely integrated, and 3 percent indicated that their systems were not integrated at all. While there are some homegrown and best-of-breed solutions still running on campuses, most institutions are running integrated vendor-supplied applications.

Degree to Which Administrative Information Modules are Integrated



In-house or outsourced

A small number of institutions outsource their administrative applications. Only 1 percent of those who responded to the survey indicated that they outsource core administrative systems, while 3 percent outsource financials, 3 percent outsource student systems, 6 percent outsource advancement systems, 3 percent outsource human resources, and 12 percent outsource payroll systems.

The use of the cloud for email and learning-management systems is still growing. However, the use of the cloud for administrative applications is slower and hasn't been used very often for replacement of ERP solutions hosted on campus. Most cloud offerings from vendors of administrative applications are very much the same offerings from a few years ago that were hosted or described as ASP (Application Service Provider) offerings. The name has changed, but the concept is the same with a few differences as a result of technology advancements. Concerns in the past about having administrative data hosted away from campus are still prevalent on many campuses, but that is slowly changing as experience in the cloud with academic and social networking activities continues to grow. Some institutions are bound by national laws that do not allow administrative and personal data to be stored outside their nation. That can pose a problem for higher education cloud activities in those countries.

Upgrade Planning

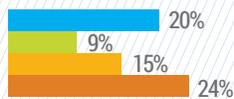
Administrative systems take considerable money, time, and effort to implement and maintain, but no university can exist without them. Once these systems are in place, institutions do not have the resources to replace them for many years. While in some business and industries replacement cycles are much less than ten years, in higher education they can be more than twenty years.

Over the past 35 years of using IT to support the management of higher-education institutions, in any given year, about 10 to 15 percent of the institutions either were planning the replacement or upgrade phase or were actually changing systems. This year that percentage is slightly higher. Twenty percent are currently replacing/upgrading financial systems, 15 percent are replacing/upgrading student systems, 14 percent are replacing/upgrading human resource systems, 12 percent are replacing/upgrading advancement systems and 17 percent are replacing/upgrading payroll systems.

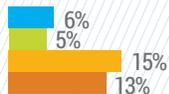
According to the 2015 survey responses, in two to three years 20 percent will replace/upgrade their financial systems, 19 percent will replace/upgrade their student system, 20 percent will upgrade/replace their human resource system, 21 percent will upgrade/replace their payroll system, and 23 percent will upgrade/replace their advancement systems. These replacements and upgrades will require extensive planning and project management skills and effort. We believe that many institutions faced with tight budgets the past five years now are replacing or upgrading systems. As with deferred maintenance on buildings, there comes a time when postponed work must be done to maintain the integrity of the buildings or, in this instance, information systems.

Use of the Cloud for Administration Applications

Student applications (enrollment management, registration...)

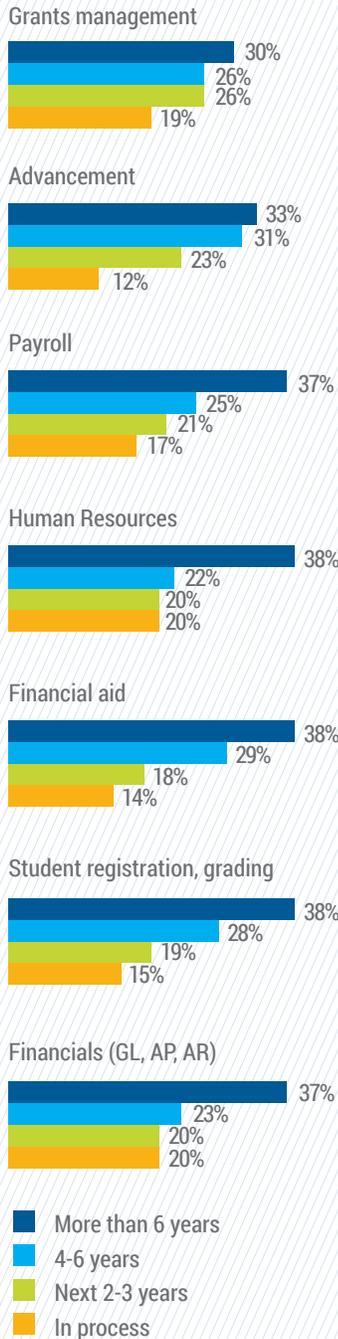


Financial applications



2012 2013 2014 2015

Timeline for Upgrading or Replacing Administrative Systems



The majority of respondents continue to discourage shadow systems at their institutions. Many of the institutions (41 percent) indicate that shadow systems are less prevalent than a few years ago while 10 percent indicate they are likely to diminish in importance in the future. Twelve percent indicate they are growing in number, and 3 percent indicate they are likely to grow in the future.

The 2015 survey also showed how important business process reengineering (BPR) is for institutions. Of the respondents, 43 percent believe that BPR is very important, 48 percent believe it to be somewhat important, and only 8 percent did not believe it to be important.

In summary, ERP solutions are still the ones most commonly used for administrative information. Although open-source applications often are touted at conferences, our survey results show that very few universities report the use of open source for administrative purposes. Partnering with other institutions through shared services or collaboration agreements may provide some institutions with a cost-saving strategy, but the numbers are small at this time. Advances in mobility platforms and advanced integration make real-time informational triggers a reality. For students, these tools already have become a necessity as the mobile world continues to grow.

ACADEMIC COMPUTING

IT organizations must be flexible and prepared to work with the changing demands of online learning. While the CMS/LMS is important, it is only one piece of online learning. Integration of various systems, including multimedia and social networking, requires planning and collaboration with other units. Which CMS a university uses is not strategic, but how it uses that CMS and develops learning models and academic programs is where strategic advantages are recognized. With the decline in enrollments at many institutions, providing platforms that support competency-based and other models of learning is important. The survey confirmed a number of trends, as well as a few surprises, regarding teaching and learning, including the following:

- Vendor dominance in the learning management or course management system (CMS) market continues to be in flux. Blackboard continues to lose ground, with Moodle maintaining ground and Canvas making the biggest gain.
- Sixty percent of institutions have been using their current CMS solution for more than five years, and fewer institutions are considering an immediate change in their CMS in comparison with 2014. However the percentage of institutions currently implementing a new CMS grew from 2 percent in 2014 to 5 percent in 2015.
- Central IT continued to provide the primary support for the CMS; however, this percentage has continued to decrease since 2011. Also, the number of respondents outsourcing their CMS has increased slightly from last year, a trend that appears to be consistent over the past five years.
- The Office of the CIO or the Office of the Provost/Chief Academic Officer remained the primary reporting authority for instructional design, course design, and online learning management (64 percent); however this reporting line continues to decline with an increase in these functions reporting to separate units for online education or dean-level positions (25 percent in 2015 up from 19 percent in 2014).
- The use of desktop virtualization stabilized over the past year, increasing from 32 percent in 2011 to 51 percent in 2013, 54 percent of respondents in 2014, and 54 percent in 2015. Sixty-five percent of the respondents used desktop virtualization to replace student community labs, a number that has been consistent for the past three years, suggesting the use of desktop virtualization is no longer growing.
- VMware is the dominant vendor of desktop virtualization; all other vendors combined do not equal the number of users of VMware in this year's survey.
- Computer labs remain largely unchanged with all segments reporting similar numbers as last year. The notable exception was the number of universities not supporting computer labs increased to 5 percent from 3 percent in previous years. While that percentage is small, it will be interesting to see if it continues to grow in the future.
- Interest in MOOC's is slowing at many institutions, and the number of institutions exploring the value of MOOC's has decreased from 56 percent in the 2013 survey to 23 percent in 2015.

Types of Institutional Standard CMS Systems

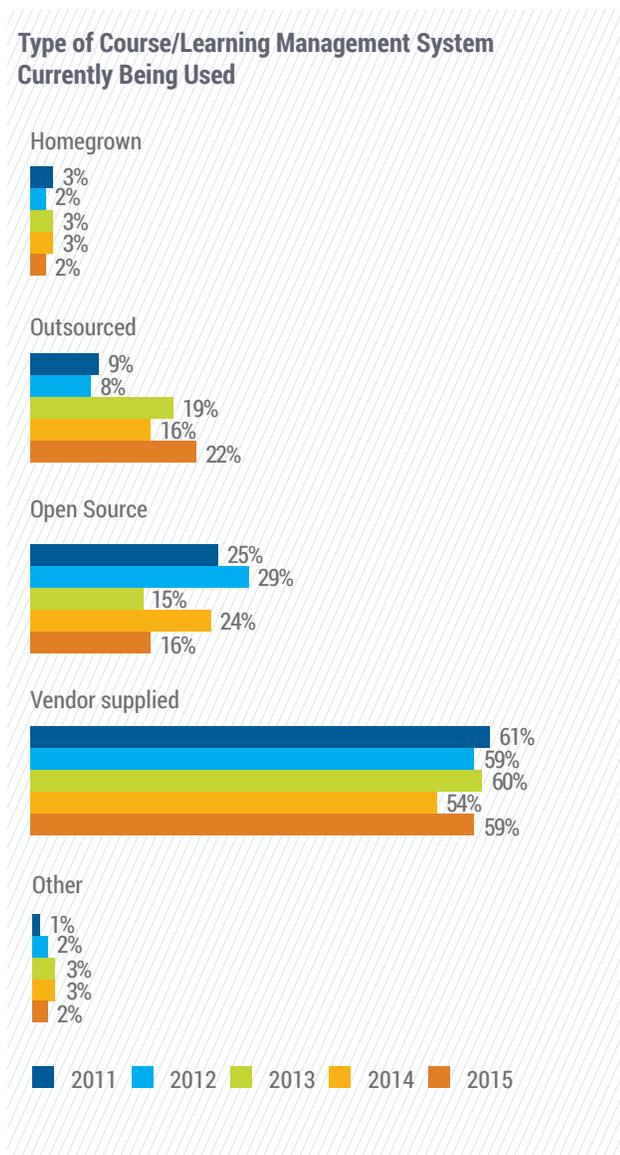
The majority of institutions (59 percent) continue to use a vendor-supplied CMS as the standard. The number of institutions using open-source solutions dropped from 24 percent in 2014 to 16 percent in 2015. This may explain the increase in institutions using an outsourced solution, which rose to 22 percent in 2015 from 16 percent in 2014. Only 2 percent of respondents use a homegrown CMS solution.

Blackboard continues to lead the pack with 47 percent reporting Blackboard as their standard, but this is down from 61 percent in the 2010 survey. Moodle continues to hold a solid share of the market at 32 percent, with Canvas growing to 13 percent of the market share from only 8 percent in 2014 and 0 percent in 2010. Desire2Learn was reported as the standard by 9 percent of institutions with Sakai gaining ground to 7 percent from 5 percent last year. Since Blackboard acquired Angel over two years ago, 0 percent of respondents reported using the Angel Platform, which is interesting with respect to the overall decline in Blackboard usage.

Please note: Our sample size was global and large, but the data are meant only to provide useful trend information and strategic and tactical support for CIOs in higher education, not marketing data about the use of CMSs in higher education.

Longevity of CMS Systems

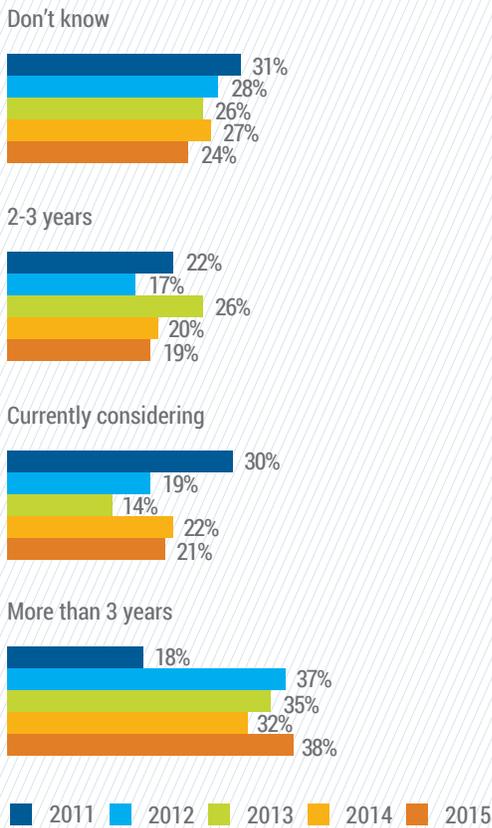
There has been little change over the past three years regarding the longevity of the CMS at institutions, with 60 percent of institutions reporting they have used the same CMS for longer than five years (down from 63 percent in 2014). However, the percentage of institutions in the process of implementing a new CMS rose from 2 percent in 2014 to 5 percent in 2015 with the remaining 35 percent having their current CMS for less than five years.



Replacing the CMS System

The CMS market space is likely to remain dynamic over the next several years, with 40 percent of the respondents falling into one of two categories: currently considering changing or changing within two to three years. Only 37 percent of respondents planned to stay with their current CMS for more than three years, while 24 percent were not sure when they would replace their CMS.

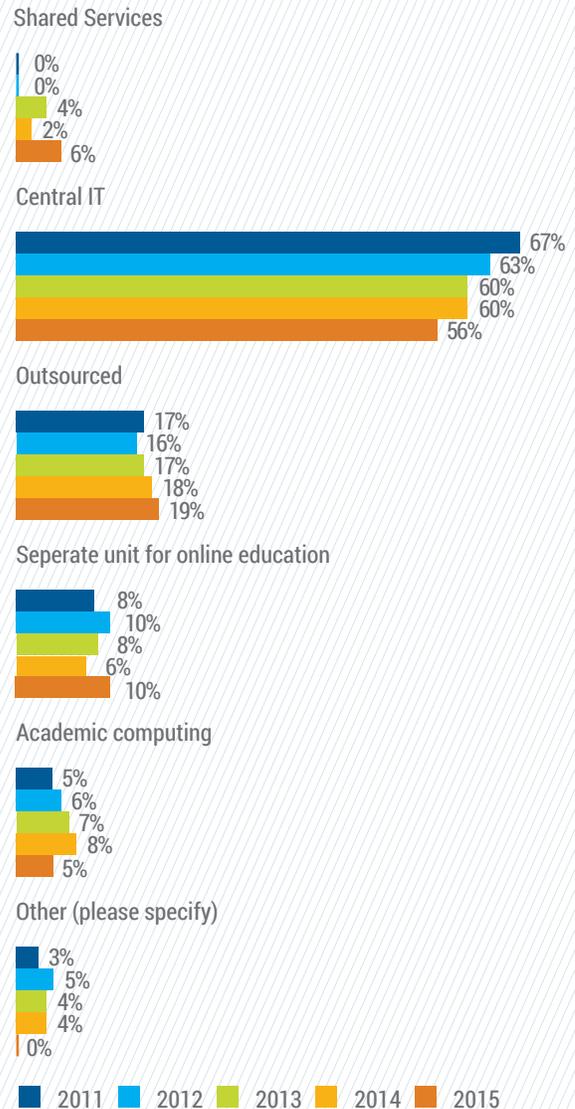
Timeline for Replacing Current CMS System



Maintaining the CMS and Related Infrastructure

A majority of respondents (56 percent) still assign responsibility for the CMS and related infrastructure maintenance to the central IT unit. However that seems to be decreasing, while the outsourcing of this support seems to be growing. A small but growing number of institutions are utilizing shared services for support of the CMS.

Changes in Responsibility for Maintenance of CMS and Related Systems

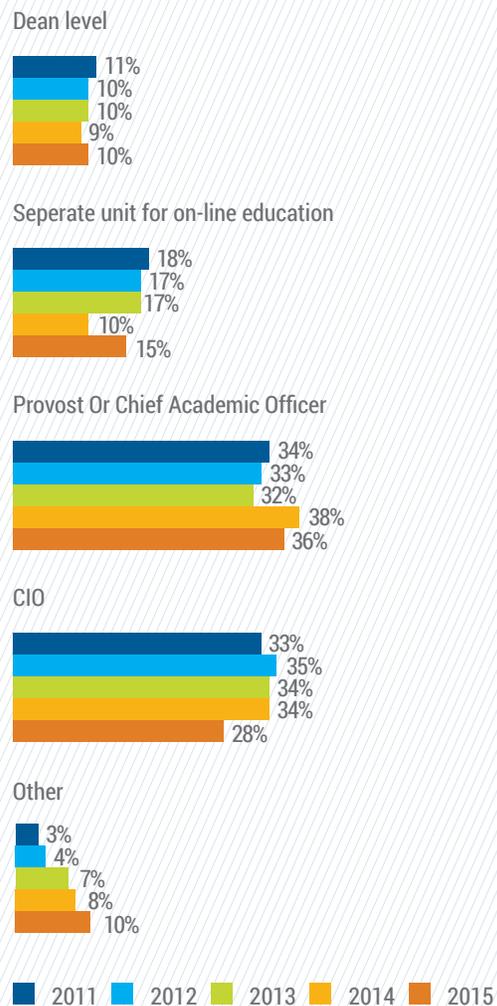


Institutions with between 3,001-5,000 and 5,001-10,000 students are more likely to outsource at 21 percent and 25 percent, respectively, than other institutions. Public institutions appear to outsource more than private institutions with 21 percent of public institutions outsourcing their CMS vs.17 percent of private institutions. This is up from 17 percent of public institutions and 14 percent of private institutions that were outsourcing their CMS in 2014.

Reporting Structure for Instructional Design, Course Design, and the Management for On-line Learning

Reporting functions varied for instructional design, course design, and management of online learning. In two-thirds of the cases, these functions report to the provost/chief academic officer (36 percent) or the CIO (28 percent) numbers that have decreased over the past two years. It is worth mentioning that there were increases in both separate online education units (15 percent) as well as dean-level positions (10 percent) being responsible for these functions.

Changes to Reporting Structure for Course Design and Online Learning Responsibilities



MOOCs

Interest in MOOCs (massive online open classes) appears to be diminishing quickly. In 2013, 56 percent of respondents stated they were exploring the value of MOOCs at their institutions, whereas in 2015, only 23 percent are doing so. While the use of MOOCs in various forms has increased slightly over the past three years, so has the percentage of institutions stating they are “not considering at this time.”

Approximately five percent are using MOOCs as a form of remediation or preparatory learning, and another 1 percent are using it for undergraduate courses, the same percentage as the 2014 survey. Seven percent are using MOOC content within their existing courses, and nine percent are currently developing MOOCs.

Twenty-three percent are exploring the use of MOOCs, and 64 percent are not considering MOOCs at this time. For the second year in a row, there was a decline in the number exploring the use of MOOCs and an increase in the number of institutions that are not considering use at this time.

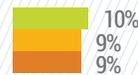
The type of institution does seem to matter concerning the use of MOOCs. While more than 70 percent of master’s level institutions are not considering MOOCs, 50 percent of research universities are not exploring MOOCs. Twenty-six percent of research universities are developing courses to be delivered as MOOCs while no two-year institutions indicated development of courses. MOOCs have externalized many university programs to a worldwide audience; one report indicated over 50 percent of individuals registering for a MOOC at a U.S. institution were from outside the United States.

Current Institutional Involvement with MOOCs

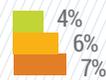
Working with other institutions to develop MOOCs



Developing courses to be delivered as MOOCs



Using MOOCs as a form of content for some courses



Using MOOCs to replace some current undergraduate courses



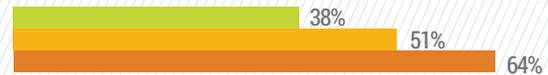
Using MOOCs for some remedial courses



Exploring the value, use and role of MOOCs



Not Considering at this time



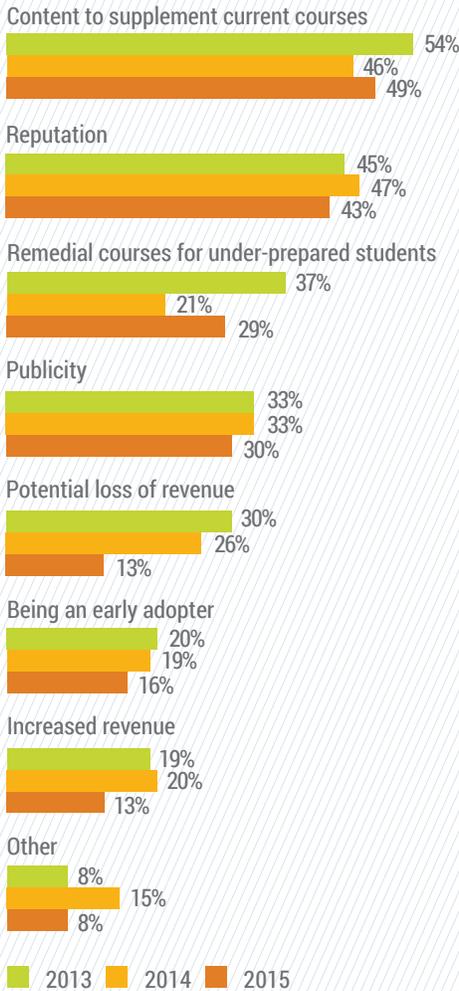
Legend: 2013 (light green), 2014 (yellow), 2015 (orange)

Top MOOC platforms or providers currently being used include Coursera at 68 percent; EdX at 41 percent; and Udacity. Canvas, and 2U at 6 percent. While most institutions don’t currently offer a MOOC, of those that do, only 1 percent reported completion rates greater than 50 percent, 2 percent reported completion rates of 25 to 49 percent and 7 percent reported completion rates between 0 and 24 percent.

Institutions consider MOOCs for a variety of reasons, with having content to supplement current courses (49 percent) given as the top reason. Publicity/brand recognition (30 percent) and offering remedial courses (29 percent) were next, with being an early adopter (16 percent) rounding out the top four.

Respondents continue to indicate increased revenue was important in their considerations, but less so than previous years. While having content to supplement current courses ranked at the top of an institution's concern about a new activity, institutions rated reputation a close second in the reasons for adopting MOOCs.

Interest in or Concerns About MOOCs



Finally, only 4 percent of institutions indicated that MOOCs were a critical component to a long-term instructional strategy. Eighty percent said MOOCs were not critical to the long-term strategy of the institution and the remainder (16 percent) were unsure if MOOCs were important.

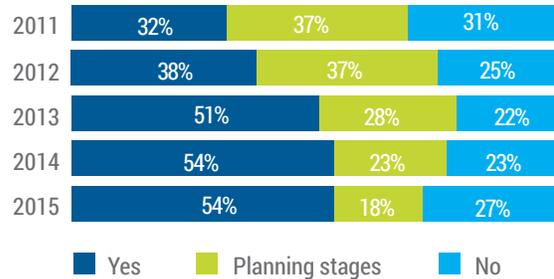
In summary:

- a) MOOC adoption continues to be slow.
- b) Interest in MOOCs continues to decline from 2013.
- c) MOOCs are strategically significant for only a small percentage of the institutions.
- d) MOOCs are not replacing traditional teaching methods at institutions.

Use of desktop virtualization

CIOs reported no growth in the adoption of desktop virtualization (VDI) solutions. Last year 54 percent of the institutions deployed a VDI solution for their computer labs; this year 54 percent are using VDI to replace purchasing computers for the student labs. Growth from 2012 has diminished and remained flat the past three years. VDI adoption is higher at institutions with 5,001–10,000 students (75 percent) than it is at institutions with fewer than 3,000 students (35 percent).

Use of Desktop Virtualization



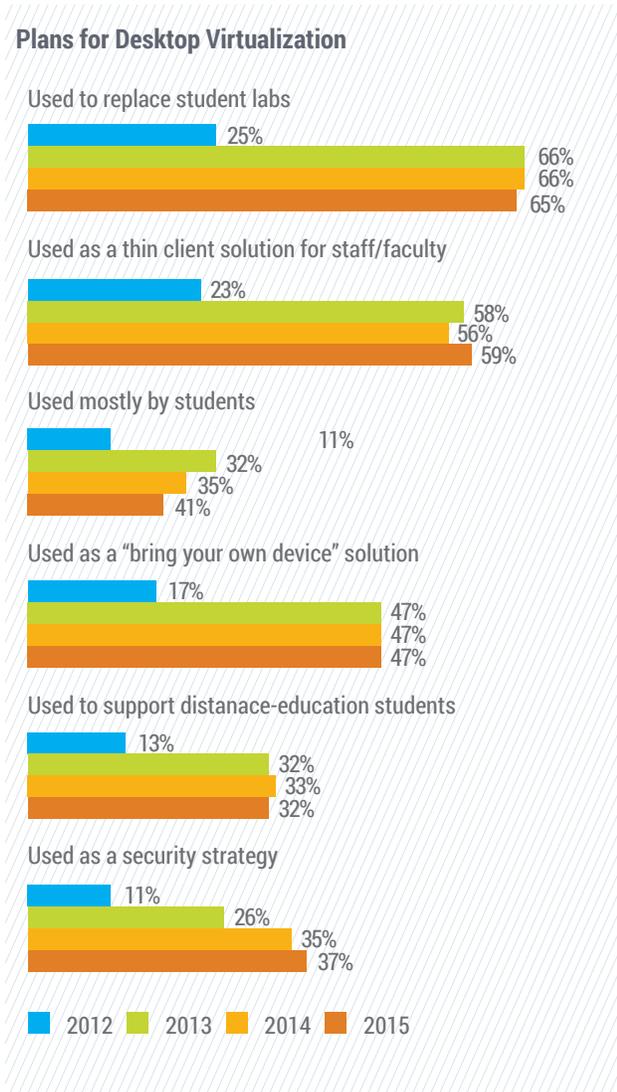
This year 18 percent indicate they are planning a VDI implementation, a decrease from 23 percent last year. We believe that the growth of using VDI at universities has steadied, and departments have completed their VDI projects. A question for next year's survey will be to ask about VDI's benefits, including cost savings or productivity. Twenty-seven percent of institutions had no plans to deploy a VDI solution, which reflects a slight increase over the 23 percent in 2014 that reported they had neither planned nor deployed a VDI solution.

Plans for desktop virtualization

The primary reasons cited for deploying virtual desktops are replacements for computer labs (65 percent) or to support thin clients for faculty/staff (59 percent). We think VDI services are becoming a low-cost, popular, cloud-based offering and could be the reason universities are not increasing their investments in campus-based solutions. Forty-seven percent indicated support for BYOD strategies as a goal, the same as in 2013 and 2014. Thirty-two percent of the institutions cited support of distance education as a reason for VDI support and 37 percent of respondents cited security as the goal for VDI, which is little changed from 35 percent last year. For the past 3 years, the rationale for growth of VDI remained flat across most categories except security.

The trend seems to indicate that VDI is here to stay, because it is seen as a multi-faceted tool that can increase productivity for administrative and academic departments as well as provide efficiencies and security for the lab environment. VMWare seems to be the VDI solution of choice with a whopping share of 73 percent; Citrix was listed by 32 percent, a decrease from 42 percent in 2014, although Microsoft usage increased to 22 percent from 17 percent in 2014. So, according to our survey respondents, what is the future of desktop installations and community labs? As expected, these two areas are seeing slower growth. Last year 50 percent of the institutions expected desktop installations to stay about the same or decrease. That number remains the same for this year. This year 18 percent expect desktop installations to grow. There is no significant increase, but 16 percent of the respondents indicate they expect a decline in desktop installations.

Consumerization has reduced the demand for universities to invest in community labs and, as a result, community labs are likely to continue shrinking in the coming years. Space previously reserved for computers is being reassigned to offer collaborative study space. Only 18 percent of the institutions expect community labs to grow, with 44 percent seeing a decrease or no growth. Institutions would like to decrease the number of community labs, a move that would save money and support requirements, as well as relieve some space needs. Another factor is that many student-owned computers are often superior to university-owned computers, and institutions can't keep up with the rapid change.



INFRASTRUCTURE

We continue to see higher education move from internally hosted solutions to vendor-hosted solutions. Data centers are evolving, changing from a university's private data center, to infrastructure and software as a service. These changes are affecting IT infrastructure and networking strategies on university campuses. The LBCIO survey focused on four primary areas affected by current technology trends:

- Security
- Incident management
- Networking
- Digital repositories and document management

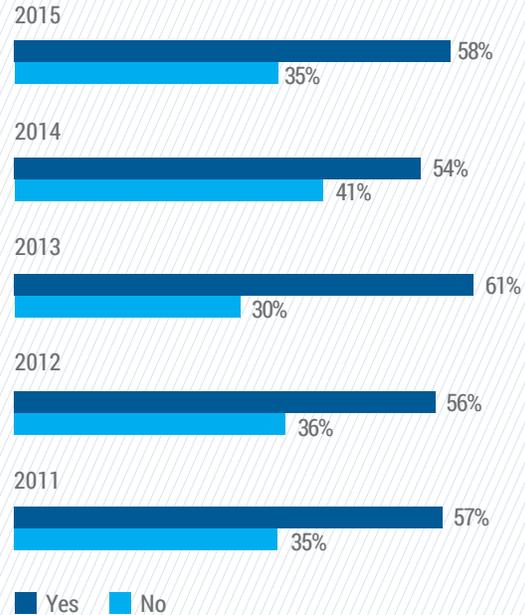
Security

2014 was described by some as the “Year of the Data Breach,” with costly breaches affecting retail, healthcare, and other industries. 2015 has continued the trend; a current example is a breach exposing federal worker data. According to this year’s survey results, CIOs rank data security as the main issue that keeps them awake at night. While security breaches touch people across all industries, higher education institutions are vulnerable because they promote an open environment to support teaching/learning, research and community access, and support while trying to protect large amounts of sensitive and highly personal information and data.

In 2014 and the beginning of 2015, the IT industry experienced many critical vulnerabilities. April 2014 started with the Heartbleed vulnerability; Bash Bug was announced in September, and POODLE in October, with hundreds of Microsoft patches being released over the past year. July 2015 also marked the end of support for Windows Server 2003, which does not pose as great a risk in end of life as Windows XP which ended support in 2014 and is running unprotected on many PCs. The fact remains that there is a security threat posed with the end of support for any operating system still in use. Changes in legislation and PCI compliance also have been changing IT security landscapes across IT in all industries.

All these threats and new policies have caused IT to react and start implementing changes to meet these new challenges. University CIOs are responding by putting into operation security plans and hiring dedicated IT security personnel. More than half (58 percent) of the institutions surveyed indicated that they had a specific person designated as chief security officer (CSO). Ninety-five percent of the CSOs report through the IT organization.

Change in Prevalence of CSO by Year



CSO Reporting Lines



It is likely (including those organizations without a designated CSO) that the security function is a component of one or more IT positions on most campuses. The CSO position is more common in public (70 percent) than in private (46 percent) institutions.

Security plans often include protection strategies, educational efforts, monitoring techniques, plan review, and an incident response plan. The survey results show that about half of institutions have a formal security plan (48 percent) and another 28 percent are in the process of developing such a plan. Over the past six years these numbers have risen from 43 percent reporting having a formal security plan and 16 percent working on a plan in 2010. Forty-five percent of these plans are being reviewed and updated yearly.

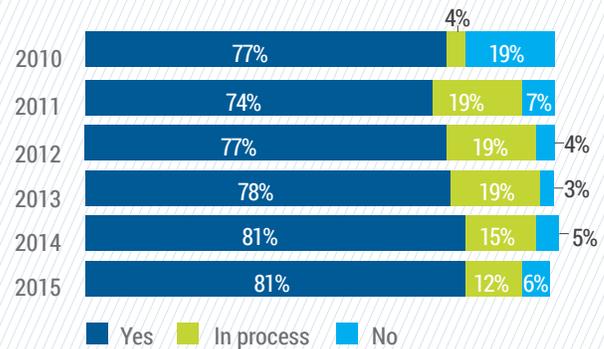
Good security plans are formulated based on results from a security audit. More than three-fourths (77 percent) of the institutions surveyed have completed at least one security audit; this number has been steady since 2012. A little less than half the institutions (42 percent) are performing yearly security audits while 50 percent perform the security audit every two or more years. Penetration testing (simulated computer attacks) is also holding steady at 66 percent of institutions. Understanding the significance of data security is reflected by the fact that 76 percent of universities have seen an increase in spending on IT security projects over the past five years.

Multifactor authentication provides the institution with a greater likelihood that a person/entity seeking access is who he says he is. While only 21 percent of institutions have implemented a multifactor authentication solution in 2015 (up from 11 percent in 2012), 43 percent of institutions currently are considering such a solution, an increase from 30 percent in 2012.

Incident management

Security planning is an exercise in providing insurance against undesirable outcomes. Incident management reflects that same philosophical basis: determining an appropriate amount of effort and expense to apply against risks that are difficult to quantify. Incident management is no longer just an IT issue or concern; it is being reviewed and discussed at all levels of the university. Natural events, civil unrest, and IT security have prompted university officials to consider the impact of severe disruptions in business operations and the need to ensure access to critical university systems. What must higher education institutions do to protect themselves, and what are they planning for the future? The following chart shows the importance of the topic and planning efforts.

Plans to Resume Critical Operations in Case of a Crisis



The percentage of institutions with a formal business continuity plan (currently 81 percent) has been gradually rising since 2010. In 2015 only 6 percent do not have a plan, down from 19 percent in 2010. There is no difference between public versus private schools, as both were at the 81 percent threshold. One of the ironies of planning within higher education is the tendency to avoid rehearsing the plan. Over one-third (35 percent) of the respondents in 2015 indicated that their business continuity plan had never been tested, while about 28 percent test the plan annually, and 10 percent more frequent than annually. Sixty-three percent have a secondary data center that provides some level of recovery potential in the event of a catastrophe affecting the primary data center, 30 percent have a fully redundant data center, while 33 percent have only a partially redundant data center for critical services. Fully redundant data centers rose to 30 percent from 20 percent in 2012, showing the importance that universities are placing on IT services. Fully redundant data centers are more prevalent in public universities (34 percent) than in private universities (22 percent), while partially redundant data centers are more prevalent in private universities (37 percent) than in public universities (31 percent).

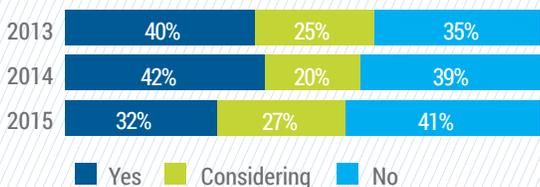
Networking

As universities continue to look to software and infrastructure as a service, a robust network infrastructure is more critical. Increasing demands for video streaming and online collaboration are putting additional load on available bandwidth. Wired networking remains an important service on many campuses for office use, whereas wireless is more critical for students and faculty, especially in the classroom. LBCIO members reported an average of four smart devices per student, thereby continuing to increase the demand for ubiquitous wireless access and straining security efforts.

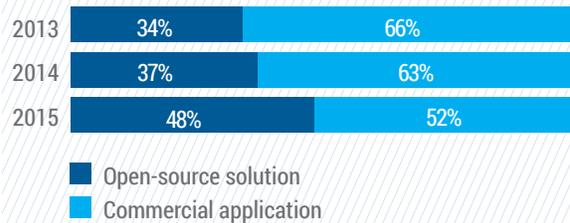
Digital Repositories and Document Management

Institutional use of digital repositories seems to be decreasing. This year use of digital repositories was down to 32 percent from 42 percent in 2014 and 40 percent in 2014. This decline could be due to shared services and/or more institutions relying upon the cloud. For those using digital repositories, the use of open-source solutions has increased from 34 percent in 2013 to 52 percent in 2015.

Use of Digital Repository Solutions



Types of Digital Repository Solutions



In terms of document management at their institution, there was little difference from responses in 2014.

	2015	2014
Integrative middleware for core academic and administrative systems	51%	50%
Separate component on the IT stack	49%	50%

When asked how IT is managed, there is a slight increase in document management at the departmental level from 2014:

	2015	2014
At the institutional level	47%	50%
At the departmental level	53%	50%

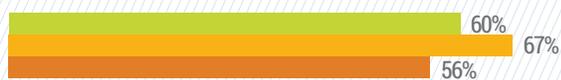
Ninety-four percent prefer out-of-the-box solutions for new IT investments, compared to 6 percent who prefer customized solutions, with little variance in responses between size or type of institution. This hasn't changed from 2014.

CLOUD COMPUTING

The use of cloud computing in higher education has seen significant growth over the past few years, and institutions are using the cloud for a variety of activities. Most institutions reported using cloud computing for a mix of academic, administrative, and community services. Cloud computing for management needs has been growing. It is notable that, since the survey began six years ago, no one has reported using the cloud for community service/outreach activities.

How Cloud Computing is Used

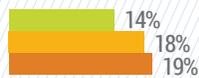
Mix of academic administrative and community service



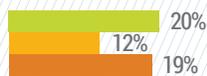
Community service or outreach



Mostly management needs



Mostly academic (teaching and learning)



Not sure



2013 2014 2015

Institutional size did not reveal major differences on how institutions use cloud computing, and there is little difference on cloud usage by type, public vs. private. However, use of the cloud for academic purposes was much higher at doctoral institutions (33 percent) than at research institutions (20 percent), master's with some graduate programs (18 percent), master's only (11 percent), and two-year (10 percent).

Factors Influencing the Use of Cloud Computing

Institutions indicated that many factors influence their usage of cloud computing. As we've noted the past few years, saving money and protection of sensitive information are the most positive and negative concerns respectively; however, a growing concern is access to information in the cloud with 73 percent in 2015 compared to 64 percent in 2014 and 57 percent in 2013.

Factors Influencing the Use of Cloud Computing

Saving money through the use of cloud computing



Concern about security



Concern about privacy



Ownership of data



Protection of sensitive data/information



Access to data/information in the cloud



Ability to bring new activities on-line quickly



Other



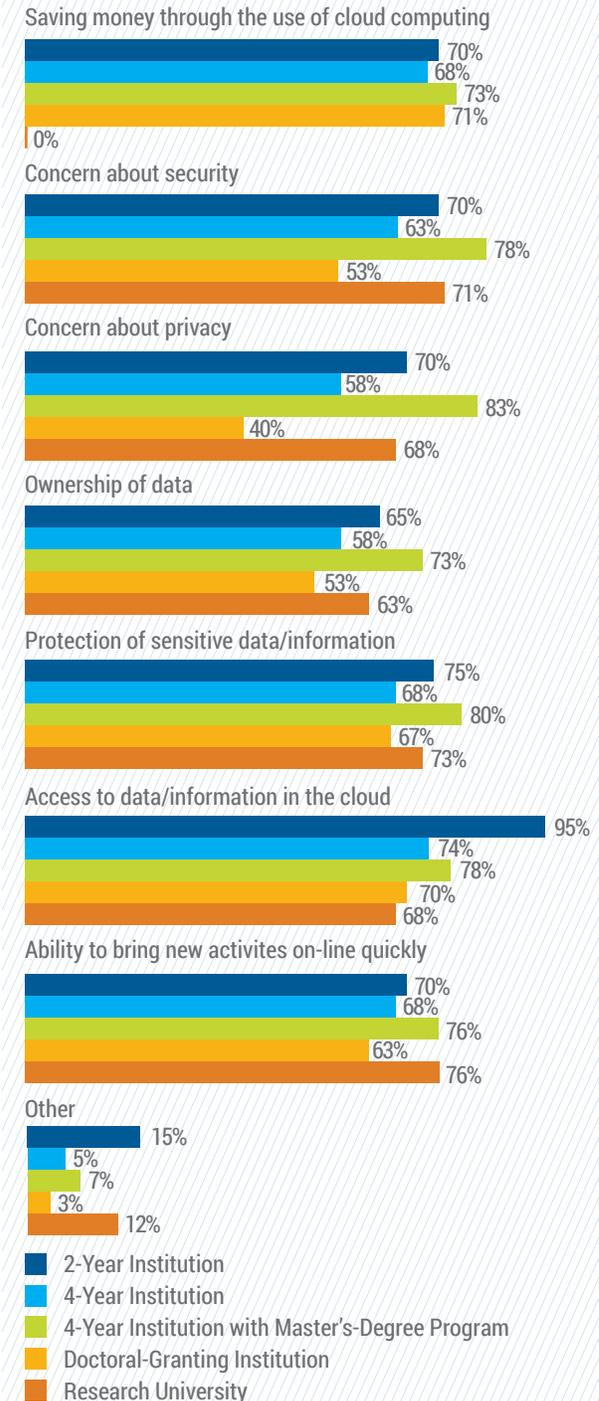
2012 2013 2014 2015

Use of Cloud Computing by Institution Classification

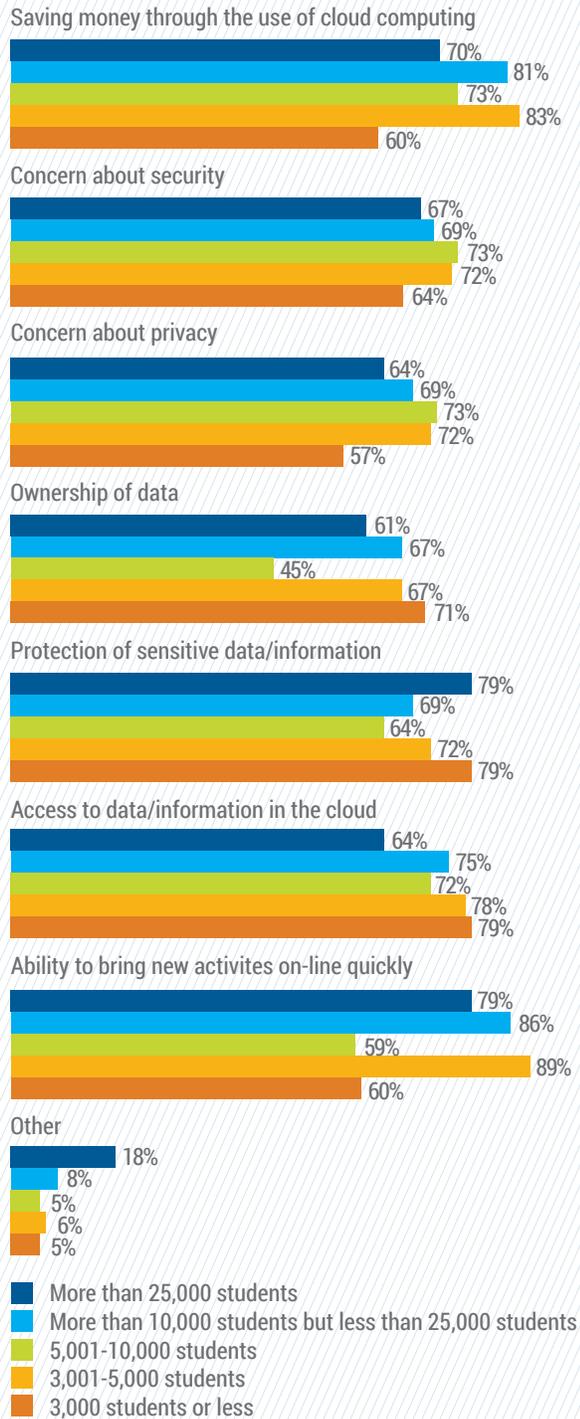
Two-year institutions reported having access to the information in the cloud as their highest influencing factor at 95 percent. Their concern with ownership of data was the lowest among all other classifications. However, doctoral-granting institutions were more influenced by the cost saving and less concerned about privacy and security than other institutions.

When reporting on factors influencing cloud computing, smaller institutions (3001-5000 students) reported the highest interest in cost saving (83 percent) and bringing new activities quickly to the cloud (89 percent), while larger institutions reported more interest in protection of sensitive data and the ability to bring new activities online quickly.

Cloud Computing Influencing Factors by Institution Classification

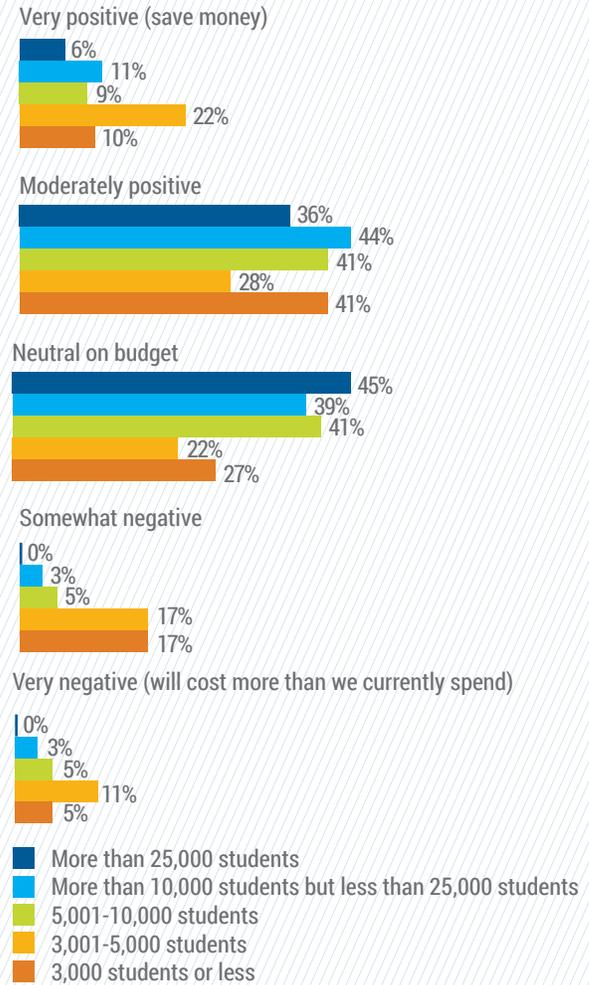


Cloud Computing Influencers by Institution Size



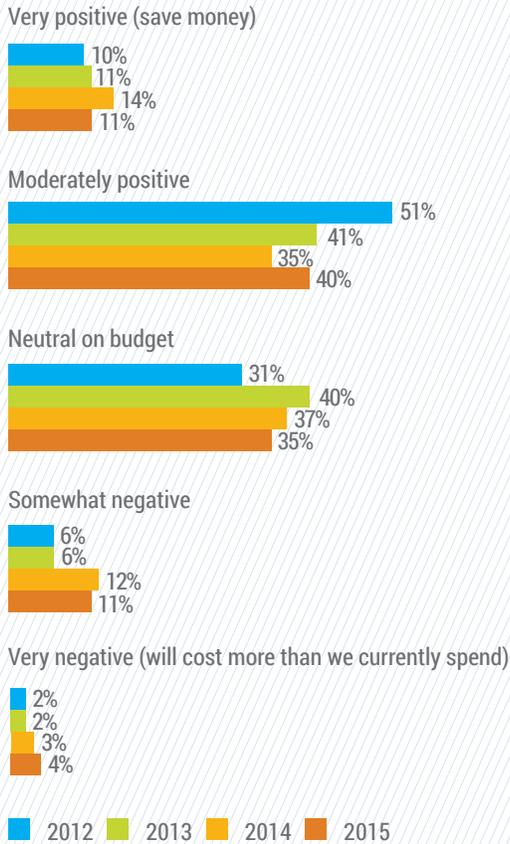
Over the past four years, most institutions have seen a moderately positive impact on the budget when using cloud computing; however, the overall position of very positive and moderately positive impact on budget fell in 2015 from 2014.

Cloud Computing Impact on Budget by Institution Size



Most institutions expect cloud computing to have a moderately positive or neutral impact on budgets. While the numbers have changed slightly during the past four years, the numbers overall are reasonably consistent during that period.

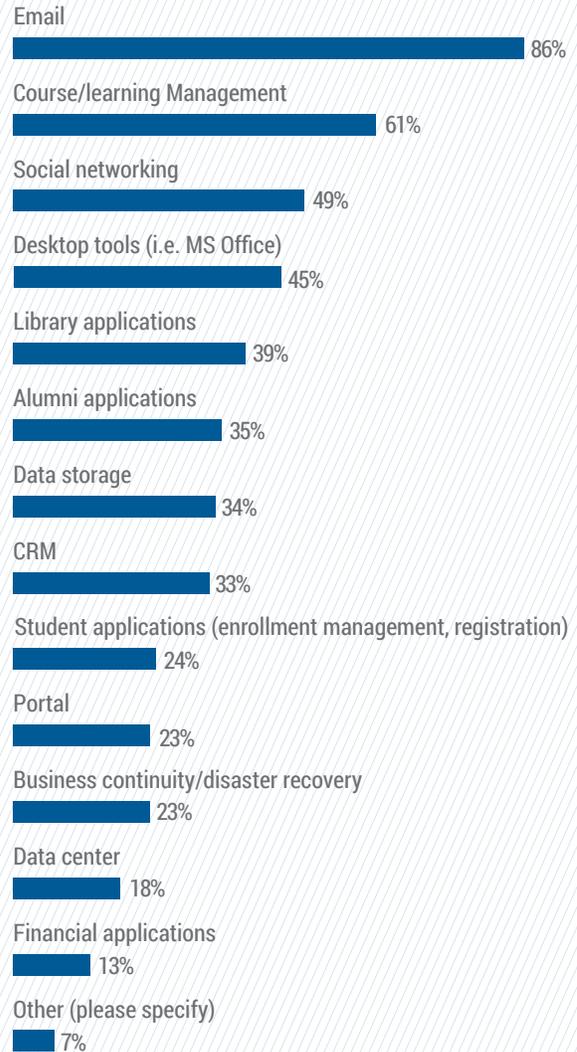
Projected Impact of Cloud Computing on Budget



Applications in the Cloud

Email continues to be the primary application moved to the cloud with 86 percent indicating that they have either placed mail into the cloud or are in the process of doing so, up from 81 percent in 2014. The area with the most significant increase of usage between 2014 and 2015 (12 percent) is in the use of Desktop tools, i.e., Microsoft Office which is likely due to the maturity of online office applications like Microsoft Office365 and Google Apps and the speed of adoption in higher education for low or no-cost. There has been a decrease in using cloud computing in disaster recovery and business continuity from 25 percent in 2014 to 23 percent in 2015.

Application in the Cloud

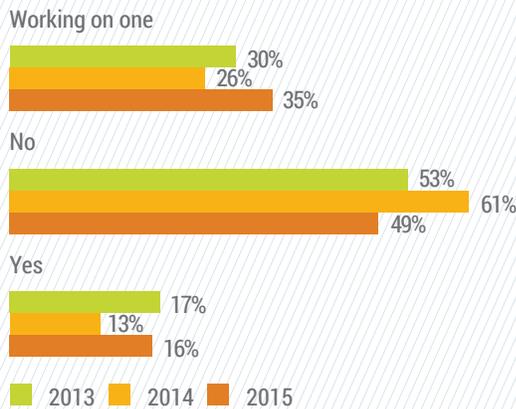


The data from the past few years show considerable growth in the use of the cloud for course/learning management (61 percent up from 24 percent in 2012), alumni applications (35 percent up from 21 percent in 2012), library applications (39 percent up from 28 percent in 2012) and desktop tools (45 percent up from 26 percent in 2012).

BIG DATA

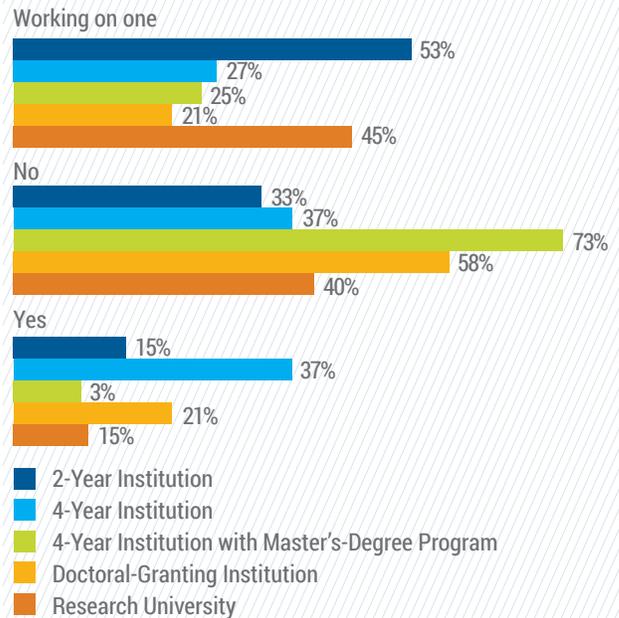
The use of big data is another nascent trend, as we reported last year. We first asked questions about big data strategies three years ago. This year about half (49 percent) of the CIOs reported not having a big data strategy, although 35 percent are working on establishing a strategy and 16 percent currently have one. In comparing the responses over the previous years, there was an increase in institutions that reported having a big data strategy (3 percent) and an increase of institutions working on one (9 percent) from 2014. While the growth in a strategy for big data is not huge, more institutions are interested in developing or having a big data strategy.

Presence of Big Data Strategy



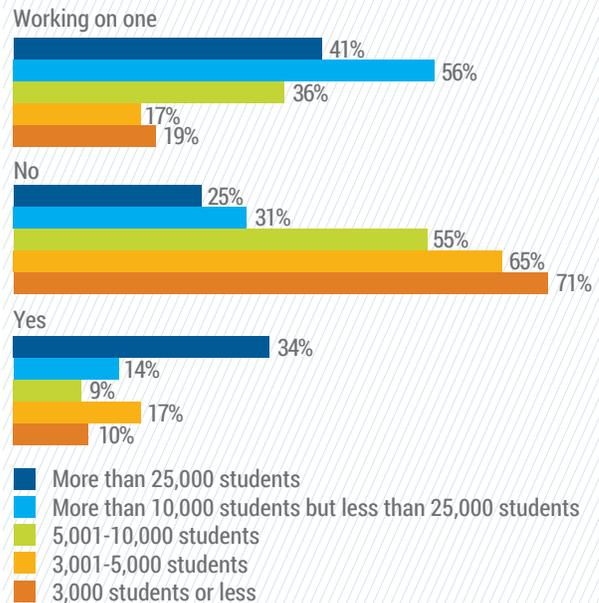
Institutional classification seems to make a difference as research universities and doctoral-granting institutions are more likely to have a strategy or be working on one than the other classifications. Four-year institutions with master's degrees are the most likely not to have a strategy.

2015 Big Data Strategy By Institution Classification



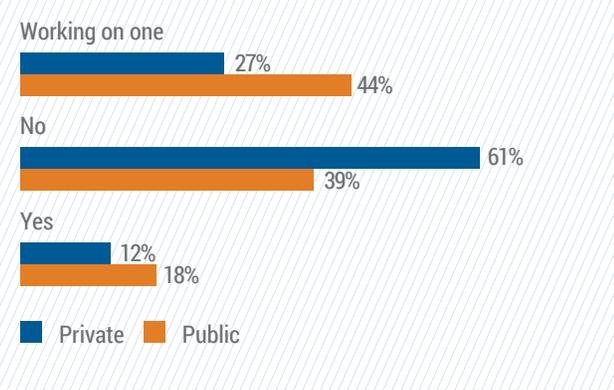
Overall, smaller institutions (3000 students or less) are not as likely to have a big data strategy (71 percent) as other institutions. Larger institutions reported more attention to big data strategy either by having one (34 percent) or working on one (41 percent).

Big Data Strategy By Institution Size



When it comes to institution type, CIOs of public institutions reported a higher rate of having a strategy (18 percent) or working on one (44 percent) than private institutions, where the majority (61 percent) reported having no strategy or not working on one.

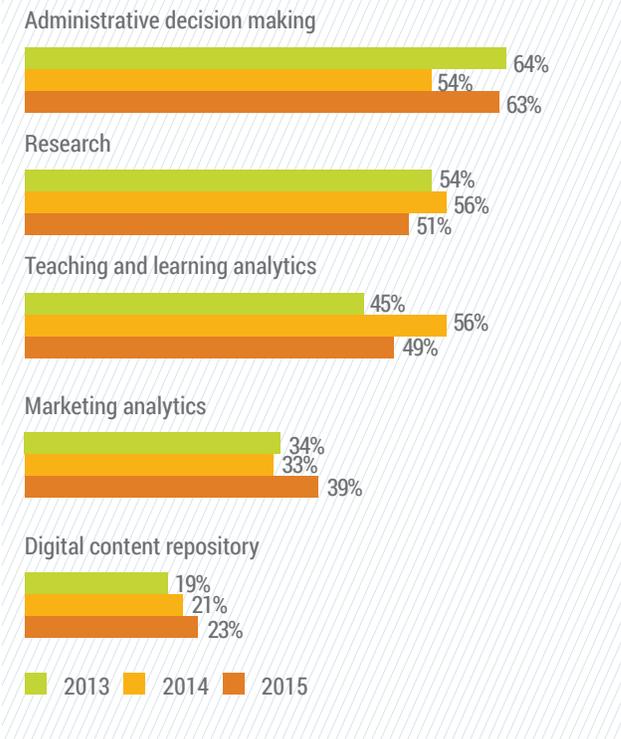
Big Data Strategy by Institution Type



Big Data Usage

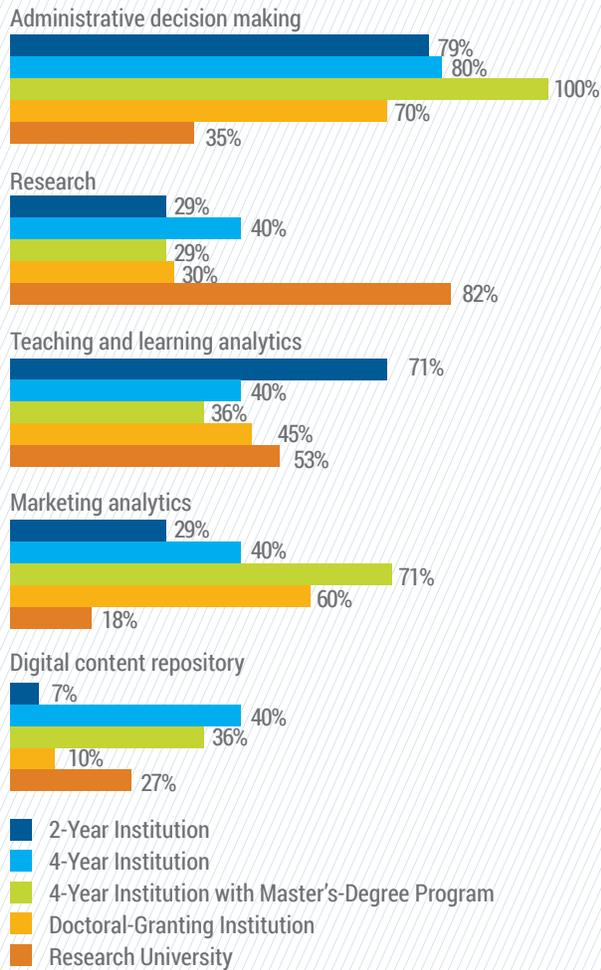
Higher education institutions leverage big data for different uses. The greatest use is in administrative decision making (63 percent up from 54 percent in 2014), followed by research (51 percent) and teaching and learning analytics (49 percent).

Use of Big Data

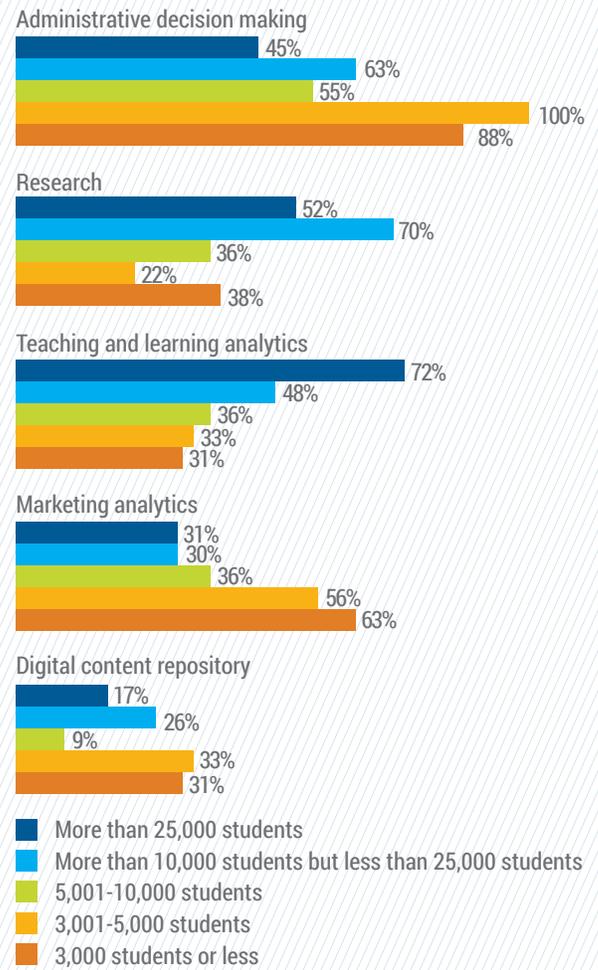


By institution classification, research institutions reported higher use of big data in research (82 percent) and lower use of big data for marketing. However, 2-year institutions were more likely to use big data for teaching and learning analytics.

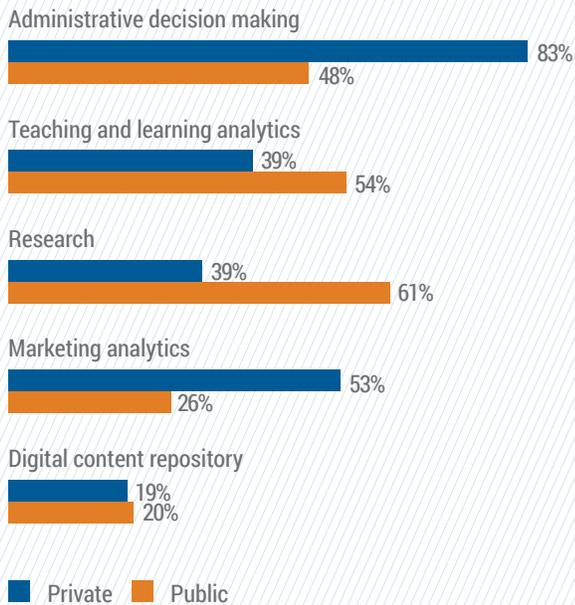
Use of Big Data Strategy By Institution Classification



Use of Big Data by Size



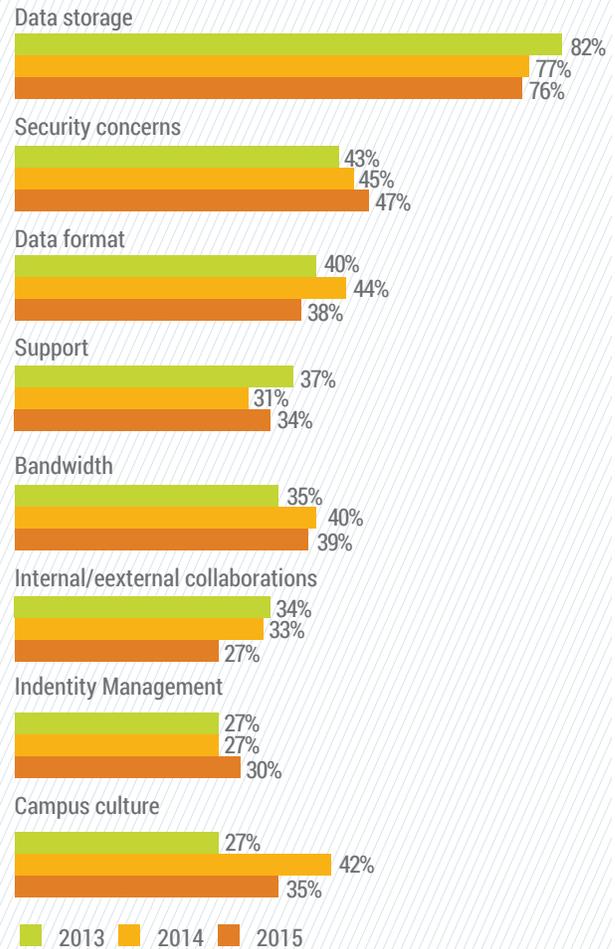
Use of Big Data by Institution Type



Big Data Impact

Over the past three years big data has had the largest impact on data storage, but data storage has been trending down, perhaps because of the reduced storage cost and more efficient big data technologies. However, security concerns are growing year after year as is Identity management. Bandwidth impact is third on this year's list.

Big Data Impact: Three-Year Trend



WHAT KEEPS CIOs AWAKE AT NIGHT?

This year we asked the question “What is the one issue that weighs heavily with you or keeps you awake at night?” The responses are very revealing, as CIOs listed security and privacy issues at the very top, but resource planning and funding are also very important. There are a few interesting responses that indicate some of the frustrations with the job of CIO:

“University non-IT Leadership not outsourcing strategically but chasing empty promises or believing that ‘If we Cloud it then we will save.’ This results in a growing lack of respect for CIOs.”

“I’m looking forward to retirement and getting away from the pressure...”

Some CIOs expressed concerns about the rising cost of higher education and how many people are beginning to question the real value (in dollars and cents) of a degree and whether we’ve reached a price point no longer attainable for many in the middle class. Others indicate a concern about the use of IT for teaching and learning and how to provide support as both learning technologies and pedagogy change.

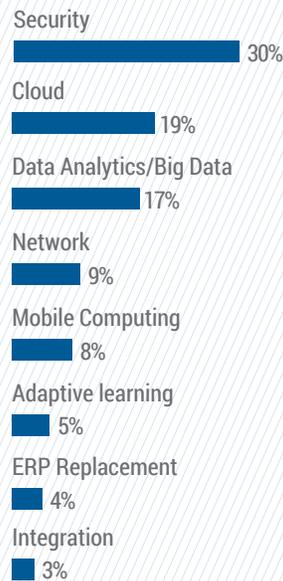
Issues that Weighs Heavily with CIOs



What One Technology Will CIOs Have to Invest in During the Next Five years?

For the second year we asked CIOs what one technology they will have to invest in during the next five years. The results parallel what keeps them awake at night. Security is at the top of the list, and it reveals how the concern remains even after many years of investing and implementing new technologies and strategies for resolving security problems. (Security was selected as the most important issue facing IT leaders in the CAUSE Current Issues survey for 1984.) Worries about security also fly in the face of what many IT leaders believe, that there will be an ultimate technology solution to protect an organization’s information asset in the future. At a Gartner Symposium event in 2004, Bill Gates said, “I think within the next two years [security] will get off the top five list [of concerns].”

Top technology Investment for the Next 5 Years



While security is more than a technology, it is at the top of the list of CIO concerns. Institutions are willing to invest in any technology that promises to keep their information and their institution’s reputation protected.

SUMMARY

Only after the glow (or hype) of a new idea dims do organizations slowly begin the work of incremental and continual adoption. While some of the technologies included in this report (e.g., MOOCs) are passing their exuberant irrationality phase, most of the technologies are likely to see more significant, if not less raucous, advances. What goes quiet deserves our gaze.

Analytics is one area of untapped potential. Even though universities still are hampered by insufficient data integration, many will continue to make progress in unifying sources of data, adopting analytic tools, and thus begin tapping into more complex analysis. Interesting areas to follow in the future include:

- The extension of consumer personal fitness monitoring technology to academic fitness will come. Today, Fit Bit, Apple Watch and Microsoft Band devices can record physical activities and monitor body measurements, such as heart rate, skin temperature, galvanic skin response, sleep monitoring and, of course, steps taken. In the future, wearable skin sensing technology and microphones could potentially assist students in developing good academic behaviors. (A recent study at Dartmouth suggests that a student's GPA can be predicted through the use of the student's smartphone).
- Adaptive learning technology still is, perhaps, the gold standard for how IT can provide tailored learning interactions. Adoption takes time, due to the cost of developing solutions and the slow rate of faculty acceptance. Conventional learning system vendors are likely to fill in the gap with real-time data streaming that will provide additional information concerning a student's academic fitness and can also help instructional designers develop and deliver personalized content and interactions to faculty and students.
- Continued focus on analyzing student retention and success will begin to expand to regularly include noncognitive and metacognitive measures. These measures gather information about a student's perseverance, confidence, and planning skills and provide additional insights about why students persist or drop out. They also can provide valuable clues to faculty and advisors when counseling students.
- The ongoing maturity of both software as a service (SaaS) and infrastructure as a service (IaaS) means these two approaches are likely to gain traction in higher education. Over the next few years, several of the major ERP vendors will be hard at work on multi-tenant SaaS versions of their on-premise software. University data centers are likely to shrink in the coming years. The IT supply chain has historically been made simple by Moore's Law, in which IT staff did not have to do much detailed financial forecasting. With the rapid evolution of cloud solutions, including IaaS/PaaS solutions, the supply chain is getting more complex. Today, Amazon Web Services, Microsoft Azure, and Google IaaS offerings can be purchased through resellers. Network companies are adapting by providing more advanced networking and security services for integrated on/off ramps to all the major cloud providers. University infrastructure tomorrow may not resemble the largely on-premise infrastructure of today.

A critical trend that does keep CIOs and CISOs up at night is the increasingly sophisticated cybercrime committed by local and foreign miscreants. While feeble and run-of-the-mill automated hacking continues, much more focused theft of data and money is increasing. And the threats are not just on the outside but increasingly involve insider knowledge or access. Some of these crimes are 21st-century silent equivalents to noisier 19th-century bank heists and train robberies. Most universities still lag behind in the adoption of more sophisticated security schemes and counter measures. We suspect this, too, will change.

Lastly, and perhaps more importantly, as technology continues to become more complex and sophisticated, IT workers who can quickly master new technologies continue to be scarce. While higher education attracts many who like its research and teaching missions and the campus culture, more often than not the IT worker leaves for an industry where compensation and career movement are often better. It will continue to be difficult to attract the type of talent that can keep universities near the forefront of innovation. Is higher education doomed to be an IT farm team for the vendor and corporate IT big leagues? Time will tell.

If you would like more information about the survey or The Leadership Board for CIOs in Higher Education, or would like to become a member of LBCIO, please contact—

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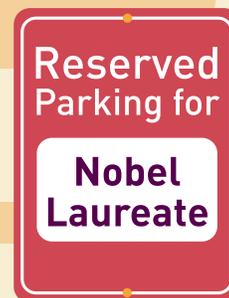
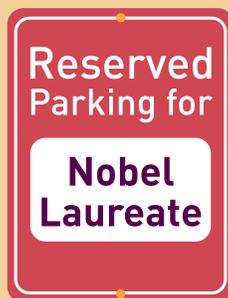
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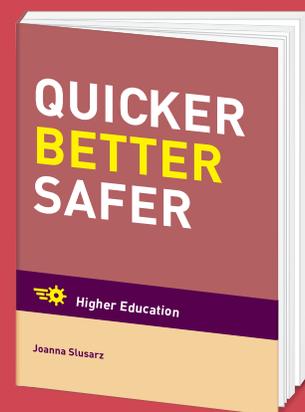
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