

INFORMATION TECHNOLOGY IN HIGHER EDUCATION

2018

EXECUTIVE
SUMMARY

SURVEY OF CHIEF INFORMATION OFFICERS

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Introduction

This report, the ninth annual global LBCIO survey of Chief Information Officers (CIOs) in higher education, provides us with some new insights and changes in how we look at the evolving role of the CIO in higher education. For 2018, we made a few changes to the survey. We added questions that the Chronicle of Higher Education suggested and dropped a few others. The Chronicle of Higher Education will do a report “*Securing The Digital Future – what college leaders need to know about the changing role of the CIO*” based on the new questions. We also made changes in the survey based on feedback from LBCIO members and respondents to previous surveys.

Security continues to be a significant headache for CIOs in higher education and the issue was at the top of issues that keep CIOs awake at night again this year. More CIOs indicate that they are getting on top of phishing and malware, but many also believe that a significant number of faculty and staff are not adequately concerned about security.

LBCIO surveys provide key metrics to help CIOs manage and plan IT for their institutions. Results from the survey are shared only in the aggregate, 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 a story of what CIOs currently are undertaking 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.

To get a picture of what’s happening with IT on campuses today, LBCIO surveyed a broad range of colleges and universities in April and May of 2018, collecting strategic and tactical information on major issues higher-education CIOs are facing. The survey included questions on topics including:

Characteristics of CIOs in higher education Financial and budget information for IT

- **IT organization and governance**
- **Personnel and staffing issues**
- **Administrative computing plans**
- **Academic technologies and services Infrastructure, networking**
- **Security New and emerging technologies and IT leadership issues**

Dr. Michael Zastrocky, Executive Director of LBCIO, was assisted by the following LBCIO members in the analysis of this year's survey results:

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We would also like to thank Dr. Jan Fox for providing additional support in the writing and production of this report. Her contributions to higher education are well documented through the years, and her experiences and insights are invaluable to us all.

Institutional and CIO Characteristics

2018 Survey Respondent Demographics

The 2018 survey was sent to almost 1,000 CIOs globally, and the response rate was greater than 20%. The survey was conducted for a period of three weeks during April and May 2018.

As in prior years, CIOs from public institutions were the majority of the respondents (55%) versus private, nonprofit institutions (45%) and for-profit institutions (1%). This year the breakout by classification of institutions was as follows:

Research universities	22%
Doctoral-granting institutions	20%
Four-year institutions with master's degree	35%
Four-year institutions without master's degree	8%
Two-year institutions	16%

The size of the responding institutions varied, with 23% having enrollment of 3,000 students or less, 17% with 3,001-5,000 students, 22% between 5,001 and 10,000, 21%

with enrollment of 10,001-25,000 students, and 18% at more than 25,000 students. Public institutions made up almost 55% of the respondents, private institutions almost 45% of respondents and for-profit institutions made up 1% of respondents.

CIO Responsibilities

Over the past five years, CIOs consistently reported their management scope included traditional core responsibilities for supporting administrative and academic applications, programming applications, helpdesk, networking, and telecommunications. This year’s survey has shown a decline in library management responsibilities for the second year in a row. The percentage of CIOs responsible for research computing has stayed the same from last year, while institutional research responsibilities increased from last year. As security continues to be high priority, it is not surprising that 100% of CIOs reported that IT security and disaster recovery is included in their scope of management.

CIO Characteristics

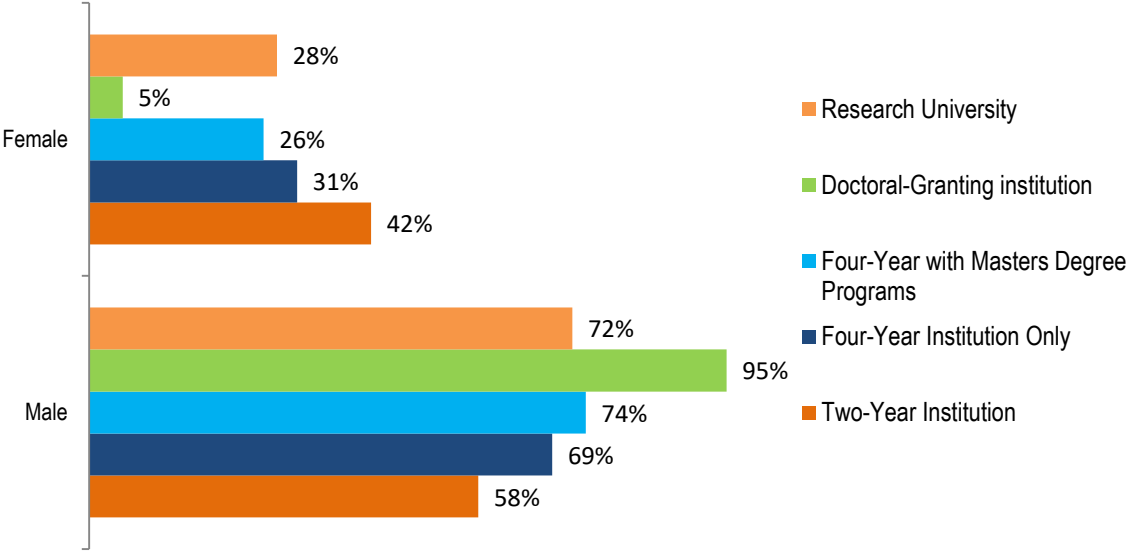
CIOs in higher education tend to be mature in age, with forty-seven percent in the 55-and-older category. Thirty-seven percent of CIOs are between the age of 46 and 55 years of age, while only fifteen percent were between 36 and 45 years of age and just two percent were younger than 35 years old. Men continue to dominate the field, although the 2018 survey marks an increase in female CIOs up from nineteen percent last year to twenty-five percent this year, the highest percentage in our nine years of surveys

CIOs with a terminal degree make up 25% of CIOs while those with master’s degrees make up the bulk of CIOs with 55%. The reverse is true on the longevity as CIO. Since 2012, CIOs with 15 years or greater experience increased from 23% in 2012 to 32% this year, and that number has been climbing. CIOs reporting to the CEO (35%) continue to be the norm. However, CIOs reporting to the Chief Financial Officer (CFO) increased to 29% in 2018 up from 19% in 2012, and those reporting to the Chief Academic Officer (CAO) have decreased from 25% in 2012 to 17% in 2018

Changes in CIO Characteristics by Gender

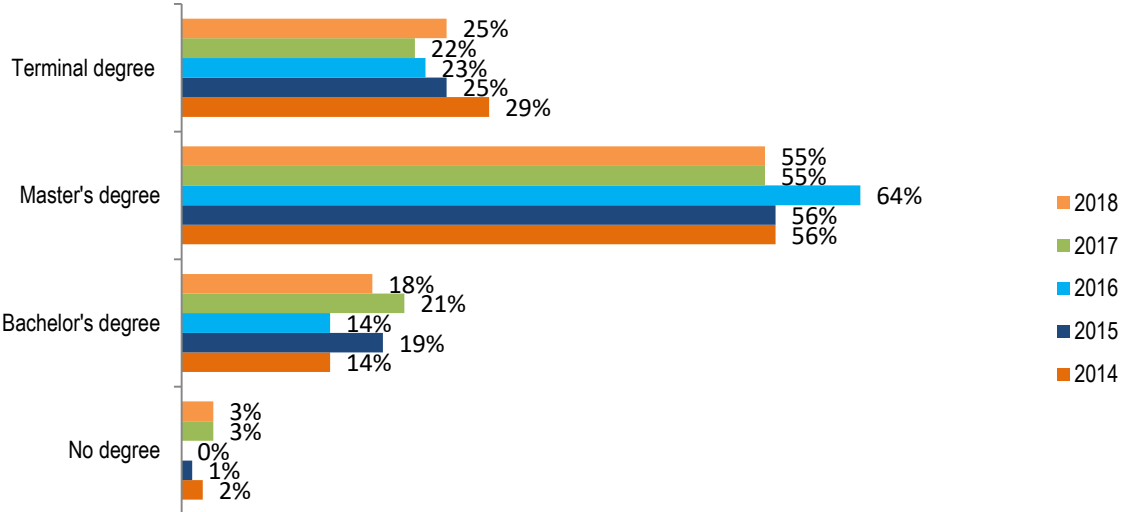


CIO Characteristics by Gender and Institutional Classification

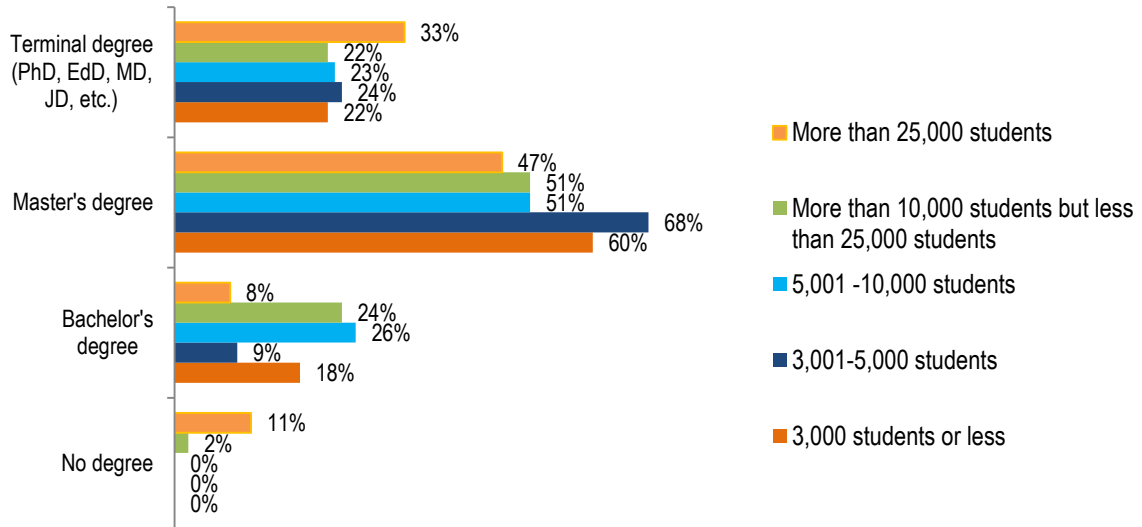


Various combinations of education, experience in the role, and knowledge influence CIO professional advancement opportunities. Eighty percent of CIOs earned a master’s or higher degree, while three percent of CIOs who responded do not hold a degree at all and eighteen percent hold a bachelor’s degree.

Highest degree attainment of CIO

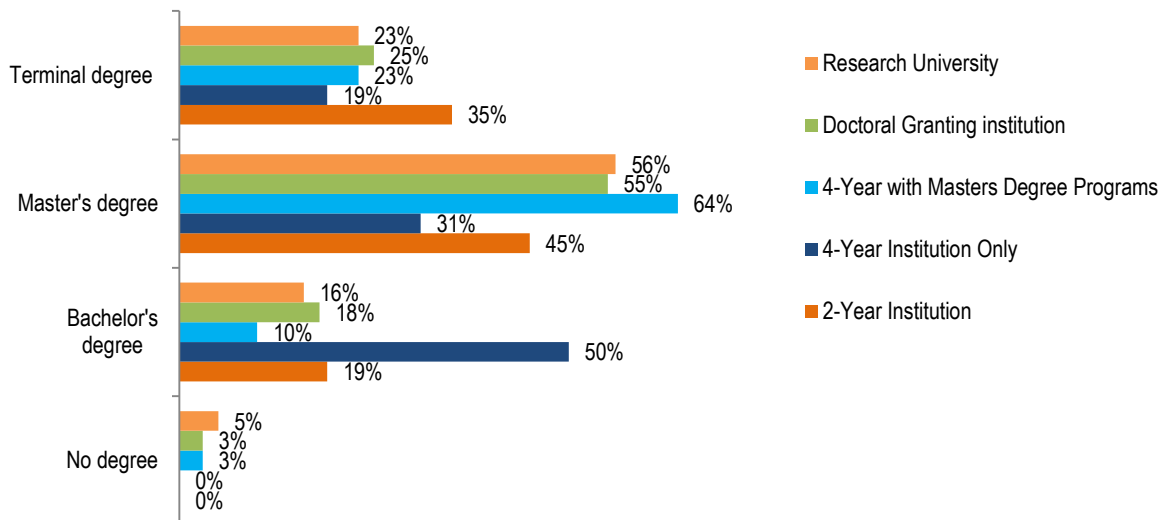


Highest degree attainment of CIO



The size of the institution continues to be important regarding the CIO's degree attainment. At institutions with more than 25,000 students, 33% of CIOs had a terminal degree compared with 22% at institutions with 3,001- 5,000 students. The type of institution also finds some differences with more CIOs at 2-Year institutions with terminal degrees than all other classification.

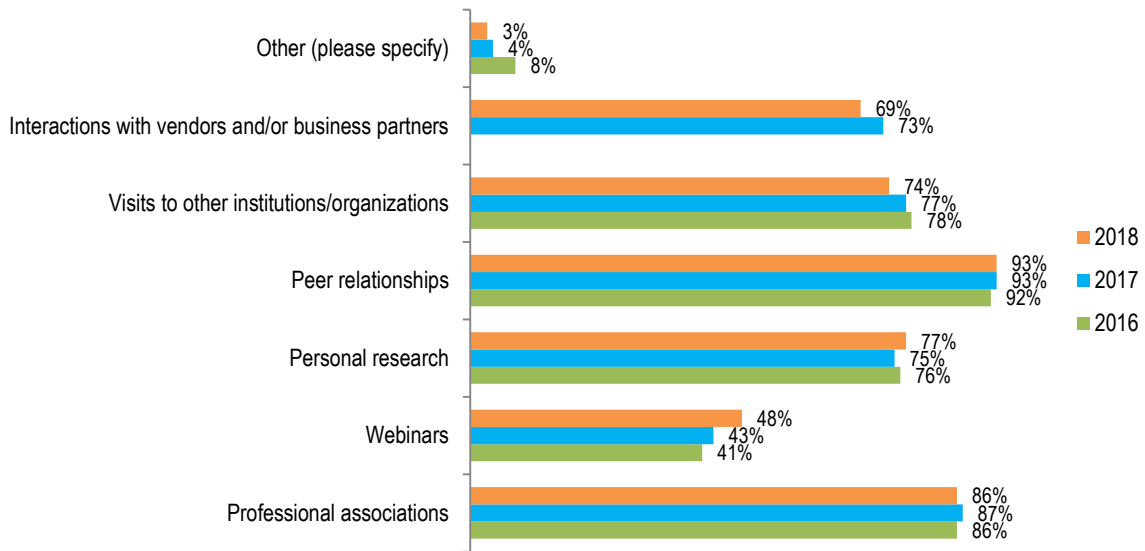
Highest degree attainment of CIO



For the third year this year's survey asked what types of activities are important for a CIO's professional growth and to increase his or her knowledge. Peer relationships and professional associations remain the most important activities

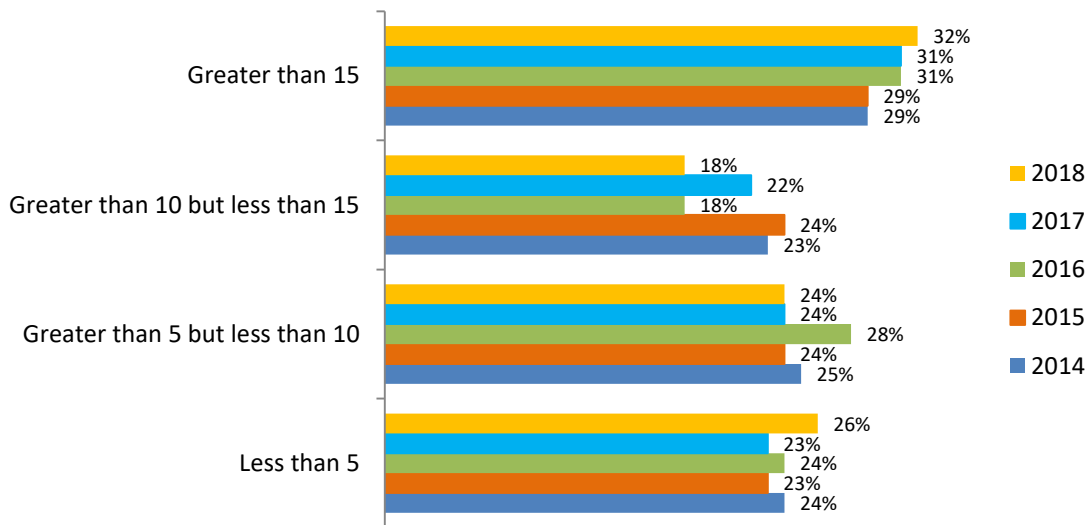
for most CIOs. In the other responses, one person mentioned “*building relationships with cabinet peers*”, another stated “*interaction outside higher education in order to gain insights and different perspectives*”, and one person said “*leadership training and executive coaching*”.

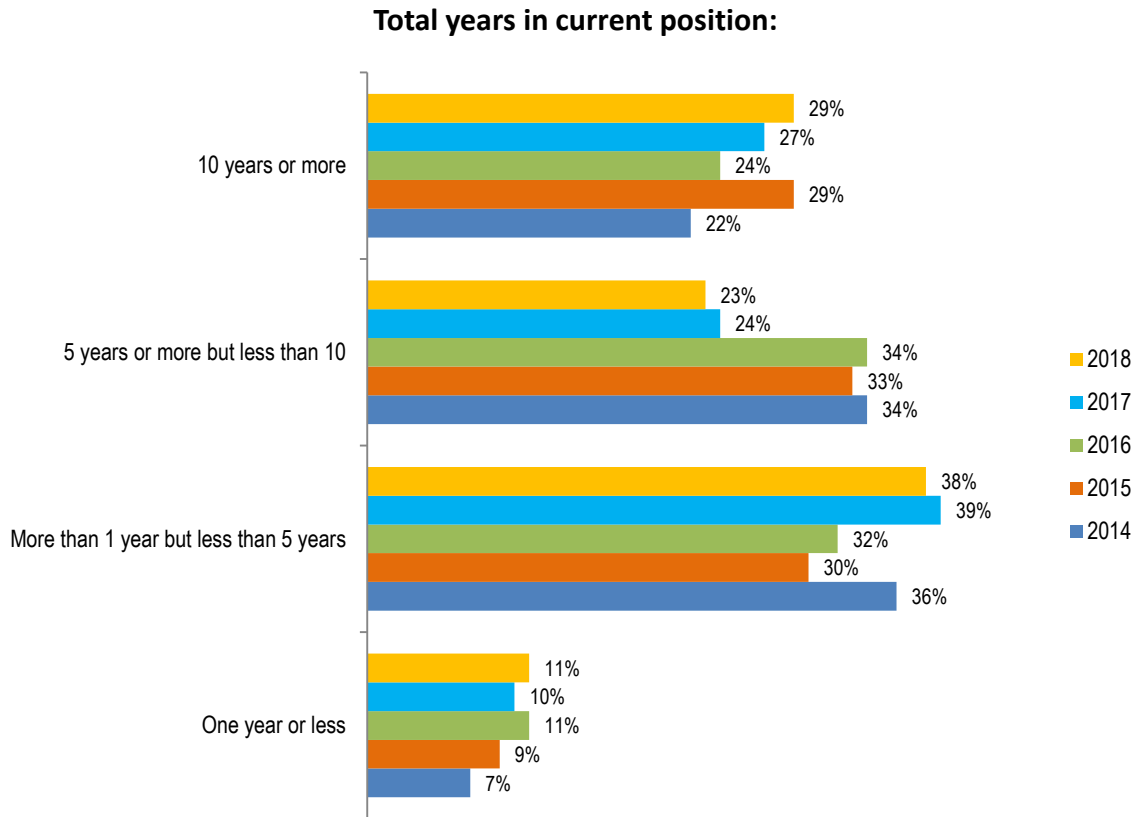
What activities are important for a CIO to increase their knowledge (check all that apply)



Change in IT leadership continues to hit many institutions as 49% of CIOs have been in their current role for less than five years. On the other hand, 5% of CIOs have been a CIO for ten years or more. We will likely continue to see a changing of the guard at the CIO position as more CIOs retire.

Total years CIO has been a CIO (by function):

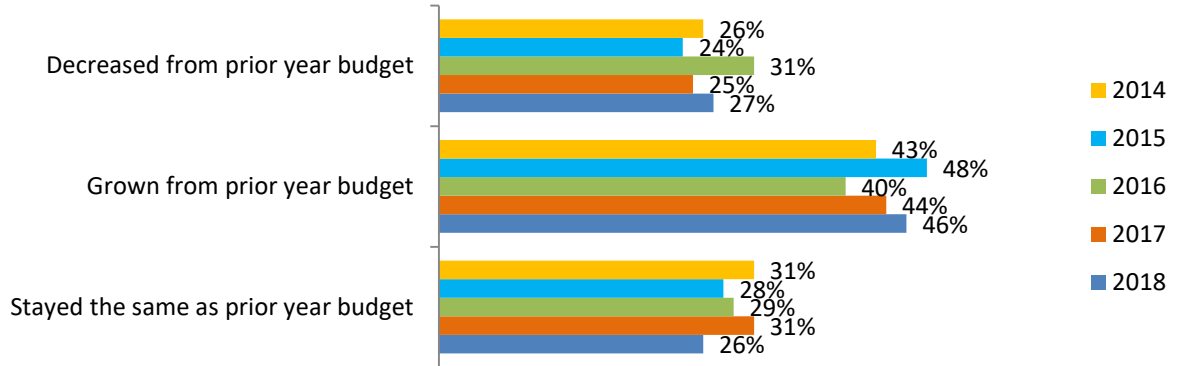




Financial and Budget Planning

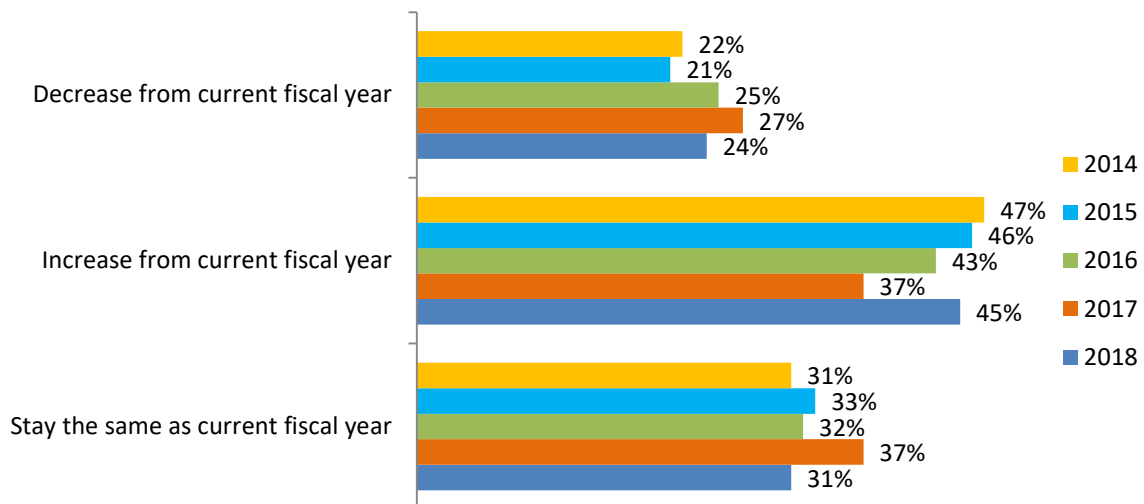
While budgets seem to be getting better for both the institution and IT since 2010, we still saw a significant number of institutions with decreasing budgets (27%). Most respondents stated that total institutional operating budgets have “grown from the prior year budget” (46%). This was a moderate increase from last year’s 44%. However, the percent of institutions reporting decreased institutional operating budgets increased to 27% this year, up from 25% last year, and 26% reported that their budget stayed the same (down 5% from 2017). Generally, the changes from 2014 to 2018 indicate that most institutions are dealing with either flat or decreased funding at the institutional level. This implies that many institutions are still expected to “do more with less” or “more with the same.” This also implies that planning and priority setting will continue to be important for CIOs as they struggle with funding issues.

Has your current fiscal year operating budget for the institution:



When asked about next year’s institutional budget, optimism reigns. Forty-five percent of CIOs anticipate growth in the institutional budget, while 31% expect budgets to stay the same, and 24% project a smaller operating budget for their institution. The percent of anticipated increases in institutional budgets (45%) is much better than 2017 (37%) and more in line with previous year’s expectations (43% in 2016, 46% in 2015, 47% in 2014). The percent of anticipated decreases in institutional budgets (24%) and those who expect the institutional budget to stay the same (31%) still indicates that more than half expect institutional funding to move downward, or at best, stay the same.

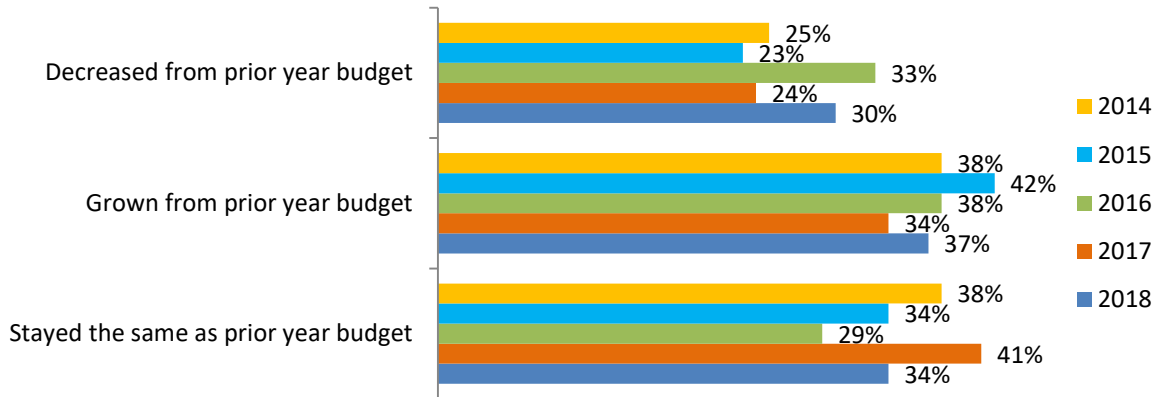
Do you expect your fiscal year operating budget for the institution next year to:



Budgets for Information Technology

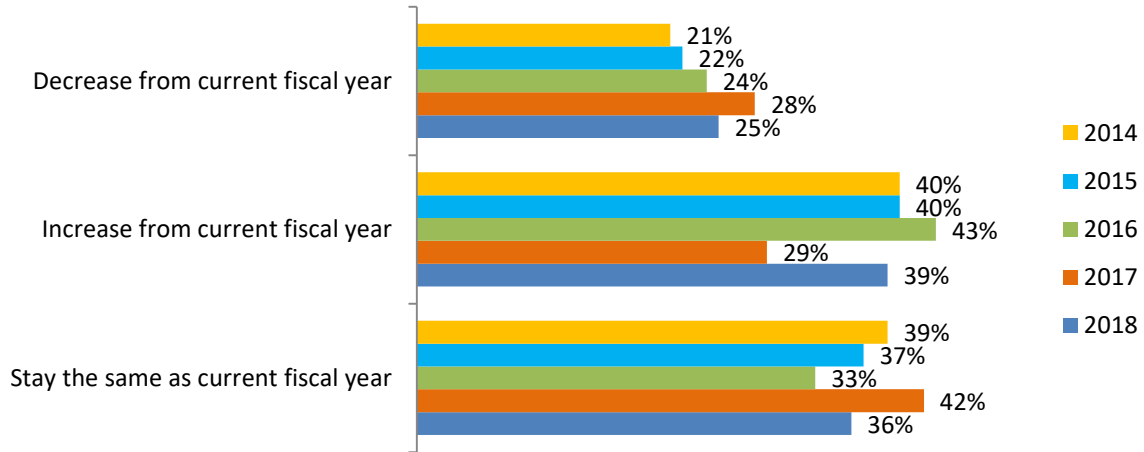
Thirty-seven percent of CIOs saw their IT budget for the Fiscal Year 2017-2018 increasing from last year, rather than staying the same (34%) or decreasing (30%). However, the bad news is that those whose budget decreased grew 6% over 2017/18.

Has your current fiscal year budget for IT:



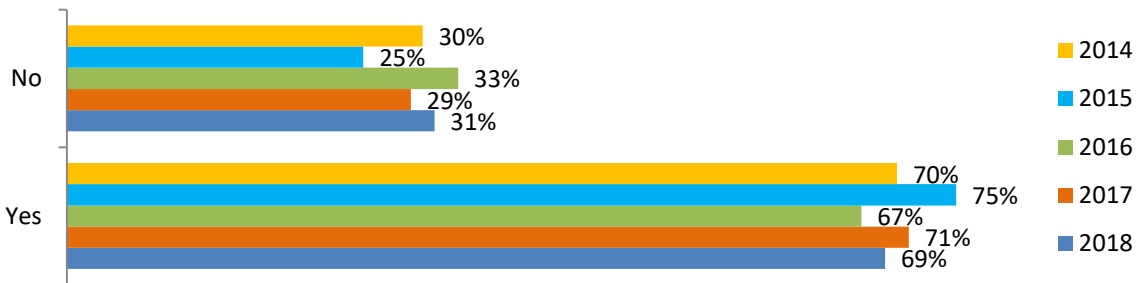
Thirty-nine percent expect their IT budget to increase next year while 36% expect it to stay the same and 25% expect it to decrease. This seems to imply that some of those expecting increases in the general budget (45%) may not see a corresponding increase in IT.

Do you expect your fiscal year budget for IT for next year to:



One key indicator on the true value of IT strategic plans is the IT budget plan. If it is linked to the budget-planning process, which indicates IT planning is more than a planning exercise. If it isn't linked or incorporated into the budget planning process, then all bets are off on its real value.

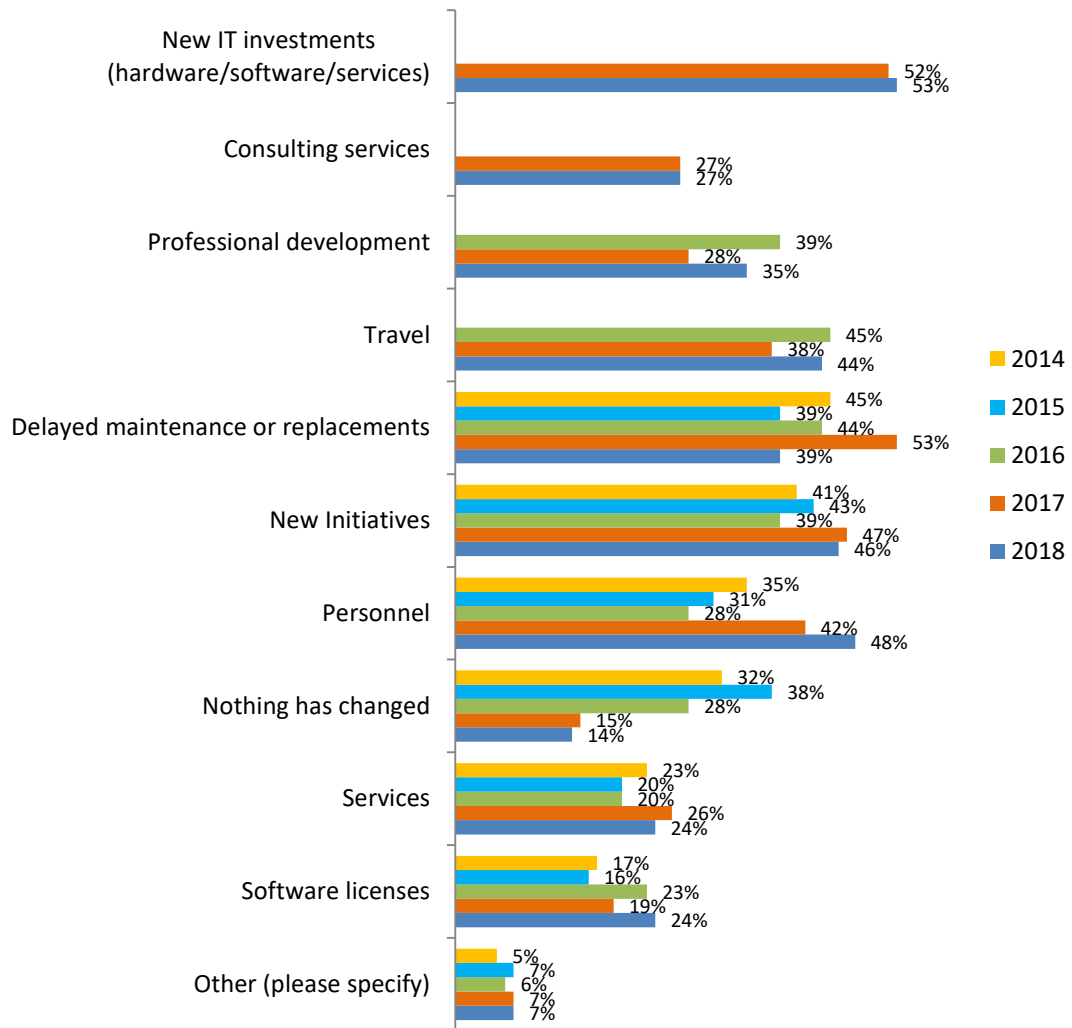
Is your IT strategic plan linked or incorporated into the budget planning process?



Where IT Cuts Happened

Those CIOs reporting reductions in IT funding scrambled to identify sources of savings. Among the targeted reductions, the most reported items were reductions in new IT investments (53%), personnel cuts (48%) and new initiatives (46%). On the other hand, delayed replacements and upgrades (39%) are down from 53% last year.

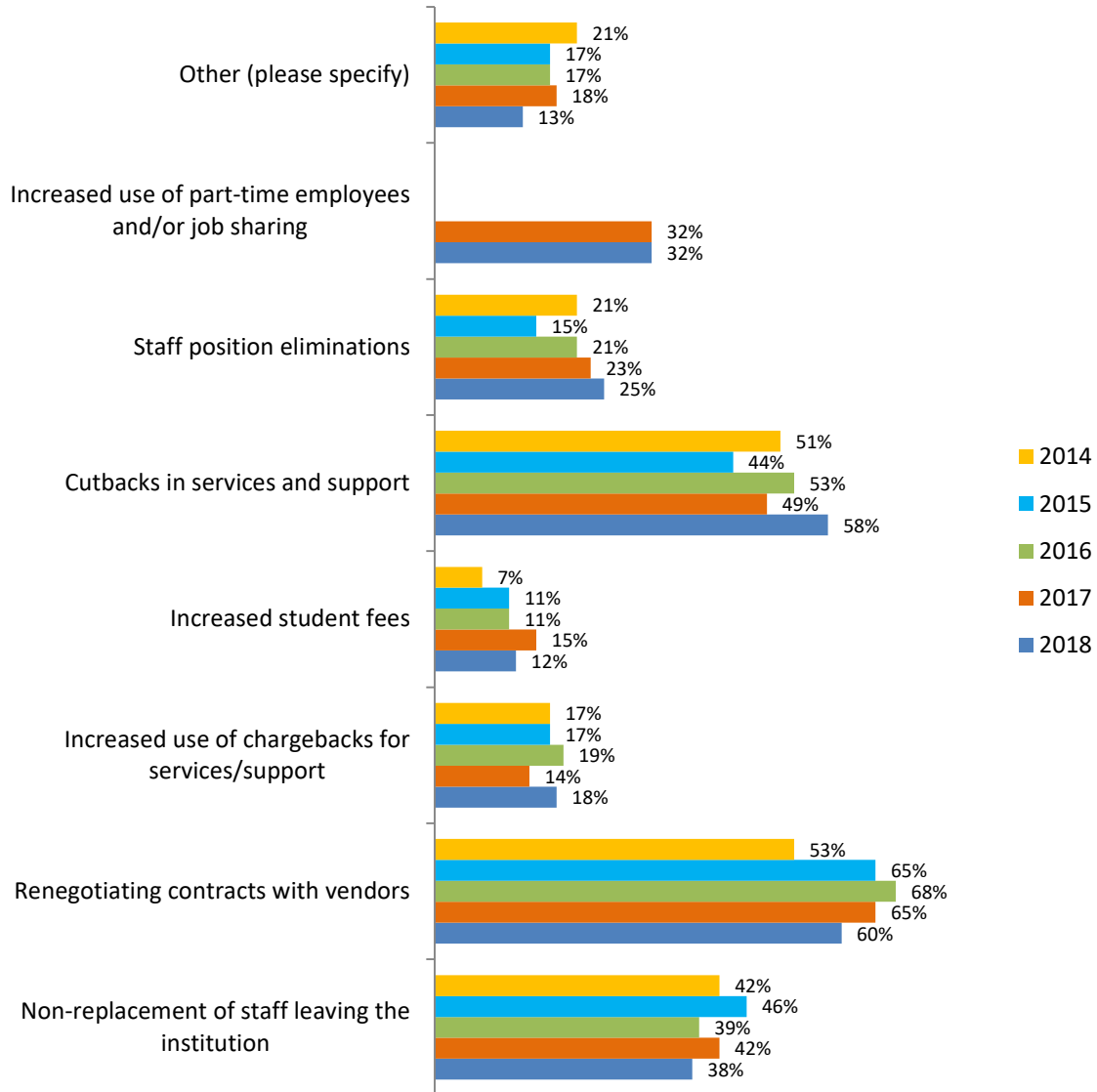
If Your IT Budget Has Been Cut From The Prior Year, Which Of The Following Have Been Cut (check all that apply):



Where Further Cuts Are Expected

CIOs who expect their IT budget to go down or stay the same will likely renegotiate contracts with vendors (60%), use cutbacks in services and support (58%), and non-replacement of staff (38%) as the likely sources for savings in their IT budget.

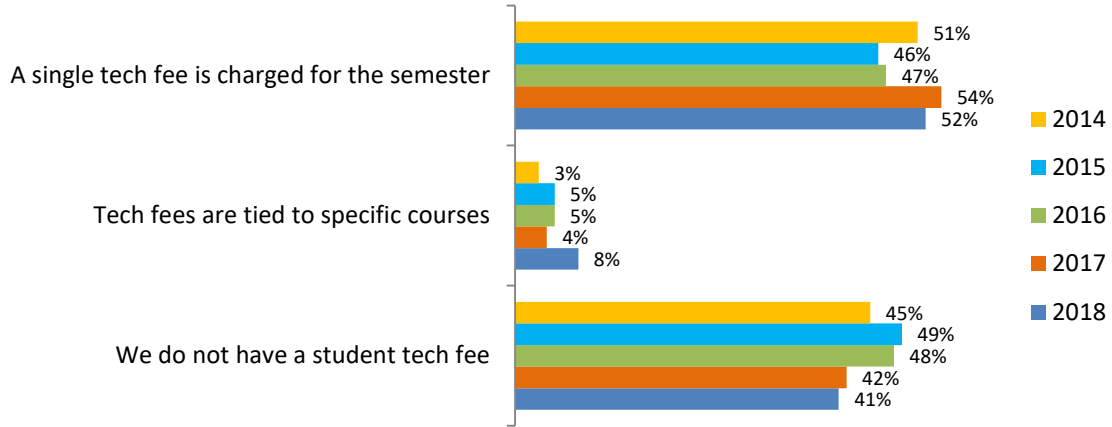
If you are planning for no growth or cuts in your IT budget for the next fiscal year, which of the following strategies will you likely follow (check all that apply):



Technology Fees

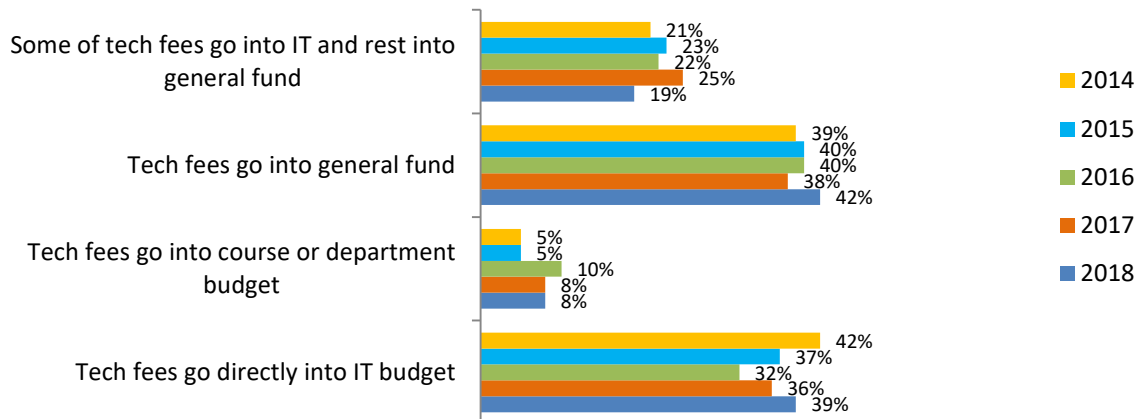
The practice of charging student technology fees has been rising as those who do not charge a fee has dropped from 49% in 2015 to 41% this year. The practice of tying a fee to specific courses seems to be gathering traction as 8% reported the practice this year up from 3% in 2014.

Which best describes your use of student technology fees?



The money collected from student technology fees doesn't necessarily make its way into the IT budget. Only 39% of institutions reported that student fees went into the IT budget, up 7% from 32% in 2016. Many CIOs have to face the political issues surrounding tech fees when these funds end up in the general fund (42%) up from 38% in 2017. For other institutions, tech fees were split between the general fund and the IT budget (19%) or went into a specific course or department budget (8%).

Which best describes the use of student tech fees if you charge a tech fee (check all that apply)



IT Organization and Governance

Staffing

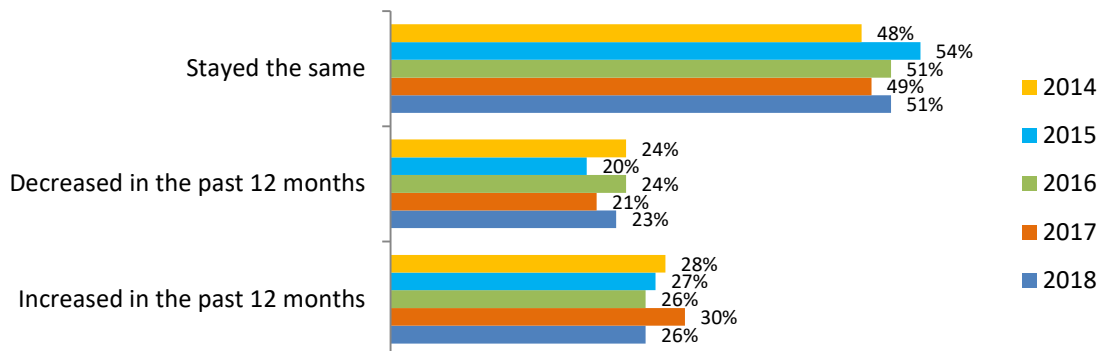
This year we did not ask questions about what/who reports to the CIO as we added questions for The Chronicle of Higher Education Report “Securing The Digital Future – what college leaders need to know about the changing role of the CIO”. This report uses data from the LBCIO surveys and interviews with LBCIO board members to provide insights into the role of the CIO in higher education and how it fits into the institutional organization.

The good news is that IT staffing is expected to remain the same for most institutions over the next year (64%) while only 15% are expecting an IT staffing reduction. Nine percent of the respondents reported not outsourcing any IT services. This is a 5% decrease over last year.

Full time IT staff seems to be steady with relatively the same amount of increase/decrease over the last few years. There is a small decrease in the number of institutions that have increased staff in 2018 which might be a troubling trend. On the other hand, there are projections for a significant increase in outsourcing which is likely the direct result of cloud, SAAS, etc. Outsourcing has increased for 44% of institutions with very few institutions showing a decline. Forward-looking, there are more institutions that think their full time IT staff will increase than decrease which is promising, but overwhelmingly most think their full time IT staff will remain the same. The net of this is likely an increase in overall IT capacity, but most of this is being made up of outsourcing opportunities as higher education takes advantage of industry trends and following our corporate peers.

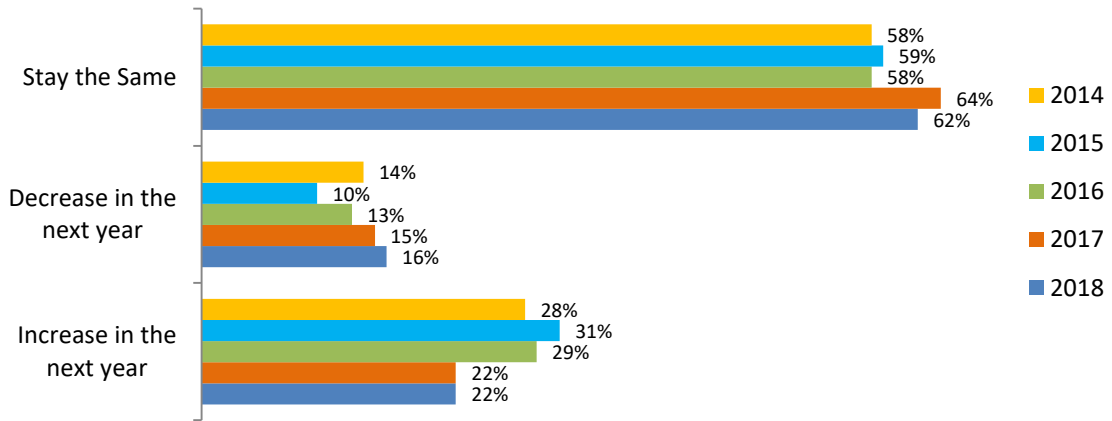
In 2018, there was an overall 4% downturn reported in increased IT staff size, while 23% of institutions reported a decreased IT staff size (up 2% from last year).

Changes to the Size of Full-Time IT Staff



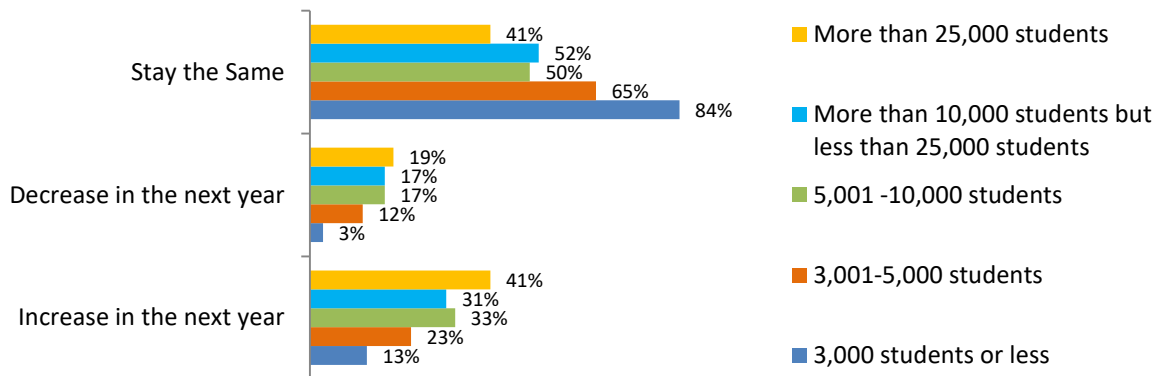
There appears to be no trend. However, as the overall projection for 2019 indicates IT staff size will remain largely the same – 62% of CIOs expect a static staff size in 2019.

Projections for Size of Full-Time IT Staff

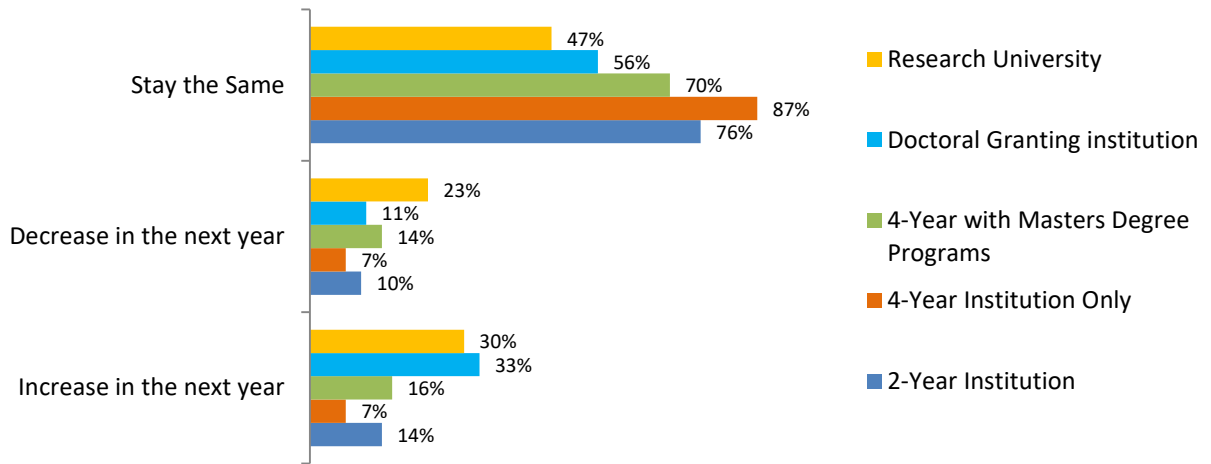


Smaller institutions expect little growth in IT staff while larger institutions are more optimistic about staffing size growth. On the other hand, more of the larger institutions are expecting a decrease than smaller institutions that are expecting staffing to remain stable. Another indicator seems to be the type of institution as four-year institutions are most likely to see stable staffing with fewer indicating a decrease and also an expected decrease in staffing.

Projections for Size of Full-Time IT Staff, by Size of Institution



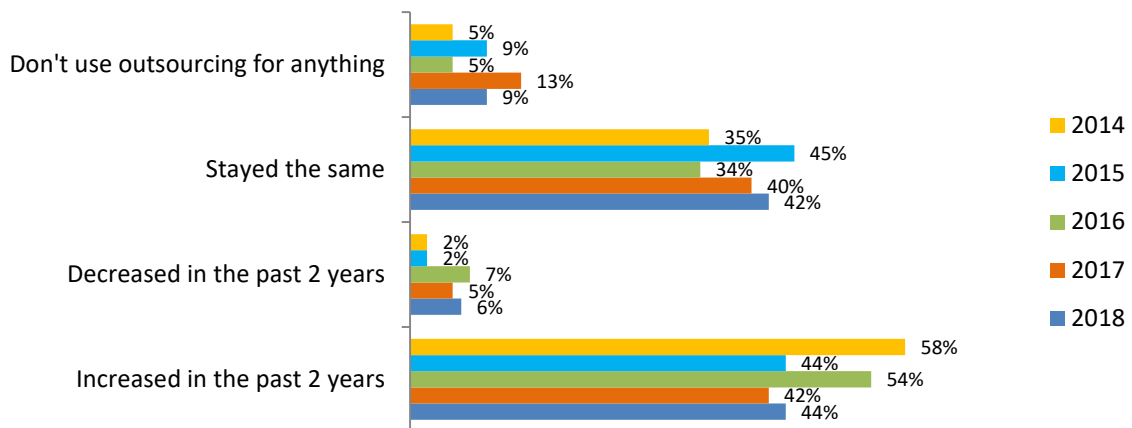
Projections for Size of Full-Time IT Staff, by Type of Institution



Outsourcing

We continue to see considerable year-over-year variance in outsourcing. CIOs who reported that their institutions do not engage in outsourcing activity is slightly lower at 9% while those indicating they have increased outsourcing activities is up from 42% in 2017 to 44% in 2018, however those changes are not great.

Has your use of outsourcing of IT services or support:



IT Governance

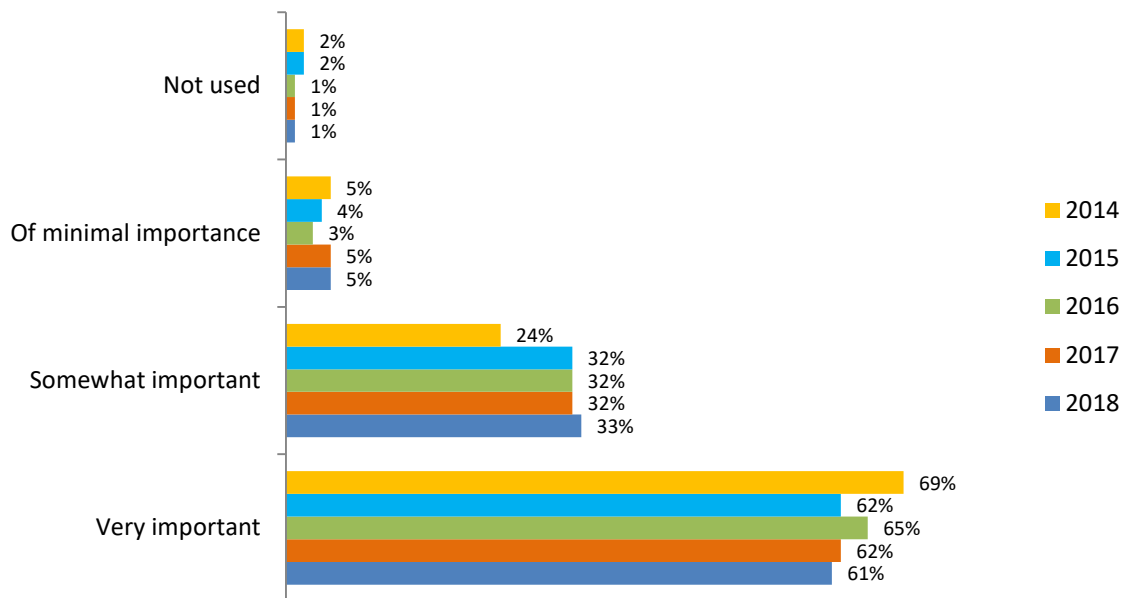
Almost every CIO continues to believe that IT governance is very or somewhat important and this has remained consistent for the last several years. This really isn't a surprise given the dynamics most institutions face. Budget pressures, outsourcing, and increased focus on business outcomes drive IT governance as a critical part of our success. The number of CIOs reporting complete or high

reliance has decreased from 73% to 65%. At the same time, there is an increase in the number of CIOs that rely completely on IT governance for decision making, but this continues to be a very small percentage. Surprisingly, more institutions (36%-2018 vs. 28%-2017) are reporting that they have low or no reliance on IT governance. This is a significant decrease year over year but is consistent with previous years excluding 2017. This might indicate that there was more optimism around IT Governance for 2017, but this optimism did not pan out, and the results settled back to be more aligned to previous years.

The CIO’s opinion of the effectiveness of IT Governance has decreased at about the same rate as the reliance topic above. It isn’t surprising that these two measurements have mirrored results. Note that almost double the number of CIOs now believe that IT governance has no effect in looking at the results for 2017 (7%) vs. 2018 (15%). This could also be related to the optimism in 2017 waning as reality of the situation settled in 2018.

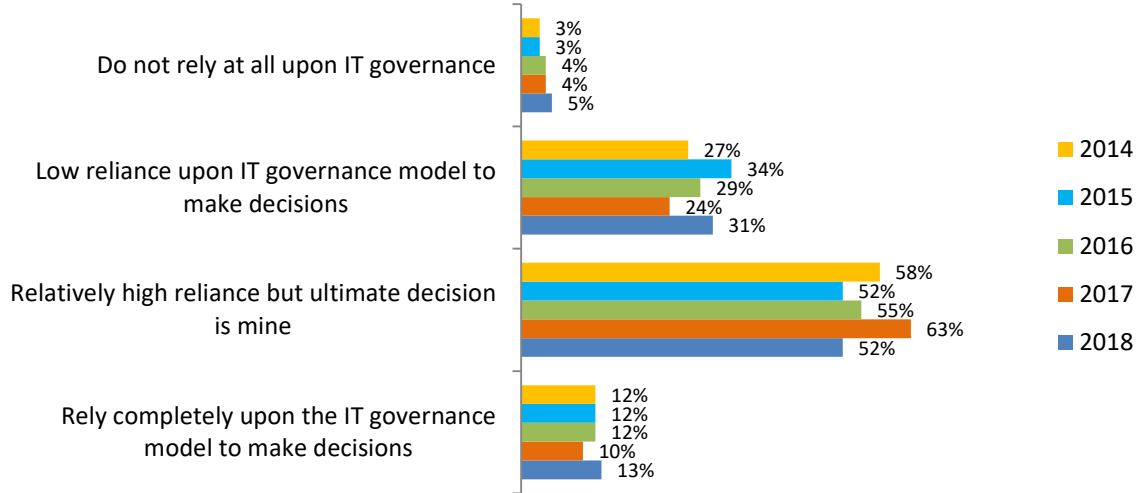
IT governance groups remain somewhat consistent with a large number of CIOs reporting user groups, high-level committees and faculty groups continue to be the preferred advisors to IT governance model. Most CIOs continue to view IT governance as very important (63%), with no or negligible change year over year in perspectives on this topic.

Importance of IT Governance



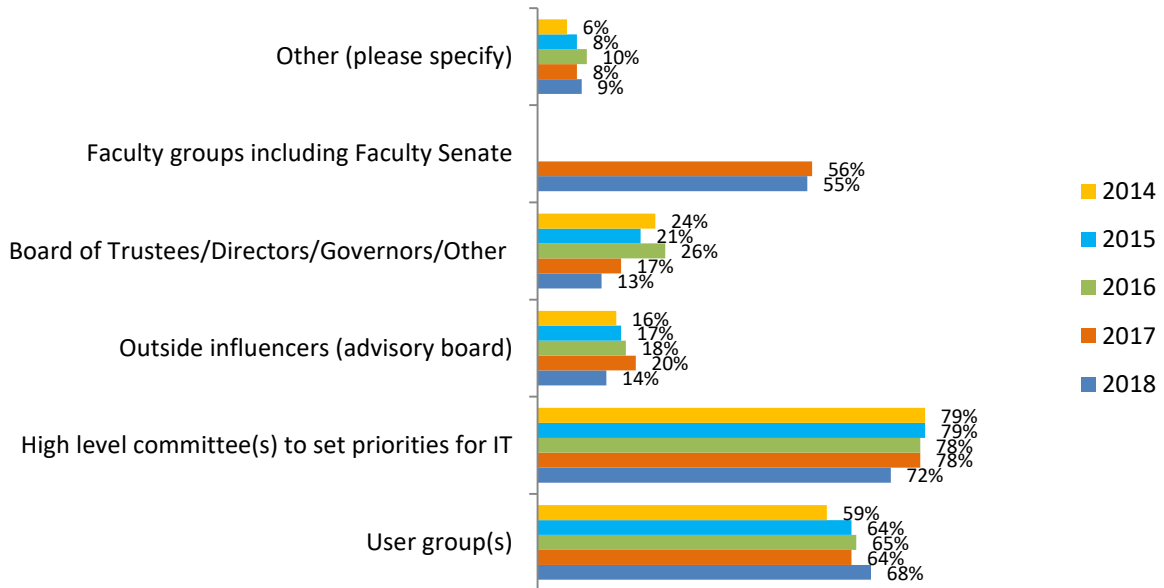
Consistent with reporting in previous years, most CIOs use IT governance as an advisory function, reserving the final decision for themselves. Only 10% of respondents rely completely upon the IT governance model to make decisions. An interesting change from last year is that 63% of CIOs indicate high reliance upon IT governance, but reserve the ultimate decision as being “mine,” up from 55%.

How much as a CIO do you rely upon IT governance to aid in decision making?



High-level committee(s) is present in the vast majority of IT governance models in higher education, but there was a significant drop in Board-level involvement, from 26% to 17%, which is the lowest in four years. Faculty groups, including Faculty Senate, were introduced this year as an option, and not surprisingly, more than half of all CIOs reported the involvement of that important constituent group.

Does your IT governance include: (check all that apply)



Administrative Computing

Administrative Application Section

- We haven't seen any significant changes in the number of institutions outsourcing their ERP. 1% of this year's respondents outsource their ERP.
- The importance of Business Process Reengineering/Process Improvement Analysis has increased steadily the past four years. In 2015, 43% of respondents answered that this area was "Very Important" for their institutions compared to 57% this past year – more than a 30% increase.

The survey results for 2018 continue to show a significant investment in vendor-based Enterprise Resource Planning (ERP) systems for core student, financial, payroll, human resources, advancement, and grants management services within higher education. While the increase reported is slight (up to 84% from 79% in 2017) when coupled with the decline in best of breed solutions (down to 6% from 11%) we may just be seeing a difference in how vendor solutions are viewed. Most best of breed are combinations of vendor solutions so this may mean more are moving away from best of breed to a single vendor provider, or CIOs may just view best of breed using vendor-supplied applications as vendor-supplied applications.

Upgrades of these systems increased significantly this past year, most likely due to vendor-provided release schedules that offer new functionality, new features, and provide critical support for security patches and vulnerabilities. However, it may just be that deferred maintenance of administrative applications has caught up and CIOs must upgrade to not only add features and functionality but to be able to continue vendor supplied maintenance.

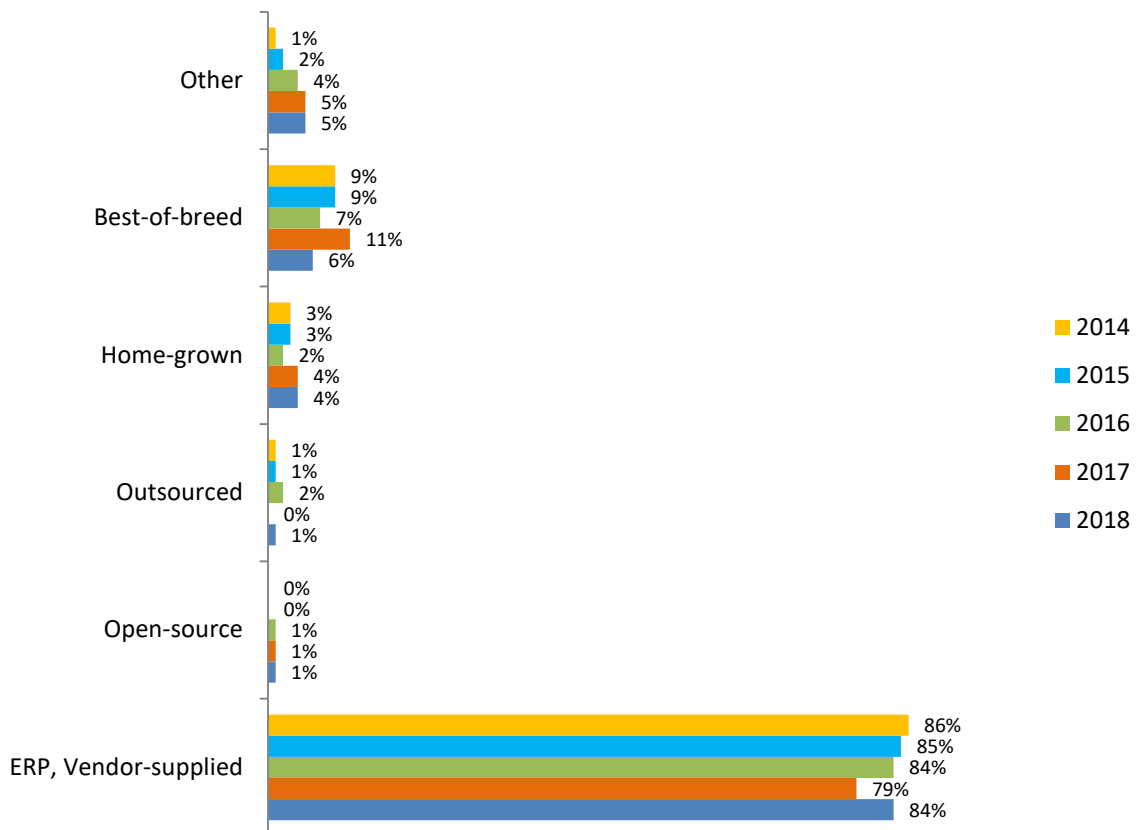
While there is much ongoing discussion within higher education in moving administrative computing systems into either a hosted "Infrastructure as a Service," (IaaS), "Platform as a Service," (PaaS), or even to a "Software as a Service" (SaaS) model, most ERP and core administrative systems remain on-premise, as reflected in this year's survey results. For higher education, the move to the cloud for ERP systems has been slower than some anticipated based on past survey results. Most vendors of administrative applications are moving their applications to the cloud and hosted environments, and we will likely find in future surveys that as technology advances and vendor experiences in the cloud increase so will the move to the cloud increase. However, since security is still the most important issue facing CIOs and their institutions, a breach of security in the cloud could slow down that movement.

Enterprise Resource Planning (ERP)

Vendor-supplied ERP systems are still the major players on campus (84%), but when we add in best of breed which are primarily a mix of different vendors (6%), we have fully 90% are vendor applications. Home grown continues to remain fixed at 4% with outsourced and open source each at 1%.

Again this year, ERP systems are primarily supported and maintained on-premise. While there was a small increase in outsourced ERP solutions last year, we did not see any significant response (1%) in outsourced solutions for 2018 and only 1% use open-source solutions. Although cloud solutions for administrative applications continue to be heavily discussed in higher education, few institutions have moved or are in the process of moving these systems into the cloud as reflected in this year's survey. This may be due to the overall cost of changing from current applications and many institutions are waiting to see how others are doing in their move to cloud-based administrative applications. They also would like to have real numbers on the actual cost of moving to the cloud.

Core Administrative Applications (financials, student systems, human resources, advancement)

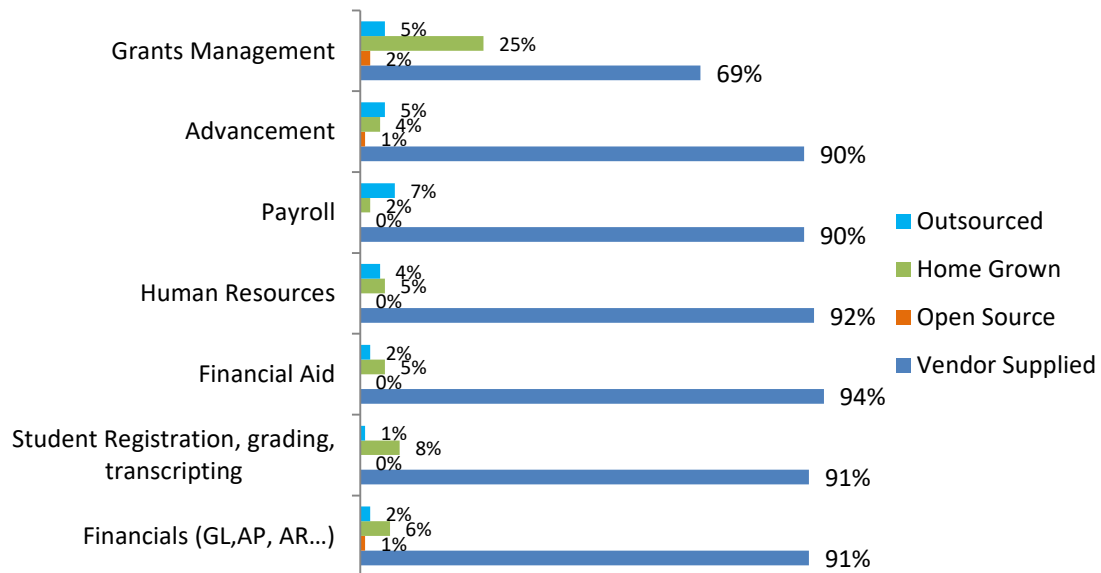


Component Breakdown

The majority (over 90%) utilize vendor applications for financial, student services, financial aid, human resources, and advancement. Many of these business areas demand the currency of state and federal regulations and policy. Thus they are best maintained by vendor providers who are able to interpret and implement state and federal requirements on a large scale.

The largest change over the years is in the area of grants management as more institutions are moving to a homegrown solution. Vendor-supplied grants management still maintains the largest percentage with 69%, but with homegrown modules increasing to 25% compared with 16% in 2016.

Types of Administrative Applications



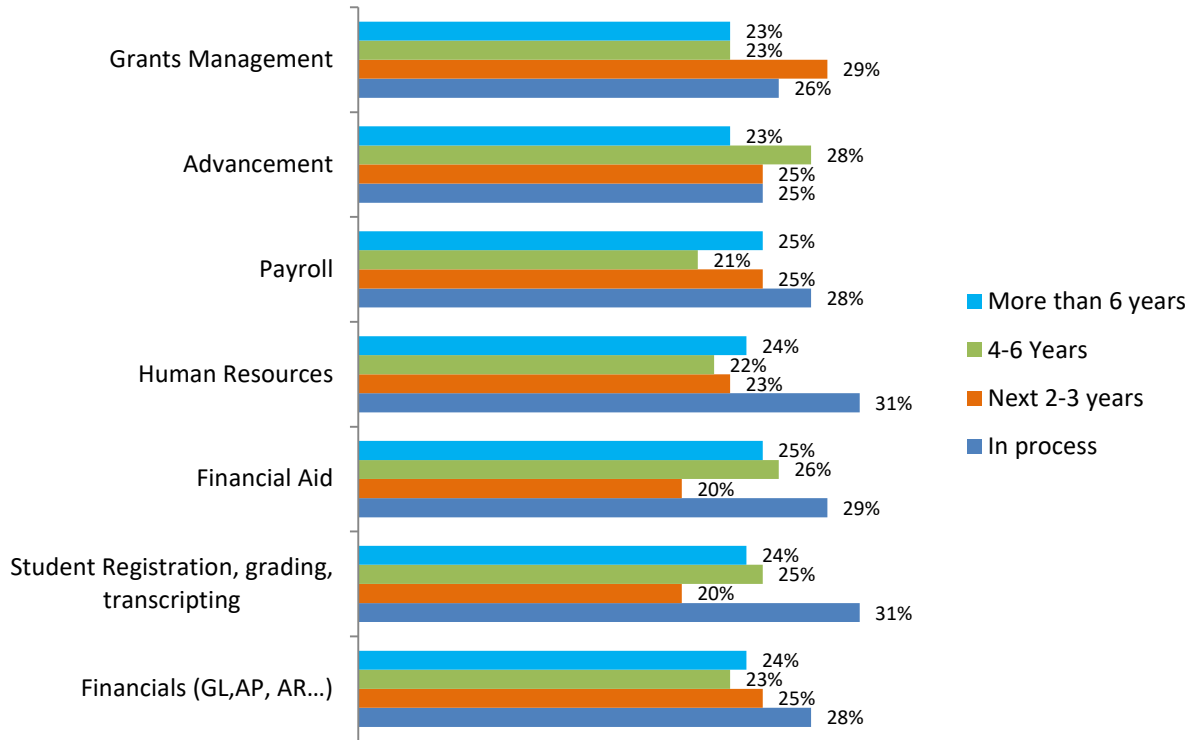
Upgrade Planning

Delayed maintenance has been a money saving strategy for the past few years. However, there comes a point when you can no longer delay upgrades or replacements.

Many institutions are currently upgrading core systems, including: financial aid (29% up from 11% in 2016), payroll (28% up from 19% in 2016), financials (28% up from 17% in 2016), human resources (31% up from 21% in 2016) and student services (31% up from 17% in 2016). This pattern aligns with the upgrade timings often matched with the vendor-supplied upgrade releases. The advantages of upgrading and keeping systems current offers customers new features and

functionality, as well as provide important security patches and critical maintenance from the vendors.

Projections for Replacing or Making a Major Upgrade



Business Process Improvement and Workflow

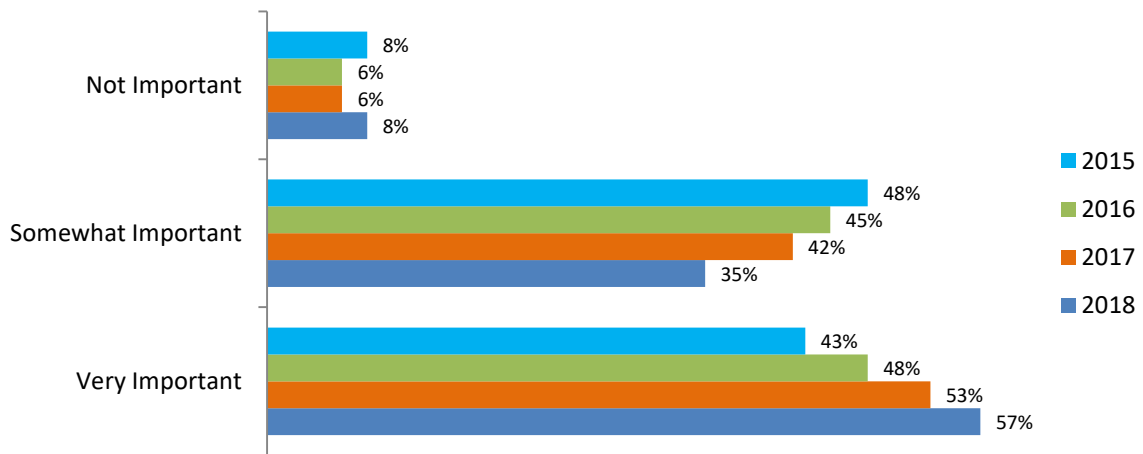
This year we also added a question on the importance of workflow, and the majority of institutions indicate workflow is very important (62%) while only 4% say it is unimportant.

How important is workflow?



Business-process engineering continues to grow in importance, with 57% indicating it is very important up from 53% last year and 43% in 2015.

How important is Business Process Reengineering at your institution?



Administrative systems grab the highest percentage of IT spend at most institutions and as a CEO one time said to his CIO “academic and administrative expenses for IT are not to be treated as equal. If we don’t pay people and bills for all of our services and support, we are out of business no matter how well we do with IT expenditures for teaching and learning”. We will likely continue to see institutions upgrading and replacing administrative applications in the future as institutions must meet external and internal requirements for managing and securing administrative and personal data and information.

Academic Computing

Technology is fundamental to teaching and learning, and IT organizations are increasingly challenged by the changes and advances in academic resources. With so many initiatives like BYOD (Bring Your Own Device), online learning, and remote non-campus-based student populations, CIOs have been predicting a major reduction in computer labs or community labs, but this has not transpired. As financial pressures continue to mount for most institutions, many seek ways to cut costs while improving revenue from increases in enrollments and retention, and many are looking to data analytics and business intelligence for accurate and meaningful data to make informed decisions. This year’s survey confirmed a number of trends, as well as provided a few surprises regarding teaching and learning, including the following:

There seems to be more stability in vendor dominance in the CMS/LMS market as 71% of the institutions reported a vendor-supplied option, while 16% use open-source, and 12% outsource their CMS/LMS.

Institutions selecting open-source products decreased this year by 4% from last year and by 7% from 2016. The selection of open-source products has oscillated over the last six years with no real trend.

Blackboard is the standard for most institutions (42%) while the use of Desire2Learn continues to increase (14% in 2018 up from 12% in 2017). The use of Canvas continued its upward trend as a standard up to 29% from 23% in 2017 and only 4% in 2013.

The type of institution seems to have an impact as the greatest use of Moodle occurs within 4-year institutions (44%) while the use of Canvas is greatest in the 2-Year Institutions and Research Universities at 40%.

Over the last six years, there has been little change in the length of time institutions have been using their current CMS/LMS solutions, with 66% using the same system for more than five years. Thirty-one percent of the institutions are considering replacing their current systems over the next three years or more.

Central IT continues to provide the primary support for the CMS/LMS with 56%, up from 53% from last year but down from 63% in 2012.

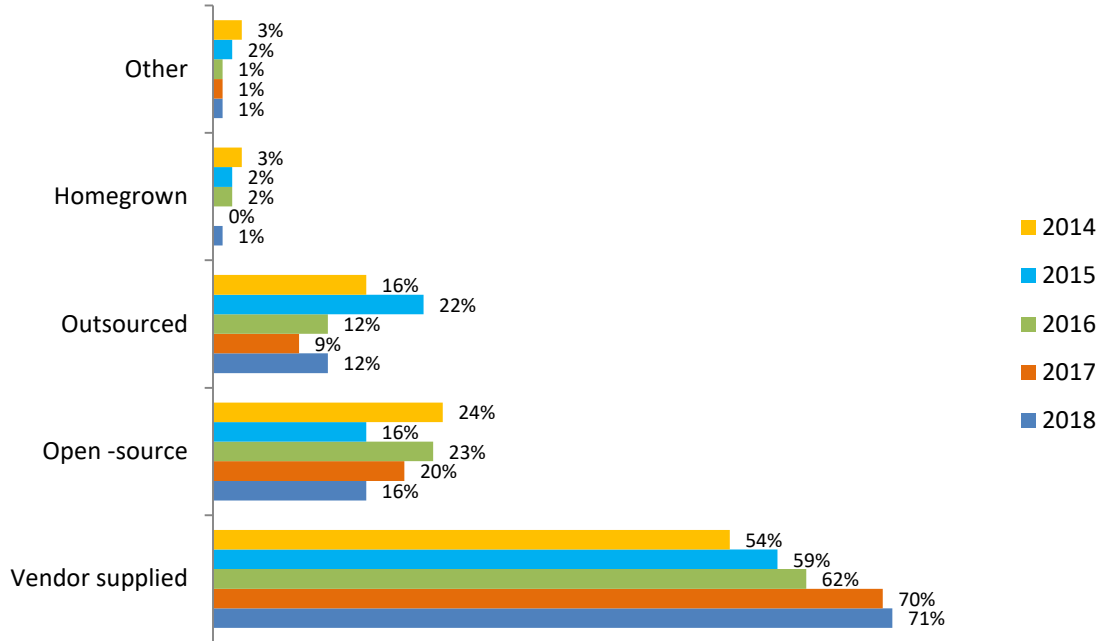
The Office of the Provost/Chief Academic Officer continues to increase as the primary reporting authority for instructional design, course design, and online learning management (43% up from 40% in 2017 and 32% in 2013).

New questions asked this year concerning how well the CMS/LMS meets institutional goals for academic innovation and how faculty view technology have produced a separate report for the Chronicle of Higher Education "Securing The Digital Future."

Types of Institutional Standard CMS Systems

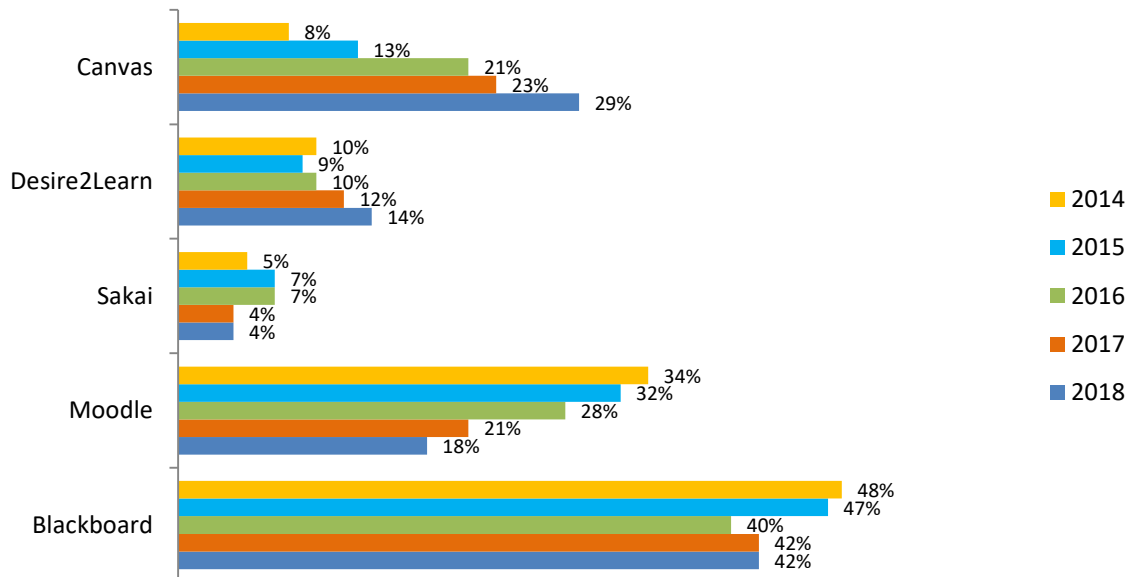
The majority of institutions (71%) continue to use a vendor-supplied CMS/LMS as the standard. Surprisingly, the number of institutions using open-source solutions decreased from 23% in 2016 to 20% in 2017 and 16% in 2018. Outsourced CMS/LMS systems increased to 12% from 9% in 2017 but down from 22% in 2015. This overall decline could be an anomaly or due to increased vendor costs or poor outsource experiences.

Which best describes your current Course/Learning Management System

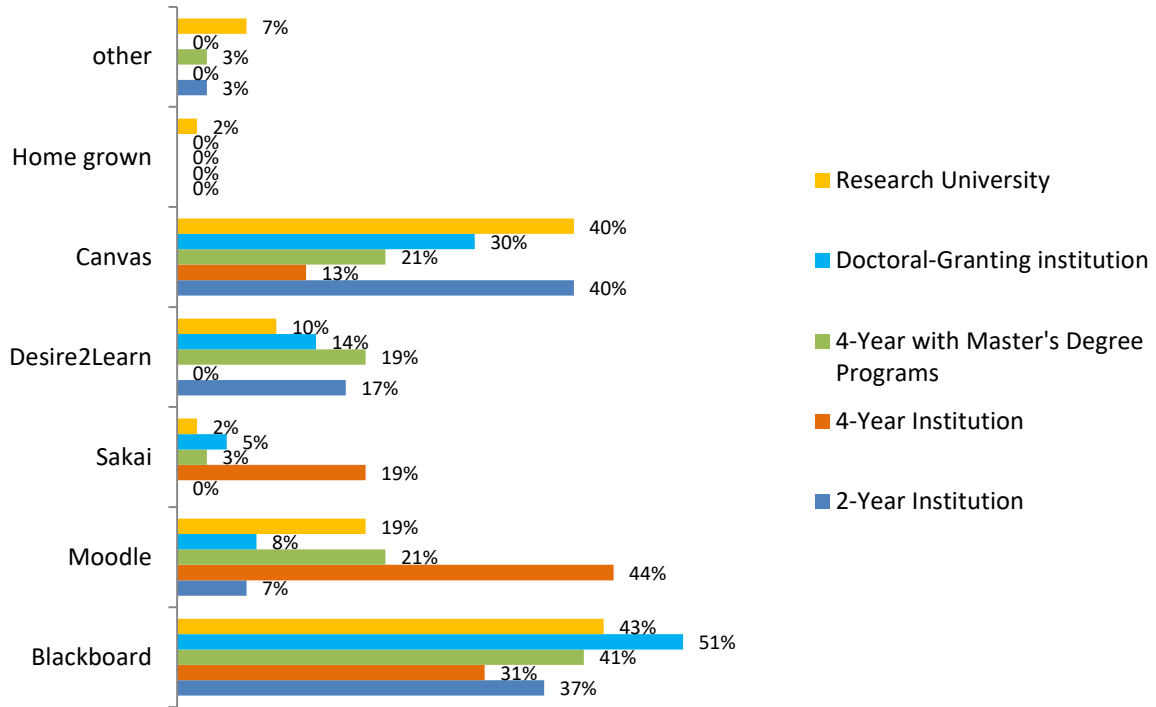


Blackboard remains the overall Course/Learning Management system institutional standard at 42%, while the use of Canvas grew by 7%, and was most popular at 2-year institutions and research universities. Desire2Learn was popular in two-year institutions, while Moodle was prominent in four-year institutions.

CMS as an institutional standard



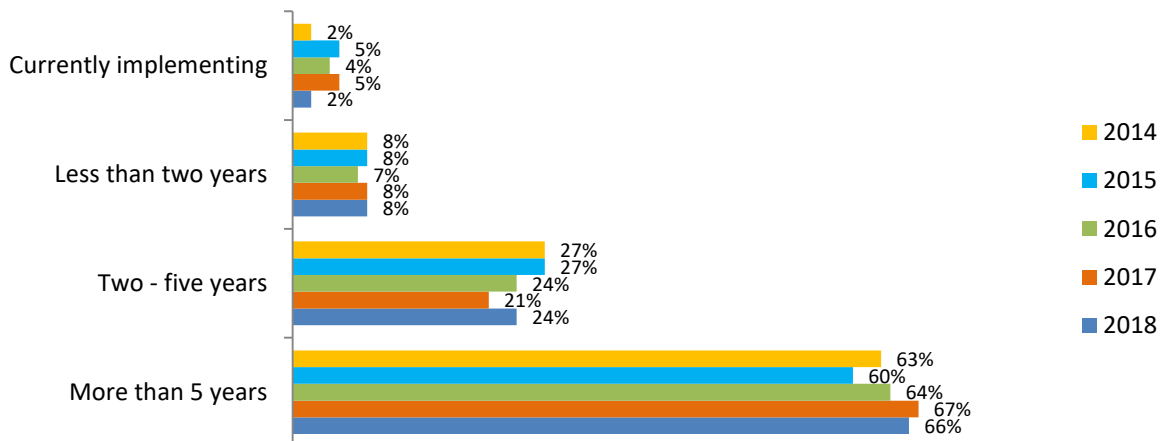
Institution CMS/LMS Standard by Type of Institution:



Longevity and Replacement of CMS Systems

There has been little change over the past five years regarding the longevity of the use of CMS/LMS at institutions, with 66% of the institutions reporting they have used the same CMS/LMS longer than five years. Thirty-two percent of the institutions reported that they anticipate replacing their CMS/LMS in the next one to five years.

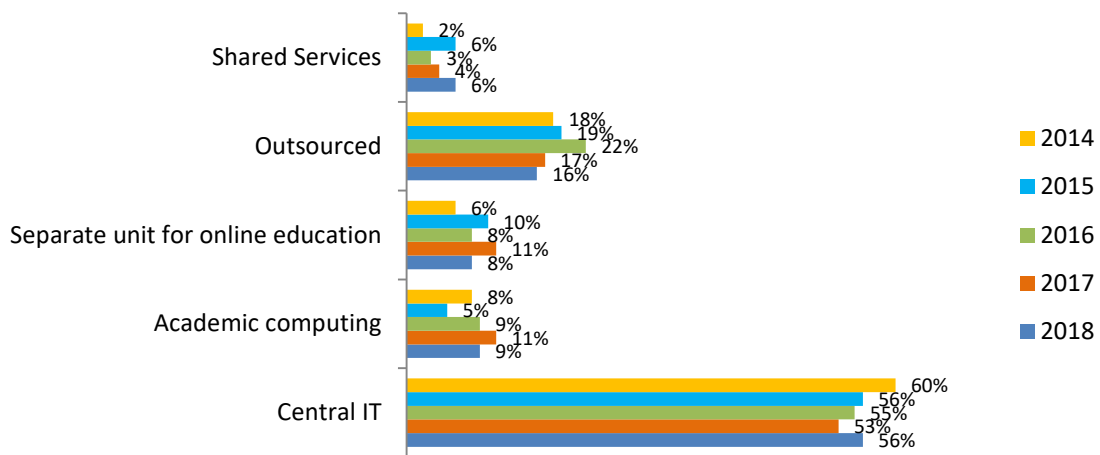
How long have you used your current course management system?



Maintaining and Managing the CMS/LMS Infrastructure for Online Learning

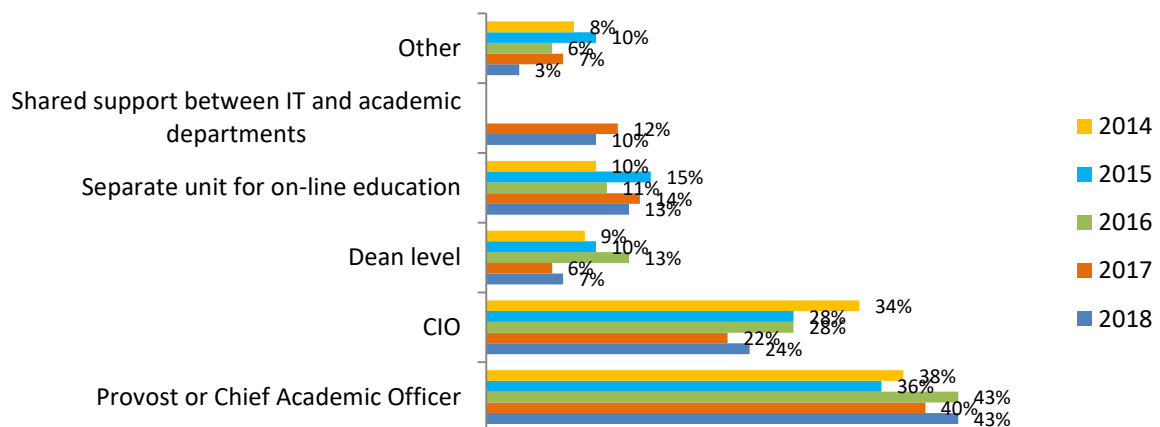
The responsibility for maintaining the CMS/LMS still overwhelmingly resides in Central IT, at 56%, which is an increase of 3% from last year and a decline from a high of 60% in 2014. It appears the declining trend in outsourcing the CMS this past year is in line with outsourced CMS support decreasing to 16%. Support from academic computing also decreased to 9% in 2018 from 11% in 2017.

Who Is Responsible For The Maintenance Of Your Course Management System And Related Infrastructure?



Reporting structure for course design and online learning continues to show some minor change. The Provost or Chief Academic Officer is the primary reporting structure at 43% while reporting to the CIO is at 24%, and a separate unit for online education sits at 13%. Shared support between IT and academic was next at 10%.

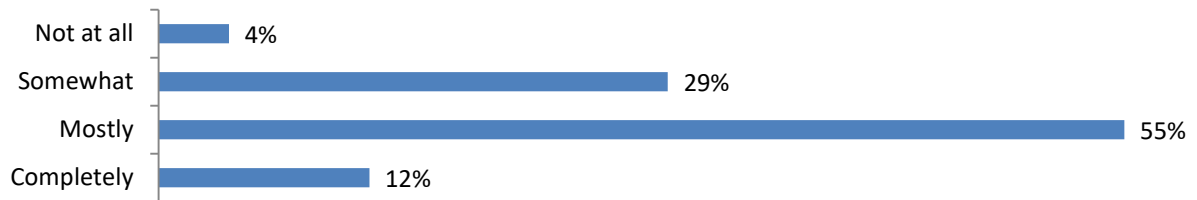
Where does instructional design, course design and the management for on-line learning report?



Academic Innovation with CMS/LMS

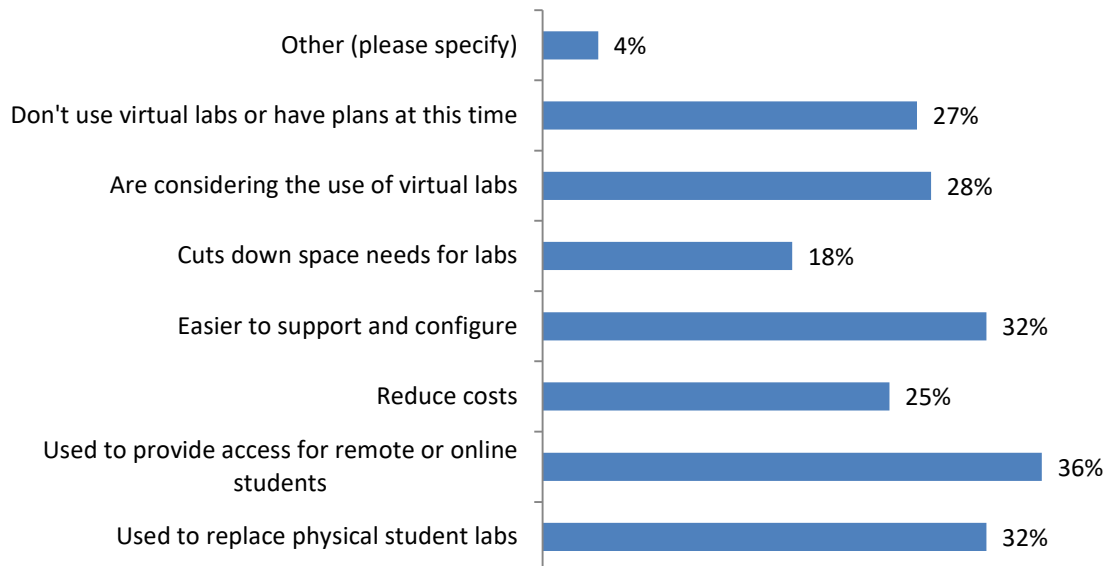
This year we asked the question “How much is your current learning/course management system prepared to meet your institution’s goals for academic innovation.” The results indicate that while the overall response is positive (67% answered completely or mostly), there is room for improvement as 29% answered somewhat and 4% said not at all.

How much is your current learning/course management system prepared to meet your institution's goals for academic innovation?



We replaced prior year’s questions concerning the support for community labs with a question on the use of virtual labs. Thirty-two percent indicated that they are using virtual labs to replace community labs and that it reduces space needs (18%).

Which best describes your use of virtual labs? (check all that apply):



In summary, far more than half (71%) of the Course/Learning Management Systems are supplied by vendors, which is the highest percentage reported over the past six years. Sixty-six percent of the institutions reported using their current Course/Learning Management Systems for more than five years. There is little

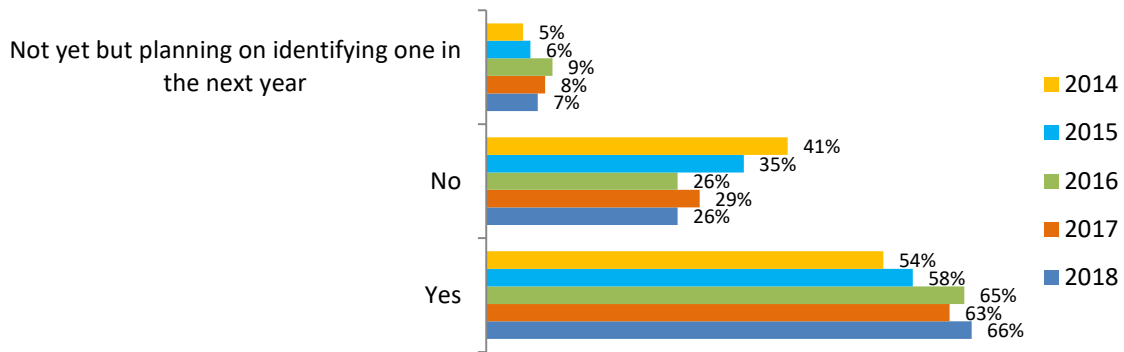
change in the reporting structure for course design and online learning where the Provost or Chief Academic Officer is the most likely choice followed by the CIO at 24%, and 10% of the institutions reported sharing support between IT and academic departments. The responsibility and maintenance of the Course/Learning Management Systems and related infrastructure continues to reside in Central IT.

Infrastructure

Security

Institutions have continued to move towards having a designated Chief Security Officer (CSO). In 2014, only 54% of all institutions had someone in the role of a CSO while 41% didn't have one and weren't thinking about adding one. This year, 66% of all institutions have a CSO while only 26% didn't have one and weren't thinking about adding a CSO.

Percentage of Institutions with a Designated Chief Security Officer

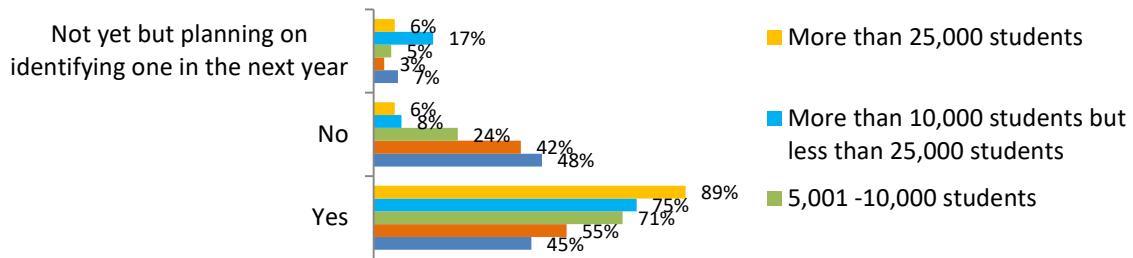


Size and type of institution do seem to matter when it comes to having a CSO. More than 89% of institutions with more than 25,000 students had a designated CSO while 90% of research universities had a CSO, followed by four-year institutions (75%), two-year institutions with 69% (up from 57% in 2017), doctoral-granting institutions with 68%, and four-year master's degree programs at 47%.

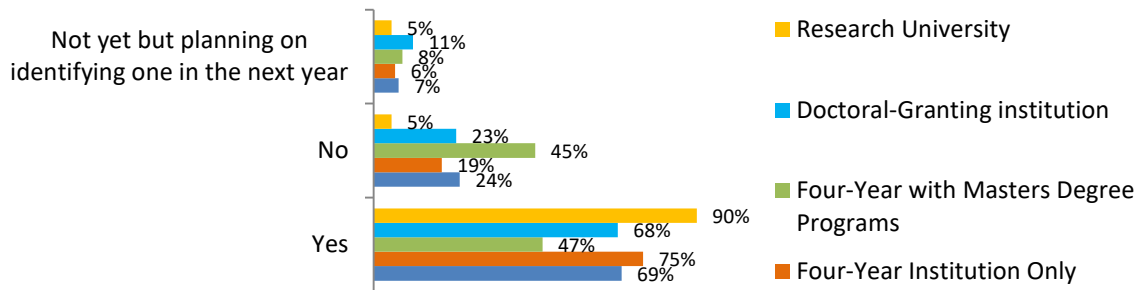
As important as the topic of security is in 2018, we still do not have a 100% adoption rate in having one person on staff that has the title of CSO. With increasing security threats and the dependence on digital information, it is imperative to have a trained CSO in place. However, many smaller institutions may have someone functioning part-time as a CSO without the title, and the potential

threats are less than a large research university with vast amounts of research data that is often extremely sensitive and vital to major government and corporate grants. The discrepancies may also be due to restrictions around securing research data and personal assurances required by large grants and contracts.

Percentage of Institutions with a Designated Chief Security Officer, by Size of Institution

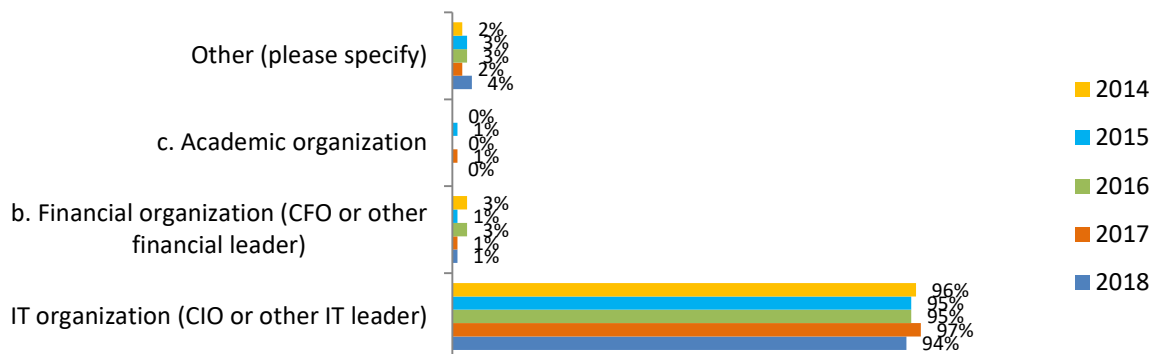


Percentage of Institutions With a Designated Chief Security Officer, by Type of Institution



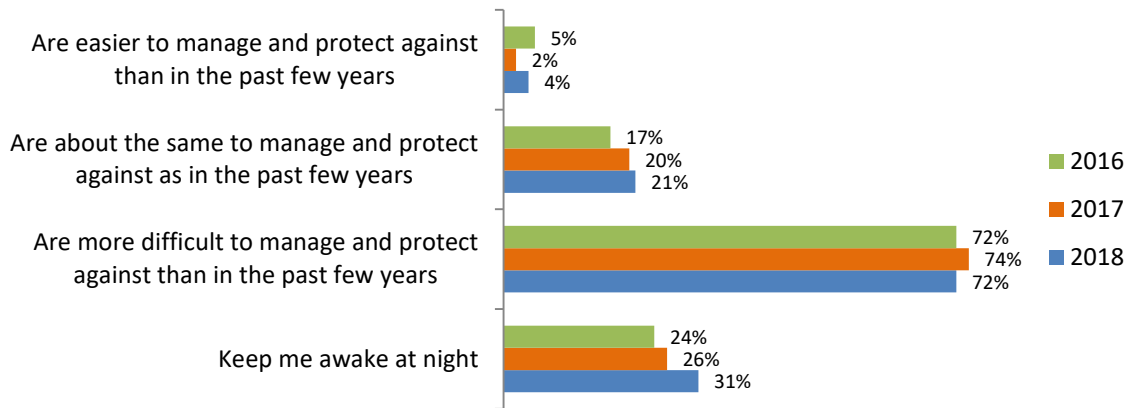
Regardless of the number of students or the type of institution, the clear majority of CSOs report to the CIO or IT organization leadership.

Where the CSO Reports



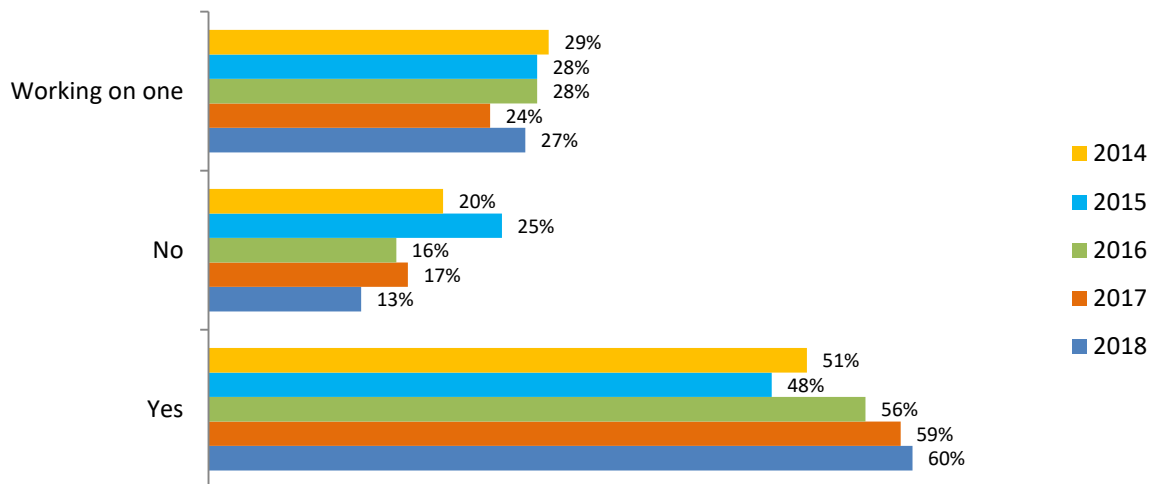
An increasing number of CIOs indicate that the issue of security keeps them awake at night (31% vs. 26% in 2017 and 24% in 2016), and CIOs overwhelmingly agree it is more difficult to manage and protect institutional information resources than in the past few years.

Security Issues...



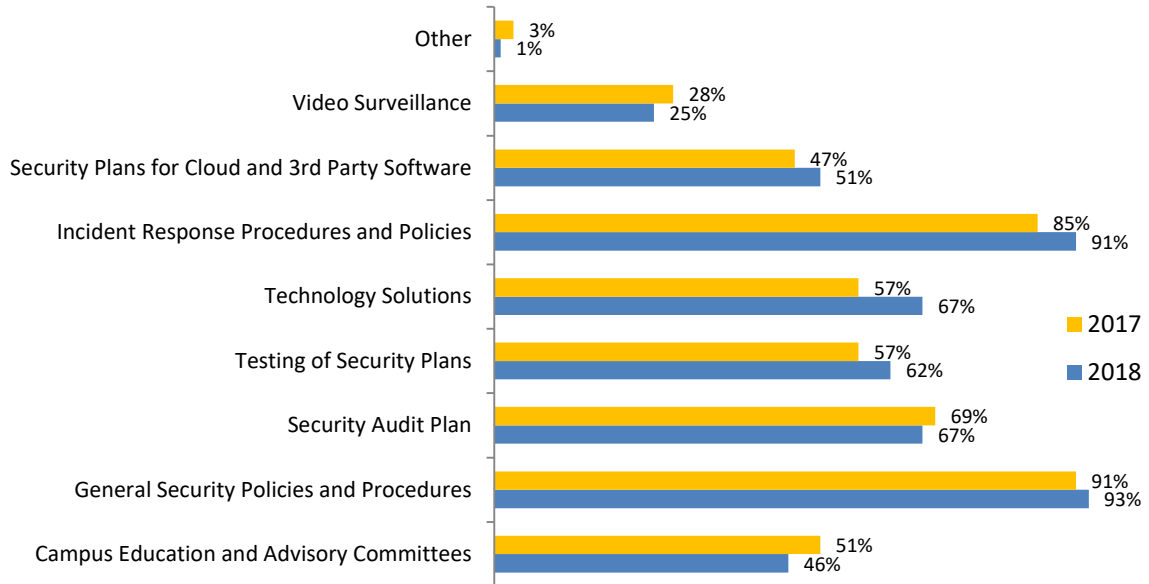
A formal IT security plan will not completely prevent intrusions and security incidents, but they help the institution to regularly evaluate the problems and what’s being done to help the institution protect itself from security breaches. The majority of institutions has a formal security plan or is working on one (87%), while only 13% indicate they have no plan and aren’t working on one.

Do you have a formal IT Security plan?



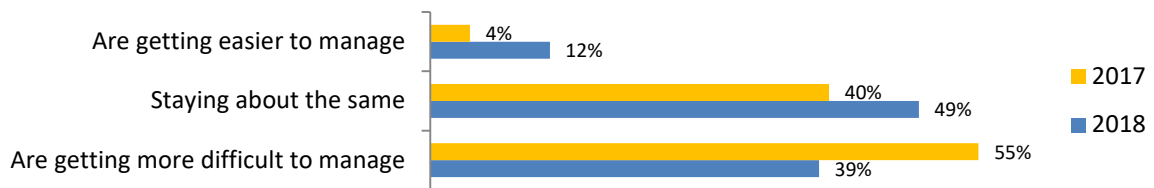
What’s in the plan provides insight into what the institution believes is important and needs to be planned for. While most institutions include incident response procedures and general policies, we find that reliance on technology solutions has increased by 10% this year up and testing of the plans is up 5%.

What is included in your security plan?

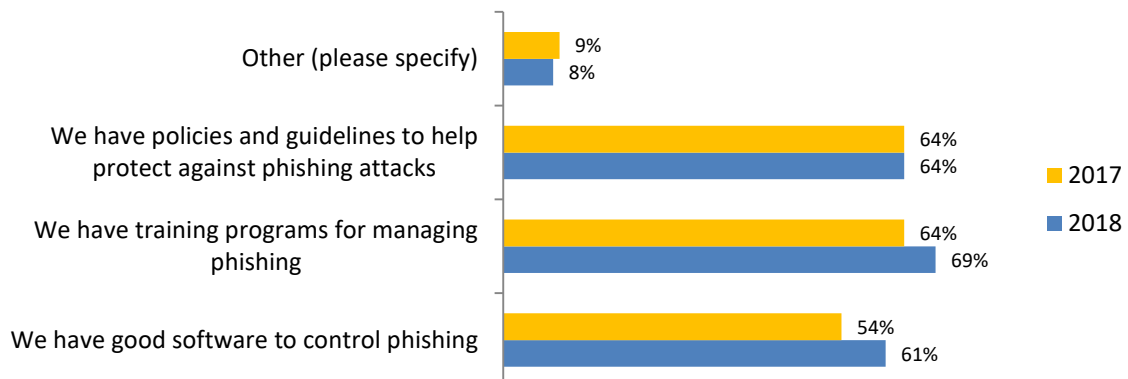


Phishing and ransomware attacks were added to the 2017 survey. While phishing attacks are difficult to manage and require additional software, training, and policies and procedures; it appears that software and training are having an impact. One CIO said, “People are more savvy than a few years ago, but so are the phishers.”

Phishing Incidents



Ways Institutions are Managing Phishing

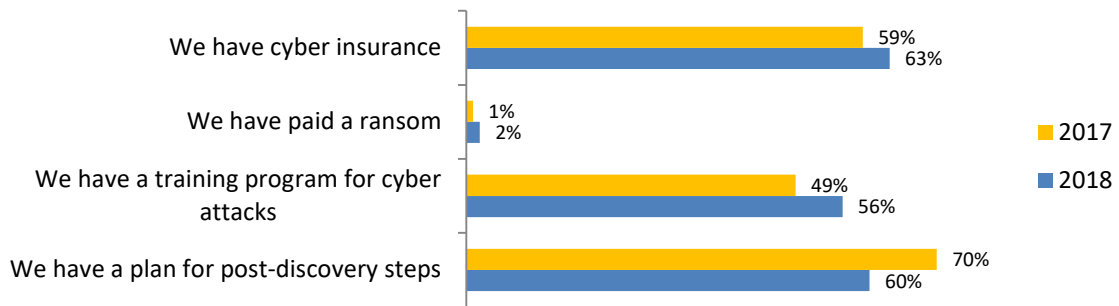


The use of cyber insurance has increased from 59% in 2017 to 63% in 2018. This may be the reason that in 2018 45% indicated ransomware attacks were “getting worse” a drop of 10% from 55% in 2017. In 2018 2% had paid a ransom compared to 1% in 2017. We will want to see how this changes in the future.

Ransomware Attacks

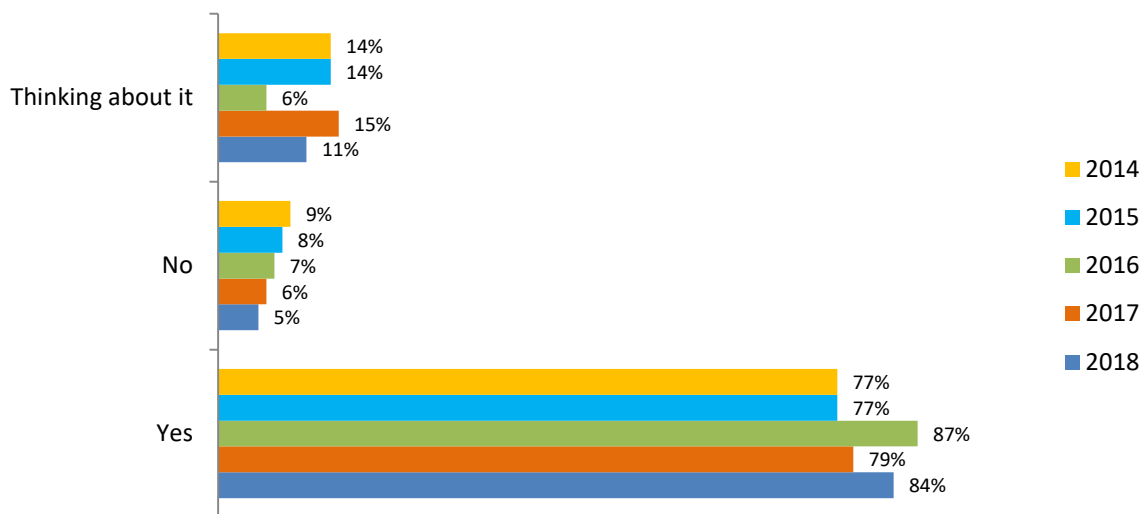


Ways Institutions are Managing Ransomware

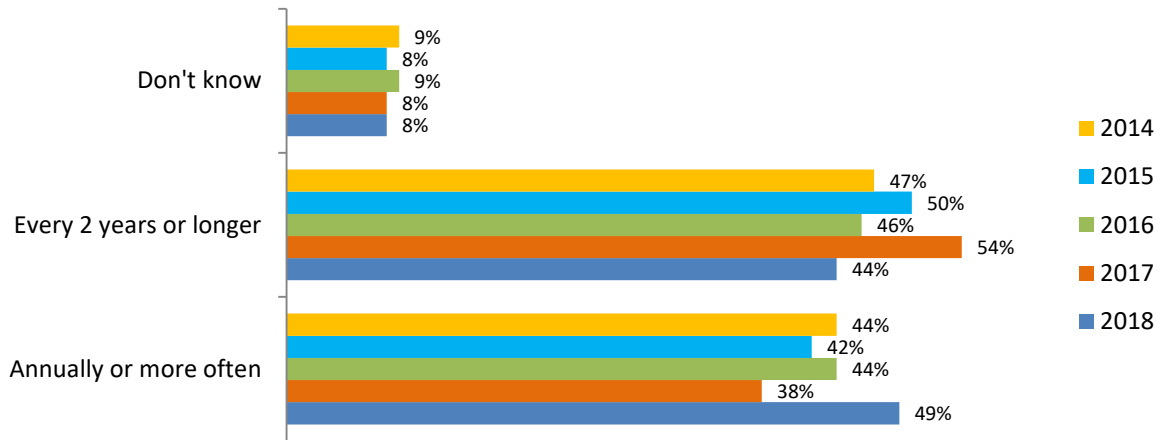


Those institutions who have not completed a security audit continue to shrink from 9% in 2014 to only 5% in 2018. Those who plan for an annual audit have increased from 38% in 2017 to 48% in 2018, the highest in the past five years.

Have you completed a security audit?

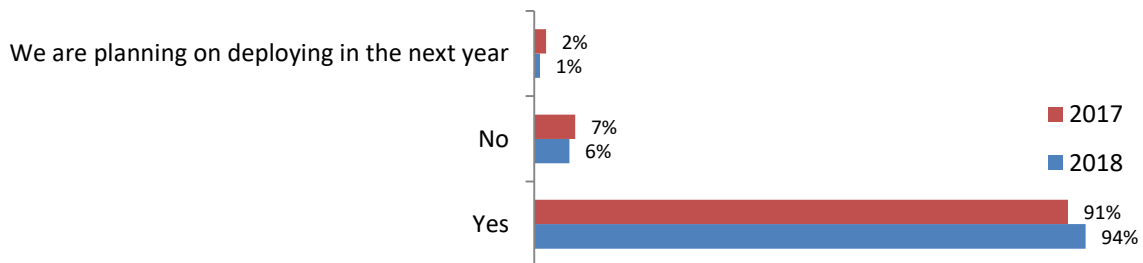


If so, how often do you plan to do a security audit?



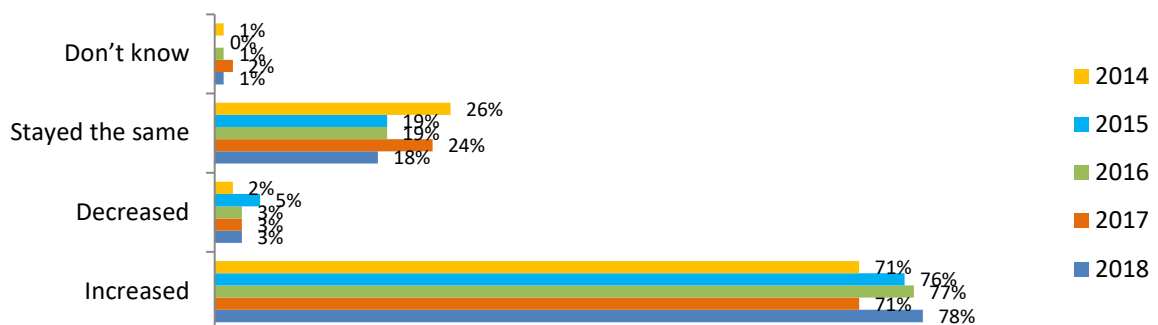
Last year we added a question on the deployment of video surveillance on campus. It appears that what was widespread last year is even more widespread this year. Ninety-five percent have video surveillance in place on campus.

Do you deploy video surveillance on your campus?



Overall, institutions continue to spend more on security, and that trend has continued for the nine years we have had the LBCIO survey.

How has the percentage of IT spend on security changed over the past five years?



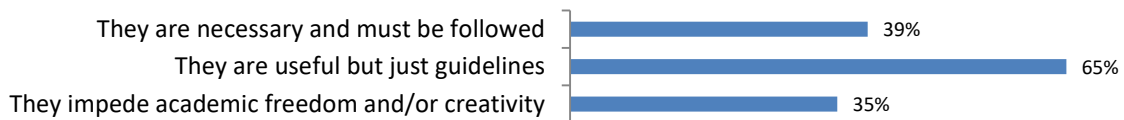
This year we asked several questions concerning how various campus constituents view security and their role in managing security issues and intrusions. The results are published in a special report from The Chronicle of Higher Education “Securing The Digital Future.” While more than half indicate that awareness is good or excellent (52%), there is still a large group who believes the awareness is poor or could be better (49%)

How would you describe your campus culture in supporting good practices toward IT Security? (For instance, faculty and students are aware of their role in preventing various attacks)



The majority of CIOs indicate that the faculty view security measures to be just useful guidelines (65%) and 35% believe they impeded academic freedom and/or creativity. The good news is that 39% said they are necessary and must be followed. We will want to see how responses change in the future. CIOs are in the tough position of having to maintain tight security, but many are sympathetic to the issue of academic freedom being impeded. Only 41% indicated academic freedom was not impeded by security safeguards while 52% said it was somewhat impeded.

What is your faculty's appreciation for security controls-policies, passwords, multi-factor, cloud, data access, etc.(check all that apply)?



Some faculty have complained that extreme IT security and data safeguards can impede academic freedom. How much do you agree with that concern?



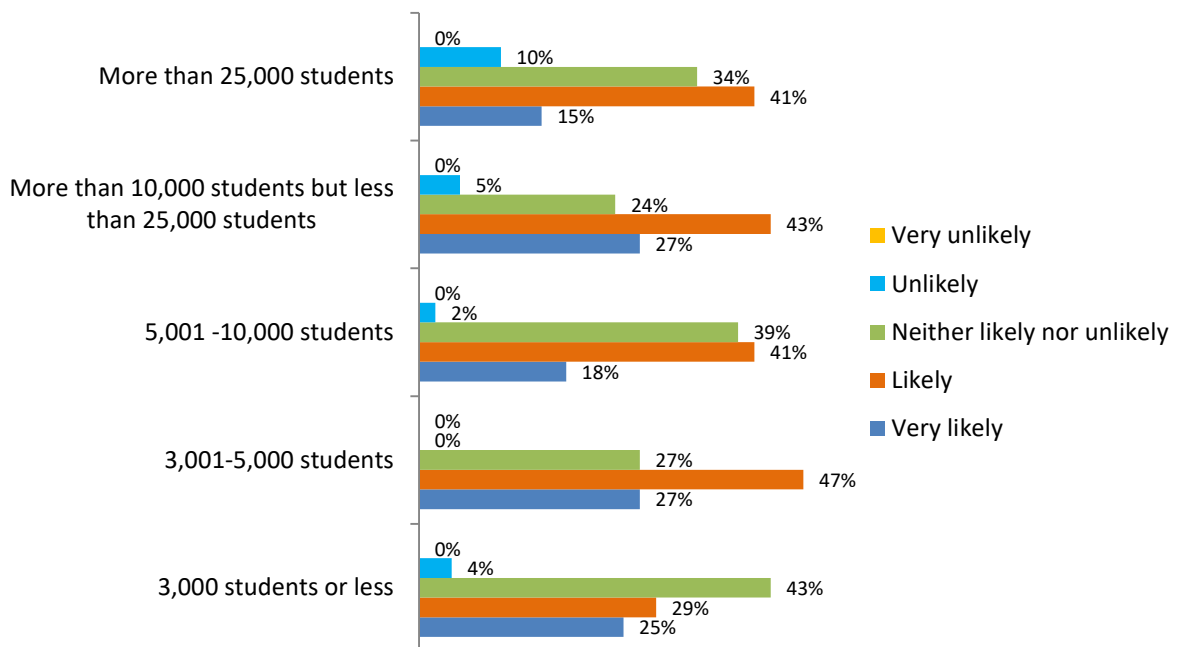
Concerning how a security breach could damage the institution's reputation, the majority (61%) answered very likely or likely.

How likely do you think a potential security breach could damage the institution's reputation? For instance, an attack successfully steals student data, hurting marketing and enrollment.



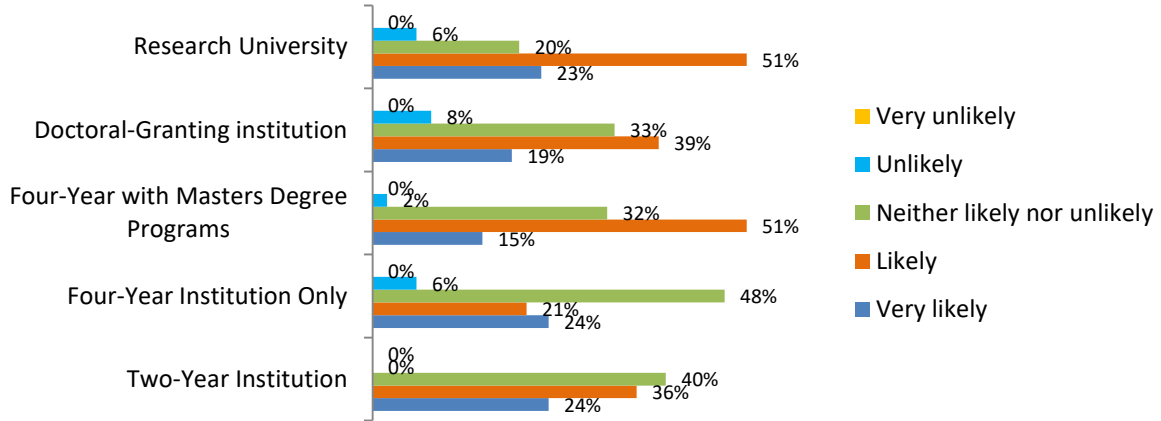
It appears that the size and type of institution may have some impact on how much the institution views the impact of a security breach. Fifteen percent of institutions with more than 25,000 students believe it will very likely have an impact while 27% of those with less than 25,000 students but more than 10,000 students and 27% of those with less than 5,000 students but more than 3,000 students believe it is very likely.

How likely do you think a potential security breach could damage the institution's reputation?



On the other hand, research universities are most likely to view the damage as very likely or likely (74%) while only 65% of four-year institutions view the damage as likely or very likely.

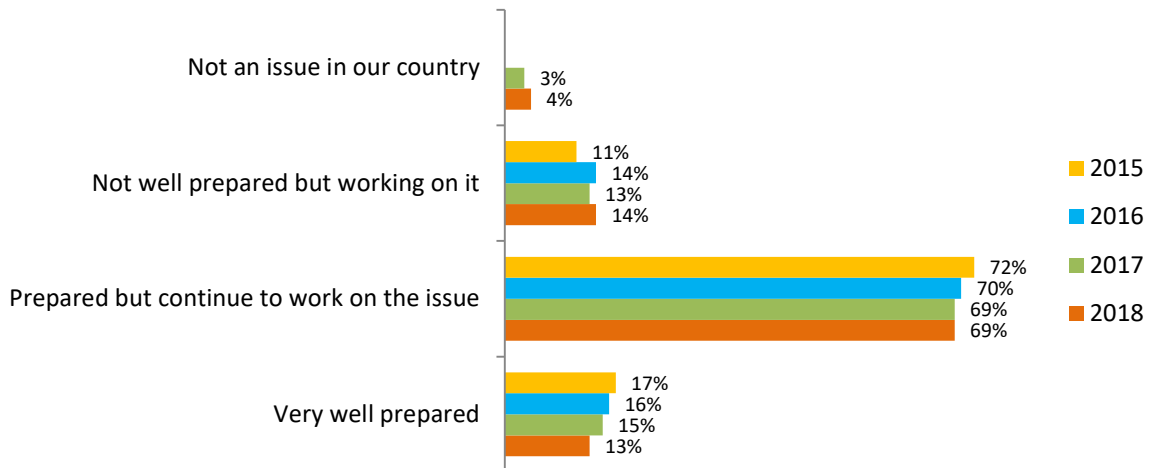
How likely do you think a potential security breach could damage the institution's reputation?



Incident Management

Most CIOs believe their institution is prepared for dealing with compliance issues, but more than two-thirds believe they must continue to work on the issue.

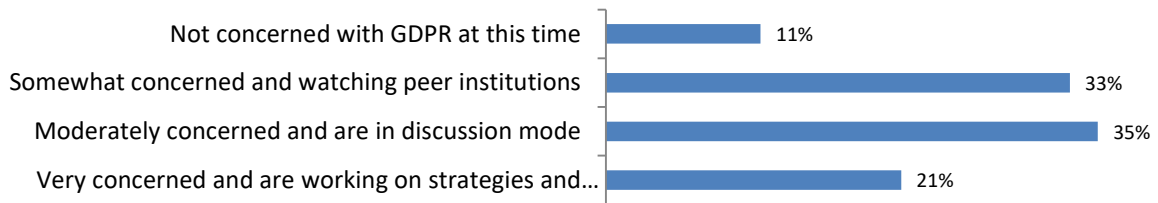
How well prepared is your institution prepared to deal with eDiscovery, FERPA, HIPAA and other compliance requirements?



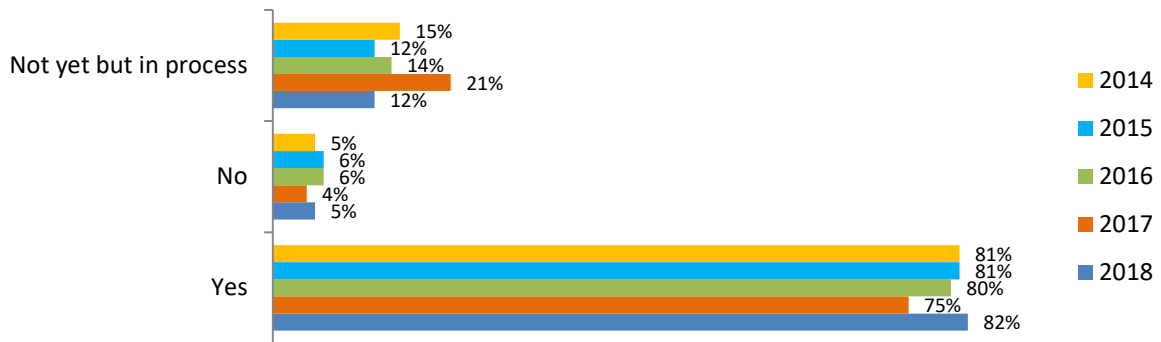
Plans to resume mission-critical operations in case of an incident are up from last year's dip, but the size of the institution seems to matter. More than 9% of institutions under 3,000 FTE do not have a plan while 0% of institutions over 25,000 do not have a plan.

There has been much written about the EU’s General Data Protection Regulation (GDPR) recently. We added a question to see how concerned CIOs were with GDPR. We will follow up next year to see how much that concern has turned into action.

How concerned is your institution with General Data Protection Regulation (GDPR)?

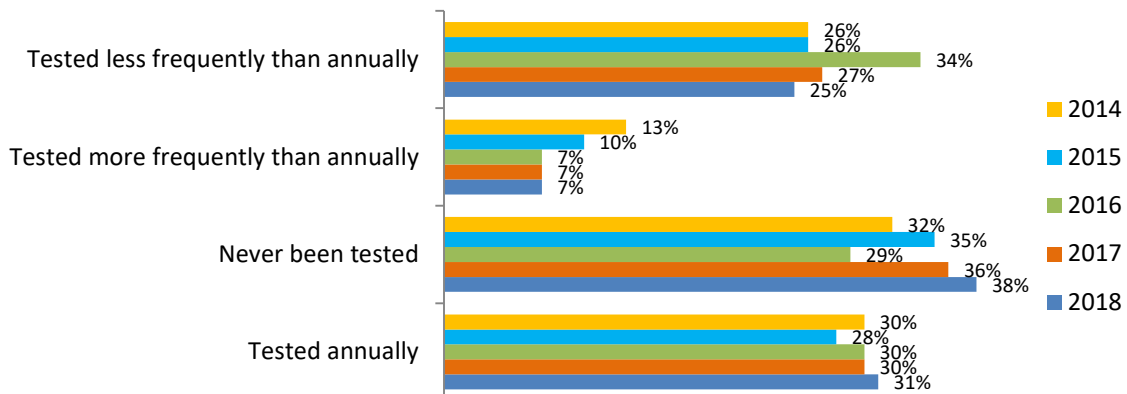


Do you have a plan to resume mission critical operations in case of a crisis?



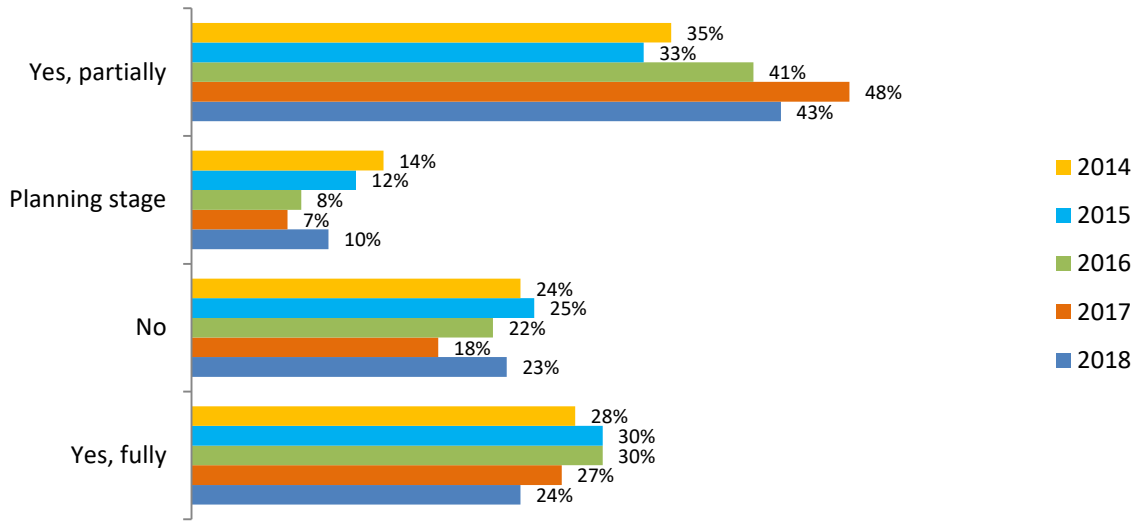
For those institutions that have a plan, 38% have tested the plan which is higher than in previous years. Testing of a plan is one way to ensure the plan is effective.

Frequency of Testing Plan to Resume Mission-Critical Operations



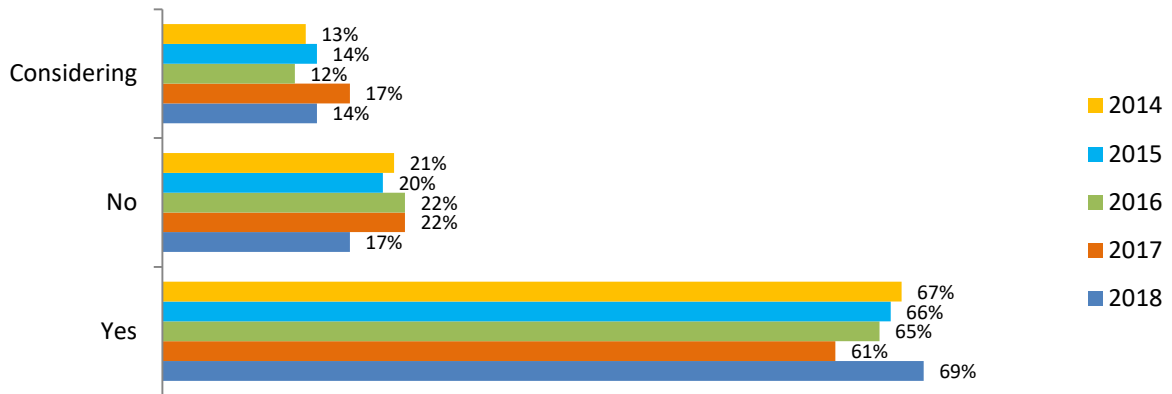
The number of institutions without fully redundant data centers rose from 18% last year to 23% this year. We believe this may be due to the increased reliance on the cloud to manage this level of service and support.

Percentage of Institutions With a Fully Redundant Data Center Where All Systems Could Be Up and Running in Less Than a Week



Penetration testing is up slightly from the past several years, and those who have not done it or are not considering doing penetration testing is down from prior years.

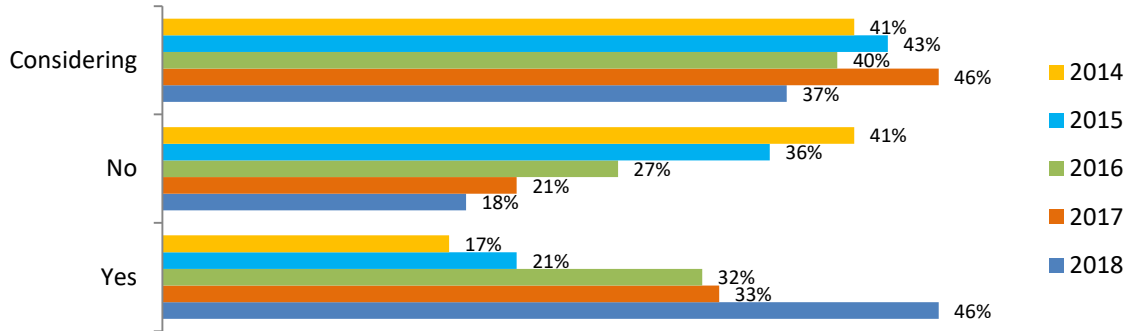
Institutions That Have Done Penetration Testing Using an Outside Firm



However, the use of Multi-Factor Authentication (MFA) is continuing to increase both in current use and plans. Last year we indicated that as phishing and

ransomware attacks continued to increase, institutions would increase their use of MFA. This seems to be borne out by the data these past five years.

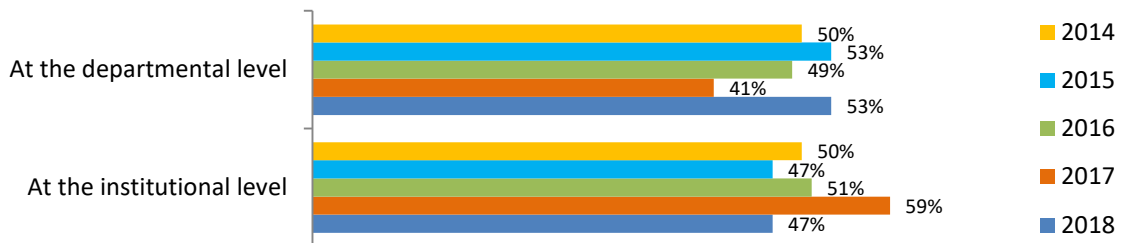
Institutions That Have Implemented a Multi-Factor Authentication Solution



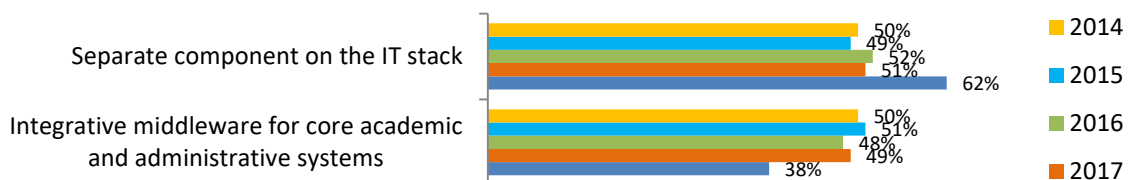
Other Observations

Last year data showed that document management was more likely managed at the institutional level (59%) than at the department level (41%). This year, it appears that more institutions manage document management at the department level (53%) than at the institutional level (47%). However, the movement towards document management as a separate component on the IT stack increased to 62% from 51% this year.

How document management is managed

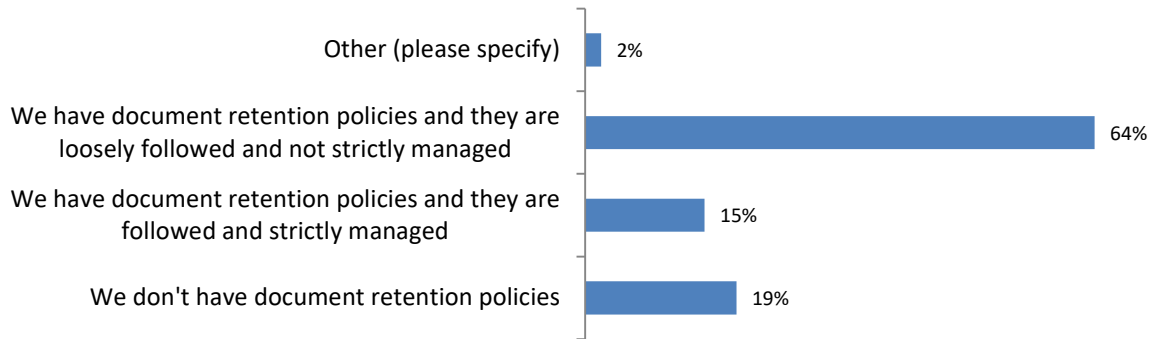


How Institutions Describe Document Management



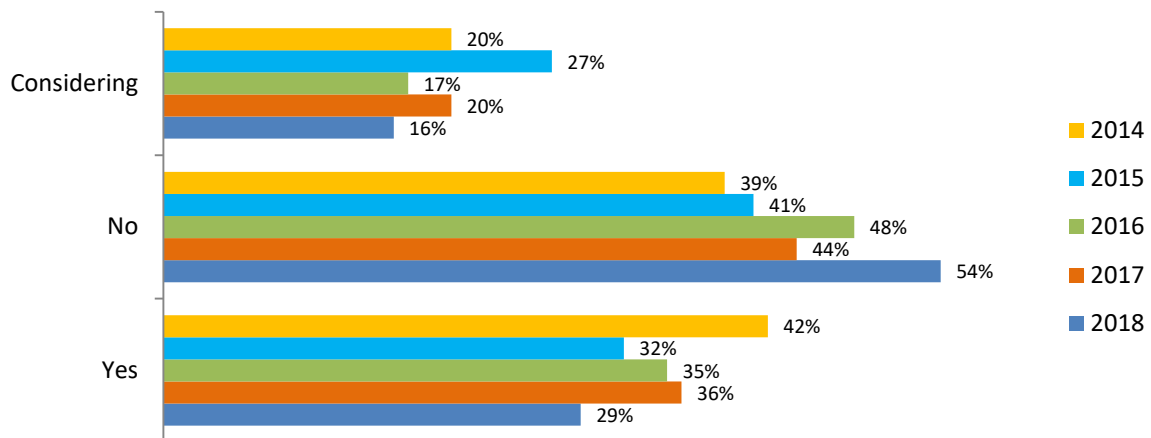
We added a question concerning document retention policies this year. It appears that while the majority have policies (79%), only 15% indicated those policies are followed and strictly managed.

Document retention policies are:



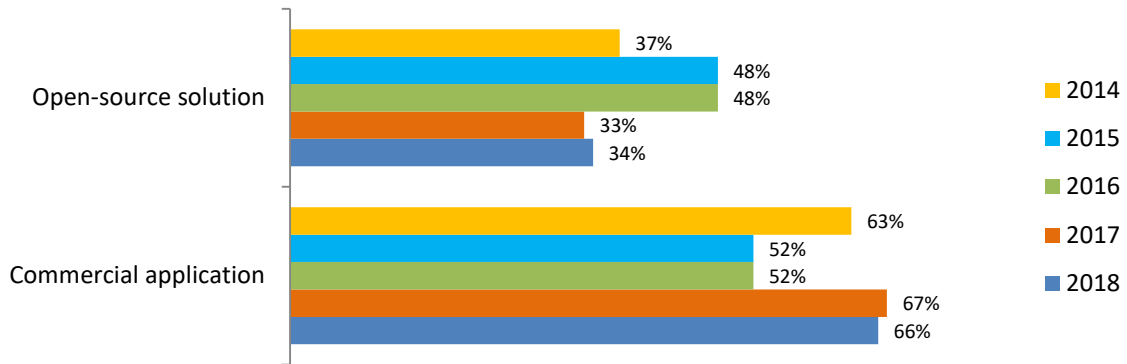
Digital repository solutions are still not in mainstream use on campus, with only 29% of institutions reporting that they have one in place. That is down from a height of 42% in 2014.

Percentage of Institutions That Utilize a Digital Repository Solution (DR)



Sixty-six percent of institutions that use a digital repository solution use a commercially available application compared to 34% that use an open-source solution. However, since only 29% of schools even have a solution, the percentage of all institutions using either type of solution is not as large as the number might indicate.

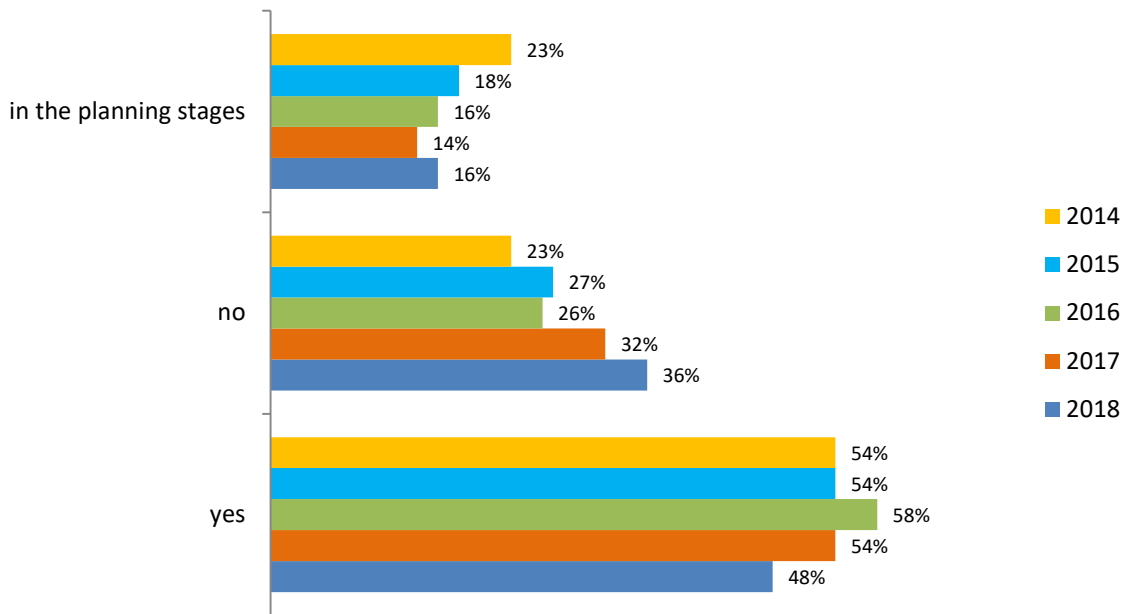
Descriptions of Digital Repository Solutions



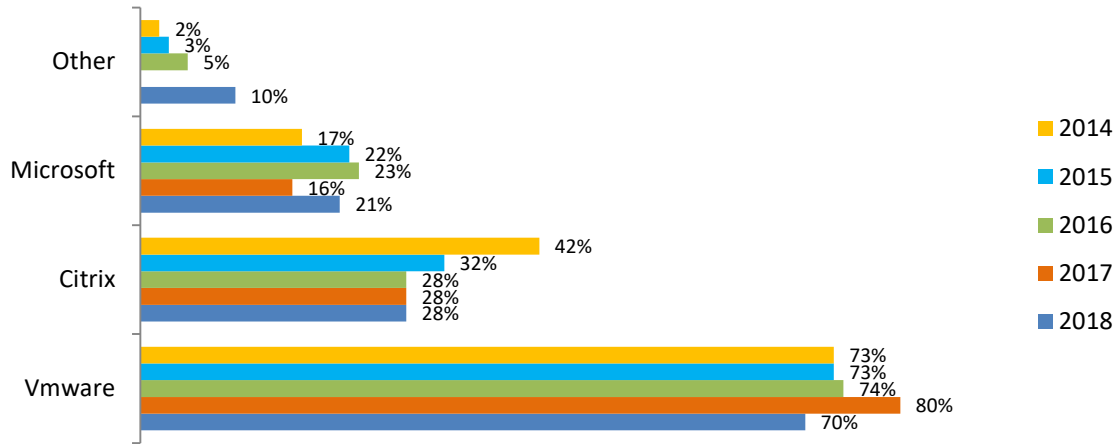
Virtualization

While the use of desktop virtualization has remained just above 50% in the past five years, this year the figure dropped to less than half (48%). The number of institutions who are not utilizing desktop virtualization or are planning for its use has risen to 36%, up from 23% in 2014. If they were using desktop virtualization, 70% were using VMware a drop from 80% last year) followed by 28% using Citrix and 21% using Microsoft.

Institutions Currently Utilizing Desktop Virtualization

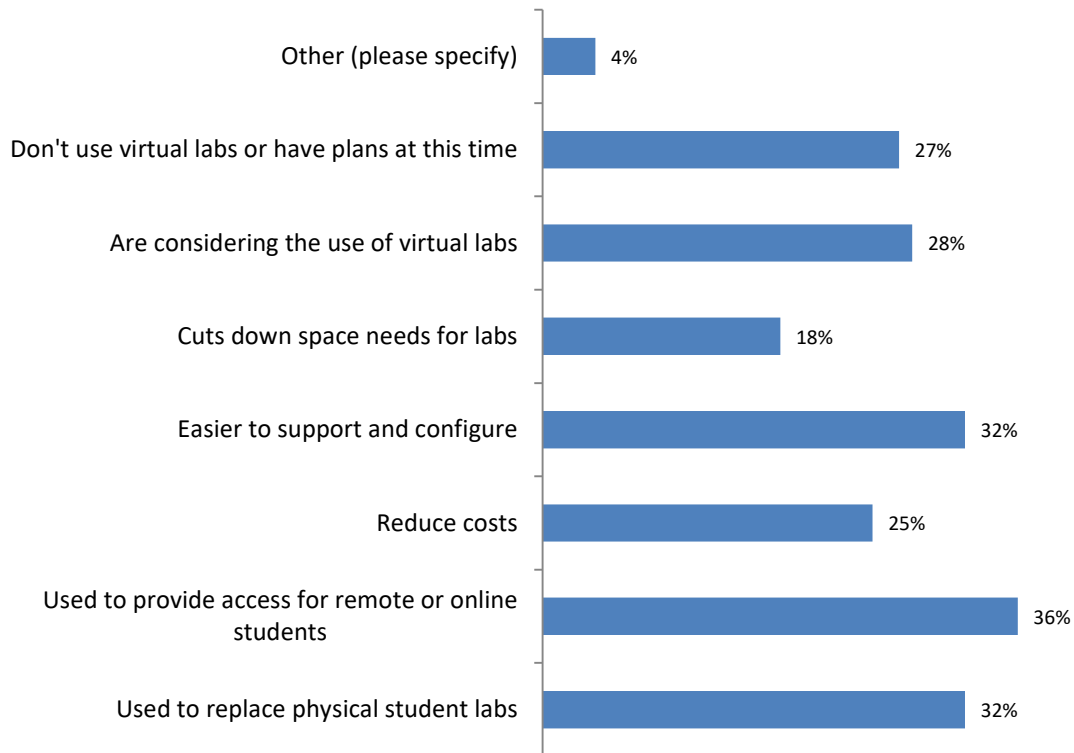


Tools Institutions are Using That are Utilizing Desktop Virtualization (check all that apply)



We asked a related question this year concerning the use of virtual labs. Twenty-seven percent do not use virtual labs but for those that do use virtual labs, the greatest use is to provide access for remote or online students.

Which best describes your use of virtual labs?



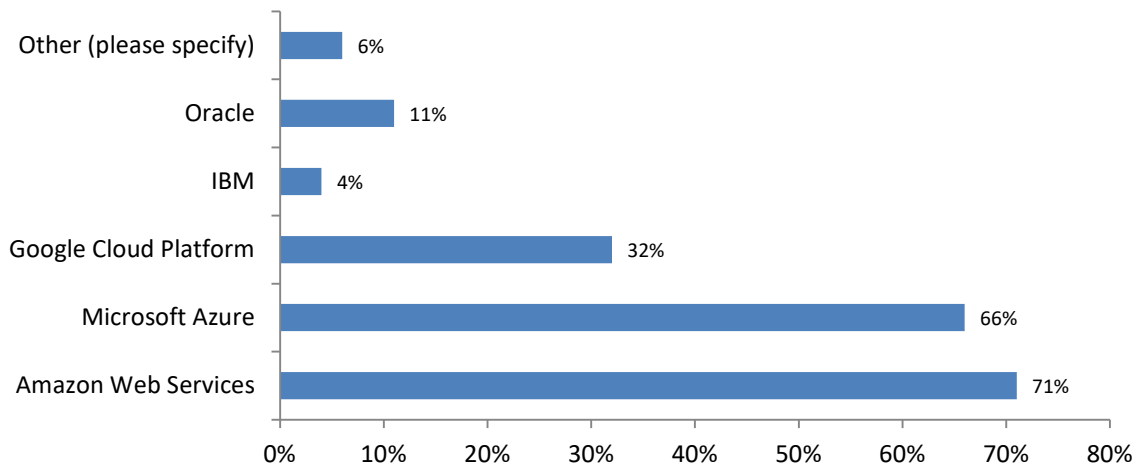
New and Emerging Technologies and IT Leadership Issues

Cloud Computing

The use of cloud computing in higher education has seen significant growth over the past several years, and institutions are using the cloud for a variety of activities. Results of the survey suggest the adoption of cloud services are being initiated by vendors moving their next generation of applications only to the cloud, at times with no supported local hosting option. While this can lead to efficiencies for schools running “Software as a Service,” (SaaS) there are typically no options for customization, which can be challenging in some use-case scenarios. Cloud-based activities range from common back-office systems such as email to advanced analytic cloud-based platforms. The barriers, particularly around security that initially inhibited cloud adoption, have all but vanished on many fronts. In many cases, cloud providers have security staffing and technologies that many individual institutions would be unable to afford. IT departments and higher-education leadership have embraced the cloud as a means to scale, increase efficiency, and in some cases, provide cost-cutting. However, if a serious breach took place with a cloud provider, that could change the landscape and slow the movement towards the use of the cloud for administrative applications. While there have been several major breaches in recent years, including Microsoft, Dropbox, Apple iCloud, Home Depot and Yahoo, none have directly impacted administrative applications in higher education.

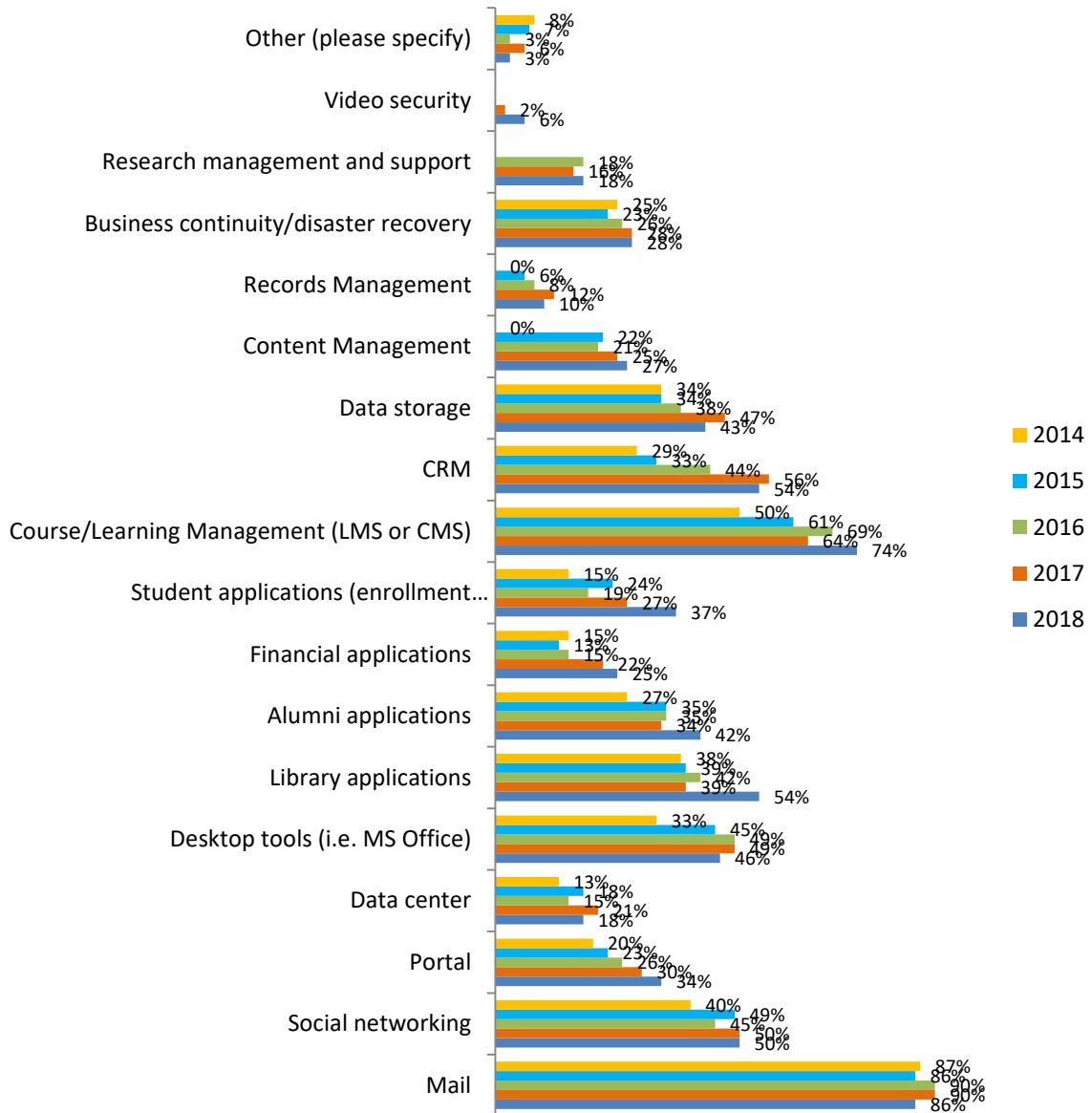
Survey trends in cloud computing include increased confidence in moving many applications and services to the cloud. While email, LMS, social networking, and desktop tools are common in the cloud, campuses are increasingly moving the portal, data center, CRM, alumni, financial applications, and data storage to the cloud. Minimal reductions over last year are in the areas of library management, alumni applications, and research management and support. One notable change over last year’s survey was in Course Management/LMS systems which saw an increase from 64% to 74%.

There are many cloud providers out there, but several have risen to the top. Respondents reported that Amazon Web Services (71%), Microsoft Azure (66%) and Google Cloud (32%) dominate the general-purpose cloud services environment for all institutions regardless of size or type. A number of corporations offering cloud solutions have recognized they are unable to compete with the above-mentioned vendors and have migrated their platforms to these platforms. Most institutions use cloud computing for a mix of academic and administrative needs.

Cloud Providers That Institutions are Currently Using Or Considering

The most common cloud applications implemented were email, learning management systems, library management systems, customer relationship applications, and alumni systems. Data storage cloud adoption continues to grow, suggesting institutions are finding alternatives to Google and Microsoft attractive, with corporate offerings from Dropbox and Box.com becoming more mainstream as well. The adoption of cloud for ERP areas of Finance and Students system was the lowest of all applications. This may indicate CIOs were restricted by adequate or completed cloud offerings, budget constraints, the task was too daunting or concern about customizations that cannot be easily remedied in a multi-tenant SaaS cloud-based system.

Which of the following areas are you either currently placing in the cloud or are in the process of placing in the cloud



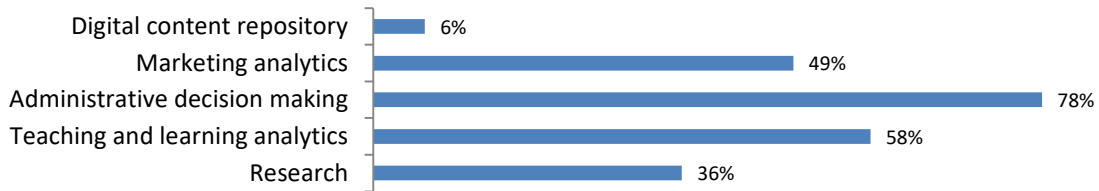
Data Analytics and Big Data

Most institutions have a data analytics strategy or are working on one (69%). Seventy-eight percent leverage data analytics for administrative decision making followed by teaching and learning analytics (58%) and marketing analytics (49%). We expect those areas will continue to be important for institutions and those numbers will increase.

Does your institution have a Data Analytics strategy?

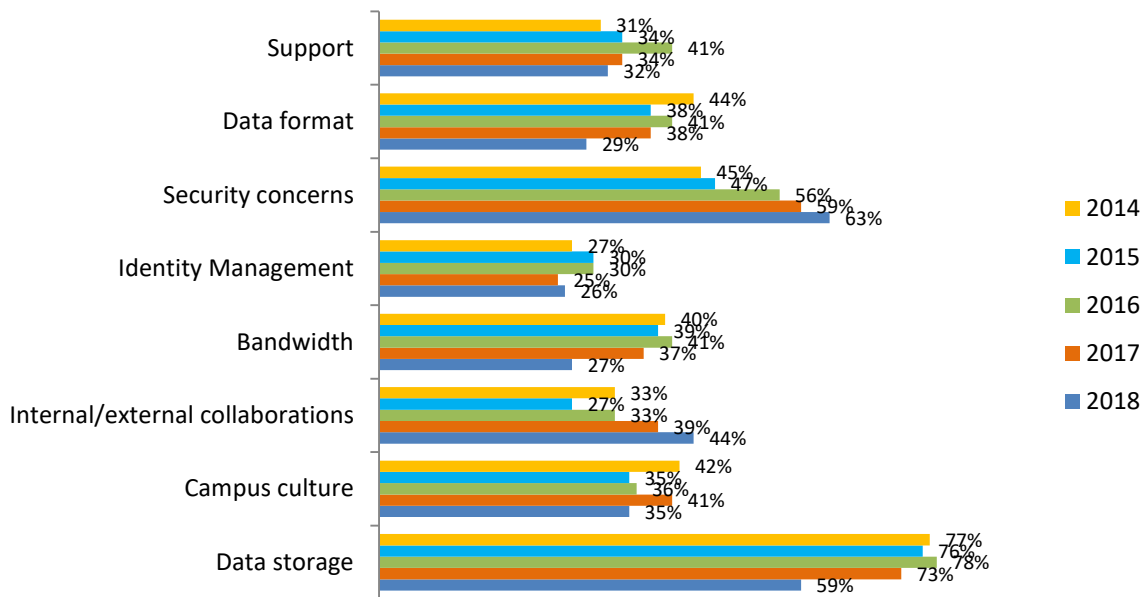


Is your institution leveraging Data Analytics for: (Check all that apply)



The impact of big data has diminished in many areas particularly in data storage. However, security concerns are increasing in importance as might be expected.

The Impact of Big Data

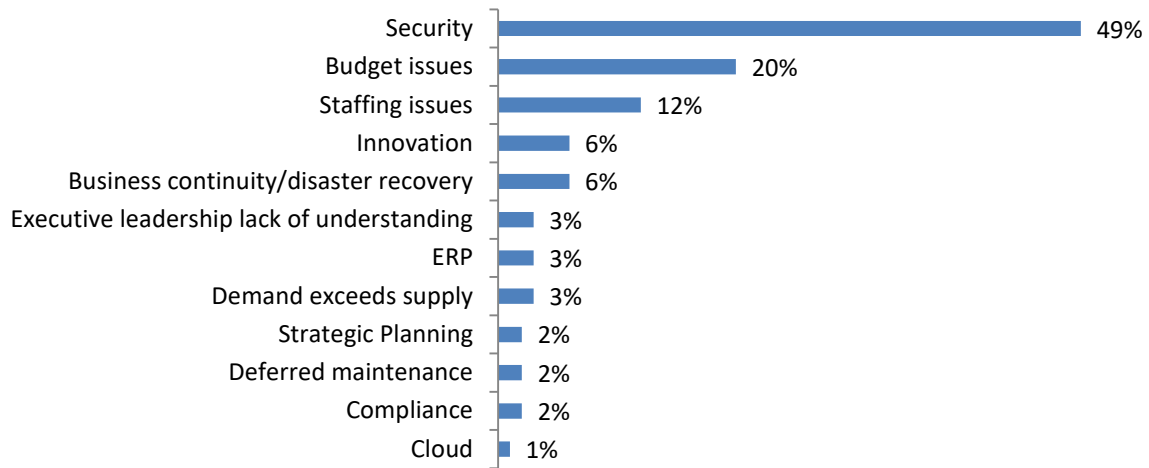


IT Leadership Issues

What Keeps CIOs Awake at Night?

For the fourth year, we have asked the question “What is the one issue that weighs heavily on you or keeps you awake at night?” Each year, security and related privacy issues are at the top. More than 49% listed security and privacy issues, up from 31% in 2015. Budget issues were next at 20% and staffing issues, including retaining and recruiting skilled people, dropped to third at 12%.

What is the one issue that keeps you awake at night?



A few interesting responses include:

Technology is only growing and becoming more crucial, but lack of funding is so prevalent that the colleges bury their heads in the sand.

Rapid pace of technology change and expectations

The inability of campus executive leadership to understand ANY of this and their total unwillingness to try.

A significant data breach that includes protected/restricted/high risk database

How to keep adding and providing the services, at a quality level, with stagnant budgets

Age and complexity of legacy infrastructure

The institution's ever increasing technical debt due to nearly five years of continually deferring IT spending to balance the budget

How to make sure our past successes do not blind us to the changing needs around us

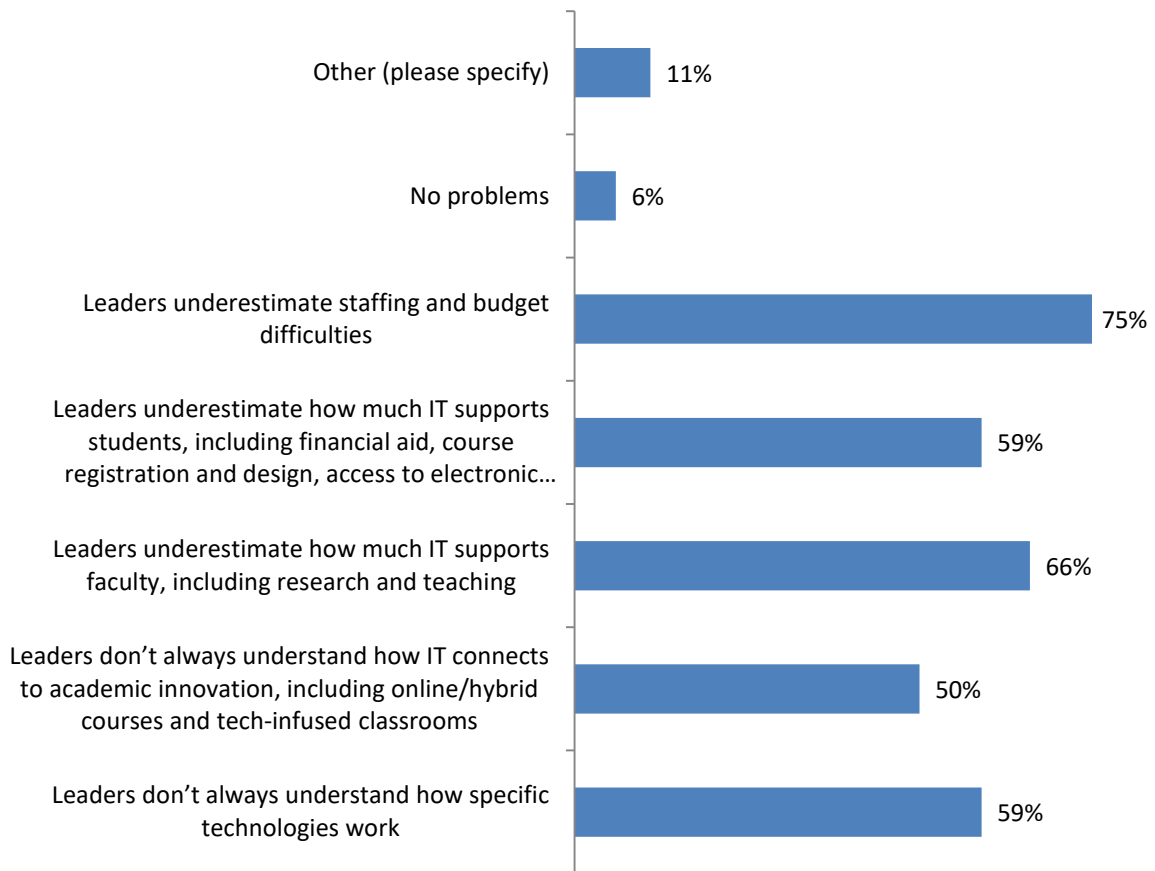
Rapid speed of disruptive technological innovations and advances of cyber security threats may outpace our ability to compete and manage the risk appropriately, without making significant changes to our operating model and institution's culture and priorities.

We asked several new questions this year to extend our understanding of how CIO concerns translate to the leadership of the institution.

To what degree does the leadership of the college -- board of trustees, president, president’s cabinet -understand how much this particular issue challenges the institution...



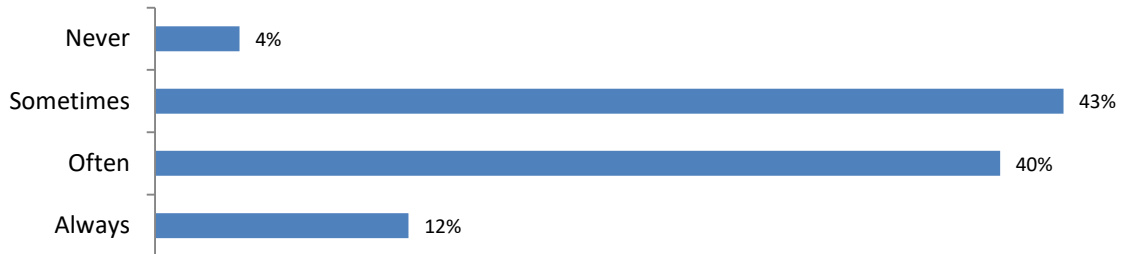
What problems do you face when working with the leadership to address IT challenges? (check all that apply)



While CIOs believe that executive leaders understand to some degree how the concerns of the CIO impact and challenge the institution and its academic mission, that doesn't seem to translate to understanding staffing, and budget difficulties, Seventy-five percent of CIOs believe that executive leaders underestimate staffing and budget difficulties and 66% underestimate how much IT supports teaching and learning and research. One area that is of concern is that executive leaders do not

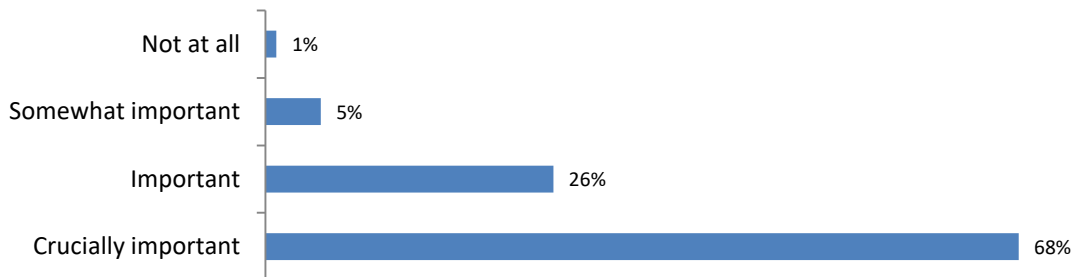
always consider IT when developing the strategic goals for the institution. If institutional leadership does not consider IT when developing strategic plans, then it follows that they will likely have difficulty understanding the budget and staffing needs for IT.

How much does the leadership consider IT when developing the strategic goals of the institution?



CIOs believe that the IT infrastructure is important in meeting the institution’s strategic goals and 68% believe it is “crucially important.”

How important is IT infrastructure to your institution’s ability to meet its strategic goals?



CIOs believe that leadership often (40%) or always (12%) consider IT when developing plans to improve student success or wellness.

How much does leadership consider IT when developing plans to improve student success or wellness? For instance, some institutions collect and use student data to design interventions to help academically or emotionally at-risk students



One bright spot is that leadership seems to understand the importance of the IT infrastructure in its ability to meet plans for academic innovation. The key to success, however, is the translation to budget and staffing needs. We will continue to assess these in future surveys.

How important is IT infrastructure to your institution's ability to meet its plans for academic innovation



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

The question "What One Technology Will CIOs Have to Invest In During The Next Five Years?" was asked for the fourth year. Analytics and Big Data came in at 23% vs. 14% in 2017 while security came in at 19% vs. 22% in 2017. Some interesting responses included:

Current infrastructure will be crucial. After that, I am not sure there is ONE technology. It will depend on the digital maturity of each institution.

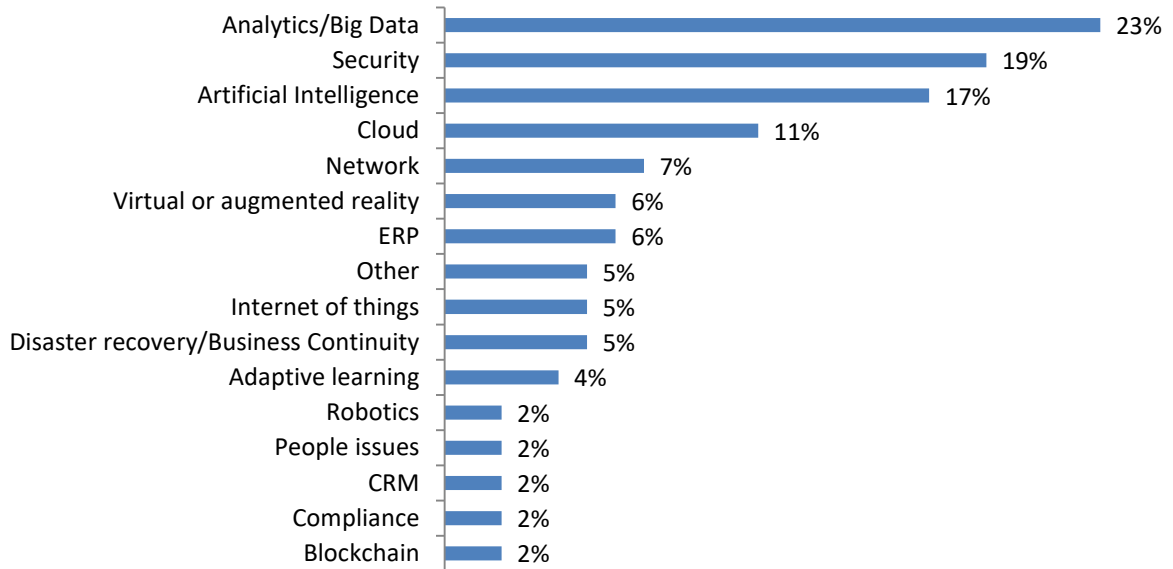
Eliminating the ERP and move to best of breed cloud-based solutions while investing in the core infrastructure required for data integration, access, and security.

It appears that the big ask is going to be storage, whether on-premise or in the cloud

Network upgrades to handle things like 4k video and vendor streamed augmented reality applications

It isn't glamorous, but cloud strategies are stack-of-cards strategies without a highly reliable and robust network

What is the one technology higher education CIO's will have to invest in during the next 5 years?



Summary

The challenges facing higher-education CIOs continue to be complex, growing in number and diverse. We hope this year's LBCIO survey will provide CIOs and the executive management of the institution with insights and peer information to help manage an IT organization that is growing in demand for services and support while continuing to deal with financial and human resource constraints.

One of higher education's goals has always been to protect the integrity of the institution and the physical security and privacy of students, faculty, and staff. Security continues to be a major concern for CIOs in higher education. CIOs are responsible for an infrastructure that must deal with a variety of attacks from all corners of the globe. Some attacks are made for financial gains (ransomware and phishing are examples), while other attacks hit at the integrity of the institution including personal privacy, grades, and evaluations, research and even class discussions. It is no wonder that many CIOs are kept awake at night with concerns for security.

New questions added to this year's survey show CIO concern for how seriously the community views security. While most see IT as important to the academic mission and infrastructure of the institution, there are still large numbers in the community who believe that security measures are a burden. Some executive leaders who view IT as critical are not willing to add IT planning into institutional strategic and budget planning. If IT is critical, then it must be part of both strategic and tactical

plans. To treat it as just a necessary infrastructure (like any other utility) goes against the true importance of IT being core to future plans to support the ever changing landscape supporting the basic mission of higher education. We will continue to monitor attitudes and planning in future LBCIO surveys.

CIOs in higher education are dealing with massive amounts of technical and cultural change. The college or university of 2018 may have the same general mission of the college or university of 1968, but the management and delivery of services and support are radically different. As one CIO reported, *“management needs to understand how complex and expensive existing and new technologies are, particularly with regards to security and compliance.”* In 1968, many of the basic functions of the institution were reasonably well defined and the rules were spelled out well in documents like NACUBO’s book “College and University Business Administration” or CUBA, “the core reference work for all phases of higher education management.” (NACUBO is the National Association of College and University Business Officers) Today, NACUBO is working on another rewrite of CUBA, and the complexities are obvious when comparing the latest version with the earliest version published in the fall of 1967. Information technologies have been at the heart of many of those changes, and many of the changes would not have been possible without the rapid change in technologies. We expect to see even greater changes in the next fifty years, but at the heart of those changes will likely be new and advanced IT innovations. We hope that the LBCIO surveys these past nine years have provided some insights and understanding of the complex environment that the CIO in higher education faces. We look forward to the 2019 LBCIO survey and a review of the past ten years of information we have gathered. We know that this or any other survey cannot really address all of the issues facing higher education and CIOs in higher education, but we hope that this report from the 2018 LBCIO survey will help CIOs plan for the future and better manage their IT organizations and resources.

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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