

EDUCAUSE CENTER FOR ANALYSIS AND RESEARCH

# The Higher Education IT Workforce Landscape, 2019



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## Authors

**Joseph D. Galanek**, EDUCAUSE

**Dana C. Gierdowski**, EDUCAUSE

**D. Christopher Brooks**, EDUCAUSE

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## EDUCAUSE

EDUCAUSE is a higher education technology association and the largest community of IT leaders and professionals committed to advancing higher education. Technology, IT roles and responsibilities, and higher education are dynamically changing. Formed in 1998, EDUCAUSE supports those who lead, manage, and use information technology to anticipate and adapt to these changes, advancing strategic IT decision making at every level within higher education. EDUCAUSE is a global nonprofit organization whose members include U.S. and international higher education institutions, corporations, not-for-profit organizations, and K–12 institutions. With a community of more than 99,000 individuals at member organizations located around the world, EDUCAUSE encourages diversity in perspective, opinion, and representation. For more information please visit [educause.edu](https://educause.edu).

## Foreword

Since 2002, EDUCAUSE has been exploring the contours of the higher education IT workforce—shedding light on the people who constitute that workforce and their attitudes and perceptions about the work they do. This year we are pleased to offer our fourth comprehensive national research study on this subject. As with our previous studies, this resource is designed to aid IT professionals in their career decision-making and institutions in their support of the people who make up their staff and leadership. More explicitly this year, we've put forth in this report a number of challenges to readers and their institutions to take a closer look at issues of diversity within the higher education IT community and to consider how these issues may open all of us to important changes and opportunities for the workforce in the future.

As part of its recently adopted strategic vision, EDUCAUSE is firmly committed to supporting members and institutions as they address important challenges and opportunities related to diversity, equity, and inclusion (DEI). This report clearly details the many areas of need for walking out this commitment together as a professional community. We find, for example, that compared with the larger US workforce, employees in higher education IT are predominantly white and minority racial-ethnic groups are underrepresented. We also find that Millennials are underrepresented in this workforce and that the representation of women among chief information officers (CIOs) has declined over the past several years. The news, however, isn't all grim; we also highlight a few bright spots. Perhaps most notably, we find that LGBTQ representation in higher education IT is twice that of the general US population and that women have made gains among both IT management and staff. And we are not without promising solutions for the future diversity and inclusiveness of the higher education IT workforce; indeed, throughout this report we point the reader to some helpful resources to aid us all in building toward that better future.

Of course, this report covers many additional topics that I am confident you will find enlightening and helpful: the skills and professional development activities rated most important for IT staff and leadership; important job-retention factors; the career trajectories that lead professionals to positions of higher education IT leadership; and the relationships between IT professionals and other colleagues around the college campus. Whether you are currently part of the IT workforce or sitting on the outside looking in, I hope you will take all of this rich information with you as you continue your professional journey in IT, higher education, or other professional spaces. Most importantly, I hope you will build on the information you find here as you map it onto your own particular institutional environments and professional practices. I encourage you to dig deeply into this report and then move beyond it—pursue the questions it raises for you, and continue on in the discovery that is really only just beginning here.

Thank you for taking the time to read this important work, and best wishes to you on your professional journey.

*—Mark McCormack, Senior Director of Analytics and Research, EDUCAUSE*

## Introduction

This is the fourth comprehensive research study on the IT workforce in higher education from the EDUCAUSE Center for Analysis and Research (ECAR). Like previous workforce reports, it describes the state of the higher education IT workforce across all organizational levels,<sup>1</sup> as well as the demographic makeup of the workforce, the state of hiring in higher education IT, the skills important to succeeding in higher education IT, workforce retention, career paths of CIOs and managers, and the roles CIOs and managers play. This year, we've also included findings on the diversity of the higher education workforce by including demographics on respondent sexual orientation and disabilities to enable dialogue among higher education IT professionals about workforce diversity, equity, and inclusion (DEI). Because we have consistently found that most higher education IT professionals tend to stay in higher education, we trust this report can offer insights into why this is the case and how valuable employees can be retained. By identifying the trends, needs, activities, obstacles, and goals of the workforce at all organizational levels, our results may offer ideas for sustaining an environment that can meet the ever-evolving needs of stakeholders. Finally, we hope that this report offers clear pathways to increase career satisfaction, opportunities for advancement, and career development.

## Key Findings

- **Women continue to be underrepresented in the higher education IT workforce**, but their numbers have increased in recent years. Women have made the greatest gains as managers, followed by staff. Despite these gains, the percentage of female CIOs has declined, and considerable work remains in order for women to break through the glass ceilings in higher education IT.
- **The higher education IT workforce appears to be getting older.** The median age of higher education IT employees has increased to 50. According to our data, Baby Boomers and Gen Xers are overrepresented and Millennials are underrepresented in the higher education IT workforce. The recruitment and retention of Millennials to the higher education IT workforce will become increasingly important to counter looming Baby Boomer retirements.
- **The higher education IT workforce remains predominantly white.** Although the workforce has experienced some moderate improvements with regard to ethnic diversity, our data suggest that minority groups in higher education IT tend to be underrepresented compared with the overall US workforce.
- **The percentage of higher education IT employees who identify as LGBTQ is twice that of the general population.** LGBTQ employees may be more drawn to IT positions in higher education given these institutions' broader commitment to diversity of thought, creed, and demography, creating a more welcoming environment than general IT work environments.
- **The percentage of higher education IT employees who have disabilities and impairments is substantial.** About 8% of respondents reported having been diagnosed with a disability or impairment. Of those identifying as having a disability, 27% have a sensory impairment, 22% have a learning disability, 21% have a mobility impairment, and 16% have a mental health disorder.
- **Most CIOs and managers reported that they have been able to fill open positions, but fewer reported being able to create and hire for new positions.** Institution size and classification were associated with IT departments' ability to hire. Larger institutions likely have larger IT departments and therefore greater capacity to hire and restructure positions and roles to meet the needs of an extensive organization.
- **Over half of institutions reported not adding any full-time IT positions, and only a little more than a third of institutions reported eliminating positions.** Attrition was the factor that contributed to the highest numbers of positions eliminated. When positions were added, they were for creating and maintaining IT infrastructure (e.g., systems administrator) or were necessary to enhance security.

- **Business skills such as effective communication and the ability to manage relationships within the institution were considered the most important skills for job success.** Although technical skills such as managing processes and services and engaging in design thinking are somewhat less important, they tend to rank higher than general managerial skills.
- **The professional development activities that most contributed to professional growth were analyzing data for strategic decision-making and attending a conference on higher education in IT.** Among all organizational classes engaged in these activities over the past two years, a strong majority assessed these opportunities as moderately or greatly contributing to professional growth in their current position.
- **Quality of life and work environment are the most important factors in keeping employees at an institution.** Other generally important factors include occupational stability and benefits. All of these factors were rated significantly higher than monetary compensation across organizational levels.
- **Higher education IT employees across organizational levels and Carnegie classes deemed insufficient staff and financial resources to be major or critical obstacles to effective job performance.** IT employees are confident in their abilities and skills to do their work, and they reported gaps in these areas as among the least critical obstacles to effectiveness in their current positions.
- **Competitive compensation and additional budgetary resources were the most important factors to CIOs and managers** for adequately maintaining their IT workforce over the next three years. Outsourcing systems, functions, and services and contracting work to be done are among the less important solutions to workforce maintenance.
- **The paths to CIO and manager positions in higher education are related to previous roles, experience in higher education, and education levels.** Although managers come from every IT sector and are typically hired to manage units within the sectors in which they have developed specialization and competency, CIOs tend to come from other executive leadership positions. Managers and CIOs both tend to have considerable experience within higher education, but managers appear to be loyal to their institution, whereas individuals aspiring to a CIO position may have to leave their institution. Education levels are associated with moving up the managerial ladder: CIOs and managers have earned more advanced degrees than staff.
- **CIOs who have an appointment to a president's or a chancellor's cabinet more frequently engage in shaping their institution's academic directions and strategic activities than their counterparts who do not have those appointments.** CIOs and managers most frequently engage in a collaborative relationship with their institution's chief information security officer.

## The Makeup of Today's IT Workforce

Higher education IT is a rich tapestry of groups and individuals who serve higher education at a number of organizational levels and who perform a host of roles and functions for their campuses. The higher education IT workforce is demographically complex and does not always reflect the composition of the general public. In this section, we provide some answers to this seemingly simple question: Who is the IT workforce? Thanks to the 1,592 higher education IT employees who took the time to respond to our 2018 survey, we have the answers. Knowing who “higher education IT” is can help in deciding who it wants to be in the future. This knowledge also affords opportunities to (re)consider hiring strategies that will render organizations more representative of their campuses and communities; generate awareness; develop greater sensitivity to issues of diversity, equity, and inclusion in the workplace; and assist those who may need accommodations to do their work effectively.

### Organizational Level

EDUCAUSE has been conducting research on the IT workforce in higher education since 2002. This report follows in the vein of our 2014 and 2016 predecessors in that it does not focus simply on IT leadership (*CIOs*) but also on non-CIO managers (*managers*) and nonmanagerial staff (*staff*).<sup>2</sup> In this way, the scope of this research project is broadly inclusive of the entire higher education IT workforce.

In our sample, respondents self-reported the distribution as follows: 246 (15%) are CIOs (or equivalent), 745 (47%) are managers or supervisors, and 601 (38%) are IT staff (see figure 1). Although this sample may not be representative of the composition of higher education IT, it does offer us enough statistical power to generalize and offer recommendations within those categories. To that end, we give a considerable amount of attention to this tripartite distinction along organizational lines.

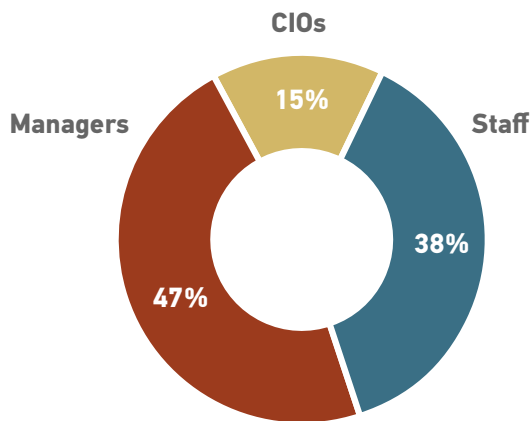


Figure 1. Organizational level of respondents to the workforce survey

## Gender

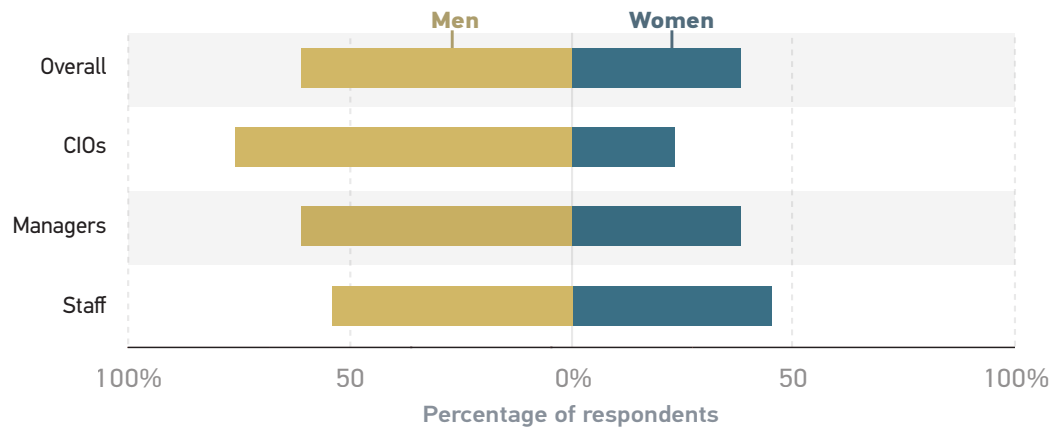
In the United States, women make up 50.9% of the population and men make up 49.1%.<sup>3</sup> In many ways, however, this is where equity for men and women ends. Women continue to find themselves politically, socially, and economically unequal to men nearly five decades after the passage of the Equal Rights Amendment (ERA)<sup>4</sup> and almost a quarter of a century after the Fourth World Conference on Women issued the Beijing Declaration:

- Women are paid only 80% of what men are paid for the same work.<sup>5</sup>
- Women pay more for common household items than men (a.k.a. the Pink Tax).
- Women hold only 24% of the 535 seats in Congress.<sup>6</sup>
- Women are outnumbered by men in the news media, producing only 37% of the content and reporting on only 25% of stories.<sup>7</sup>
- Women are CEOs of only 24 (4.8%) of the Fortune 500 companies and only 25 (5%) of the Standard & Poor's 500 companies.<sup>8</sup>
- Women constitute only 29% of the overall elite tech sector workforce.<sup>9</sup>
- Women make up only 26% of the computing workforce.<sup>10</sup>

And, unfortunately, this imbalance persists in the field of higher education IT.

The percentage of women in higher education IT in 2018 lags behind official US Department of Labor statistics that show women constituting 43% of the overall full-time workforce.<sup>11</sup> In our 2018 sample, women made up only 38% of the overall higher education IT workforce (see figure 2), a percentage that is similar to our samples in previous years. Broken down by organizational level, however, the percentage of female managers is now at 38%, representing a 25% increase in the past two years. The proportion of female staff has increased from 40% in 2016 to 45%. The gains experienced by women in IT managerial and staff positions are offset somewhat by a decrease in the number of women holding CIO positions: 23% in 2018 versus 27% in 2016. The numbers of women in the IT workforce we identified surpass the 26% in the computing workforce identified by the American Association of University Women (AAUW) in 2015,<sup>12</sup> the 27% of computing and information systems managers noted by the Bureau of Labor Statistics,<sup>13</sup> and the aforementioned 29% among elite tech sector companies. Despite these relative gains and the somewhat favorable comparisons, considerable work remains to promote gender equity in higher education IT.





**Figure 2. Percentage of men and women in each organizational level**

The AAUW has published the *Playbook on Best Practices* for promoting gender equity in the IT world.<sup>14</sup> Drawing on research and practice, the *Playbook* provides “a set of specific strategies and actions that have been shown to measurably increase the representation of women in the engineering and computing professions.” Generally, the three broad sets of strategies (under each of which are more specific, detail-oriented approaches) include the following:

- Supporting an inclusive talent pipeline by changing the culture, stereotypes, and perception of technology careers
- Building equity into the culture and process of recruiting talent—for example, “using neutral language in job postings, conducting blind interviews, using panels, and having objective criteria for deciding whom to hire”
- Creating and sustaining a culture that supports the success of everyone—for example, “having high-level leaders prioritizing gender equity, defining and measuring specific goals toward gender equity, providing professional development, and addressing implicit biases”<sup>15</sup>

The strategies in the AAUW *Playbook* could be very useful for addressing gender inequity in the higher education IT workforce.

### Age and Generation

Based on the data we collected, the higher education IT workforce is getting older. In 2018, the median age of higher education IT employees was 50, exactly two years more than when we reported on it two years ago. And, the typical employee continues to be older (by about eight years) than the typical US worker.<sup>16</sup> Employees' ages vary, of course, reflecting an increase in age as one moves up the organizational ladder (see figure 3). CIOs are, on average, the oldest group of IT employees, with a median age of 54. None of the CIOs in our sample was under 30—the middle 50% of CIOs were 47 to 59. The age distribution of IT managers looks remarkably similar to that of higher education IT employees overall. The typical manager is 50, and the middle half of all managers are 42 to 56; the under-30 manager is a rare commodity, representing only 1% of the managers in our sample. Higher education IT staff are the youngest group, but their age has increased more than that of CIOs or managers in the same period. Only 6% of higher education IT staff are younger than 30, and the median staff age has increased by four years, to 47.

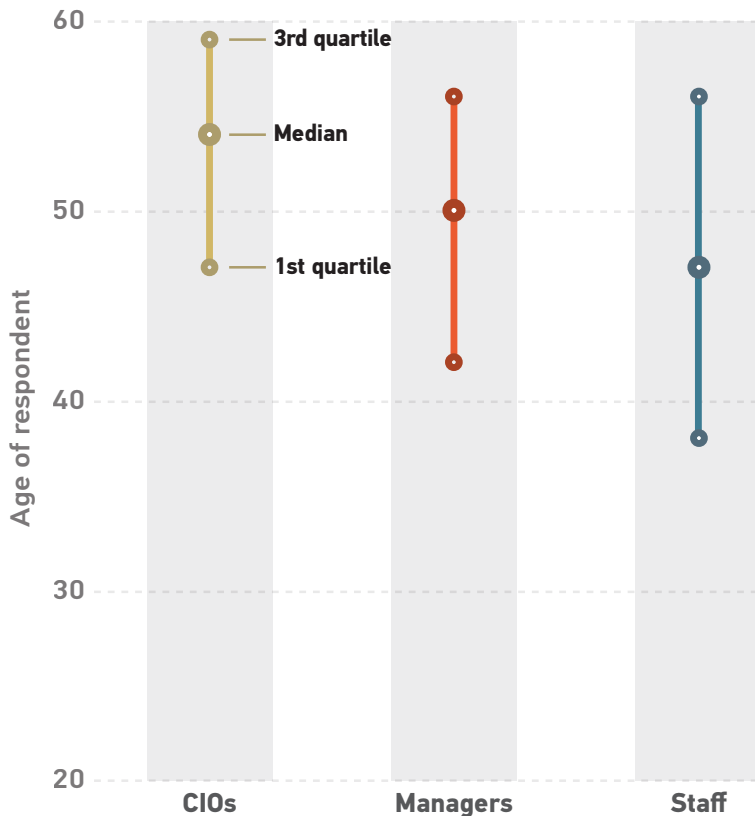
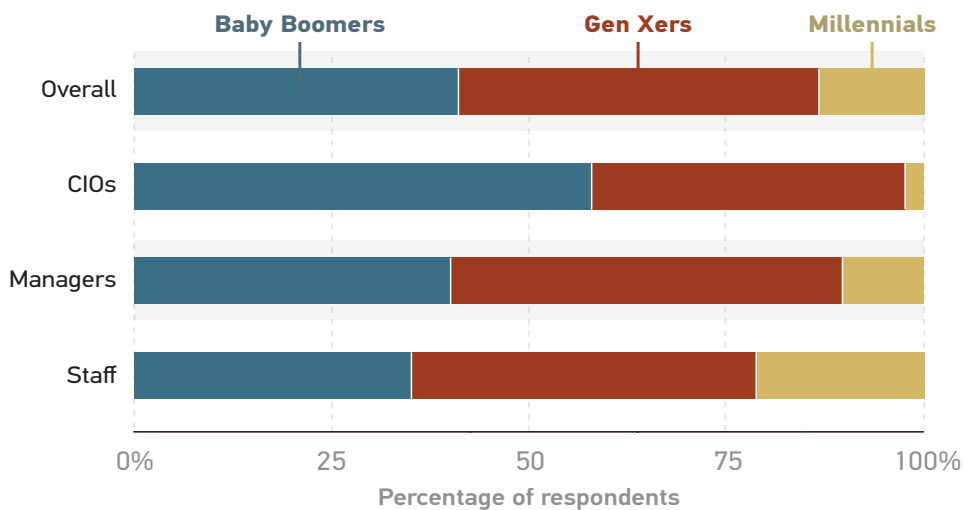


Figure 3. Age ranges of IT professionals

Grouping the IT workforce by generation<sup>17</sup> reinforces the findings above: older employees (Boomers and Gen Xers) are more likely to be CIOs and managers than younger (Millennials) higher education IT workers (see figure 4). It also helps to hammer home the additional and concerning findings that the higher education IT workforce is 1) atypical of the general population and 2) not getting any younger. First, the generational distribution of higher education IT employees looks nothing like that of the rest of the US labor force. According to a 2018 Pew Research Center study, Millennials are now the largest generation in the workforce, constituting 35% of the labor pool. They are followed closely by Gen Xers (33%) and more distantly by Baby Boomers (25%).<sup>18</sup> Baby Boomers and Gen Xers are overrepresented in the higher education context, while Millennials are underrepresented by a factor of two-thirds.



**Figure 4. Generational distribution in each organizational level**

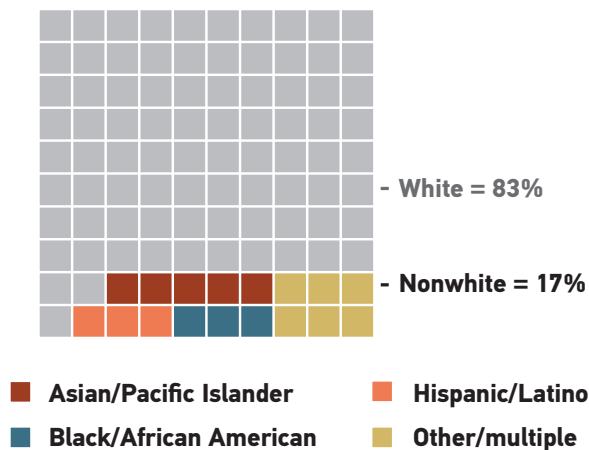
Similar stability in generational stratification persists for the CIO and managerial levels. However, staff age level has increased significantly. The proportion of Baby Boomers among higher education IT staff positions increased by five percentage points since 2016, while the percentage of Gen Xers fell by five points and the percentage of Millennial staff remained unchanged. It is entirely possible that our survey undersampled, and thereby underrepresents, Millennials in our data set. If this is the case, our concerns about generational replacement may be somewhat mitigated; if, however, our data reasonably represent the generational composition of the higher education IT workforce, the implications for workforce maintenance—much less growth—going forward are potentially serious.

Why might Millennials not be entering the IT workforce at colleges and universities? We cannot know the answer for certain, but one strong contender may be that private sector IT employers may simply have deeper pockets than higher education institutions. Although all generations ranked “quality of life” as their top factor in keeping them at their respective institutions, Millennials were significantly more likely than Gen Xers (by 9%) and Baby Boomers (by 17%) to say that monetary compensation was very or extremely important. This finding dovetails with a recent report by Deloitte on Millennials in the workplace that found that pay was the top priority when considering an employer.<sup>19</sup> That same study also provides additional insights into what Millennials are looking for when selecting employers: quality of life and salary may attract Millennials into positions, but they stay for employers’ commitments to diversity and flexible working conditions.

In an era of shrinking budgets for higher education and clear salary limits based on human resources (HR) job classifications, it may remain difficult to initially attract Millennial talent. Understanding what may attract and retain Millennials is a good first step toward addressing generational replacement.<sup>20</sup> We already know, for example, that some Millennials are souring on private sector businesses, with fewer saying they believe business leaders are committed to helping improve society and more saying they believe the sole ambition of businesses is to make money. As a result, higher education IT organizations may be able to take advantage of this disaffection by focusing on how colleges and universities help improve society, do more than seek revenue, and look out for society’s interests. Additionally, IT organizations that cannot work with HR to transcend more traditional models of employment to accommodate telecommuting, remote working, and flexible hours options may also be at a disadvantage in recruiting and retaining younger staff. Implementing new and innovative approaches to developing and maintaining their workforces by focusing on creating flexible working conditions and promoting diversity and generational equity in the workplace may put higher education IT organizations in a better position to address the inevitable challenges of generational replacement.

## **Ethnicity**

Our survey found that the overall higher education IT workforce remains predominantly white (83%) (see figure 5), a percentage that considerably exceeds that of the US labor force (78%)<sup>21</sup> and the larger civilian IT labor force (70%).<sup>22</sup> Modest improvements in the ethnic diversification of the higher education IT workforce are continuing, but this trend is comparatively slower for managerial and CIO-level positions than for staff (see table 1).



**Figure 5. Breakdown of IT professionals by ethnicity**

**Table 1. Percentages of nonwhite higher education IT professionals, 2010–18**

	2010	2014 <sup>23</sup>	2016 <sup>24</sup>	2018
<b>CIOs</b>	4%	13%	15%	16%
<b>Managers</b>	8%	13%	15%	16%
<b>Staff</b>	10%	12%	15%	18%

Although a technical degree is not necessarily a requirement for IT roles, computer science education may serve as a useful proxy to gauge the ethnic disparities we observe. The percentage of whites among computer science majors dropped from 83% in 1992 to 62% in 2016, while the percentage of minority computer science majors increased,<sup>25</sup> suggesting a decrease in racial/ethnic disparities among these majors. Moreover, the percentage of potential IT employees (based on degrees earned in the field) suggests that the ethnic disparity in the higher education IT workforce should be less than it is. White students accounted for only 53% of information technology degrees awarded in 2016; comparatively, black students earned 15% of IT degrees, Hispanic students earned 13%, and Asian students earned 9% of the same degrees.<sup>26</sup> Put simply, higher education IT can do better when it comes to the recruitment, retention, and promotion of ethnic minorities. The \$64,000 question is, of course, “How?”

The solution to the problem of minority underrepresentation in the higher education IT workforce depends largely on the source(s) of the problem. We may see fewer minorities working in higher education IT due to structural constraints. For example, the socioeconomic status of minority populations may limit opportunities for early (K–12) access to computing resources to develop

the skills for and interest in entering the field of information technology. Or, and possibly relatedly, there may not be a large enough pool of minorities in the local labor force with the technical skills required to work in higher education IT. Neither of these explanations is, however, satisfactory. In the case of the former, we have already noted that larger numbers of minorities are majoring in and graduating with degrees in computer science despite structural disadvantages they may have had growing up. In the case of the latter, minority underrepresentation in IT professions persists even in areas (metropolitan) where minority populations are sizable.<sup>27</sup> Another source of minority underrepresentation in higher education IT may be institutional procedures related to hiring, retention, and promotion. There are any number of ways in which bias can be introduced into the hiring process, including where jobs are advertised, whether the language in job advertisements is inclusive (or exclusive), how candidates' resumes are screened and reviewed,<sup>28</sup> the manner in which interviews are conducted, and/or how salaries and benefits are negotiated.

Finally, the cultural sources of potential inequity in higher education IT may be the most difficult to overcome. A recent groundbreaking study by the Kapor Center for Social Impact (KCSI) on why people voluntarily leave jobs in the tech field appears to confirm that IT work environments can be toxic, "characterized by bullying, stereotyping, sexual harassment, and racial bias."<sup>29</sup> The "unfair treatment" identified as the single largest reason people leave the technology field is manifest in ways that disproportionately affect minority employees and women. For example:

- Men of color were more likely to leave due to unfairness (40%).
- Men and women of color were twice as likely as white or Asian men and women (25%) to have experienced stereotyping.
- Women of color were passed over for promotion more than any other group (almost 33%).<sup>30</sup>

Those experiencing unfairness, stereotyping, and/or bullying were more likely to leave and/or stay employed at their jobs for shorter periods of time.

While difficult to address, this culture can be improved by implementing changes to institutions, processes, and practices.<sup>31</sup> When it comes to recruiting minority candidates, for example, higher education IT organizations can take these steps:

- Advertise positions more broadly and move beyond known networks to recruit.
- Demonstrate explicitly their (and the institution's) commitment to diversity.
- Review candidates' resumes or CVs blindly (i.e., without names or other identifiers).

- Maximize the number of individuals who interview candidates to reduce the impact of any single individual.
- Develop a mechanism that allows for anonymous candidate reviews and interrater reliability to be assessed.
- Extend the same offer package to all candidates.

In addition to these basic alterations to the recruitment process, the difficult work of changing individual and aggregated attitudes, beliefs, and behaviors may require more long-term efforts. In their report on “tech leavers,” the KCSI researchers recommended the following:

- Implement comprehensive diversity and inclusion strategies that have unconditional support from organizational leadership and assess the impact of those strategies.
- Create inclusive cultures based on a set of core values, establish a code of conduct, and continuously evaluate the workplace culture.
- Develop effective and fair management processes that include auditing performance evaluation and compensation practices for potential biases and implementing management training and bias-mitigating strategies.

These approaches are resource intensive, and it may take some time to reap the benefits. However, such efforts are more likely to have a lasting impact than issuing a string of diversity reports lacking initiatives to act upon their findings<sup>32</sup> or hiring an executive-level chief diversity officer.<sup>33</sup>

## Sexual Orientation

For the first time since beginning our workforce research in 2010, we collected data on the sexual orientation of higher education IT employees. Doing so allows us to better understand and be responsive to the experiences and needs of these individuals. Even if we do not work with or are not aware that we work with people who are LGBTQ,<sup>34</sup> we hope that our efforts make IT employees cognizant of their presence in the broader higher education IT community.

Despite the fact that general IT culture has been demonstrated to be somewhat hostile to members of the LGBTQ community,<sup>35</sup> the percentage of LGBTQ higher education IT employees is practically twice that of the general population. Among our survey respondents in 2018, 5% self-identified as gay, 3% as bisexual, 1% as queer, and another 1% as another sexual orientation. The remaining 91% of the population self-identified as straight.<sup>36</sup> According to a recent Gallup report, 4.5% of US adults self-identified as LGBT in 2017.<sup>37</sup> This percentage has been steadily increasing since tracking began in 2012, when 3.5% self-identified as such. Why this percentage is greater in higher education IT is up for speculation:

perhaps colleges and universities are inherently more attractive to those who are LGBQ given their broader commitment to diversity of thought, creed, and demography, or perhaps higher education IT departments are comparatively less hostile to LGBQ employees than the tech sector studied by KCSI.<sup>38</sup> This may be more likely given that only 4% of LGBQ respondents (compared with 9% of those who identified as straight) said their next job will be outside higher education. Regardless, given that legal protection for sexual orientation varies considerably by state, there is ample opportunity for discrimination, bullying, and harassment to erupt unchecked even on college campuses. Understanding that nearly 10% (or more, if this information is disclosed) of your workforce may belong to the LGBQ community will hopefully elicit proactive measures within IT units to promote respect for everyone in the workplace, leading to increased productivity, retention, and collaboration.

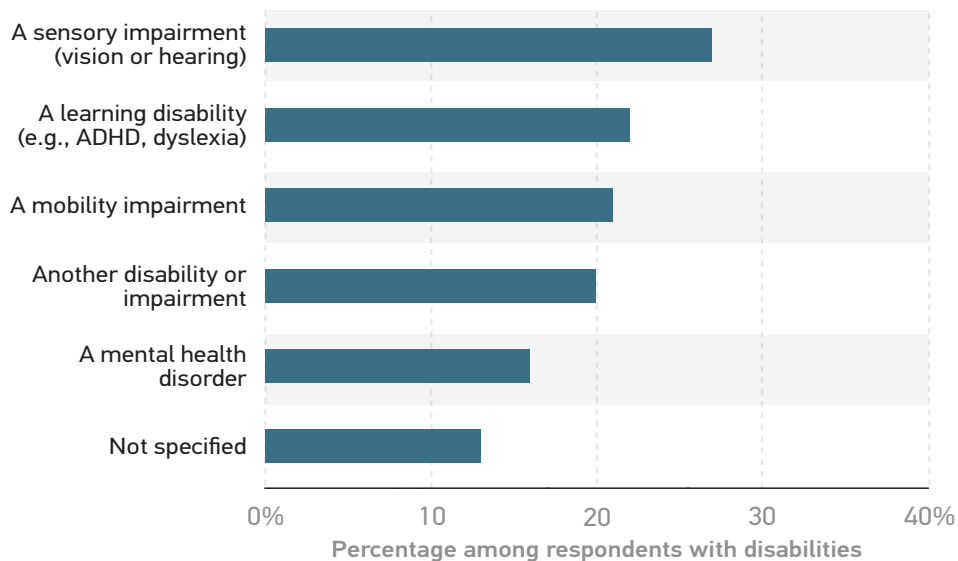
## **Disabilities**

With our increased focus on issues related to diversity, equity, and inclusion, we also collected data for the first time about the disability status of IT professionals. About 8% of the higher education IT workforce reported having been diagnosed with a disability or impairment, a percentage that is less than half of the 19% of the 2017 employment rate reported by the US Bureau of Labor Statistics.<sup>39</sup> Within our survey sample, 27% have a sensory impairment (vision or hearing), 22% have a learning disability (e.g., ADHD, dyslexia), 21% have a mobility impairment, and 16% have a mental health disorder<sup>40</sup> (see figure 6). Twenty percent have another disability or impairment, and 15% reported having some combination of two or more of these disabilities or impairments. Also of note is that 10% of respondents declined to tell us whether they have a disability or an impairment, which puts us at risk of underreporting the overall percentage.

The number of our colleagues who live with disabilities and impairments is substantial, regardless of whether they choose to disclose them or whether we know of them. Providing accommodations to those who require them to perform their work is not merely a moral or ethical issue—it is a legal one. The Americans with Disabilities Act requires that employers make reasonable workplace accommodations, and those who fail to do so run the risk of litigation. While institutional failure to provide the necessary accommodations when disabilities are disclosed is unacceptable, some individuals choose not to disclose their disability out of fear of discrimination.<sup>41</sup> Therefore, institutions may never be aware of an employee's specific needs. This lack of disclosure may be one of the reasons the unemployment rate for people with disabilities (9.2% in 2017) is more than two times that of those without disabilities.<sup>42</sup> Unfortunately, many higher education institutions continue to fail at meeting the accessibility requirements for their employees, especially for basic accommodations such as



the provision of accessible websites and electronic and information technology (EIT) procurement.<sup>43</sup> How then might higher education IT organizations create an environment that is both welcoming and responsive to the needs of those with disabilities?



**Figure 6. Higher education IT employees reporting various disabilities or impairments**

For this to happen, higher education IT has to establish and maintain an inclusive and equitable culture for those with disabilities or impairments. Fortunately, a considerable number of resources are available to help organizations develop such a culture. The Employee Assistance and Resource Network (EARN) on Disability Inclusion has developed and published “[A Framework for Building a Disability-Inclusive Organization](#)” that includes tips and advice for everything from building the pipeline and recruiting, to providing reasonable accommodations, to having accessible information and communication technologies. The US Department of Labor<sup>44</sup> and the Job Accommodation Network’s *JAN Workplace Accommodation Toolkit* are just two of many additional resources that might prove valuable in the hiring of individuals with disabilities.

## The State of Hiring in Higher Education IT

Assessing whether hiring freezes are occurring, whether new positions are being created and filled, and whether staff are being retained or let go gives insight into the state of higher education IT departments in terms of their capacity to maintain their services or implement new campus-wide projects. But IT departments do not work in isolation to fill their ranks: they must rely on their institution's HR department to aid them in finding and retaining the talent necessary to achieve their aims and contribute to their institution's overall objectives.

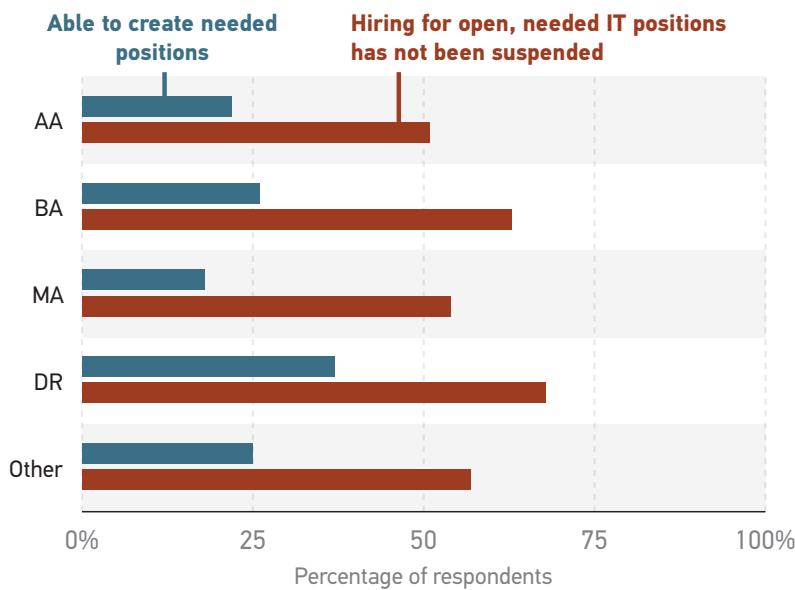
### Central IT Hiring

From 2016 to 2017 the number of overall higher education jobs increased, denoting the largest climb since 2012.<sup>45</sup> Even though there was a decline in 2016 of about 8,000 jobs, the 2017 growth in positions affirmed that higher education is hiring. Although the gains in 2017 were modest—0.6% more jobs, or 24,200 positions—they reflect what CIOs and managers told us regarding hiring: that they were able to fill needed positions (good news!) but were still not able to create important new IT positions that would meet their departments' needs (not-so-good news). Sixty-two percent said that their institution had not suspended hiring for open, needed IT positions. But, reflecting trends we observed in 2014 and 2016, a little more than half of CIOs and managers told us they were unable to create needed IT positions.

DR institutions more frequently reported they were able to create needed positions and hire for open positions (see figure 7). A strong majority of AA (67%), BA (64%), and MA (66%) institutions agreed or strongly agreed that they were unable to create positions. Similarly, more AA (35%) and MA private (33%) institutions reported that hiring had been suspended. However, only 19% of CIOs and managers at DR institutions told us that hiring for open positions had been suspended.

Institutions with fewer than 2,000 FTE students most frequently reported (66%) not being able to fill open, needed positions, and more than half of institutions with FTE of 15,000 or fewer reported they were not able to generate positions. However, for schools with FTE greater than 15,000, only 46% reported they were unable to develop needed IT positions, which may reflect the greater ability of larger institutions to create and hire for new jobs and hire for open IT slots than those with less capacity. However, these findings still reflect that nearly half of larger institutions cannot create needed IT jobs.

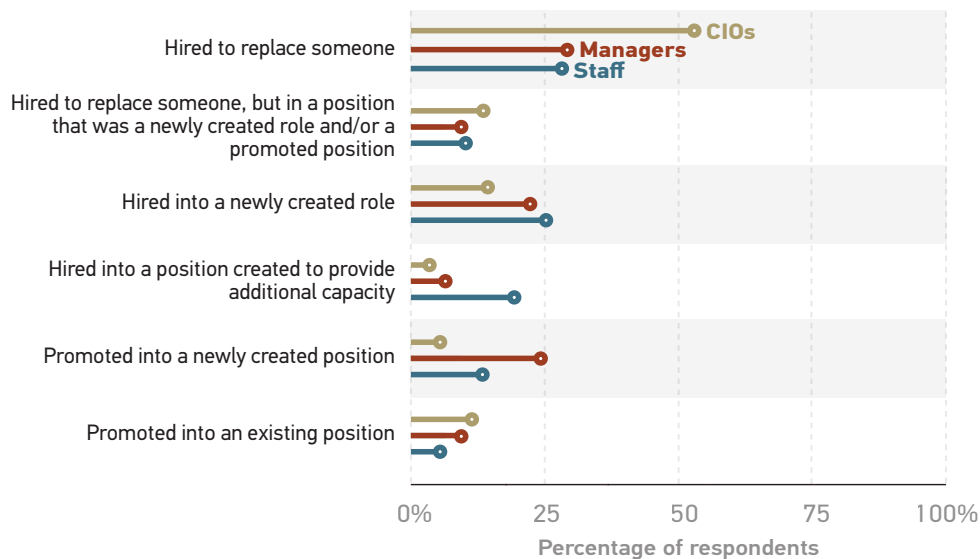
Capacity to hire new staff is an important component of the decision-making process for implementing technology-enhanced initiatives on campus, such as increasing the availability of blended learning environments.<sup>46</sup> Without additional staff resources, early adoption of technology to implement innovative projects that advance institutional strategic priorities may be limited in scope.



**Figure 7. The state of hiring in higher education IT**

### How Higher Education IT Positions Are Created

Our 2018 data suggest that while fewer people have jobs that were newly developed in the workforce, some institutions are leveraging their existing managerial talent by hiring and promoting from within. Twenty-eight percent of managers said their positions were new or added for capacity, and more managers than CIOs and staff reported they were promoted into new positions. Two-fifths of staff (18%) said their jobs were developed for additional support or they were hired into a new role (24%), and 14% of CIOs told us they were hired into a new position (see figure 8). Internal hiring and promotion can help some employees advance through the career pipeline while also benefiting the organization itself. Research has shown that in addition to saving the time and money it takes to recruit outside talent, promoting employees internally results in better performance evaluations, with employees staying in their positions longer than external hires.<sup>47</sup> But lower-level positions vacated as a result of internal hiring and promoting may go unfilled and contribute to understaffing. Given the data from the current study that point to insufficient staff and financial resources as obstacles to job effectiveness, it may be that some institutions are also hiring and promoting from within out of necessity due to skilled-labor shortages, particularly in the United States.<sup>48</sup>



**Figure 8. Reasons IT professionals were hired or promoted**

### Positions Eliminated, Positions Added

Let’s just get to the not-so-great news and rip off the Band-Aid quickly: overall, a little more than a third (35%) of CIOs reported positions had been eliminated from their central IT last year. Attrition was the most frequent reason offered for eliminating positions. Carnegie class and institution size matter when it comes to hiring and positions eliminated. Doctoral institutions had more FTE positions eliminated due to attrition and layoffs than other Carnegie classes, and medium-sized institutions (8,000–14,999 FTE) more frequently reported repurposing of staff as a reason for eliminating positions (a more positive finding). This is a useful strategy for resource-constrained IT departments that may lack the capacity to hire for new positions but may be able to collapse multiple positions into fewer ones and retrain or redirect staff. For example, this has been identified as a strategy for rapidly implementing a higher education institution’s comprehensive security program when the hiring for such projects is a nonstarter for IT administrators.<sup>49</sup> So repurposing may not be negative news for these institutions, and it may also reflect strategic decisions aimed at shoring up limited resources.

Although broader trends in higher education reflect overall increases in hiring,<sup>50</sup> over half (62%) of CIOs and managers told us that they did not add any FTE positions to central IT in the past year.<sup>51</sup> Of the CIOs and managers who reported adding positions, 32% told us that they added five or fewer positions, and the most frequently added number of positions was one. Although this may seem like a minimal change, adding one staff in a small IT department can represent

a significant increase in capacity. As with other hiring issues, size and Carnegie class matter. Institutions with larger central IT units<sup>52</sup> most frequently reported that two positions had been added and that more FTE positions were added in the past year,<sup>53</sup> compared with smaller central IT units. Doctoral institutions added more positions than other types of institution, with private doctoral and public doctoral institutions adding, on average, eight and seven positions respectively. Conversely, BA and AA institutions added fewer positions than other Carnegie classes. This broadly reflects larger trends in higher education, wherein differences are observed in job postings and positions by type of institution, with community colleges showing decreases in job postings.<sup>54</sup>

When IT departments did hire staff, which positions were added? IT positions that are critical to creating and maintaining IT infrastructure (e.g., systems administrator) or positions that are necessary to security were reported most. This suggests that even for institutions with limited resources, hiring is prioritized to ensure that core staff are in place to meet the IT department's objectives. For FTE positions added in the past year, CIOs and managers told us in open-ended responses that the most frequently added positions by title (in descending order) were:

- Systems administrator
- Project manager
- Programmer
- Network engineer
- Network administrator
- Business analyst

These positions accounted for nearly a quarter of positions added in the past year.<sup>55</sup>

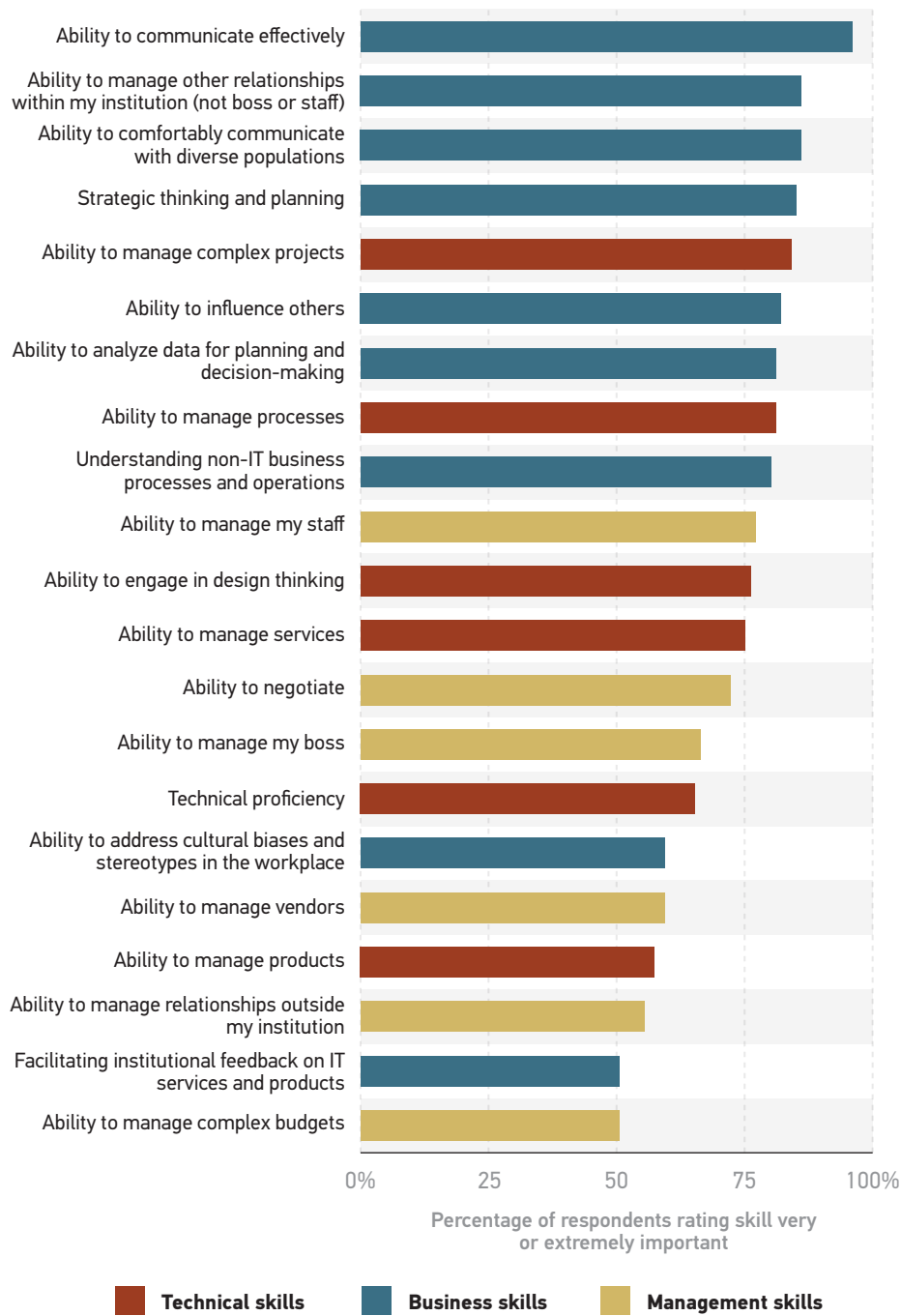
The highest number of added positions by category were within network administration and security.<sup>56</sup> Of note here is that information security continues to be identified by EDUCAUSE as the top IT issue, and trends observed here reflect a prioritization of hiring for security positions. This was followed (in descending order) by systems-related positions, such as systems engineer, systems administrator, or systems manager; business analysis/intelligence; technical support/help desk; and managerial positions, including C-level positions.<sup>57</sup> Adding business intelligence (BI)/business analyst positions aligns with the IT issues identified for 2018: using BI and analytics to improve institutional processes. So hiring, when it occurs, is being done strategically, to meet an institution's prioritized needs.

## Skills Needed and How to Get Them

Professionals in higher education IT cannot rely on technical skills alone. We identified the skills they need for success, as well as the professional development activities respondents identified as contributing most to their growth in their current position. While technical skills are certainly crucial for employment, respondents told us that a host of other skills are necessary to be successful CIOs, managers, or staff in higher education IT. Respondents indicated that being able to communicate effectively and to collaborate with others beyond their supervisors and/or staff—from peers with equal positions to faculty and students—are essential components of successful job performance. Sustaining job performance and employee passion for the work is also dependent on strengthening an employee’s current skills, facilitating the acquisition of new skills, and identifying areas of professional development.

### Important Skills

Business skills were at the top of the list, as they were in 2016 when we asked participants to rate how important different kinds of technical, management, and business skills were to their job success (see figure 9). Effective communication was ranked the highest (very or extremely important among 97% of respondents) for all organizational levels, and this was consistent across Carnegie class, enrollment size, and ethnicity. The ability to manage other relationships within the institution—other than those between boss and staff—was also rated highly. Although more managers and CIOs than staff said this skill was important, likely due to their supervisory duties, over three-quarters of staff also rated managing inside relationships as key to their professional success. These results align with previous ECAR data about the growing need for managing relationships, communication, and soft skills for successful IT service delivery in higher education,<sup>58</sup> as well as with broader private sector research on the importance and value of soft skills over technical expertise.<sup>59</sup>



**Figure 9. Importance of various professional skills for success**

This year we also asked respondents about the importance of being able to comfortably communicate with diverse populations. CIOs (92%), managers (89%), and staff (82%) all ranked this near the top as important to performing

their jobs well. This suggests IT professionals at all levels are recognizing that working with individuals from various backgrounds and cultures is a valuable skill; it may also be a result of shifting student demographics<sup>60</sup> and increases over the past decade in international student enrollments.<sup>61</sup> (This is especially salient when we consider that the higher education IT workforce is predominantly male and white.) This year we also asked for the first time about the technical skill of engaging in design thinking, and three-quarters of respondents said this was, in fact, valuable, which signals that IT professionals are acknowledging that human-centered design practices<sup>62</sup> are important to their success. As we would anticipate, strategic thinking and planning skills were also highly rated, with almost all managers (92%) and CIOs (96%) and three-quarters of staff ranking it as very or extremely important. As with our 2016 results, abilities assessed as important also aligned with job-level responsibilities. For example, CIOs and managers ranked the ability to manage staff toward the top, while technical proficiency was more important to staff than it was to managers and CIOs.

## **Professional Development**

Professional development opportunities contribute to individual growth and also to a stable IT workforce. Higher education IT staff who have professional development opportunities are more likely to report they are satisfied with their jobs and intend to stay at their current position.<sup>63</sup> Higher education IT employees also perceive a positive return on investment once they've engaged in development opportunities. These findings can ideally be used to help CIOs, managers, and staff identify what may contribute most to their professional development and prioritize opportunities that may be offered through their institution or professional associations.

We asked CIOs, managers, and staff to rate the contribution of various activities to their professional growth, regardless of whether they had completed them (see table 2).<sup>64</sup> This year, we added an item about analyzing data to inform strategic decisions, and all organizational levels told us that this activity had the highest contribution to their professional growth. These trends are promising, given the need for CIOs to leverage analytics in their institutions to assess and implement strategies that foster growth, operations, outcomes, and innovation.<sup>65</sup> This also suggests that managers and staff have buy-in to an institutional culture that prioritizes data-driven decision-making.



**Table 2. Importance of development activities for professional growth, by organizational level (more important activities listed first)**

CIOs	Managers	Staff
<ul style="list-style-type: none"> <li>• Analyzing data to help inform strategic decisions</li> <li>• Attending a conference focused on higher education IT</li> <li>• Engaging in informal peer networking</li> <li>• Serving on a professional working group, task force, committee, or board</li> <li>• Obtaining advice from a mentor</li> <li>• Engaging in formal peer networking (as part of an organized group, consortium, etc.)</li> <li>• Participating in formal management/leadership development programs</li> <li>• Reading about current higher education news/developments</li> </ul>	<ul style="list-style-type: none"> <li>• Analyzing data to help inform strategic decisions</li> <li>• Attending a conference focused on higher education IT</li> <li>• Participating in formal management/leadership development programs</li> <li>• Obtaining advice from a mentor</li> <li>• Serving on a professional working group, task force, committee, or board</li> <li>• Completing a “stretch” assignment outside my role or outside my annual goals</li> <li>• Engaging in informal peer networking</li> <li>• Reading about current IT news/developments reports</li> <li>• Reading about current higher education news/developments</li> </ul>	<ul style="list-style-type: none"> <li>• Attending a conference focused on higher education IT</li> <li>• Analyzing data to help inform strategic decisions</li> <li>• Taking formal technical training classes</li> <li>• Obtaining advice from a mentor</li> <li>• Engaging in informal peer networking</li> <li>• Serving on a professional working group, task force, committee, or board</li> <li>• Reading about current IT news/developments reports</li> <li>• Completing a “stretch” assignment outside my role or outside my annual goals</li> <li>• Reading about current higher education news/developments</li> <li>• Participating in formal management/leadership development programs</li> <li>• Delivering a presentation at my institution</li> </ul>

Among respondents who told us that they had engaged in data analysis to inform strategic decisions in the past two years, 88% of CIOs, 84% of managers, and 73% of staff reported that it made a moderate or great contribution to professional growth in their current position. This return on investment in data analysis may also reflect the needs of CIOs and managers to make more data-informed arguments to institutional stakeholders and demonstrate positive results from leveraging institutional data to make decisions. Because staff also rated data analysis as important, managers should be cognizant that their staff need not just the experience but a meaningful experience in data analysis that significantly contributes to the larger IT department and institution and helps build the skills necessary for career advancement. This type of mentoring is needed if IT departments seek to build staff capacity to take on more responsibilities or lead projects on their own.<sup>66</sup>

This assessment of data analysis is also good news. Ideally, data analysis should be an activity within the context of data analytics, which seeks to increase the value of institutional data by leveraging it to identify trends, optimize processes,

or take corrective measures within IT departments' strategic activities. Although process data are important (e.g., how many help desk calls were fielded), analytics seeks to predict the when and why of trends.<sup>67</sup>

After attending a conference focused on higher education IT in the past two years, 85% of CIOs, 83% of managers, and 76% of staff told us this activity moderately or greatly contributed to their professional development. Conferences are certainly about gathering information on the latest developments in the field, but networking and attending workshops are also objectives that could increase career development opportunities for all organizational levels.

These findings broadly tell us about professional development for CIOs, managers, and staff:

- Analyzing data for strategic decisions should be a priority development activity for CIOs, managers, and staff. Managers should ensure that any data analysis tasks for staff have high impact and should offer opportunities for growth in their current position and not simply serve to “check a box” in a yearly performance review.
- Attending higher education IT conferences should be a priority for all three organizational levels. Managers should mentor staff in identifying relevant conferences to attend and help them determine how best to maximize their time to ensure that attendance and participation contribute to professional growth.

By prioritizing these professional development activities while taking into account individual needs, higher education IT CIOs, managers, and staff can engage in activities that will likely result in increased professional growth and, we hope, satisfaction within their current positions.

## Retention

This year, we observed a tension between what employees tell us keeps them at their jobs and what CIOs and managers think they need to do to retain their employees. On the one hand, employees cited factors related to well-being and work/life balance as critical for keeping them at a job. On the other hand, obstacles to employee effectiveness and factors CIOs and managers ranked as most important to maintaining their workforce are both related to human and financial resources, which are very traditional concerns.

### What Employees Say Is Important for Retention

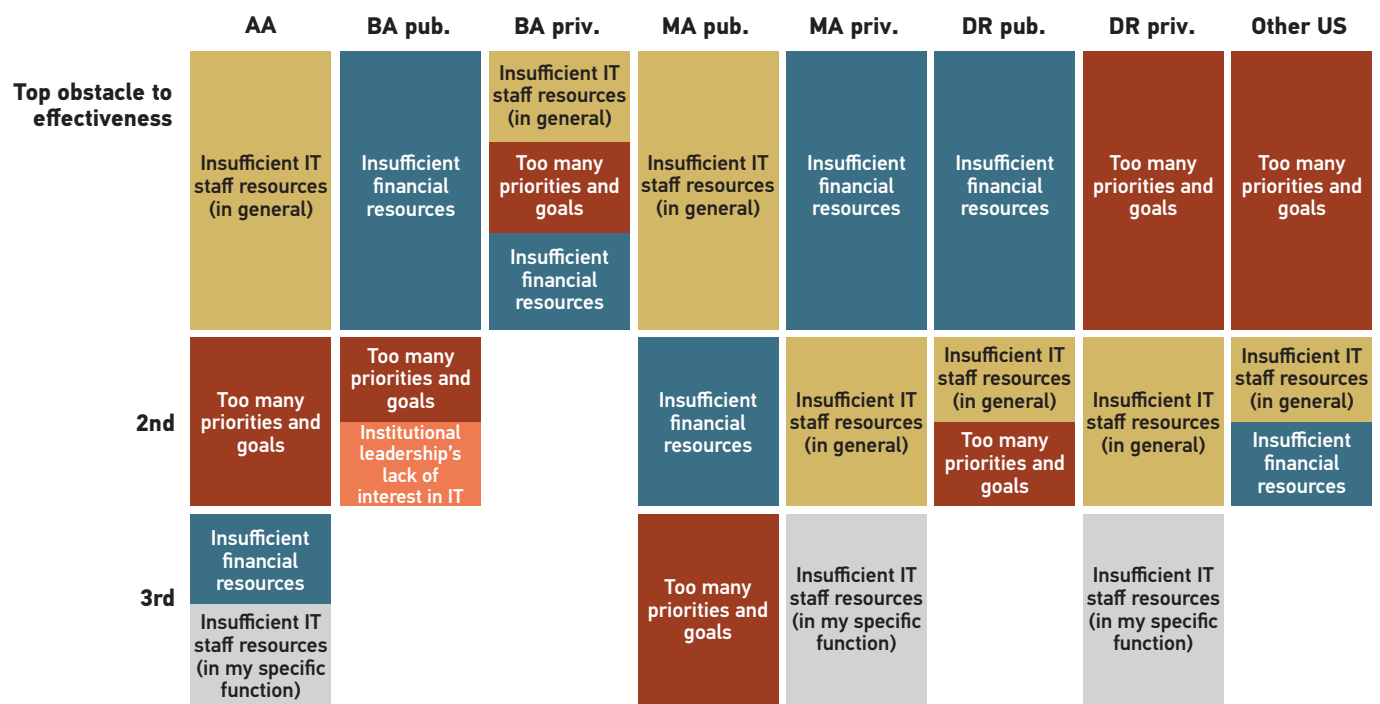
A competitive salary and good benefits are often thought of as the most important features that organizations use to recruit talent, but what factors are the most important to retaining IT professionals in higher education? The nature of work has changed considerably in the 21st century, and it stands to reason that the job factors employees value may be changing as well. To better understand employee retention, we asked IT professionals to rate how important different factors are at keeping them at an institution. As they were in 2016, factors related to overall well-being were rated as most important, with “quality of life” and “work environment” at the top (see figure 10). When looking by demographics, men, women, Gen Xers, and Millennials rated quality of life highest. Staff and managers rated this factor first, followed by work environment, and CIOs said work environment was only slightly more important than quality of life. While a competitive salary can be critical to attracting the most skilled or experienced candidates, our respondents rated monetary compensation in the middle of the pack as a reason for keeping them where they are. While quality of life is subjective, it is commonly associated with aspects of physical and mental health and well-being.<sup>68</sup> So it seems that offering benefits, perks, and programs related to these areas can be helpful in retaining skilled employees.

	AA	BA pub.	BA priv.	MA pub.	MA priv.	DR pub.	DR priv.	Other US
Top factor for retention	Work environment	Quality of life	Work environment	Quality of life	Quality of life	Quality of life	Quality of life	Quality of life
2nd	Quality of life	Work environment	Quality of life	Work environment	Work environment	Work environment	Work environment	Occupational stability
3rd	Occupational stability	Occupational stability Opportunity to build my leadership skills	Occupational stability	Benefits My boss/leadership	Benefits	Benefits	Benefits	Benefits

Figure 10. Factors keeping respondents at their institutions

### What Employees Say Are Obstacles to Effectiveness

Participants were also asked to rate the extent to which certain circumstances, skills, and deficiencies were obstacles to their effectiveness in their current positions. Much as they told us when we asked about the skills needed to maintain an IT workforce, respondents most frequently cited general finances and human resources as playing a critical role in assessing their on-the-job effectiveness (see figure 11). CIOs, managers, and staff all rated “insufficient IT staff resources (in general)” as the number one major/critical obstacle to effective job performance, indicating that higher education IT may be feeling the labor shortages that other industries are experiencing.<sup>69</sup> In contrast, IT employees across organizational levels rated gaps in abilities and skills at the bottom, which is a trend that is holding from 2016.



**Figure 11. Obstacles to effectiveness in respondents’ current positions**

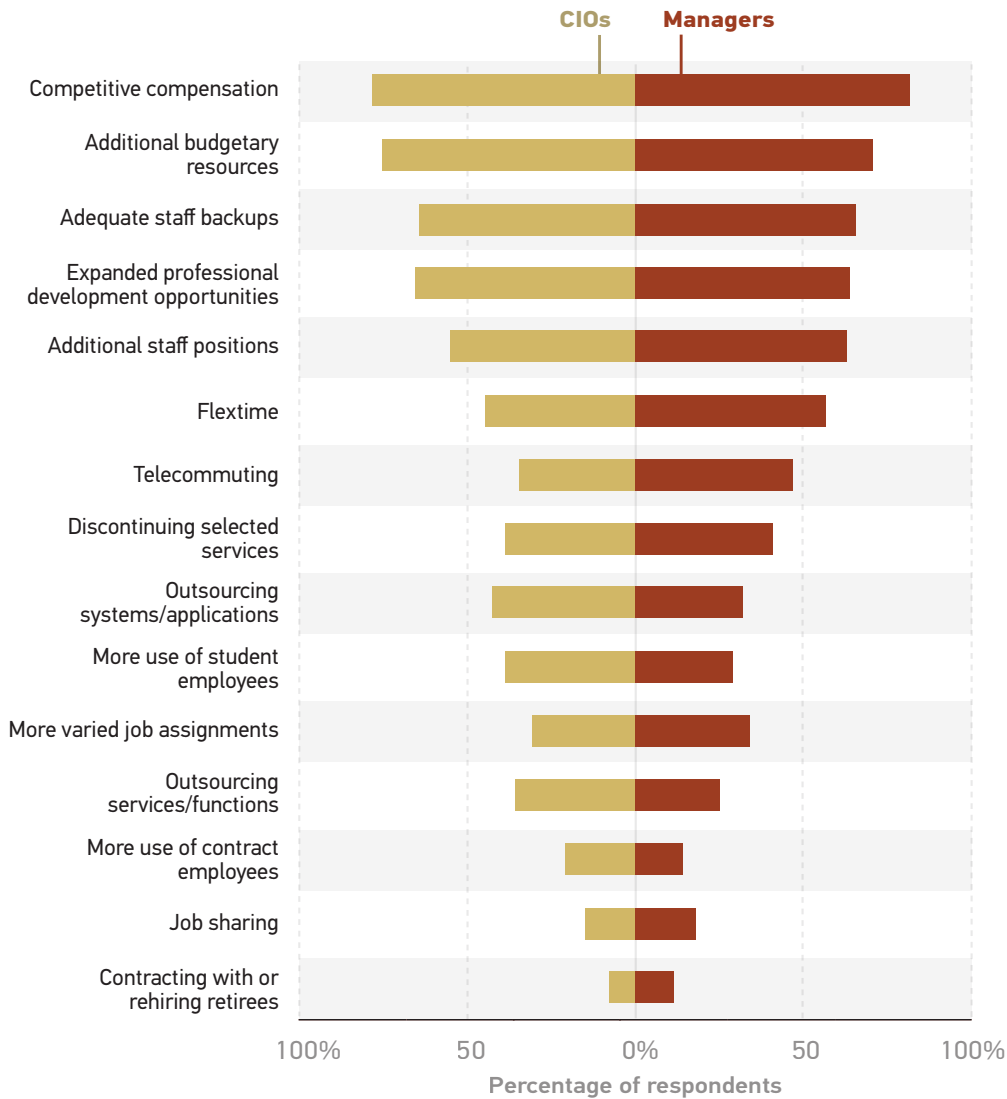
Given these financial and staffing issues, only slightly more than half of respondents (52%) said it was important to them to work in higher education rather than in another industry or area. However, nearly half of respondents said they would possibly (25%), probably (11%), or definitely (11%) look for employment opportunities outside their current institutions in the next year, which is a decrease of only two percentage points from 2016. These results

were similar across organizational levels and Carnegie class, which suggests institutions may experience issues retaining talent, especially in light of US economic growth and low unemployment rates that have resulted in the number of job openings outpacing the qualified labor pool in 2018.<sup>70</sup> These economic circumstances may be problematic for higher education IT, as recent research has forecast that talent shortages in technology will continue to grow globally over the next several years,<sup>71</sup> with deficits already being reported in information security<sup>72</sup> and software development.<sup>73</sup>

With respondents also reporting that the skills/positions in the shortest supply are those related to security, higher education IT should consider creative approaches to address retention issues. Work/life convenience benefits<sup>74</sup> that impact quality of life, such as flextime and telecommuting, are low-cost options that can help employees be more agile in balancing their job duties with personal responsibilities, especially if more competitive salaries aren't in the budget. Recent research suggests more-flexible working hours, vacation time, and at-home work options are highly desirable, second only to better health benefits, when considering a lower-paying job with better perks versus a position with a higher salary.<sup>75</sup> Creative approaches like these can also help IT units establish a more diverse workforce and contribute to gender equity, because flextime is highly valued by women<sup>76</sup> and can help reduce gender-related pay gaps, particularly for hourly employees.<sup>77</sup>

### **What CIOs and Managers Think Is Important for Retention**

CIOs and managers were also asked to rate the importance of various factors in maintaining an IT workforce to adequately meet the needs of their institutions in the next three years (see figure 12). As in 2016, the factors that ranked in the top five reflect the importance of sufficient financial and human resources. CIOs and managers agreed that competitive compensation and additional budgetary resources were the most important factors in meeting institutional needs. There seems to be a disconnect in this area between leadership and staff because those in leadership positions put compensation at the top, while staff rated salary below other factors such as quality of life in keeping them at an institution. Respondents rated additional staff positions in the top five; however, they also put using more contract employees and contracting/rehiring retirees at the bottom, which suggests that even though managers and CIOs believe having more staff is important, hiring contractors may not be considered a viable means of building capacity. More managers than CIOs told us flextime and telecommuting were important in maintaining their workforce; managers likely have closer working relationships with their staff than CIOs and therefore may have a greater sense of how more creative management options would meet the needs of their employees.



**Figure 12. Factors important to maintaining the IT workforce**

In open responses, participants also most frequently reported that positions/skills related to security were in the shortest supply at their institutions,<sup>78</sup> followed by management,<sup>79</sup> database administrators, developers, and network and system administrators. Given that information security was rated number one on the list of *Top 10 IT Issues, 2019* (and the three years prior), IT units should focus their efforts on hiring, training, and retaining talent in security-related areas to meet their institutional needs.

## The CIO and Managerial Pipelines

As the higher education IT workforce continues to age, we need to understand where talent comes from, how it moves from staff to managerial to executive roles, how experience is garnered, and how well educated it needs to be. In this section, we consider briefly the higher education IT pipeline with an eye to helping current and potential employees think about how they might navigate through the pipeline of these professions.

### Higher Education Grows Its Own

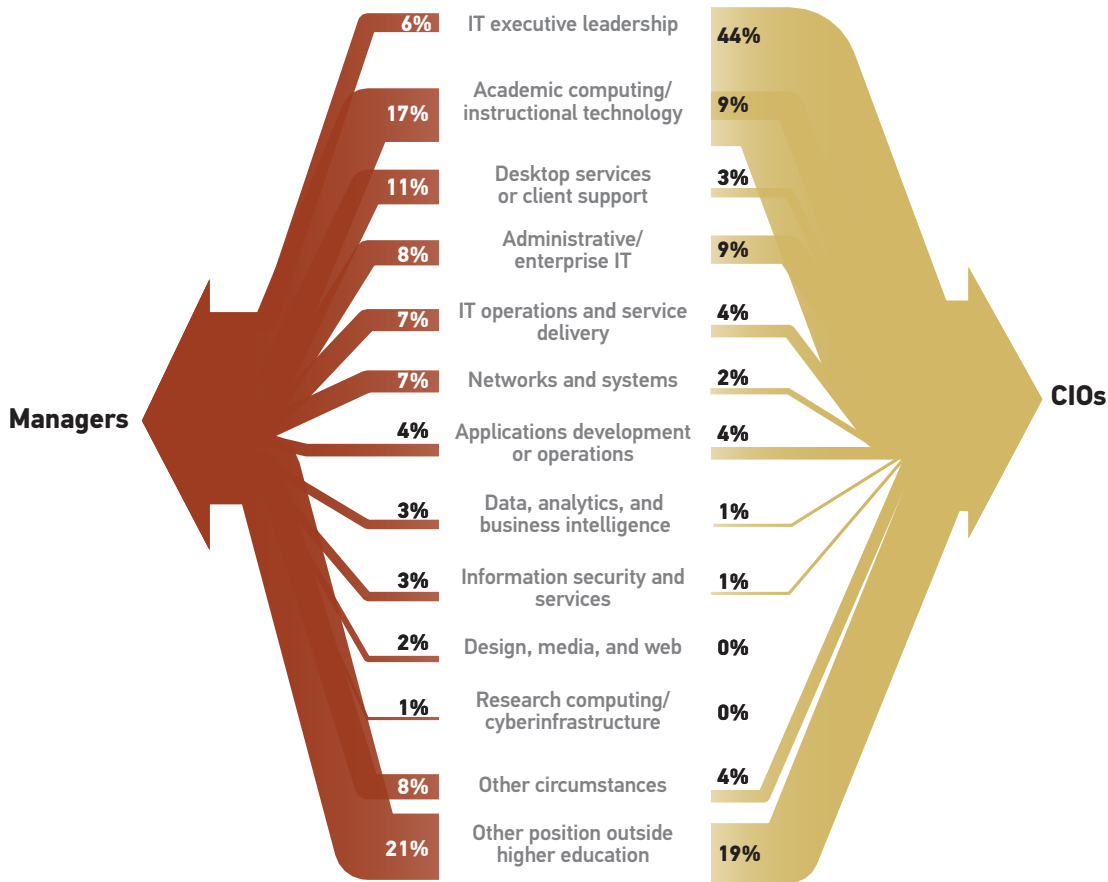
Higher education tends to “grow its own” leaders. Whether colleges and universities are particularly good at attracting IT talent or whether that talent is particularly attracted to those types of institutions, the fact remains that once IT employees begin working for a college or university they tend to stay for a long time, especially as they rise through the ranks. Among these employees, over two-thirds (68%) of staff, over three-quarters (79%) of managers, and four-fifths (81%) of CIOs reported that their job immediately preceding their current one was in higher education. Among those who previously worked in higher education, about three-quarters (76%) of staff respondents and four-fifths (82%) of managers worked at *their current* institution. For CIOs, however, the story is a bit different. A majority of CIOs (53%) reported that they worked at another higher education institution immediately prior to joining their current one; at the same time, 64% of *new* CIOs<sup>80</sup> came from their current institution. Therefore, a general takeaway is that, compared with managers, CIOs may need to move out if they hope to move up.

### Pathways to Leadership

While we can only speculate about what leads individual staff members to initially select certain higher education IT sectors in which to pursue their careers (i.e., particular skill sets, academic or professional interests), we do know that they tend to remain in those sectors over the course of their careers.<sup>81</sup> That is, a previous position in an IT sector is the best predictor of the sector in which a staff member is currently employed. In this way, IT staff tend to focus on developing within-sector expertise and domain specialization (e.g., information security staff tend to remain in information security from one job to the next; academic computing staff tend to remain in academic computing). But what about those who want to move into management and leadership positions?

Just five higher education IT sectors account for half of the managers in our sample: academic computing/instructional technology (17%), desktop services and client support (11%), administrative/enterprise IT (8%), IT operations

and service delivery (7%), and networks and systems (7%) (see figure 13). Additionally, the overall best predictor of an IT manager’s current sector is the previous sector in which she or he worked, not unlike what we observed with staff. To summarize, managers come from every IT sector and are typically hired to manage units within the sectors in which they have developed specialization and competency (e.g., desktop service specialists become desktop service managers; administrative computing specialists become administrative computing managers).



**Figure 13. Manager and CIO origins**

CIOs are, however, an entirely different animal. In 2018, the only previous IT position that predicted whether one is currently a CIO is a position in IT executive leadership.<sup>82</sup> Indeed, 44% of CIOs told us that they held an IT executive leadership position immediately prior to their current role. How one increases the odds of garnering an IT executive position is, perhaps, even more interesting. According to our 2015 data (which included items about one’s previous *two* positions), we found that the probability of landing an IT executive leadership position was significantly increased by switching sectors at least once;<sup>83</sup> that is,



an individual who moved from information security to administrative/enterprise IT, for example, was significantly more likely to land an executive position than someone whose career path resided solely in one or the other of those sectors. Although an executive position is the best path to landing a CIO position, it is not the only path available to aspirants. Individuals from administrative/enterprise IT, applications development and operations, and academic computing/instructional technology have marginally better odds of making it to C-level positions than do those from other IT sectors.

### Higher Education Experience

If higher education tends to grow its own workforce, we also know that it takes its sweet time in cultivating the professional development and growth of that workforce from staff to managerial to executive positions. The median number of years of higher education employment experience is well over a decade for each of the three organizational levels. But there are significant differences between these levels regarding the number of years spent in higher education (see figure 14): CIOs (19 years) and managers (18 years) have significantly more experience in higher education than do staff (14 years).

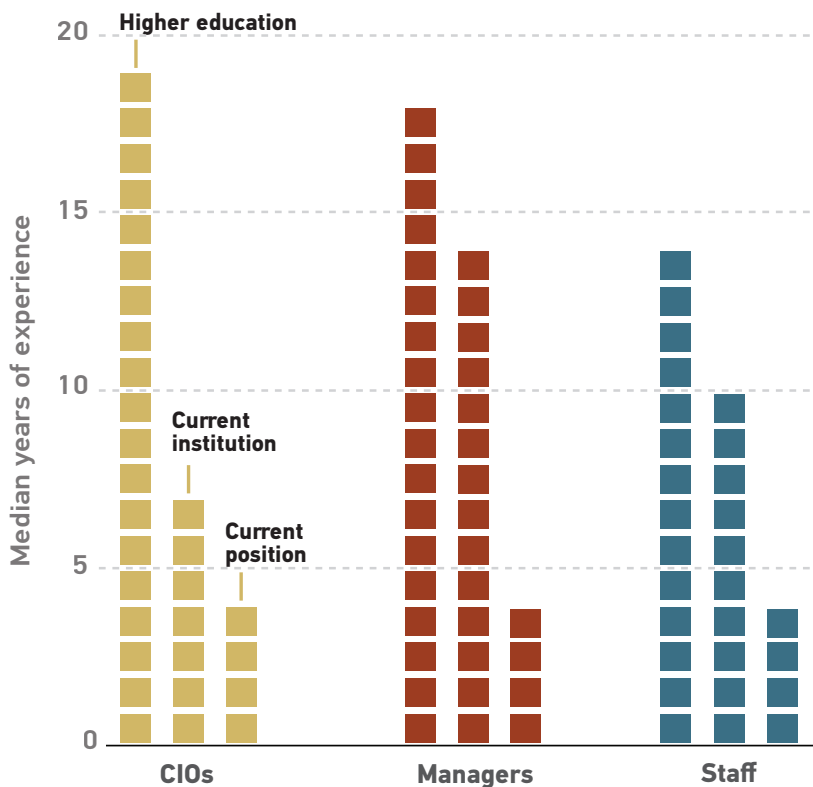
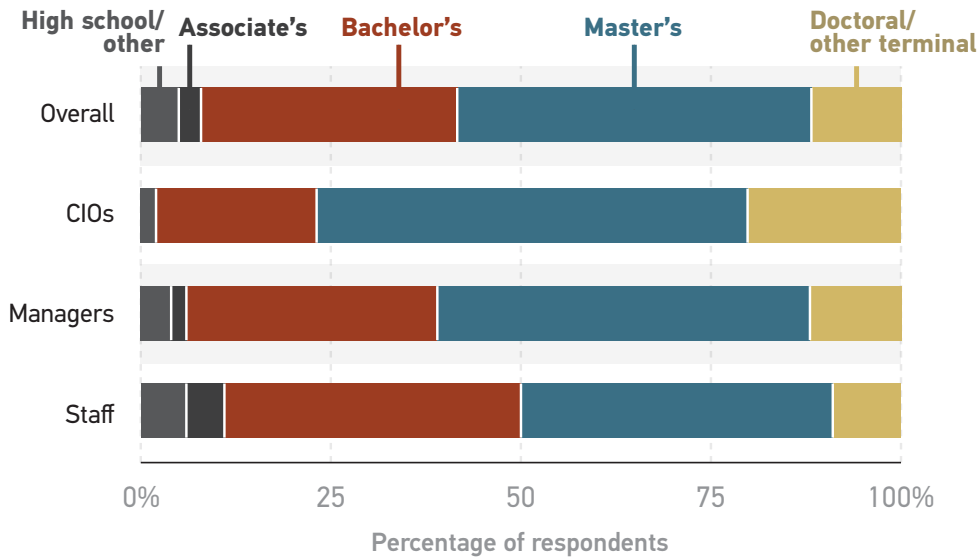


Figure 14. Median number of years of experience in higher education IT

Remaining committed to one's institution appears to be rewarded with managerial responsibilities, but one might find it necessary to leave that institution in order to advance to an executive-level position. When it comes to institutional fidelity, managers are the ones who typically remain at their institution significantly longer than either staff or CIOs. While the typical IT staff member has been working at their current institution for a decade and the typical manager reports a tenure of about 14 years, it appears (unsurprisingly) that the longer a staff member remains at their school the greater the likelihood of becoming a manager. CIOs, however, are a different story. As noted earlier, more than half of CIOs (53%) we surveyed said they were employed at another institution immediately before taking on their current role. Among new CIOs that number is slightly higher (64%). Once at the top, there are few options other than leaving an institution if one seeks new professional challenges and responsibilities.

## Education Level

In an era when some of the top computer and information technology companies in the world are no longer requiring college degrees,<sup>84</sup> the allure of being the next Jobs or Gates (or Zuckerberg or Musk, for the younger set) leads some to drop out of college, and the "UnCollege" movement is devaluing the importance of a college degree. Higher education IT, however, continues to demonstrate that the degrees colleges and universities confer on their graduates are practically a necessity for employment and advancement (see figure 15). Nearly half (47%) of higher education IT employees have earned a master's degree, a third (34%) have a bachelor's degree, and 12% hold a PhD. A significant and positive association exists between education levels and organizational rank in higher education IT: more CIOs have earned PhDs (20%) and master's (56%) degrees than have managers or staff, and more managers hold a master's (49%) than staff. Staff reported holding master's and bachelor's degrees in roughly equal numbers (41% and 39%, respectively). Only 8% of the workforce holds a degree below a bachelor's (i.e., high school diploma, vocational/occupational degree, associate's degree).



**Figure 15. Highest education level of CIOs, managers, and staff**

We should not be surprised that institutions of higher education value and reward those who pursue and earn degrees from colleges and universities. Our evidence suggests that a culture that puts a premium on a well-educated workforce persists in higher education IT organizations. About three-quarters (73%) of higher education IT employees reported that earning a graduate or professional degree would make at least some contribution to their professional growth in their current position regardless of current education level. Thirteen percent of respondents (90% of whom already hold at least a bachelor’s degree) told us their manager/supervisor encourages them to earn a graduate or professional degree. And, 13% and 14% of those with master’s or doctorate degrees, respectively, have earned those degrees in the past two years, typically while working in their current position at their current institution.<sup>85</sup> Higher education IT attracts well-educated talent, grooms that talent with more educational opportunities, and rewards those who better themselves by earning advanced or professional degrees. Bypassing college on the slim chance of striking it rich in the private technology sector may be a sexy path for those who admire and aspire to quick wealth, but a sheepskin continues to prove itself to be one of the most valuable investments an individual can make in their professional development—especially if one wants to work in higher education IT.

## Leadership and Management

What does it mean to “manage” as a CIO or an IT manager in higher education? If you are planning to engage more in collaborative partnerships, sharpen your communication skills, and seek out professional development opportunities to become a manager, here’s what the job of a “typical” CIO or manager could look like.<sup>86</sup>

### How CIOs and Managers Spend Their Time

Typical managers spend half of their time (50%) managing IT operations, while typical CIOs reported spending 40% of their time on such tasks. CIOs and managers spend an equal amount of time (20%) planning and innovating within their IT departments. However, CIOs spend more time (15%) than managers (10%) in planning and innovating outside their IT department—for example, with business and academic units. CIOs and managers spend an equal amount of time in HR/staffing/professional development (10%) and serving the larger IT profession (5%), usually through presentations or articles.

We also asked CIOs and managers whether they guide academic, strategic, and administrative directions, including discussing IT implications of institutional decisions with senior campus leadership. Figure 16 presents the breakdown of these activities by managers, CIOs on a president’s or chancellor’s cabinet, and CIOs who do not hold a cabinet position. As one might expect, more CIOs than managers engage in these types of activities, although more than half of managers also engage in nearly all of these activities.<sup>87</sup> CIOs on cabinets engage in these activities more than managers or CIOs not on cabinets.

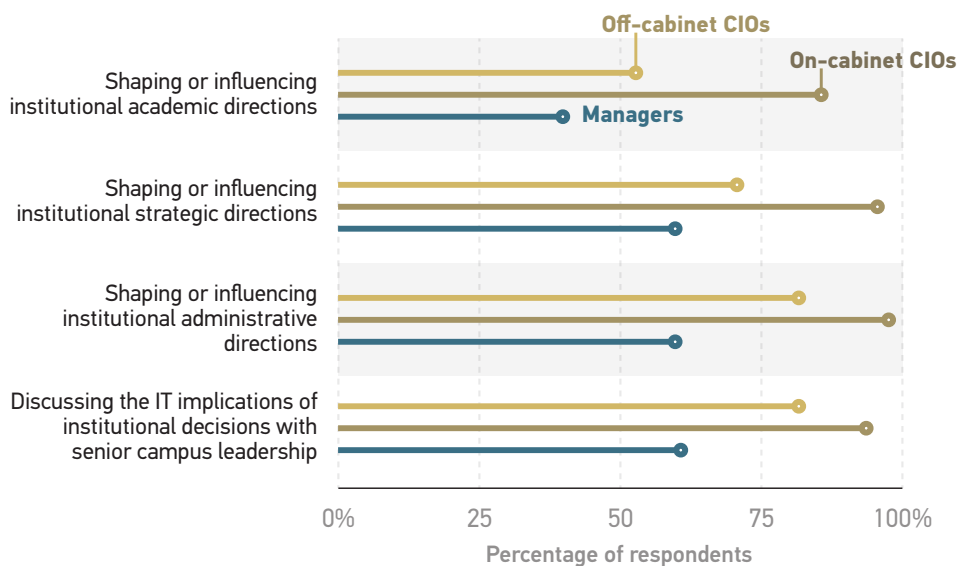


Figure 16. Frequency of CIO and manager activities

The most frequently reported activities for CIOs who did not hold a cabinet position were discussing the IT implications of institutional decisions with senior campus leadership and shaping or influencing institutional administrative directions (82% of off-cabinet CIOs reported doing each at least sometimes). Seventy-one percent of off-cabinet CIOs reported shaping or influencing institutional strategic decisions. Around 60% of managers told us they discussed IT implications with senior campus leadership and also engaged in shaping the administrative and strategic directions of their institution. Fewer managers (40%) and off-cabinet CIOs (53%) than on-cabinet CIOs (86%) reported influencing their institution's academic direction. Overall, this is good news for the IT workforce pipeline because it indicates that managers are gaining experience in strategic activities that we would likely attribute to CIOs, suggesting they are acquiring needed skills to grow their careers.

The top three activities of CIOs and managers are participating in shaping or influencing institutional administrative directions, discussing IT implications of institutional decisions, and shaping or influencing institutional strategic directions. CIOs holding a cabinet position participate in these important activities much more often than do off-cabinet CIOs. In particular, when CIOs serve on cabinets, they appear to shape institutional academic directions more than when they are not on a cabinet. This suggests that when CIOs have a seat at the table as a C-level administrator, they appear to have greater influence within their institution. Regardless of whether a CIO has a seat on the cabinet, these activities are possible when CIOs closely collaborate with other sectors of their institution. CIOs, by the nature of their roles, are in a position to assess how appropriate technologies can facilitate institutional objectives, which includes a focus on customer experiences, particularly those of students.<sup>88</sup> Therefore, CIOs should be considered integral members of an institution's administration. Their presence on a president's or a chancellor's cabinet indicates that they engage in strategic activities more frequently, and with this increased engagement, they have opportunities to align IT with broader institutional objectives and aims.

## **Collaborative Relationships**

CIOs and managers are not solo artists: they are leaders who are also key collaborators on their campuses to facilitate institutional objectives. In fact, relationship building has been identified as a high-priority professional development activity to build one's career in higher education IT.<sup>89</sup> We asked CIOs and managers how frequently they experience a collaborative relationship with 15 categories of executive and administrative campus leaders. As with the frequency of strategic activities, more CIOs than managers said they engage in collaborative relationships with campus leaders. Although managers have less

engagement with senior leaders, these findings should encourage managers to cultivate collaborative partnerships when the opportunity arises because such collaboration will undoubtedly contribute to their professional development and leadership skills. Table 3 presents the percentages of CIOs and managers who told us they often or almost always have working relationships with C-level campus leaders.

**Table 3. Top five most frequent intra-institutional collaborative relationships of CIOs and IT managers**

Rank	CIOs	Managers
1	Chief information security officer (CISO): 89%	Chief information security officer (CISO): 58%
2	Chief financial officer (CFO): 74%	Registrar: 32%
3	Chief academic officer (CAO)/provost: 63%	Chief data officer (CDO): 26%
4	Registrar: 60%	Director of libraries: 24%
5	Director of institutional research: 59%	Director of institutional research: 21%

The majority of CIOs (89%) and managers (58%) reported having experienced a collaborative partnership with the chief information security officer (CISO). This finding reflects the higher education IT community’s continued emphasis (four years in a row) on security as a top IT issue and signifies that information security in higher education is a “shared responsibility” among stakeholders, including all members of the IT staff.<sup>90</sup> It is encouraging that more than half of managers also reported relationships with CISOs. This indicates that managers also engage in a shared responsibility of asset protection via information security policies and practices.

Additionally, nearly three-quarters (74%) of CIOs reported a collaborative relationship with the CFO. Collaborative partnerships between CIOs and C-level financial officers have been identified as “foundational” relationships. This could mean, for example, that costs for necessary staffing and associated budgets are collaboratively identified or prioritized during institutional IT initiatives, such as making an institution “analytics ready.”<sup>91</sup> Also of note is that 63% of CIOs also reported a collaborative relationship with the CAO/provost. Although fewer CIOs had collaborative partnerships with CAOs than with CFOs, relationships between CIOs and CAOs are similarly viewed as critical in order to achieve the vision of CAOs and ensure the institution’s mission is served both functionally and technically.

On the other end of the scale, only 32% of CIOs and fewer than 10% of managers told us they had a collaborative relationship with the chief diversity officer (CDO). This may be due to the challenges CDOs experience in higher education settings. For example, recent research suggests that slightly more than half of CDOs may not have adequate resources to perform their responsibilities, although a majority reported having support from their school's administration.<sup>92</sup> This lack of resources may affect their ability to forge these collaborative relationships. Partnerships between CIOs and CDOs may be of value to managerial ranks, given the lack of diversity in the higher education IT workforce and the necessity of ensuring an inclusive work environment. This is also concerning, since the EDUCAUSE Learning Initiative ranked universal design for learning and digital accessibility together as second most important among the 2018 Key Issues in Teaching and Learning.<sup>93</sup> The importance of these two issues necessitates cross-institutional dialogue and collaboration among IT departments, faculty, CDOs, and vendors and will necessarily include strategies to address accessibility issues at the onset of project planning.<sup>94</sup> IT departments must be partners within this process to ensure successful policy creation and implementation of these initiatives.<sup>95</sup>

## Conclusion

This year's higher education IT workforce landscape report identifies trends that have remained relatively stable over the past several years and provides insight into how higher education IT can address the anticipated challenges to hire and retain a sustainable workforce. Higher education IT continues to be able to hire for open positions but has difficulty creating and hiring new positions. Hiring continues to be focused on key positions for IT infrastructure, such as security and network administration. However, the workforce remains largely male and white and is aging. It also exhibits a work environment with larger than expected numbers of members of the LGBTQ community but lower than expected numbers of individuals with self-reported disabilities and impairments. If higher education IT "grows its own," it's important to identify opportunities and implement strategies to diversify the workforce to fill existing and anticipated openings.

Quality of life, rather than salary, tops the list of reasons employees may be attracted to and stay in higher education IT. Nontechnical skills are highly valued among higher education IT employees; professional development remains an important means to build those skills so that they can meet an institution's broader aims and objectives, such as leveraging data for strategic decisions. CIOs and managers continue to demonstrate that higher education IT is based on foundational relationships with other sectors of their institution and that collaboration is key to harnessing IT to contribute to institutional objectives. These findings suggest that more work needs to be done to diversify the workforce and to increase the capacity to create new staff positions to address the challenges of digital transformation, student success, and broader institutional aims and objectives.



## Recommendations

- **Increase the number of women and minorities in the higher education IT workforce and create more opportunities for their advancement to managerial and leadership positions.** Clear steps to achieve this include supporting comprehensive diversity and inclusion strategies related to the talent pipeline, building equity into the culture and process of recruiting talent, creating and sustaining inclusive cultures that support the success of everyone, and developing effective and fair management processes that include auditing performance evaluation and compensation practices for potential biases.
- **Recruit Millennials to the higher education IT workforce in preparation for the looming retirements of Baby Boomers and Gen Xers.** The underrepresentation of Millennials in the higher education IT workforce may be corrected by first understanding their long-term career goals, workplace needs, and value systems. Higher education is well positioned to attract Millennial talent by emphasizing the role higher education plays in advancing the greater good, generating opportunities for more creative approaches to how IT works, and valuing diversity, equity, and inclusion in the workplace.
- **Cultivate a strategic working relationship with human resources** to create, fill, and replace positions in a timely manner when needed. Establishing such a relationship can be beneficial when the time comes to reorganize the unit, retrain and reassign employees, and fund and fill positions in a timely manner when they are vacated.
- **Explore the possibilities of offering convenience benefits such as flextime, telecommuting, and more vacation time, which may contribute to recruitment and retention by aiding individuals in coordinating their job duties with their personal responsibilities.** These benefits can impact quality of life and the work environment, which employees said are the most important factors in staying at an institution; therefore, such benefits can help maintain an effective IT workforce.
- **Provide employees with training and other opportunities to develop the technical, business, and managerial skills that they deem to be most important to doing their jobs successfully and advancing their careers.** Although each employee may have specific needs based on prior experience, IT sector, assigned duties, and career aspirations, opportunities to learn how to communicate effectively, manage relationships across the institution, communicate with diverse populations, engage in strategic thinking and planning, and manage complex projects provide the greatest value to employees.

- **Rethink resource allocations to improve organizational responsiveness and create new positions that will enable implementation of innovations, increase capacity to be early adopters of technology, and keep pace with rapidly developing technologies.** IT departments need to be agile when it comes to creating positions to fill gaps in their workforce to meet stakeholders' needs and respond to technological innovations.
- **Increase opportunities for professional development activities that focus on data analysis for strategic decision-making and attending higher education IT conferences.** Data analysis opportunities for all organizational levels should have clear links to informing strategic decisions to ensure meaningful development activities that will increase technical and management skills.
- **Emphasize the strategic importance of the role of the CIO to position IT as a first responder to the cultural, technological, and workforce trends and changes that digital transformation has brought to higher education.** CIOs are in a better position to increase the impact and reach of their organization when they report directly to the president of their institution, and they have the greatest impact on shaping and influencing the strategic directions of their institution when they hold a seat on the president's or chancellor's cabinet.

## **Methodology**

Survey invitations were sent to 40,317 IT professionals in the EDUCAUSE database. A total of 1,592 respondents provided data that could be used for analysis, resulting in a response rate of 4%. Respondents were from all 50 US states (plus the District of Columbia, Puerto Rico, and Guam) and from 35 countries outside the United States; 815 institutions of higher education were represented. Non-US respondents made up 10% of the sample. Data collection took place in April and May of 2018.

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## Notes

1. In our previous workforce reports, we used the term “managerial” to refer to the three types of workforce study respondents: staff, manager, and CIO. This year, we altered the language to avoid confusion with references to those who are managers and to better reflect the hierarchy of roles in IT organizations.
2. We use the term “organizational level” throughout this report to refer to all three of these respondent types.
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4. The ERA was passed by Congress in 1972 but has yet to be ratified by the requisite three-quarters (currently 38) of the states for it to become constitutional law. In 2018, Illinois became the most recent state to ratify the ERA. For more information on the ERA, see [https://en.wikipedia.org/wiki/Equal\\_Rights\\_Amendment](https://en.wikipedia.org/wiki/Equal_Rights_Amendment).
5. Kevin Miller, *The Simple Truth about the Gender Pay Gap*, AAUW, n.d.
6. According to the Center for American Women and Politics, “25 women (25%) serve in the U.S. Senate, and 102 women (23.4%) serve in the U.S. House of Representatives. Four women non-voting delegates (2D, 2R) also represent American Samoa, the District of Columbia, Puerto Rico, and the Virgin Islands in the United States House of Representatives.” For more, see “Women in the U.S. Congress 2019.”
7. Women’s Media Center, *The Status of Women in the U.S. Media, 2017*, March 21, 2017.
8. See Emily Stewart, *Women Are Running for Office in Record Numbers*, Vox, June 8, 2018, and Catalyst, *Women CEOs of the S&P 500*, respectively.
9. The percentage of women in leadership (23%) and technical (16%) roles in the largest tech companies is much lower than the overall average. See Roger Cheng, “Women in Tech: The Numbers Don’t Add Up,” CNET, May 6, 2015.
10. See the National Center for Women & Information Technology.
11. US Department of Labor, *Full-Time and Part-Time Employment*, n.d.
12. American Association of University Women, *Solving the Equation: The Variables for Women’s Success in Engineering and Computing* (Washington, DC: AAUW, 2015).
13. US Bureau of Labor Statistics, “Women in the Labor Force: A Databook,” *BLS Reports*, no. 1065, April 2017.
14. Kathleen Buse, Nicole Evans, Emma George, Jeremy Ford, and Jessica Anderson, *Playbook on Best Practices: Gender Equity in Tech* (Washington, DC: AAUW, 2017).
15. *Ibid.*, 2–3.
16. In 2017, the median age of the US workforce was 42.2 years. See “Labor Force Statistics from the Current Population Survey.”
17. In 2018, we continue the practice of drawing up generational definitions as delineated by the Pew Research Center. The definitions used in this report are as follows: Millennials (born 1981–1997), Gen Xers (born 1965–1980), and Baby Boomers (born 1946–1964). For more information, see Pew Research Center, *The Generations Defined*, May 8, 2015.

18. Richard Fry, *Millennials Are the Largest Generation in the U.S. Labor Force* (Washington, DC: Pew Research Center, April 2018).
19. Deloitte, *The Deloitte Millennial Survey 2018*, n.d.
20. Sitara Kurian, *Meet the Millennials*, KPMG, June 2017.
21. US Bureau of Labor Statistics, “Labor Force Characteristics by Race and Ethnicity, 2017,” August 2018; and US Bureau of Labor Statistics, “Labor Force Statistics from the Current Population Survey,” January 19, 2018.
22. Julia Beckhusen, *Occupations in Information Technology: American Community Survey Reports* (Washington, DC: US Census Bureau, August 2016), 13.
23. Jacqueline Bichsel, *Today’s Higher Education IT Workforce*, research report (Louisville, CO: ECAR, 2014).
24. Jeffrey Pomerantz and D. Christopher Brooks, *The Higher Education IT Workforce Landscape, 2016*, research report (Louisville, CO: ECAR, April 2016).
25. Ben Bours, “Women and Minorities in Tech, By the Numbers,” *Wired*, March 27, 2018.
26. Data USA, *Information Technology: STEM Major*, n.d.
27. Mark Muro, Alan Berube, and Jacob Whiton, *Black and Hispanic Underrepresentation in Tech: It’s Time to Change the Equation* (Washington DC: Brookings Institution, March 28, 2018).
28. Marianne Bertrand and Sendhil Mullainathan, “Are Emily and Greg More Employable Than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination,” *NBER Working Paper No. 9873* (Cambridge, MA: National Bureau of Economic Research, July 2003).
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30. *Ibid.*, 4.
31. See Jennifer R. Keup, Arianne A. Walker, Helen S. Astin, and Jennifer A. Lindholm, “Organizational Culture and Institutional Transformation,” *ERIC Digest* (Washington, DC: ERIC Clearinghouse on Higher Education, 2001); and Robert Rohrschneider, *Learning Democracy: Democratic and Economic Values in Unified Germany* (New York: Oxford University Press, 1999).
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33. Steven W. Bradley, James R. Garven, Wilson W. Law, and James E. West, “The Impact of Chief Diversity Officers on Diverse Faculty Hiring,” *NBER Working Paper No. 24969* (Cambridge, MA: National Bureau of Economic Research, August 2018).
34. LGBTQ is an initialism that stands for lesbian, gay, bisexual, transgender, and queer. Transgender was not included in our questions regarding sexual orientation, but was included in our question regarding gender identity.
35. Scott, Klein, and Onovakpuri, *Tech Leavers Study*, 4. This study found that “LGBTQ employees were most likely to be bullied (20%) and experience public humiliation or embarrassment (24%).”
36. Note that totals do not sum to 100% due to rounding.
37. The Gallup poll asked the question, “Do you, personally, identify as lesbian, gay, bisexual, or transgender?” While this item differs in an important way from ours, the Gallup data are the best available for comparison at a national level.

38. One respondent told us that they stay in higher education for both “job security” and a “sense of safety as an LGBTQ person.”
39. US Bureau of Labor Statistics, “Persons with a Disability: Labor Force Characteristics Summary,” June 21, 2018.
40. This number tracks slightly below the one in five individuals who the National Institute of Mental Health identifies as living with a mental illness.
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42. US Bureau of Labor Statistics, “Persons with a Disability: Labor Force Characteristics–2017.”
43. See “IT Accessibility Risk Statements and Evidence” and “IT Accessibility Risk Statements and Evidence by Topic.”
44. US Department of Labor, *Hiring People with Disabilities*.
45. *Higher Education Employment Report Q4 and Annual 2017*. These jobs are defined as “all jobs at public and private colleges and universities, community colleges, technical and trade schools, as well as business, computer, and management training schools.”
46. Álvaro Hernán Galvis, “Supporting Decision-Making Processes on Blended Learning in Higher Education: Literature and Good Practices Review,” *International Journal of Educational Technology in Higher Education* 25, no. 25 (December 2018).
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48. Eric Morath and Jennifer Smith, “Jobs Go Unfilled as the Economy Expands,” *Wall Street Journal*, August 7, 2018; and US Department of Labor, *U.S. Department of Labor Data Shows That American Job Openings Exceed Job Seekers for First Time on Record*, June 5, 2018.
49. Higher Education Information Security Council, *Budget Conscious Strategies for Information Security: Building Resources on a Budget*, working group paper, April 2018.
50. *Higher Education Employment Report*.
51. These responses are independent of whether respondents reported they could hire for new or open positions.
52. IT units with 90 or more employees (75th percentile).
53. Denominator does not include responses that indicated 0 positions were created.
54. For example, job postings and jobs for community colleges have shown a decline over the past several years. See, for example, *Higher Education Employment Report*.
55. A total of 177 positions with specific titles were identified. For top positions, the frequencies of coded open-ended responses were as follows: systems administrator ( $n = 9$ ), project manager ( $n = 7$ ), programmer ( $n = 7$ ), network engineer ( $n = 7$ ), network administrator ( $n = 6$ ), and business analyst ( $n = 5$ ).
56. Position titles identified in open-ended responses were assigned to broad categories of types of roles (e.g., security, programming, database management/engineering). Frequencies of network administration and security were  $n = 15$  each.

57. Systems engineer, systems administrator, or systems manager ( $n = 14$ ); business analysis/intelligence ( $n = 11$ ); technical support/help desk ( $n = 11$ ); and managerial positions, including C-level positions ( $n = 11$ ). The highest-level executives in senior management usually have titles beginning with “chief,” forming what is often called the C-level.
58. Jacqueline Bichsel, *IT Service Delivery in Higher Education: Current Methods and Future Directions*, research report (Louisville, CO: ECAR, April 2015).
59. Charles Duhigg, “What Google Learned from Its Quest to Build the Perfect Team,” *New York Times Magazine*, February 25, 2016; “The Key Attributes Employers Seek on Students’ Resumes,” *National Association of Colleges and Employers*, November 17, 2017; and Pew Research Center, *The State of American Jobs*, October 6, 2016.
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61. Neil G. Ruiz and Jynnah Radford, “New Foreign Student Enrollment at U.S. Colleges and Universities Doubled Since Great Recession,” *Pew Research Center*, November 20, 2017.
62. Holly Morris and Greg Warman, “Using Design Thinking in Higher Education,” *EDUCAUSE Review*, January 12, 2015.
63. Jeffrey Pomerantz, *Retaining the Higher Education IT Workforce*, June 13, 2016.
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66. For more regarding the importance and types of mentoring, see *Mentoring*.
67. Grochow, *Enterprise Analytics and the CIO*.
68. Centers for Disease Control and Prevention, *Health-Related Quality of Life (HRQOL)*, May 31, 2016.
69. Eric Morath, “American Job Openings Now Outnumber the Jobless,” *Wall Street Journal*, June 5, 2018.
70. Ibid.; and Eric Morath and Jennifer Smith, “Jobs Go Unfilled as the Economy Expands,” *Wall Street Journal*, August 7, 2018.
71. Korn Ferry, *The Global Talent Crunch*, May 2, 2018.
72. Frost & Sullivan Center for Cyber Safety and Education, *2017 Global Information Security Workforce Study: Benchmarking Workforce Capacity and Response to Cyber Risk*, 2017; and CareerCast, *The Toughest Jobs to Fill in 2018*, n.d.
73. CareerCast, *The Toughest Jobs to Fill in 2018*.
74. Society for Human Resource Management, *2017 Employee Benefits: Remaining Competitive in a Challenging Talent Marketplace*, April 4, 2017.
75. *Employee Benefits Study: The Cost and Value of Employee Perks*, Fractl, 2017.
76. Ibid.



77. Claudia Goldin, *Hours Flexibility and the Gender Gap in Pay*, Center for American Progress, 2015.
78. Open responses included references to security positions such as security analyst, security engineers, security awareness trainers, and chief information security officers.
79. Qualitative data coded as “management” included responses such as executive leadership, project management positions, directors, and team managers.
80. “New CIOs” are defined as those who did not previously hold the senior-most information officer position at an institution.
81. See “[Career Paths: Higher Education IT Sectors](#).”
82. The category of IT executive leadership includes the following positions: senior-most information officer (e.g., CIO, VP); senior-most information officer of a department/division/school; deputy/associate information officer; deputy/associate information officer of a department/division/school; senior-most data/analytics officer; senior-most digital officer; senior-most IT business/finance officer; senior-most online learning or distance education officer (associate provost, vice president, dean); senior-most privacy officer; senior-most security/information security officer (e.g., CISO); and senior-most technology officer (e.g., CTO).
83. EDUCAUSE Center for Analysis and Research, *Career Paths: Higher Education CIOs*, n.d.
84. Courtney Connley, “[Google, Apple and 13 Other Companies That No Longer Require Employees to Have a College Degree](#),” CNBC, October 8, 2018.
85. The typical higher education IT employee who reported earning an advanced or professional degree within the past two years has been in their current position for three years and at their current institution for nine years. They have also been working in higher education in some capacity or the other for fourteen years.
86. For reporting in these sections, we use the median percentage of time among respondents in each group unless otherwise noted, so results represent the activities of “typical” managers and CIOs.
87. These reflect responses of “sometimes,” “almost always,” or “often.”
88. Michael Berman, Raechelle Clemmons, Kyle Johnson, Keith McIntosh, and Melissa Woo, “[Challenge Accepted: Why CIO Is the Best Job on Campus](#),” *EDUCAUSE Review Online*, 2014.
89. EDUCAUSE in Partnership with Jisc, *Technology in Higher Education: Guiding Aspiring Leaders*, February 2016.
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91. Bruce Maas and Michael Gower, *Why Effective Analytics Requires Partnerships*, May 8, 2017.
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95. Sean Moriarty, *Building a Culture of Accessibility in Higher Education*, July 30, 2018.