IT Leadership in Higher Education, 2016: The Chief Information Officer
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Citation


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Introduction

The job of chief information officer (CIO) has a scope and influence across campus that makes it—according to some, anyway—the best job on campus. Not everyone aspires to the CIO role, however, considering the time, attention, and tolerance for uncertainty required by that level of leadership. Some have argued for eliminating the CIO role entirely and folding its responsibilities into other C-level positions. Yet research has shown that the CIO role is more prevalent and more important in higher education than ever.

Data collected by the EDUCAUSE Core Data Service (CDS) show that 68% of institutions of higher education have a position titled CIO; the highest-ranking IT officer at the remainder of institutions may have a different title but performs similar functions. This ubiquity makes it critical for us to understand the nature and scope of the CIO role, as well as the background and characteristics of those brave souls who do this job.

As part of its series of studies of the IT workforce in higher education, the EDUCAUSE Center for Analysis and Research (ECAR) conducted a survey of CIOs. This study sought to identify the characteristics and functions of CIOs: what background and training do these individuals possess, what is their scope of work and responsibilities, and what personal and professional characteristics contribute to their success. The audiences for this report are CIOs themselves, those who aspire to be CIOs, and those to whom CIOs report. This report can help all of these stakeholder groups understand the job of CIO—at their local institution and elsewhere—and compare it to a higher education-wide baseline.

EDUCAUSE IT Workforce Research: Focusing on Our People and Professions

This report is part of the IT Workforce in Higher Education, 2016 research series, which includes IT leadership reports on the chief information officer, the chief information security officer, the enterprise architect, and the chief data officer.

These practical reports, which analyze the skills needed to prepare for and fulfill functional roles, are intended for aspirants, those in the roles now, and their IT managers and leaders.

The research helps colleges and universities reinvest in the IT workforce by defining professional competencies and laying the foundation for tools that can guide professional development and career planning.
Key Findings

- **CIOs in higher education most commonly report to the president or chancellor.** This is followed by reporting to the highest-ranking academic officer (e.g., provost, vice chancellor for academics).

- **The leadership position to which CIOs believe they should report depends on what a CIO believes is the value of their position: the strategic importance of IT, or collaboration across the institution.** CIOs who more strongly value the former believe they should report to the president or chancellor; CIOs who more strongly value the latter believe they should report to the highest-ranking academic officer.

- **The number of total reports (direct and indirect) to a CIO (that is, the size of the institution’s IT organization) varies significantly by Carnegie class.** CIOs at doctoral institutions have the largest number of total reports, while CIOs at associate’s institutions have the fewest.

- **CIOs’ scope of responsibility is remarkably consistent across types of institutions of higher education, largely because they have responsibility for all areas of IT on campus.** Where CIOs’ responsibilities vary, it is by Carnegie class and institution size. Few CIOs are responsible for areas that, at many institutions, are independent campus units outside the IT organization (e.g., institutional research and libraries).

- **CIOs at medium-sized institutions (enrollment of 4,000–7,999) have the broadest scope of responsibility but little direct representation at the cabinet or board level.** Precisely because these CIOs have such a broad scope of responsibility, however, they have a great deal of direct input into decision making in academic units.

- **CIOs have been in higher education for a long time but in their current position for a much shorter period of time—a median of 18 years in higher education and 4 years in their current position.**

- **Almost half of all CIOs are hired from within their current institution and more than three-quarters from within higher education.** In both cases, CIOs primarily come from other IT executive positions.

- **The demographics of CIOs in higher education are changing, reflecting greater ethnic diversity and younger individuals in the position.** CIOs are predominantly male and white, but this is changing with the new generation of CIO hires. Unfortunately the same is not true for gender diversity.
Skills for which CIOs evaluate themselves lowest—areas where professional development is most needed—include areas of IT that are often independent units on campus, and areas that are often within the scope of positions that report to the CIO. CIOs consider all IT skills to be important for their success and believe that they themselves possess most of these skills.

CIOs focus on IT as a means to serve the business of the institution. This reflects CIOs’ understanding of the role as spanning the entire institution, requiring collaboration with other leaders across campus.

CIOs enjoy the variety of the job and the opportunity for direct impact on the institution. Because IT is integrated into every unit on campus, providing IT leadership has clear impacts on the institution, both operationally and in terms of student success.
Reporting Relationships

To Whom the CIO Reports

The C in CIO stands for “chief.” Still, everyone reports to someone. And the most common position that CIOs in institutions of higher education report to is the president or chancellor (34% overall). This is followed by the highest-ranking academic officer, usually a provost or vice chancellor (20%). Approximately 2% of CIOs report jointly to the president and some other position.

Reporting lines vary by Carnegie class: At doctoral institutions, CIOs most commonly report to the highest-ranking academic officer (41%), while at master’s institutions it is evenly split between the president/chancellor and the CFO or other highest-ranking business officer (33% each). At bachelor’s and associate’s institutions, CIOs predominantly report to the president/chancellor (44% and 45%, respectively). Figure 1 shows who CIOs report to, by Carnegie class.

Figure 1. Place of the CIO in IT leadership structure
Despite this diversity in the CIO’s reporting relationships, a majority of CIOs think that they should report to the president or chancellor (65% across all types of institutions). Respondents were also asked why they think they should report to a particular position. Those who said they should report to the president or chancellor stated that this reporting relationship establishes hierarchical equality to other senior staff and reinforces the strategic importance of IT. On the other hand, CIOs who said they should report to the highest-ranking academic officer responded that this arrangement is preferable because of the opportunities for collaboration that it enables with peers across the institution, both IT and non-IT.

This is worth repeating: CIOs who think they should report to the president or chancellor value the strategic importance that such a reporting line lends to their position, while CIOs who think they should report to the highest-ranking academic officer value collaboration across the institution. These differences of opinion about the CIO’s reporting relationship are so striking that we asked CIOs who have these different reporting relationships to discuss them. Celeste Schwartz, vice president for information technology and college services (a CIO-equivalent position) at Montgomery County Community College in Pennsylvania, reports to the president. Schwartz suggested that being part of the college leadership team provides her with firsthand information about institutional goals and institutional challenges. Having a “seat at the table” enables an open dialogue about institutional priorities and the impact IT solutions may provide while maximizing IT integration and avoiding overlaps across campus. On the other hand, Kyle Johnson, dean of information technology (also a CIO-equivalent position) at Chaminade University of Honolulu, reports to the provost. Johnson suggested that, while his job is to identify how technology can be leveraged to enhance the institution’s mission and all its operations, this reporting relationship and close collaboration with faculty and the institution’s Faculty Center keep him especially focused on the teaching and learning experience.

**Who Reports to the CIO**

To whom the CIO reports varies by Carnegie class, and so does the number of employees who report to the CIO. Figure 1 also shows the median number of total reports (direct and indirect) to the CIO, by Carnegie class. Overall, the median number of direct reports to CIOs is 6, while the median number of total reports is 40. The number of direct reports to a CIO may be a proxy for the depth of the IT hierarchy at an institution, but the number of total reports to a CIO is the size of the entire IT organization. As one would expect, therefore, the number of a CIO’s total reports varies significantly by Carnegie class: At associate’s institutions, for example, the median number of total reports to CIOs is 20, while at public doctorals it is 120.
Influence

Across all Carnegie classes and sizes of IT organizations, respondents were evenly split on whether they are members of the president or chancellor’s cabinet. CIOs who are cabinet members, however, are naturally in a better position to directly shape institutional administrative and academic directions: The 2016 higher education IT workforce landscape study found that CIOs who serve on the cabinet are significantly more likely to discuss the IT implications of institutional decisions with campus executives.7

There is also a division among CIOs on whether they are required to attend meetings of their institution’s board (board of regents, board of governors, etc.). Overall, CIOs are about evenly split among being required to attend every meeting, attending on an as-needed basis, and not being required to attend. Combining the two “Yes” categories (attend every meeting and as-needed), the percentage of CIOs who are required to attend board meetings at least occasionally never dips below 59% (for very large institutions) and gets as high as 83% (for associate’s institutions). CIOs who are members of the president or chancellor’s cabinet are also typically required to attend board meetings: 82% attend at least occasionally.
Scope of Work
Regardless of how involved CIOs are in campus decision making, the scope of their responsibilities is quite clear. Respondents were asked how much time they allocate to a set of five high-level activities (plus an “other” option). Figure 2 presents the typical amount of time allocated by CIOs to these various activities: The median can be interpreted as the amount of time spent by the “average” CIO, while half of all CIOs are contained between the first and third quartile.⁸

![Figure 2. Percentage of time CIOs spend on various activities](image)

There is little difference across institution types in the percentage of time that CIOs allocate to these activities. The only significant difference is in managing IT operations and services: CIOs at very small institutions spend far more time (median of 43%) than those at very large institutions (25%).⁹ As discussed above, the number of reports to a CIO varies by institution size and Carnegie class; CIOs at very small institutions have the smallest number of total reports (direct and indirect). It may be that CIOs at very small institutions spend a larger percentage of their time managing operations and services because there are few others in their institution’s IT units to whom they can delegate these activities.
Areas of Responsibility

The 5 broad activities to which CIOs allocate time were broken down into a more detailed list of 13 areas of IT responsibility (plus an “other” option). Respondents were asked the following three questions:

1. What areas of IT are you currently responsible for at your institution?
2. Are there any areas of IT that you are but should not be responsible for at your institution?
3. Are there any areas of IT that you are not but should be responsible for at your institution?

Figure 3 shows the responses to these questions. In response to the first question, a set of seven items rose to the top of the list, with greater than 90% of CIOs indicating that they are responsible for these areas of IT. Among these items, three themes are identifiable: enterprise-scale IT, IT operations, and campus leadership.

![Figure 3. CIOs' current and ideal scope of responsibility](image-url)
There are very few areas of IT that CIOs would give up and very few CIOs who would give up even those. Most of these make up a cluster of areas that are often independent units on many campuses: institutional research; design, media, and web; and library services. Perhaps unsurprisingly, these same areas are at the bottom of the list for which CIOs currently have responsibility. In other words, few CIOs are responsible for areas that are independent campus units, and even some CIOs who are responsible for these areas would give them up if they could.

On the other hand, there are several areas of IT that CIOs believe are gaps in their scope of responsibility—areas they are not currently responsible for but believe they should be. Near the top were academic computing/instructional technology, and data, analytics, and business intelligence. Surprisingly, some CIOs believe they should be responsible for the very areas that other CIOs would give up if they could: institutional research; design, media, and web; and library services.

Areas of IT for which CIOs are responsible vary by institution type. First, and perhaps indicative of the state of analytics in higher education, is the wide gap between public and private institutions in CIOs’ responsibility for institutional analytics: 85% of CIOs in private institutions have responsibility for data, analytics, and business intelligence, but only 72% of CIOs in public institutions do. The report *Analytics Landscape in Higher Education, 2015* found that at 40% of institutions, responsibility for institutional analytics initiatives lies outside campus IT units—that is, outside the CIO’s scope of responsibility. In other words, CIOs’ responsibility for institutional analytics differs by institution type both because fewer public institutions have deployed institutional analytics and because at some institutions other campus units have responsibility for institutional analytics.

The area of IT with the most striking variations in the CIO’s responsibility by institution type, however, is research computing/cyberinfrastructure. At private institutions, 58% of CIOs have responsibility for research computing, but this proportion is only 49% at public institutions. Even larger differences are seen between institutions of different sizes: At very large institutions, 72% of CIOs have responsibility for research computing, while only 41% do at very small institutions. More dramatic still are the differences by Carnegie class: At doctoral institutions, 82% of CIOs have responsibility for research computing but only 47% at master’s institutions, 64% at bachelor’s institutions, and 25% at associate’s institutions. As the 2012 ECAR report on research computing makes clear, however, there is significant disagreement about what should even be included in the definition of research computing: Some things, such as server space, may be considered to be merely infrastructural at research-intensive institutions, while others, such as high-performance computing, may be entirely beyond the reach of smaller institutions. Doctoral institutions are far more likely to provide IT
While CIOs may have little direct representation at the cabinet or board level, they have a great deal of direct input into decision making at the local, unit level.

Medium-sized institutions might be the sweet spot for CIOs, for it is at these institutions that CIOs have the broadest scope. All CIOs at medium-sized institutions are responsible for at least half of the areas on our list in figure 3. In fact, the largest percentage of CIOs to have responsibility for most areas of IT are at medium-sized institutions, and this percentage drops off as institutions get either larger or smaller. This far-reaching responsibility, however, is tempered by a lack of direct representation in institutional decision making. CIOs in general have little direct representation in institutional decision making, and CIOs at medium-sized institutions have the least. Although the differences are not statistically significant, CIOs at medium-sized institutions are the least likely to be a member of the president or chancellor’s cabinet (46%, compared to 50% overall).

This apparent dichotomy at medium-sized institutions is curious, so we sought clarification from CIOs at such institutions. Stephen Landry, CIO, and Paul Fisher, associate CIO, at Seton Hall University suggested that medium-sized institutions are small enough that the IT organization is often highly centralized, with the efficiencies that allows, but large enough to enable teams to specialize, building effective relationships with the campus units they support. In larger institutions, those specialized teams are often part of the campus units they support, while smaller institutions may not have the resources to enable the development of specialized teams. The IT organization at Seton Hall, according to Landry, has centralized teams specializing in specific areas of support. Individual members of these teams have primary responsibility for supporting specific academic units and meet regularly with stakeholders in these units. By doing so, these IT professionals gain a detailed awareness of the IT needs of units across campus. While CIOs at medium-sized institutions may have little direct representation at the cabinet or board level, they have a great deal of direct input into decision making at the local, unit level. Landry and Fisher suggested that the breadth of CIO responsibility at medium-sized institutions—including support for technology use across all facets of their institutions—gives these CIOs influence on campus-wide decisions far beyond their representation on cabinets and boards.

This direct and tangible impact on the strategic and educational mission of the institution is a large part of the appeal of the job for many CIOs. This appeal, and why CIO is considered by some to be the best job on campus, will be discussed further, below. Before that, however, we will describe the background, experience, skills, and career trajectory of CIOs.

support for research computing than any other Carnegie class; it is therefore a testament to how important IT has become to research in academia that so many other institution types also possess such infrastructure, regardless of how it is defined locally.

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**CIO Career Trajectory**

A finding that will probably surprise no one is that CIOs predominantly come from outside their current institution: The previous position held by 58% of CIOs was at an institution other than their current one. CIOs predominantly come from within higher education, however; 82% of these previous positions were at institutions of higher education (either at a different institution or in a different position at their current institution). Furthermore, 54% of these previous positions were other IT executive leadership positions, including, somewhat unexpectedly, 29% that were other senior-most information officer positions, such as CIO positions at other institutions.

Many institutions like to “grow their own” leadership by grooming employees over their career to fill progressively higher positions. Given that 42% of CIOs are internal hires, what positions should institutions consider when looking for potential CIOs? Internal CIOs—those whose previous position was at their current institution—primarily come from desktop support, networks and systems, academic computing/instructional technology, IT operations, or other IT executive positions. The executive leadership roles from which CIOs are most often promoted include, perhaps unsurprisingly, the deputy or associate information officer and the senior-most information officer of a department or specific academic unit at the institution.

The 2016 higher education IT workforce landscape report found that “individual institutions of higher education grow their own IT managers and leaders, but CIOs are grown collectively across all of higher education.” This is borne out by the finding above that 82% of CIOs’ previous positions were at institutions of higher education. What positions should institutions consider at other institutions when looking for potential CIOs? The roles from which CIOs are most often recruited include CIO or equivalent positions, and deputy or associate information officer; others are from departments of academic computing/instructional technology.

Grooming employees for leadership positions is a very long-term project, however, and one that begins much earlier than the immediately prior position. Looking further back, we found that only 67% of current CIOs were in higher education two positions ago, though 36% were in IT executive leadership positions. Furthermore, among current CIOs who were in executive leadership two positions ago, that position most commonly was … CIO. Fifty-nine percent were CIOs or held an equivalent position for a department or an entire institution. This supports the finding that the CIO role is remarkably consistent: The set of skills and characteristics necessary for a CIO to be successful is consistent across institutions, so that once one achieves the position of CIO, it

Once one achieves the position of CIO, it is possible to become a career CIO.
is possible for one to become a career CIO. The job of CIO may therefore have remarkable longevity for individuals, though not for institutions, given that CIOs in higher education have been in their current positions for a median of only a few years. Further evidence of the “stickiness” of the CIO role can be seen on the right-hand side of figure 4: Only 27% of CIOs expect to take non-IT executive leadership positions for their next job. And two jobs into the future, a significant portion of current CIOs who expect to leave IT executive leadership positions aspire, in fact, to the future position of retired.

![Figure 4. CIOs' career trajectory](image-url)
CIO Experience Profile

If gaining a specific set of skills and characteristics is a prerequisite to becoming a career CIO, then the question must be asked: What are those skills and characteristics? This section investigates the characteristics of the individuals in the CIO role. Who are these individuals, and what is their background? What skill sets do they possess that enable them to perform this role?

Background

The IT workforce landscape report found that among higher education leadership, education itself is highly valued. The educational background of the respondents to the current study makes this even clearer. A majority of CIOs hold a master’s degree: 55% at associate’s institutions, 56% at bachelor’s institutions, and 62% at doctoral institutions. This number jumps to 71% at master’s institutions. Perhaps unsurprisingly, at doctoral institutions, 29% of CIOs hold PhDs, compared with 15–20% at other types of institution.

CIOs have long experience in higher education but a short tenure as CIO: an overall median of 18 years in higher education and an overall median of 4 years in their current position (see figure 5); these findings are consistent with those of the IT workforce landscape report. The tenure of CIOs at doctoral institutions is more stable than that of CIOs at other types of institution, with a median of 25 years in higher education.

Figure 5. Years of experience for current CIOs, by Carnegie class

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The median age of CIOs responding to our survey is 54, with a range from 31 to 79. A majority of CIOs overall are male (77%), and 81% are white. These findings are also consistent with those of the IT workforce landscape report. In that study ECAR found that young professionals, nonwhite professionals, and females are underrepresented in the higher education IT workforce. It makes sense that the median age of employees in the C-suite would be above 50, as this gives these individuals at least 25 years in the workforce to cultivate leadership skills and attain “chief” positions. In the U.S. workforce there are more males than females and more white than nonwhite employees (especially in science and technology fields), so it is not surprising to find that women and nonwhite professionals are underrepresented in CIO roles. The good news when comparing the current findings to previous ECAR IT workforce research is that CIOs from minority demographics are less underrepresented today than they were in previous research.

While the age of respondents does not vary much across institution types, sex and ethnicity do. Doctoral institutions have the greatest percentage of female CIOs, at 31%, while the lowest is associate’s institutions, at 20%. Looking at institution size, medium and large institutions have the greatest percentage of female CIOs, at 30% and 35%, respectively, while very small institutions have the lowest, at 16%.

Bachelor’s institutions have the greatest percentage of nonwhite CIOs, at 25% (14% Asian, 11% black, Hispanic, or other ethnicity). Medium-sized institutions have the greatest percentage of nonwhite CIOs, at 21% (8% Asian, 8% black, 5% Hispanic or other ethnicity). Interestingly, while CIOs’ ages are fairly consistent across institution types, a CIO’s age is associated with ethnicity: Almost twice as many GenX as Boomer CIOs are nonwhite (28% of GenX CIOs are nonwhite, while only 15% of Boomers are). While diversity inequities run deep in higher education, this finding seems to indicate that higher education IT leadership is becoming more ethnically diverse with the new generation of CIO hires. (Unfortunately the same cannot be said about gender diversity: 26% of Boomer CIOs are women, but only 21% of GenXers.) See figure 6 for the intersections of sex, age, and ethnicity among CIOs.
Skills

Education is highly valued among higher education leadership, but just as important for IT leadership—and perhaps more so—is experience. Respondents were asked three questions about their level of expertise in several IT sectors, strategic technologies, and business practices. While these were asked as three separate questions on the survey, the response options that these questions offered are not easily separated. Sectors are broader than strategic technologies, for example, but a technology may fall within more than one sector. For instance, learning analytics may fall within both the “academic computing/instructional technology” sector and the “data, analytics, and business intelligence” sector. Consequently, the responses to these three questions are combined in this section.

As one might expect, the IT area in which most CIOs (82%) rated themselves proficient or expert was IT operations and service delivery. This was followed by vendor management (79% of CIOs rated themselves proficient or expert), administrative/enterprise IT (75%), academic computing/instructional technology (69%), and business process management (67%). This list accounts for everything for which greater than two-thirds of CIOs rated themselves proficient or expert. On the other end of the spectrum, there were as many items for which more than one-third of CIOs rated their expertise very low: data collection and sophisticated analytics methodologies for information security (37% of CIOs rated themselves as novice or as having no expertise), DevOps (a clipped compound for “development and operations,” 37%), research computing/cyberinfrastructure (37%), library services (48%), and mobile app development (50%).
For the most part, in this section we are combining the findings from the three survey questions about respondents’ expertise. But in some cases it is enlightening to look at the findings from one question separately. The first of these cases is this: The sectors in which CIOs rated their expertise lowest were the same areas of IT that CIOs would give up if they could. Areas of IT that CIOs are but believe they should not be responsible for at their institution were identified in figure 3. These make up a cluster of areas of IT that are often independent units on campus: library services (48% no expertise or novice), institutional research (28%), and design, media, and web (23%). This finding is interesting, as it can be viewed from two directions, each seeming to reinforce the other. On the one hand, these sectors are outside the scope of many CIOs’ area of current responsibility, and not being responsible for something means that one is unlikely to get much experience with it. On the other hand, having expertise in an area may increase CIOs’ inclination to oversee it.

Figure 7 represents some of the same data as figure 3—specifically, the number of CIOs who have current responsibility for certain areas of IT. But figure 7 presents a different perspective on those data: Among the CIOs who have responsibility for an area, what fraction evaluate themselves as proficient or expert in that area? CIOs of course are often in a position to hire staff who have specific expertise, so they do not need to be proficient in all areas of IT. Nevertheless, CIOs need to have enough expertise in any given area to successfully supervise staff with deeper expertise in that area. Clearly, while CIOs have a great deal of experience in many areas, opportunities for professional development remain.
Alongside the cluster of IT areas that are often independent units on campus is one other sector in which CIOs rated themselves as novice or as having no expertise: research computing/cyberinfrastructure (37% of CIOs overall and 26% of CIOs who have responsibility for it). This sector, however, shows considerable variation by type of institution. At doctoral institutions, 43% of CIOs rated themselves proficient or expert in research computing/cyberinfrastructure, while only 11% rated themselves novice or having no expertise. This was reversed at bachelor’s institutions, where 16% rated themselves proficient or expert and 42% rated themselves novice or having no expertise. Doctoral institutions, by dint of their generally greater research intensity and output, have far greater need for research infrastructure, and so it makes sense that CIOs at those institutions would have greater experience with research computing. If these CIOs did not come into the position with that expertise, they would certainly have gained it on the job.

Along with this more extensive cyberinfrastructure comes an increased need for information and network security. While information security was in the middle of the list of CIOs’ self-assessments as expert or novice, it also showed similar variation by institution type. At doctoral institutions, 55% of CIOs rated themselves proficient or expert, while only 33% at bachelor’s institutions said the same. Even fewer CIOs rated themselves proficient or expert in data collection and sophisticated analytics methodologies for information security—only 24% overall. Here, too, responses varied by type of institution, though to a lesser degree: 27% of CIOs at doctoral institutions rated themselves proficient or expert, while only 19% at bachelor’s institutions rated themselves proficient or expert. Clearly information security is something of a problem area for CIOs. Many CIOs have little expertise with security, but, as discussed above, nearly all CIOs are responsible for it. It’s fortunate that many institutions have a chief information security officer (CISO), who often reports to the CIO.21

Data collection and analytics is an issue not only for security but also across many areas of operation in higher education. Unfortunately, data and analytics is another problem area for CIOs. Only 25% of CIOs overall rated themselves proficient or expert in learning analytics. Moreover, CIOs overall rated their level of expertise in two areas—administrative or business performance analytics, and data, analytics, and business intelligence—midway (44% and 45%, respectively) among their other areas of responsibility.

The use of data for business operations is an issue for CIOs at smaller institutions generally. As shown above, approximately 75–80% of CIOs across all institution types are responsible for data, analytics, and business intelligence as an area of IT. However, just 47% of CIOs at very small institutions rated themselves proficient or expert in business process management, compared to 67–78% at larger institutions. One might expect larger institutions to have the resources...
to hire individuals who specialize in business process management and other business analytics functions, while at smaller institutions with smaller IT units these functions might fall to the CIO. These findings, however, seem to indicate the opposite—that CIOs are responsible for business analytics functions at larger institutions more often than at small institutions. This finding may reflect a wider adoption of business analytics in larger institutions than in small. If so, this makes intuitive sense, as larger institutions are generally more complex, and therefore it may be easier for such institutions to see the benefit of quantitative metrics.

**Professional Characteristics**

EDUCAUSE and Jisc recently collaborated on two reports that address common concerns: understanding the skills required by technology leaders in higher education, and helping mid-career IT professionals prepare to become the next generation of IT leadership. Those two reports present the findings from discussions among working groups of CIOs and other IT leaders. A number of issues reappeared time and again during the course of those discussions, which were articulated in the reports as key roles played by IT leaders. Those key roles, and the skills necessary to fill these roles, became the starting point for the questions asked of CIOs in this section of the survey and the frame used in the analyses presented here.

The findings in the previous section say as much about CIOs’ institutions (and perhaps the institutions that CIOs worked at previously) as about individual CIOs themselves. It is possible to gain experience in a particular technology or service only if it is deployed at one’s institution.

CIOs were asked to indicate their level of agreement with a set of statements about themselves personally. It is perhaps unsurprising that fully 100% of CIOs agreed with the statement “I am responsible for the actions of my IT organization.” It is somewhat more notable, however, that three of the statements with which CIOs expressed the strongest agreement reflect a focus on deploying IT to serve the business of the institution (“I understand how the institution’s aims and aspirations might be furthered by IT,” “I understand how IT aligns with the business goals of the institution,” and “I understand the business challenges that the institution faces”). Given the fraught relationship, discussed above, that CIOs have with business analytics, it is encouraging to find that although many CIOs may lack expertise in analytics, they have a firm handle on the business and how it may be informed by analytics.

Following the set of statements concerning the business of the institution, those rated next highest in agreement by CIOs concern political and relationship skills. While all CIOs are responsible for the actions of their IT organization, almost all
(98%) agreed with the statement “I am accountable to my institution as a whole, not just IT.” Following closely, CIOs said they “value different perspectives,” “follow through on my commitments,” and “build relationships up, down, and across the institution.” These statements reflect the nature of the CIO role as spanning the entire institution and highlight the requirement that the individual in this role work with leaders across campus.

These statements fall into a set of categories derived from the skills identified in the EDUCAUSE and Jisc reports as necessary for IT leaders in higher education. Respondents were asked to rate the importance of these skill categories for success in higher education IT leadership and to assess the extent to which they themselves possess specific skills within each category. Figure 8 compares the percentages of CIOs who evaluated the importance of these categories as very important or extremely important with the percentages who either agreed or strongly agreed that they possess specific skills within those categories. The rating of skill levels shows the range of respondents’ self-assessments.

![Figure 8. Importance and possession of various skills for success](image)

What figure 8 makes clear is that CIOs not only consider all of these skills important but also believe they possess almost all of them. In the case of a few discrete skills, CIOs generally reported low levels of proficiency. “I tend to under-promise” and “I tend to over-deliver” (which are part of the category of political skills) are at the bottom of the pile. CIOs also believe that they need to work on
the skill “I identify trends before my peers” (one of the thinking skills) and the skill “I have networks that go outside higher education” (part of relationship and networking). By and large, however, most CIOs believe that they possess most of the skills across all of these categories. In particular, CIOs think especially highly of their skills in the communication and the leadership categories. For each skill in the communication category, at least 90% of CIOs believe they possess that skill; for each skill in the leadership category, at least 95% of CIOs said they have that skill. On the one hand, it would be easy to dismiss this finding as The Lake Wobegon effect, that all the children are above average. On the other hand, with an overall median of 18 years in higher education and responsibility for such a wide range of areas, CIOs certainly have had the time and exposure to gain these skills.
Making Future CIOs

Some consider the role of CIO to be the best job on campus. Others do not aspire to the CIO role and the time, attention, and uncertainty that level of leadership requires. Still, not only is the position of CIO more important in higher education than ever, it is also seeing a diversification of roles and responsibilities within and outside the institution. While not all technology leaders want to assume this role, more than half of all technology leaders surveyed in the Center for Higher Education Chief Information Officer Studies (CHECS) CIO studies do. What is appealing about the position of CIO? This section addresses what CIOs believe is best and most important about the job and how they believe they could do better in the role.

The job of CIO is both technical and political, with a simultaneous focus on the unique requirements of individual campus units and on the institution as a whole. Respondents were asked what they enjoy most about being a CIO, and their answers focused on a few important themes: organizational leadership, collaboration, students, and mentoring. Many respondents’ answers touched in some way on the CIO’s role in providing leadership across the institution, since IT is integrated into and affects almost every unit on campus. Some respondents emphasized “business improvements,” “efficiency,” and “productivity” as the effects of IT at the institution, while others emphasized “solutions to problems” and “enabling the academic and administrative missions of the institution.” Either way, CIOs agree that providing this type of crosscutting leadership helps the institution do what it does, better. One CIO summed up this leadership well: “I think of myself as a higher education leader more than as an IT leader.”

The nature of IT is constant change, and higher education is currently in an era of great change as well. Many CIOs wrote that part of what they enjoy about the job is this constant change. As one CIO wrote, “I love that although I have been in the same job for 20 years, I am always working on new things.” Part of the reason CIOs are always working on new things is that their scope of responsibility spans the entire institution, and, in the service of the institution, the CIO collaborates with all units on campus. Moreover, a major part of the mission of the institution is to be student focused. Many CIOs wrote that they enjoy contributing to the educational mission of the institution. While CIOs are not directly involved in student education, they certainly, as one CIO wrote, have “a direct and tangible impact on the quality of education that our students receive.” In addition to serving the institution, CIOs also serve the future of the IT profession by developing future IT leaders. Many CIOs wrote that they enjoy this mentoring, “identifying and coaching rising stars within our own IT organization” and “hiring great people and helping them flourish.”

“I love that although I have been in the same job for 20 years, I am always working on new things.”
The diversity and constant change of the position leads directly to one of the most significant issues for many CIOs, time management. Respondents were asked to identify one thing they would change to make themselves more effective as IT leaders. Time management, in many forms, rose to the top of this set of responses. Some CIOs wrote that they wished they had better time management skills, simply because the work is so all-consuming; more than one individual said they would like to have an assistant. Some CIOs wrote that they hoped to carve out more time for “reflective thinking” and more time “to develop strategy” rather than working on operational matters. Some wanted time also to collaborate with “key administrative units” and to develop a “more detailed understanding of the administrative side of higher education.” After time management, CIOs wrote about a whole host of personality traits that they would like to possess. Some wished for more patience (don’t we all), some for more political savvy (ditto), and some for more charisma or for better presentation skills to be better leaders. As one CIO wrote, “Our weaknesses are usually our strengths taken to extreme.” Quite true, and something all current and aspiring IT leaders should keep in mind, given that one’s leadership style probably cannot be separated from one’s personality.

In that vein, respondents were asked what advice they have for those aspiring to become IT leaders. Some of the most common answers to this question involved variations on the theme of building relationships, including “with associates, coworkers, and team members,” “with key stakeholders,” and “within and beyond your institution.” While few CIOs explicitly stated that the role of CIO is political, this was a clear theme running through many responses. Many CIOs wrote that interpersonal interactions, “fit,” “trust,” and “respect” are crucial for getting the job done. Trust and respect, according to many, arise from a solid understanding of the business of higher education, of the mission of the institution, and of the priorities of institutional stakeholders. Finally, there was an interesting split among CIOs about the technical side of the CIO role. On the one hand, some responses emphasized the importance of solid technical skills; one CIO even wrote that one must “understand your technology responsibilities inside and out.” On the other hand, some responses downplayed the importance of technical skills. As one individual wrote, “CIO is not really a technical position” but is instead about institutional strategy. Of course, these two viewpoints are not mutually exclusive. Leveraging technology for strategic ends requires an inside-and-out understanding of both technology and one’s responsibilities. In the end, CIOs’ advice to future IT leaders comes down to some fundamentals that are probably appropriate for most leadership positions in higher education: Learn to tolerate ambiguity, build relationships, collaborate, and focus on the students.
Conclusion

Chief information officer is perhaps both the best- and worst-understood job in an IT organization, perhaps on the entire campus. On the one hand, it is well understood that the CIO has responsibility for the IT infrastructure and organization. On the other hand, what exactly does that entail? As we have shown here, in institutions of higher education, that encompasses responsibility for nearly every area of IT on campus, including those in which the CIO has little or no experience, and even those for which the CIO believes he or she should not be responsible. This breadth of responsibility is one of the great appeals of the job, to many in it, as it requires addressing a constantly changing set of problems and requirements, as well as interaction across and even outside the institution. Despite this breadth of responsibility, however, there is actually remarkably little variation in the job of CIO across types of institutions. There is rarely greater than a 10-percentage-point spread in any of the findings of this study, regardless of how the data are sliced.

At first glance, this seems to be a contradiction. It is not, however, and the question “How can apparently nonroutine work display such a high degree of regularity?” is one that has been addressed in depth by organization science. Organizational routines are used to produce the wide range of outcomes that are required by an organization of any complexity. These routines are dynamic and continuously emerging, and they rely on the input of multiple individuals. CIOs, to a greater degree than anyone else in the campus IT organization, are in a position to shape these organizational routines and in doing so provide structure to the campus IT environment. These routines need to be flexible, however, to accommodate the diverse and unique requirements of a wide and ever-changing set of technologies, services, and stakeholders. It is this that explains the regularity of the CIOs’ profoundly nonroutine work. While the specific problems that arise are constantly changing in the short term, the organizational routines that the CIO must engage in to address these problems are more or less stable in the longer term. The job of CIO is like a stream in a wide riverbed: The water pushes sand and stones around, so that on any given day it may be flowing this way or that, but the channel in which it flows changes only slowly—unless acted upon by powerful forces.

This view of organizational routines also helps explain what much past research by EDUCAUSE and others has found and has been reified here—that IT leadership is as much about relationship building, leadership skills, and strategic planning as it is about technology. Organizational routines require input both from individuals and from other routines. Anyone attempting to manage
these routines must therefore, directly or indirectly, manage the individuals contributing to them. Relationship building, political skills, and collaboration are important to any IT leadership position, but they are critical to the role of CIO because the CIO has more influence than others in the IT organization in designing and changing routines. It is this influence, the opportunity it affords to collaborate with the widest possible range of stakeholders, and the opportunity it affords to affect the strategic direction of the institution that our respondents said makes it the best job on campus.
Advice for Current CIOs

- Consider the appropriate scope of responsibility for your position. This should depend on your current and ideal scope of responsibility for areas of IT at the institution. This should also depend on what areas of IT are under independent campus units.

- Consider the appropriate percentage of time you should allocate to the various activities within your scope of responsibility.

- Develop a vision for the future of your role.
  - Do you have responsibility for all relevant areas of IT? Are there areas that should be under your scope of work, or areas that you should divest of?
  - Is your line of reporting optimal? How might it be improved to benefit the institution?
  - Do you have sufficient resources, including staff? What critical value might you be able to add with more staff?

- Identify areas of IT in which you believe that your knowledge is not as strong as in other areas. Seek professional development opportunities to strengthen your skills in these areas.

- Consider whether it makes sense for you to have primary responsibility for certain areas of IT at your institution or if it would be more appropriate to hire one or more staff to focus on those areas, such as information security and institutional research.

- Ensure that you are taking an enterprise-wide perspective to IT at your institution. Collaborate with other leaders across campus.

- Do what you can to carve out more time for strategic and reflective thinking.

- Build external professional networks through associations like EDUCAUSE and peer-based organizations.

- Invest in the future of your institution by identifying CIO aspirants within your institution, mentoring them, and giving them opportunities to advance and expand their experience.
Advice for the CIO’s Supervisor

- Work with the CIO and other institutional leaders to determine whether the CIO’s current reporting line is the best model for the institution or if a different structure would better suit organizational goals. This naturally depends on institutional priorities, including the strategic importance of the CIO position and its place in the organizational hierarchy, as well as the need for the CIO to develop opportunities for collaboration across the institution.

- Consider whether the CIO should be a member of the president or chancellor’s cabinet and/or should be required to attend meetings of the institution’s board. This depends on the influence the CIO should have in campus decision making and the need for the CIO to develop opportunities for collaboration across the institution. The decision should be made in consultation with the CIO and other executives.

- Help the CIO establish an IT organization of the appropriate size and breadth. This will depend on the CIO’s current and ideal scope of responsibility.

- Support the CIO so that the IT organization can be as effective as possible. Understand the CIO’s strengths and areas for growth, and help the CIO and the IT staff achieve their goals.

- Support the CIO to enable him or her to carve out more time for strategic and reflective thinking. This will lead to more effective collaboration across campus and better integration of the IT unit with the institution’s strategic goals.

- Discuss with the CIO areas in which they feel the need for professional development. Provide time and resources for the CIO to pursue appropriate professional development opportunities.

- Discuss with the CIO whether it makes the most sense for the CIO or a member of the CIO’s staff to have primary responsibility for certain areas of IT at your institution, such as information security and institutional research.

- When seeking to hire a CIO, look for candidates both within higher education and in other sectors. Look for existing CIOs, as well as associate information officers and senior-most information officers of departments or units.

- Invest in the future of your institution by encouraging and providing resources for your CIO to identify and groom potential successors.
Advice for Aspiring CIOs

- Work toward a graduate degree if you don’t already have one.
- Be patient. CIOs are predominantly in their 50s and older; it takes time to work one’s way up to this position. However, your patience will be rewarded—it is possible, if you so desire, to remain in the position until you retire.
- Gain management experience, particularly in managing multiple groups with different scopes.
- Gain experience in IT executive leadership positions. These positions may be within higher education or in another sector; the important factor is that they be positions as an information officer.
- Understand that different types of institutions have different priorities, infrastructure, and culture and therefore have different types of CIOs. Consider what type of CIO you want to be and are suited to be, and look for an institution that would fit that model.
- Build relationships across and beyond your institution to establish trust and respect among key institutional stakeholders.
- Gain experience in as broad a range of areas of IT as possible. This should include areas that fall within the scope of positions or units that report to a CIO and areas that you have little experience with.
- Understand that CIO is only partly a technical position and is at least as much about relationship building, leadership skills, and strategic planning.
- Seek appropriate professional development opportunities in areas of IT, as well as communication skills and networking and relationship building.
- Build external professional networks through associations like EDUCAUSE and peer-based organizations.
Methodology

Survey invitations were sent to a pool of potential respondents with profiles in the EDUCAUSE member database indicating that they were CIOs or held an equivalent position, to subscribers to the EDUCAUSE CIO Constituent Group listserv, as well as to other CIOs identified by the respondents to the other ECAR studies of IT leadership in higher education. A total of 236 respondents completed the survey. Respondents were from 43 states spanning all regions of the United States and from 14 other countries. U.S. respondents made up 91% of the sample; non-U.S. respondents made up 9% of the sample. Data collection took place in April 2016.

Notes


5. Seventy-one percent of respondents to the survey for this report have the title chief information officer. Most of the remaining responses were split between two titles: vice president and director.

6. This is consistent with data about CIOs collected by the EDUCAUSE Core Data Service (CDS): Between 2011 and 2015, 30–32% of highest-ranking IT officers (CIO or equivalent positions) reported to the president, and 20–24% reported to the highest-ranking academic officer.


8. The percentage of time spent on various activities sums to 100% for each individual respondent. The medians presented here, however, are across all respondents and therefore do not sum to 100%.

9. For our analyses we divided institutions into categories based on enrollment size (full-time equivalent). These categories were derived from Integrated Postsecondary Education Data System (IPEDS) data for fall 2014. The categories are as follows: very small (less than 2,000), small (2,000–3,999), medium (4,000–7,999), large (8,000–14,999), and very large (15,000+). Please note that the Carnegie Classification of Institutions of Higher Education uses these same names for their categories of institutional enrollment size in the size and setting classification variable. However, our operationalization of size categories differs from Carnegie’s. For Carnegie, a very small two-year institution has fewer than 500 students, while a very small four-year has fewer than 1,000, for example. Our categories, however, are consistent across all institution types: small is small whether it’s a bachelor’s or a doctoral institution.
10. This is a far more pronounced difference than in *The Analytics Landscape in Higher Education, 2015*. A re-analysis of the data about the role that various positions play in institutional analytics shows that 56% of CIOs in private institutions and 52% in public institutions have a leadership role in institutional analytics. See Ronald Yanosky, *The Analytics Landscape in Higher Education, 2015*, research report (Louisville, CO: ECAR, October 2015), 12.

11. Ibid, 11.


13. The findings in this section are the results of a re-analysis of data from the 2016 higher education IT workforce survey. For more information, see Pomerantz and Brooks, *The Higher Education IT Workforce Landscape, 2016*. For a more in-depth view of career trajectories within the higher education workforce, see the Career Trajectory Interactive Graphics on the IT Workforce in Higher Education, 2016 research hub.

14. Ibid.

15. Ibid.

16. Ibid.

17. Ibid.


19. Observed differences are not statistically significant. However, we note that some differences would be large enough to be significant if we had as many female and nonwhite respondents as we had male and white respondents. Large sex and ethnicity inequalities severely limit the number of observed minorities, and a larger sample size may in fact have produced similar percentages and statistical significance.

20. Responses to these questions were on a Likert scale, ranging from No expertise to Expert.

21. As of 2014, 19% of U.S. institutions have a CISO. See ECAR, *CDS Spotlight: Information Security*, 2014. See also the forthcoming IT workforce report on chief information security officers, which will be part of the same series that includes this report.


23. Responses to this question were on a Likert scale, ranging from Strongly disagree to Strongly agree.

24. Responses to this question were on a Likert scale, ranging from Not at all important to Extremely important.

25. Responses to this question were on a Likert scale, ranging from No expertise to Expert.


27. Berman et al., “Challenge Accepted.”

28. Kim, “Not a Future CIO.”


