Gender Diversity among Higher Education CIOs
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Citation


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Introduction

Women's presence in the IT profession in general, and as top executives in particular, has been a theme garnering much attention over the past several years. At a time when women make up approximately 47% of the entire U.S. workforce,¹ the 2012 Harvey Nash CIO Survey reported that women represent only 9% of the corporate CIO population, a proportion that has remained stubbornly stagnant for years.² Data from higher education, however, have consistently reported women in the CIO role at much higher rates. Since 2004, nationwide surveys of higher education institutions conducted by the EDUCAUSE Center for Analysis and Research (ECAR) and the Center for Higher Education Chief Information Officer Studies (CHECS) have shown that women hold the CIO position between 21% and 26% of the time.³

While these data still do not rise to the level of proportionality seen in the overall workforce, they do raise the question of why such a discrepancy exists between higher education and the corporate sector. If the normative cultures of corporations, higher education, and the IT profession have all been white and male, why and how have women achieved more IT leadership success in higher education? What cultural elements might be present in higher education IT that have led to more frequent attainment of the CIO office for women?⁴

A mixed methods research study conducted in the fall of 2012 in cooperation with ECAR explored this phenomenon. The first, quantitative phase of the study consisted of a survey distributed to a random sample of women and men CIOs in the EDUCAUSE membership database (N = 188 respondents). Semistructured interviews with nine women CIOs who had filled out the survey constituted the second, qualitative phase of the study. This research had two aims: first, it gathered descriptive, demographic information on today's higher education CIOs in order to compare women and men in that position, and second, it addressed the organizational-level elements contributing to women's attainment of the CIO position in higher education IT organizations. The two main research questions framing the study were “What individual and organizational-level factors predict women's presence as CIOs in higher education IT?” and “How do women CIOs in higher education IT explain the organizational-level factors that have contributed to their ability to attain the CIO position?”
Research Findings

The qualitative data, from which 7 categories with 13 themes emerged, helped to flesh out significant findings from the quantitative stage of the study. The following groups of integrated findings are discussed, with references to the relevant literature: demographics and the pathway to the CIO office, higher education IT’s masculine culture and environmental factors women must navigate, and positive organizational-level elements contributing to women’s presence in the field.

Population Demographics

Prior to this study, data collected on higher education CIOs had been limited in scope. This study not only affirmed what had previously been documented about the population but also reinforced what was known. Data collected by CHECS and ECAR since 2004 have shown the higher education CIO population to be predominantly male, white, and highly educated. Participants in this study’s survey were 73% male and 84% white, and 78% had a master’s degree or higher (Figure 1). These data further reflect the very first information captured on the higher education CIO in 1990, though there are proportionally far more women in the role today than the four (7%) documented in that study of 58 higher education CIOs. When it comes to gender, race, and educational level, not that much has changed in the nearly quarter of a century since higher education began hiring CIOs and researching that role.

Figure 1. Respondent Demographics
This study’s inquiries into participants’ educational backgrounds substantiated recent CHECS data that reported technology (IT, information systems, computer science, etc.), business, education, and administration as the top-four disciplinary areas for CIOs’ highest-earned degrees. Figure 2 shows that for this study 26% of survey respondents had degrees in business, 22% in IT/computer science, 13% in education, and 4% in administration. Though as students, women dominate in the disciplines of education and public administration, that is still not the case in either business or technical disciplines such as computer science and IT. A major question these data raise is what might happen to the potential pipeline for women if those latter two categories, which are and historically have been so closely aligned with pursuing the CIO role (both within and outside higher education), continue to attract proportionally fewer women. In Through the Labyrinth: The Truth About How Women Become Leaders, Alice Eagly and Linda Carli proposed using a labyrinth metaphor to understand the complex journey women take on their way to high-ranking leadership roles. In that analogy, the pipeline represents the entry point to the maze. Having fewer women in the pipeline reduces the potential for gender proportionality at all levels of IT, and certainly at the top. At present, we can assume that because CIO jobs are often filled with candidates who come from male-dominated disciplines, a bias exists in the pipeline that needs adjustment. Whether women who are in that pipeline are discriminated against on their way to the top is a different matter altogether. The two are distinct elements that have the potential to affect gender proportionality in the CIO role; the latter element is discussed later in this article, in the section on women and the labyrinth.

![Figure 2. Common Disciplines for CIOs' Degrees](image-url)
Today’s CIO Role

Those who research what CIOs do (in and out of higher education) have indicated that a big part of the role is bridging the gap between the institution—or business—and technology, aligning IT with the mission and goals of the organization. Understanding the multifaceted needs of higher education institutions has also been emphasized as something that higher education CIOs must bring to the job. Unlike businesses focused on selling products or services, higher education’s goals are far less tangible and more diverse, and thus meeting them requires leaders who can help find technology solutions for a variety of campus domains. Additionally, those who have asked higher education CIOs what skills they need in order to be effective on the job have found that communication and strategic thinking rank far higher than technical proficiency.

There seems to be at least some disconnect between what the data show demographically about higher education CIOs’ educational backgrounds and the competencies CIOs say are important for the work the role entails. Technical proficiency does not necessarily translate into business strategy or communication expertise. With a wave of higher education CIOs on the verge of retirement, this dissonance offers the community something to think about for future generations of CIOs. If higher education wants to further diversify the top ranks of its IT departments, looking to the same male-dominated disciplines may yield disappointing results.

Demographic Differences between Women and Men

The demographic analysis showed very few statistically significant differences between women and men in higher education CIO roles. No major distinctions were recorded between the two groups for most individual characteristics, including age, race/ethnicity, marital status, age of children, salary, and the years spent in their jobs and at their institutions. The one personal difference revolved around children, with women CIOs being more likely to be childless than men (28% of women had no children, compared with only 10% of men). As with the data on individual characteristics, few differences were seen around education level and background—women’s and men’s educational profiles looked very similar. Slightly, but not significantly, more men than women had degrees in education, and slightly more women than men had IT degrees. Furthermore, the organizationally based demographic profiles of the two CIO groups displayed little contrast; whether evaluated along lines of Carnegie classification, cabinet membership, size, or structure of their organizations, no significant differentiation between the genders was measured. In these various ways, the descriptive data revealed that core principles behind CIO selections trend strongly toward a homogenous norm. Such a norm might be difficult to adjust unless the homogeneity is first acknowledged. Even then, those who study organizational culture have shown that without major disruption, shifting it can be quite difficult.
On the other hand, some of the data in the demographic profile of CIOs in higher education could be interpreted from a more encouraging perspective. Women are not significantly older or more highly educated, nor are they ghettoized in smaller, less prestigious institutions. Yes, they are less likely to have children, a fact about women executives reflected in and outside higher education, and a persistent trouble spot, for sure. The uniformity, however, suggests that if women candidates fit into the established CIO mold, they too are being considered and chosen for those positions. One final note about the demographic comparison between women and men CIOs: when analyzed for gender differences, no statistically significant salary differences were found. Women, however, made an average of almost $14,000 less than men annually. Though this income gap did not rise to the level of statistical significance, it most certainly represents a gap with practical significance. This fact figures into the discussion around salary bias later in this report.

**Pathways to the CIO Office in Higher Education**

In this study, the qualitative interviews helped add context to the demographic data gathered for understanding women’s routes to the CIO role. In *The Myth of the Ideal Worker: Does Doing All the Right Things Really Get Women Ahead?*, Nancy M. Carter and Christine Silva reported findings showing that women make the most progress by remaining with their organizations; men advance more quickly when they jump from place to place. The qualitative portion of this study partially affirmed these findings: five of the nine interviewees attained their CIO role by rising internally through the ranks at their institutions. The interviews did not entirely support what Carter and Silva had to say, however. Four of the nine interviewees, in fact, advanced their IT careers in higher education not only by changing institutions but also by making geographical leaps, at times clear across the country. Two of the four women who did this had no children and expressed no qualms about moving to get the job they wanted. Of the internal advancers, however, four of those five had children and had spent many years at their current institutions while raising them. Several actually mentioned family as a key reason for staying put. Their rationale for staying reflects what scholars have said about choices women make—more often than men—when they decide to have a family alongside a career: family needs play a big role in how they manage their commitments. So even though moving from one job or location to another might be a pathway to advancement for some women, it is not necessarily an option for others. There are not that many higher education CIO jobs, however, so moving when it is possible might, in fact, be an advancement strategy that works for women.
Higher Education IT’s Masculine Culture

The descriptive information on today’s CIOs in the academy offered a picture of higher education IT’s topmost echelon as male-dominated. This comes as no surprise when looking at both the history of the IT profession and the data that have been collected about CIOs both in and out of higher education. Technology historians draw the connection between the profession and men back to times before information technology was even formed as a field.17 Women were absent from arenas such as engineering, computer science, and business due to socially ascribed gender norms in existence when those domains emerged in the workforce. And the CIO role, when organizations first began incorporating it into their structures, inherited those norms: In both the corporate sector and higher education, CIOs were white, middle-aged men with technical or business degrees.18

Examining this information through a social structural lens gives shape to understanding higher education IT culture as masculine. Scholars of organizational theory have asserted that when a profession has a strong, historical tie to a dominant gender, the occupation itself is informed by that gender and by the values, assumptions, and stereotypes associated with it. Such scholars have also recognized organizations as locations where gendered relations are produced and regulated, through discourse and practices biased toward those in the majority.19 Thus, the elements embedded in higher education IT, where men have dominated in the profession and leadership roles since the very beginning, provide a distinctly masculine foundation for the profession’s culture. In such a culture, women exist on the periphery of cultural creation—they are outsiders.

Research by organizational theorist Edgar Schein has illustrated that institutions’ cultures become entrenched; unless drastically disrupted, they retain the assumptions that drive them, as well as their design. What Schein posits makes sense when considering today’s higher education CIO, a position that is still overwhelmingly white and male, and primarily educated in technical or business-related disciplines—characteristics confirmed by this study’s survey data.
Higher Education IT: Women and the Labyrinth

While the demographic data from this study illustrated that higher education IT is indeed dominated by men at the top, other data from the survey and interviews painted a fuller picture of the masculine environment in which CIOs work. Distinct elements that give rise to a masculine organizational culture emerged, along with associated consequences for women CIOs. The labyrinth metaphor is once again useful, as the factors discussed below contribute to a complex, winding pathway that women must frequently navigate in order to succeed.

Ideal Worker Norm

In his 2007 book *Striking a Balance: Work, Family, Life*, Robert Drago defined what he called the “ideal worker norm,” a cultural norm—or shared belief—associated with managers and professionals. The norm requires high levels of commitment to one’s job, with little regard to life outside the work sphere. This norm, he states, “serves as a dividing line within the workforce, segmenting off those who strive to be worthy and committed to meeting the demands of the norms from those who are unworthy and not expected to adhere to the norm.”20 The assumptions behind the norm are bound to gender stereotypes and dichotomies, especially when it comes to life outside the boundaries of work. While men are presumed able to commit to the ideal worker norm (whether or not they like it), women are assumed to have mixed loyalties if family is involved.

Looking at the average reported hours worked by the survey population of women and men CIOs—53.59 hours per week—does not tell the full story about how this norm might affect those individuals, as one could argue that it is reasonable to expect such hours in an executive role. The interviewees, however, painted a different picture of working norms for higher education CIOs, one more closely aligned with Drago’s description of the ideal worker. Five of the nine participants related intense expectations associated with the job. Having to always be “on” or “working 24/7” were phrases used to illustrate the work intensity level. Others talked about their days starting early and ending late, sometimes with only brief breaks in the middle to tend to a spouse or child. In all of these cases, the necessary commitment women described enlarged upon the sole data point about number of hours worked. An unrelenting work schedule has some serious implications for women at various points in their lives and will be discussed further in the section on home responsibilities.
Masculine Bias and IT Leadership

The ideal worker norm was one indication of higher education IT’s masculine culture. Other expressions of that culture included various types of bias associated with IT leadership. In 1977, Rosabeth Moss Kanter posited how proportionality could affect how groups or classes of individuals are viewed and treated within organizations. Even at 27% of the population, women exist in a role that is skewed toward men. Existing as outsiders in the CIO position, they are subject to bias and discrimination as participants in that role.

Leadership Bias and Discrimination

Scholars who study leadership and gender have illustrated that, especially in male-dominated professions, there is often a perceived incongruity between the female gender role and positions of leadership. That women leaders are perceived as out of place can lead to prejudicial treatment. Being treated differently in masculine environments then becomes something that women need to manage as part of their careers, whether consciously or unconsciously. In this study, several different overcompensating behaviors were articulated as methods of managing that bias. They included spending more time in the office, using fewer flexible work options, and adopting learned, gendered behaviors.

Face Time Required

In this study, linear regressions for various permutations of where women and men CIOs in higher education spent their working hours were run on the survey data. The analyses showed that women spent significantly more hours in the office (p = 0.0348) than their male counterparts, even after adjusting for annual income (the only other variable with a significant effect). However, this model describes only about 14% of the variability in hours, so much variability remains unexplained. Additionally, comparisons between women’s and men’s use of flexible work options revealed a pattern in which men CIOs were more likely to use those options and significantly more likely to use the compressed work week alternative (p = 0.0108).

Asking women CIOs why they and their peers spend more time in the office than men and use fewer flexible work options revealed that, in order to prove themselves as worthy leaders, they felt that they needed to be visible to others at their institutions. Interviewees expressed a clear and conscious need to publicly demonstrate their competence in the IT leadership role, given the gender-based bias they had experienced. Understanding themselves as outsiders in the role led them to modify their behavior to compensate for that bias. Being physically present in an office space illustrated commitment to their job—being an ideal worker—and left no reason for doubt as to whether they might be tending to something else when not in the office. The
“something else” that often gets attached to women in the workplace is their family. Presumptions about leaving early or needing flexibility for family reasons can corrode perceptions of women as “ideal workers,” leading them to behave in ways meant to counterbalance the bias, such as spending more time in the office.

**Learned Behaviors**

Another way that women in this study managed the masculine bias associated with the CIO role was to adopt behaviors that they felt were either appropriate for the role or appropriate for their gender within the role. Research on leadership and gender has found that knowing how to lead as a woman can be tricky business. Because of the associations between leadership and masculinity, women can trip into proverbial land mines if they act in ways that are too masculine or too feminine, especially in masculine domains like IT. Knowing “how to act” becomes an even more complex task when considering other influential cultural factors such as geographic region. Being a woman CIO at a Southern institution may be vastly different from being one in the Northeast or in the Pacific Northwest. Two participants, both from Southern institutions, told stories demonstrating some of that complexity. One woman had to learn to “bang her fist on the table” and act aggressively in order to be taken seriously, while another learned to “act like a lady,” as she saw the price other women leaders had paid for being both smart and aggressive (aggression being a characteristic of “proper” masculine behavior). These two stories illustrate the concept of the “double bind”: women who lead in a too authoritative, stereotypically masculine way may be criticized, while the contributions of those who are too stereotypically feminine may be dismissed.

**Hiring and Promotion: Bias, or No?**

The literature concerning leadership and gender touches upon how bias can affect who is hired and promoted for particular positions. In 1977, Rosabeth Moss Kanter coined the term “homosocial reproduction” to describe how organizations, such as IT, with a heavily dominant population enforce their culture through the selection of new members who resemble those already present. Edgar Schein also wrote about how leaders tend to be most comfortable with and choose new employees on the basis of existing cultural norms. These very human tendencies often subconsciously influence decisions about who is best suited for particular jobs, undervaluing or not recognizing competence in the “other.” These tendencies, when left unchecked, have been found to lead to different rates of promotion for women and men. Again, when the organizational discourse is decidedly masculine, women tend to suffer. To counteract the negative influences of such unconscious stereotypes, researchers have proposed redesigning recruitment and evaluation practices.
The survey findings illustrated that significantly more women than men felt that their gender had hindered their promotion \( (p = 0.0187) \). Though not strongly significant, proportionally more women also felt that their gender had prevented their being hired \( (p = 0.0566) \). Of the women interviewed, four expressed some very definitive negative connection between gender and their experiences with hiring and promotion opportunities. Those who spoke about these forms of gender bias pointed squarely at the hiring manager and/or supervisor level as the root of these problems. Whether being informed that the reason they were not promoted was because they were too aggressive, or being told not to meddle because technical work was “boys’ work,” the women interviewees in this study had experiences that supported what scholars have previously noted about unconscious stereotypes impacting who fits in particular positions or deserves to be promoted. This assertion that the hiring manager level is where the problems lie also supports the research that recommends altering recruitment and evaluation practices. Even with institutional practices in place, however, the hiring manager or supervisor level can be fraught with obstacles, and results can be quite idiosyncratic. Without a good deal of clamor and a strong dose of accountability, poor hiring and promotion processes can go undetected for very long periods of time.

The survey data were not entirely clear about hiring and promotion, however; they also demonstrated a positive relationship between hiring, promotion, and gender (see Figure 3). Additionally, four interviewees indicated that they had not experienced hiring or promotion bias. Those who reported these processes as fair said that transparent and/or improved human resources practices had helped. Human resource departments certainly play an important part in setting standards for hiring and promotion; studies have found that organizations perpetuate biases when they have ambiguous hiring and promotion procedures that lack proper structure.\(^{28}\) There are important practice-based implications, then, for what might be done to improve situations at institutions where procedures might not be well defined or clear. If the women who stated that they had not felt such biases present had all been from one geographic location or did not exhibit great insight into how gender impacts behaviors and experiences, there might have been more to unpack from these data. They did demonstrate insight, however, so the mixed results for hiring and promotion bias lead to questions around how much the prejudice that some women experience is tied to idiosyncratic behavior at the hiring manager and/or supervisor level, as well as to poorly designed human resource practices. Another question that ought to be asked is whether higher education is more cognizant of diversity (gender, race, ethnicity, etc.) because of the impact institutional diversification has had on the life of the academy, and if so, are human resource departments taking this up to good effect? These are questions worth posing if these unclear data are to be better understood in the future.
The varied results on this topic imply that the situation may be evolving at the institutional level. Institutions that are paying attention to the issue of gender diversity may be putting effective practices into place. However, even organizations with the best-laid plans cannot necessarily ensure that good policies are being uniformly implemented. Without better monitoring and accountability, those in positions to hire and promote can continue to do great harm to the cause of diversity.

Salary Bias

The pay gap between working women and men has been well documented for years. In its most recent report, the American Association for University Women noted that in 2011 women earned an average of 77 cents on the male dollar. The same forces that impact hiring and promotion bias have been articulated in the literature as those linked to differences in pay rates for professional women and men. Women tend to be undervalued in professions where they exist as the “other,” which shows up in wage-based inequalities despite the attention given to the topic. Wage discrimination
is difficult to assess directly, as so many factors must be taken into account, but when researchers have controlled for elements such as education, profession, and type of employment, they have still found that women earn less, on average, than men.30

Though only marginally significant \((p = 0.1089)\), data from this study’s survey indicated that women CIOs earned less annually than their male counterparts. A higher proportion of women earned less than $150,000 per year \((70\% \text{ vs. } 57\%)\). Where men and women did not vary significantly along other demographic variables such as age, education level, and background, and where women, in fact, had greater average tenures both in their roles and at their institutions, their lower salaries cannot and should not be ignored. Given that women in the study were significantly more likely than men to say that their gender negatively influenced their pay, more exists here to explore in depth. Though results concerning hiring and promotion practices were somewhat mixed, they were far clearer when it came to gender’s impact on salary. That salary is attached to both hiring and promotion processes calls into question the lack of bias reported by women in those areas. Wages are tangible evidence of fair or biased processes and must figure into any evaluation of how higher education institutions are doing when it comes to gender equity at the executive level.

**Negotiation**

The other qualitative theme that emerged related to the pay gap was the topic of salary negotiation. As of late, women in high-octane IT careers negotiating top salaries alongside accommodations for family life have been front and center in the news. Facebook COO Sheryl Sandberg advises women to just “lean in” in order to negotiate the lives they want. Melissa Myers, Yahoo!’s CEO, negotiated a package with the company worth tens of millions, complete with a nanny office next to her own. These examples lack relevance in the academic world, as Myers’s and Sandberg’s positions are more mythical than real for higher education employees. Their situations also imply that there are no structural barriers for women who want top jobs and salaries, and failure on either front is associated with the individual. Though the virtues of such an argument could be debated endlessly, at its heart it does ignore the systemic biases inherent in masculine environments like IT that affect women’s experiences with negotiation. Researchers have found, in fact, that when masculine norms are at play, women leaders who buck gender conventions and do things like negotiate aggressively are often punished for doing so.31

In this study, five of the nine interviewees spoke about salary negotiation. A number of them noted that either they or women in general have trouble asking for more money. They rationalized their behavior, saying that they were satisfied with what was offered, that they did not want to rock the boat, or even that they would feel like a bad leader if they got something for themselves but not for their staff members. What was clear, however, was their discomfort with the process of advocating for themselves. This discomfort can be directly tied to messages they have absorbed about gender-appropriate behavior and
the consequences for violating it, confirming what scholars have found about the impact of gender stereotypes on activities such as negotiating. One interviewee’s story about discovering the discrepancy between her salary and that of a male peer, and her boss’s unequal treatment, points to how different layers of the organizational structure can negatively impact outcomes for women. In that case, her boss gave her peer more only because he asked for it. While one could certainly put the onus back on the individual woman for not requesting more, given what has been documented about the double-bind phenomenon and the predicament women often find themselves in when they aggressively pursue what they want, it might more easily be argued that a structural solution to address the shortcomings of existing legislation would have a greater impact on this issue.

**Responsibilities at Home**

Another major piece of the labyrinth professional women must navigate has been well documented in the literature: Socially ascribed assumptions around gender, housework, and caretaking deeply affect women’s lives outside work and impact their career choices. Numerous scholars have assessed the lingering effects of gender roles on working women. When women first moved into the workplace, the historical roles they inherited on the home front did not disappear. Housekeeping and caretaking as feminine domains proved stubbornly difficult to shift over the years, and contemporary research shows that decades later, high-achieving women are still spending more time on domestic and relational duties than their partners or spouses.

This study validated that finding, illustrating that when five types of home-related duties were combined, women CIOs spent an average of 5.6 hours more on these tasks than their male counterparts each week; this was statistically significant when controlling for both demographic and organizational variables (p = 0.0282). In this crucial way, women and men who are CIOs in higher education varied significantly. Both women and men with children spent an average of 9.8 hours more on home-related duties than those without children (p = 0.0002). The largest mean difference shown between women and men on the individual tasks was for childcare, with women spending 3.7 more hours per week on this than men (p = 0.0444), which adds up to 192 additional hours each year on that one duty. When asked to explain this, all nine interview participants felt very clearly that stereotypical gender norms were at the heart of this difference.

If these patterns persist, there are some unmistakable implications for women who want to pursue the CIO role in higher education, and for higher education institutions if they want to diversify their executive IT ranks. If the working norms of the job are demanding in the ways described earlier, and if women have to spend more time in the office in order to prove themselves, and if they put in extra hours taking care of obligations at home, the stakes for taking on the job might be too high for certain women, especially during the years when childcare needs are greatest.
What Helps?

Much of what was documented in this study confirmed what researchers who study gender and masculine professions like IT in the corporate sector have already found: demographics influence organizational cultures, which when dominated by men take on masculine attributes. These characteristics have the potential to affect women’s participation in the profession and often negatively impact their experiences as potential and actual leaders.

Nevertheless, women are attaining the CIO position in higher education IT at greater proportional rates than they are in large corporations. In addition to some of the potentially detrimental aspects of higher education IT culture for women, this study also revealed a variety of organizational-level factors that contribute to environments that not only appeal to women but also help them pursue careers in the field and attain executive roles.

Stimulating Work

Though no survey questions were posed about what drew participants to higher education IT, two-thirds of the women interviewed spoke of how much they liked their work. They described working in higher education IT as stimulating and intellectually engaging, with something new always on the horizon to explore. Their sentiments reflect something that has been documented in the corporate IT literature: A major reason women choose to be in the profession is because it provides interesting, challenging work. As technology continuously evolves at a breakneck pace, and because it is used to solve so many organizational issues and improve processes, it is not difficult to see what might be engaging about the field. There are constantly new opportunities to investigate.

Additionally, one interview participant hit upon a quality of higher education IT that might, in fact, make it unique and an even more interesting place to be than in the corporate sector. When she worked at a law firm, IT’s role was to make things work well for the attorneys, rather than to innovate. In contrast, her work in higher education constantly involves a variety of campus constituencies with different problems to solve. As scholars have noted, higher education institutions are loosely coupled organizations with no clear goals or outcomes that focus the work. The variety of organizations within each institution that rely upon IT present interesting opportunities for higher education CIOs. And though higher education is historically and notoriously slow to change, which certainly affects IT leaders within the field, CIOs also have a diverse and ever-changing set of constituents who constantly need their attention.
Flexible Work Environments

A major strategy discussed in the literature for retaining women and helping them attain executive roles is workplace flexibility. As examined in the earlier section on home-based responsibilities, because gendered norms have connected household and caretaking duties with women’s roles, those who pursue both career and family often feel the weight of having to manage the competing demands of work and home. Policies such as flexible scheduling, flex time, and telecommuting have all been documented as helpful for professional women, and these policies can be facilitated through the use of technology. A 2003 study, in fact, found a positive correlation between an increase of women in senior management and flexible human resource practices. Where organizations lack these types of practices, it is not uncommon for women to weigh their options and leave the workforce. Flexible policies, research has shown, help organizations retain women and keep them from opting out.

The survey revealed that higher education IT organizations offer various flexible work options. Compressing the workweek was available at 15% of participants’ institutions, 33% had a distributed office option (working from home/other location), and 51% offered flex time. Additionally, six of the nine women interviewed brought up flexibility as an important component of their higher education IT experiences. Several connected the flexibility they had while raising their children to their sense of institutional loyalty. Two women contrasted their experiences in the corporate sector with the relatively humane environment they found in higher education IT, noting again how flexibility helped them manage competing work and family pressures. Others viewed it as an important benefit for their employees, empathic to the variety of life factors everyone needs to juggle.

Most of the conversations about workplace flexibility in the interviews, however, focused on past experiences, at points when participants were not in the CIO role. Add to that the lower percentages of individuals reporting in the survey that they used the available flexible options (among those with the option, only 55% used a compressed workweek, 68% a distributed office, and 78% flex time) and that women CIOs used these options significantly less often than their male counterparts, and the picture looks somewhat less bright. These collective data suggest that higher education may be more flexible than other industries at earlier points in individuals’ careers, but the executive level is often different and may disproportionately impact women because of their additional tasks on the home front. Schedule accommodations may help to retain women in the higher education IT workforce, but if the CIO role is considerably less flexible than other positions, not every woman will be able or willing to assume it, leaving part of the qualified workforce behind. If institutions make the role’s requirements such that the choice becomes more “either/or” than “along with,” they may be turning away very qualified candidates unwilling to choose the former way of operating.
Interestingly, in an era when many academic institutions, especially larger ones, feel the pressures of corporatization, it was women at smaller institutions who expressed the most distress at the lack of flexibility available to them and their staff. When a staff is so small that there are no layers of redundancy, allowing people to work from home or nonstandard business schedules may, in fact, be much more difficult to arrange than in larger IT organizations. This sentiment was not echoed by all interviewees from smaller institutions, but it may explain why some organizations do not offer their employees the flexibility they might want and need.

**Role Models and Mentors**

Role models and mentors have been identified as crucial factors for developing more gender-diverse environments. Role models are defined as those who hold positions aspirants hope to obtain. Their function is more passive in nature than that of mentors, and their presence in positions of power is what matters. Mentors, on the other hand, may be role models, but they are also individuals who actively sponsor and groom aspirants early in their careers for positions they seek. Research concerning women’s participation in male-dominated professions has found that a lack of both role models and mentors deters women’s participation in those fields.  

**Women Role Models**

It makes sense that a lack of role models discourages participation in particular jobs or industries. When groups of individuals (such as women) are absent from roles such as CIO, it becomes difficult to imagine them as well suited for the job. Women pay a psychological toll when they do not see other women in the CIO role in higher education IT organizations, or even just at the executive level in their institutions. The 2003 study that found a correlation between women in senior management and human resource policies also found a connection between the presence of low- to mid-level female managers and women in senior management. Though the direction of the correlation was not established, women’s presence stood on its own as an important component of building gender proportionality in organizations.

When survey participants in this study were asked how important role models had been to their decision to pursue the CIO role in higher education, results were decidedly neutral, and there were no significant differences between women’s and men’s responses. On the other hand, when asked if they were important for the next generation of higher education CIOs, both men and women agreed that they were. Additionally, one-third of the interview participants indicated that women executives’ presence in higher education—in general as well as in IT—makes other women feel comfortable pursuing executive roles in higher education IT. Seeing others like them at the top, they felt, made a notable difference. What these data did not indicate was the correlation between proximity, role alignment, and the positive influence of role
models. Is observing women executives across higher education as effective as having them at one's home institution? Are CIO role models in particular more helpful than executive role models in general? Assessing role model impact requires more attention to these types of nuances.

**Mentoring**

Mentoring, an even stronger thread than role models in the literature, has been documented as a particularly helpful strategy for developing top management. Research specifically in higher education IT has found this to be true as well; ECAR reports by Arroway et al. and Goldstein and Pirani both described the importance of mentors for CIO aspirants. Quantitative results from this study supported that view, with current higher education CIOs judging mentoring, especially informal mentoring, as important for that role. The qualitative data strongly supported that finding, with participants bringing up the subject 57 times during nine interviews. They added a key fact to the discussion about the culture of higher education: Mentoring is not only something that is recognized as important at the individual and institutional levels but also is a part of the professional development culture in higher education IT.

EDUCAUSE, the national membership organization supporting the higher education IT community, was noted by interviewees as emphasizing mentoring for CIOs among their professional development activities. Aside from the mentoring resource area on the EDUCAUSE website, qualitative participants pointed to the organization's online Affinity Finder, which allows mentors and mentees to find one another on the basis of various factors (geographic region, skill set, and position, among others). The many leadership institutes run and/or supported by EDUCAUSE were also mentioned as a way in which higher education IT professionals develop necessary skills and connections for their careers. Participants highlighted these support mechanisms as valuable for aspiring and current CIOs’ careers.

Understanding what types of mentoring models work for women in higher education IT needs further attention. Scholars who have looked at specific mentoring models have found women's networks and/or support groups to be valuable. This framework for mentoring was mentioned only once in the qualitative interviews but could be explored in future research about effective mentoring models for the higher education IT community. Some very positive types of mentoring are already in place in the community, thanks to a robust national professional development presence. Because mentoring has been correlated with senior managers’ development, further investigation ought to focus more specifically on the models in place and on additional models that might be further utilized to influence gender diversity in leadership roles. It would also be helpful to know whether particular areas of the corporate sector have strong national professional development organizations...
guiding efforts such as mentoring that help women in the field. EDUCAUSE's existence could be a positive factor distinguishing higher education from other industries. This study certainly suggests that possibility.

The Role of Mission in Education

Long ago, Burton Clark pointed out a defining characteristic of higher education: those who work in it believe in the educational mission. This factor has received attention in the higher education IT community as well. The 2004 ECAR study on IT leadership identified mission as important to leaders working in higher education IT. Survey data from this study corroborated that finding, with high percentages of respondents agreeing or strongly agreeing that working in higher education is important to them. The concept of mission came up in the qualitative interviews as well, when participants were asked why more women were attaining the CIO role in higher education: working toward something positive for society meant a good deal to them, with attention paid to the vocational aspect of education. One participant even framed education as a feminized field, indicating women's comfort working in certain types of disciplines (such as nursing or social work), despite men's historical dominance in higher education. That last notion is worthy of consideration, however, as women may indeed be more drawn to working in higher education IT because of the societal purpose served by academia. Is higher education, in fact, attracting more women to IT because of its mission? If so, what lessons does this offer the corporate IT sector if it too wants to appeal to a more gender-diverse base of individuals?
Summary and Recommendations

The combined quantitative and qualitative data from this study suggest that a number of positive elements are at play in higher education IT that not only make the environment appealing to women but also support their career aspirations and help them in their quest for leadership roles. Stimulating work in a discipline that draws on vocational commitment—coupled with the presence of role models, a strong professional development commitment to mentoring, and the flexibility women need throughout the arc of their careers—might provide the type of positive work culture that women need to succeed, in spite of androcentric elements. While the more favorable aspects associated with the academy may not neutralize the masculine bias inherent in higher education IT, they may nevertheless contribute tangibly to a positive, compelling setting in which women can grow their careers.

This study presents a more comprehensive picture of those in the CIO role than heretofore existed, while confirming previous research in the field. The data shed light on the similarities and differences between women and men in that position. They also serve to explain the masculine discourses that communicate norms for IT environments, while underscoring factors related to women’s attainment of this top IT job. Though the environmental culture described demonstrates evidence of inherent masculine biases, what also emerge are elements associated with women’s retention and success in the workforce. Stimulating, purpose-driven work in settings that allow for some measure of flexibility alongside a professional development community focused on mentoring for succession planning are features linked to women’s executive presence in higher education IT organizations.

Women in IT leadership persists as a salient topic of discussion today, in higher education and beyond. That information technology continues to be a crucial aspect of modern life means the significance of this subject will not fade away any time soon. The more that research uncovers about organizational characteristics that assist women in pursuing and reaching the top levels of IT organizations, the better able those organizations will be to effect positive change related to gender diversity in executive ranks.
Questions for Institutions

- Do hiring committees fully understand the competencies and capabilities CIOs need to do their jobs successfully?

- Are flexible work options and arrangements clearly articulated at my institution, and does the human resources department provide guidelines and training for implementation?

- Are flexible work options and arrangements used equally by all employees, or are there tendencies for certain groups of individuals or roles to use them more frequently than others? If the latter is true, what factors are driving the variable usage?

- Are there women in executive roles at my institution, in IT or otherwise? If so, how does their presence relate to an institutional commitment to diversity? If not, what factors might be inhibiting their presence?

- Is there an institutional commitment to mentoring future generations of IT leaders? Are there formal or informal ways in which CIO aspirants are groomed for the role? What opportunities exist for developing local programs to grow a gender-diverse next generation of CIOs?

- Does my institution allow CIO aspirants to take advantage of professional development opportunities in higher education IT?

Implications for Practice

Findings from this study concerning career pathways, the masculine bias inherent in higher education IT organizations, and the importance of mentoring suggest changes to organizational and human resource practices that could address the more negative aspects of the culture for women while strengthening efforts that help them. The following recommendations are by no means exhaustive, but they do identify creative opportunities for organizations committed to gender diversity.

CIO Pathways

What became evident in the data describing the educational pathways of higher education CIOs was that many had pursued degrees in technical and business-oriented disciplines. Though administration and education degrees also topped the list of those CIOs had pursued, more than one in five CIOs had some sort of technical degree. At the same time, higher education CIOs have indicated that communication, strategic planning, and business process skills are the most important proficiencies necessary for the job. The work of a CIO, however, is often unfamiliar to the
executives hiring them. The lack of familiarity can lead hiring committees to empha-
size skills and experience that, while helpful, may not be best suited to what organiza-
tions actually need.

**Recommendations:** Reengineer CIO hiring processes to educate participants about
the unique aspects of the role and the skill set necessary to be both productive and
successful. Expand job descriptions to include criteria that focus on skills CIOs deem
essential and thereby open opportunities to well-qualified leaders who in the past
might have been excluded.

**Unconscious Gender Bias and Human Resource Practices**

Unconscious gender biases that affect hiring, promotion, and pay must be confronted
in order to achieve substantial change for women in higher education IT.

**Recommendations:** Educate human resource officers to recognize how associations
between technology and masculinity affect hiring, promotion, and salary decisions.
These professionals should in turn share their knowledge with hiring managers and
search committees across their institutions. They could oversee hiring and promotion
efforts led by departments or committees, providing them with an essential network
of checks and balances. In addition to education, concrete cultural change also
requires transparent and fair hiring, promotion, and compensation processes in order
to prevent and offset individual, idiosyncratic behaviors.

**Flexible Work Options**

Flexible work options were explored as part of this study and found to be an impor-
tant factor in women’s career commitment in higher education IT. One of the key
components to diversifying executive ranks involves the presence of a robust pool of
aspirants. To ensure that an ample, heterogeneous supply exists, organizations require
strategies for retaining women throughout the entirety of their careers. Having a full,
gender-diverse crop of qualified individuals for the CIO role entails recognizing the
issues that women often face when balancing careers and families, and the impor-
tance of flexibility for doing so.

Though this study did not compare higher education with the corporate sector
directly, there was something deeply provocative about the commentary on flexibility.
If flexibility is necessary for managing work/life balance—and higher education IT is
doing a better job making flexible options both available and culturally acceptable for
workers—researchers ought to explore this factor in greater depth, and HR practitio-
ners should take advantage of this knowledge in their organizational work.

**Recommendations:** Human resource organizations can design and codify institu-
tional policies and procedures that departmental areas can implement. Education
and training on best practices for a flexible workforce would help guide various
institutional areas in ensuring that these procedures can work at a local level. In addition to establishing unambiguous policies and procedures, recruiters should also recognize that life today is complex; nearly every professional could benefit from some type of workplace flexibility. Institutions and departments should make flexibility part of the package offered to new employees and a point of negotiation when recruiting top talent.

**Mentoring the Future Generation of CIOs**

Research in and outside academia has extolled the virtues of positive mentoring. Higher education IT, primarily through EDUCAUSE, has developed a strong track record for both studying this topic and initiating practices to assist aspiring CIOs. This research study validated the significance of mentoring, with a majority of participants emphasizing the importance of the mentoring process. EDUCAUSE has led the mentoring charge for higher education IT, but there remains room in the field to expand upon what already exists.

**Recommendations:** EDUCAUSE has an e-mail discussion list for women in IT and offers affinity groups and other sessions at its annual conferences, as do other regional affiliates. Women's higher education IT support groups, however, tend to form more organically, working well in geographic regions such as the Northeast that are densely populated with academic institutions. With so many technological options available today that facilitate communication, support network opportunities seem underutilized in the higher education IT community. Both EDUCAUSE and regional EDUCAUSE affiliates could facilitate the organization of networking/support groups to help women in the profession.

Because room exists to enhance mentoring opportunities for CIO aspirants, regional affiliates should build upon EDUCAUSE's national efforts. Local seminars, programs, and institutes designed to mentor the next generation of CIOs could be quite helpful to women with family considerations and for whom long-distance travel might be difficult.

Finally, because such a small portion of the population participating in this research study acknowledged the presence of formal mentoring programs at their institutions, organizations should begin creating these types of programs as a way to groom personnel at and in various levels and tracks within higher education IT. If, as current data show, academia does a better job overall at retaining women in IT without a good deal of formal mentoring, then support structures built into the career path could add to the benefits women are already finding in the field. The possibilities for various strands of mentoring to positively affect the gender balance within higher education IT have not yet been fully exploited, but with all the current focus on women in IT, the timing has never been better.
Implications for Policy

Beyond the organizational and professional development practices suggested above, I also propose policy advancements aimed at increasing gender proportionality in higher education IT. My recommendations include altering policies related to the recruitment and retention of women in technical and business disciplines, as well as addressing the gaps in equal pay legislation that continue to work against women's ability to achieve parity. First, women have been underrepresented in both STEM disciplines and MBA programs for years. The gender distribution in computer science programs has been particularly alarming. In the mid-1980s, women earned 36% of all computer science degrees; by 2006 that number had dropped to 20%. While the percentage in business is higher than in computer science, this field has been troublesome as well: In 2009, women still represented only 43% of those earning master’s degrees in business. However, CIOs are often recruited in part because of their technical and/or business educational backgrounds. In addition to improvements in the hiring practices mentioned above that would broaden the fields from which CIOs are chosen, more must be done to augment the pipeline of women available for IT careers. Institutional support is necessary for policies promoting women's recruitment, retention, and advancement in technical and business-related disciplines. The research, training, and programs of organizations such as the National Center for Women & Information Technology and the Colorado Coalition for Gender and IT can help to achieve this aim.

Second, one of the most significant findings of this study demands that attention be paid to the issue of pay equity. Though institutions can do much locally to ensure that women and men receive equivalent salaries, women also require legislative support to reach a place of parity. Though the Equal Pay Act of 1963 and the Lilly Ledbetter Fair Pay Act of 2009 give women some protection in the courts, loopholes to full protection persist. This research points to the need for policies such as the Paycheck Fairness Act that “would require employers to show that pay disparity is truly related to job performance and requirements, not gender.” Data from this study indicate that prejudicial treatment still exists in the workplace and, in the end, affects women's salaries. Stronger legislation aimed at diminishing such biases is a necessary component of the road toward gender-based proportionality in IT.
Further Reading
The endnotes provide a list of resources for those interested in this topic. A research bulletin on the study's background is noted below, as well as the interview protocol used in the quantitative phase of the study. A full list of references can be obtained by contacting the author.

Background and Literature for the Study

Quantitative Survey Protocol
Notes


25. Schein, *Organizational Culture and Leadership*. 


30. Eagly and Carli, *Through the Labyrinth*.


43. Arroway et al., The Higher Education CIO; Goldstein and Pirani, Leading the IT Workforce in Higher Education.


46. Katz et al., Information Technology Leadership in Higher Education.


49. Bell, “Graduate Enrollment and Degrees: 1999 to 2009.”