Foreword

We are working in a time of profound change. The higher education industry is changing. The technology industry is changing. The intersection of the two—the space that EDUCAUSE members occupy—is a place of compounded challenges. IT organizations in higher education are resourceful, expert at making things work with safety pins and bubble gum. MacGyver-like, they work wonders with what they’ve got. However, many IT organizations are (and often have no choice but to be) focused on keeping things running, solidly maintaining the status quo of on-campus resources.

As consumer technologies and consumer expectations have begun to dominate the technology space, homegrown and even collaboratively developed solutions have fallen short of the scale and polish available from commercial solutions. Even when an institution (or group of institutions) can match the R&D and engineering of commercial solutions, it is very difficult to do so at a competitive price. Collaboration, not only among institutions but also with commercial partners, is often the most viable solution to meet institutional needs scalably.

To make the shift from a traditional IT organization to one that is more equipped to cope with today’s dynamic environment, it is necessary to invest in transforming the organization. By focusing on the fit between technology and the business of education, and by grounding technology in the needs of the academy, enterprise architecture is uniquely positioned to guide the transformation of the IT organization. The discipline serves as a bridge between isolated IT and the modern role of technology as an integral and ubiquitous partner in fulfilling the goals of the institution. Enterprise architecture must reflect higher education’s need to balance academic rigor, student life, business, and the complicated realities of IT, and it must span the organization to ensure that investments and policies are in place to meet the future needs of the institution.

The function of an enterprise architect is varied and shaped by the culture and the needs of the institution that the position serves. The range of titles, duties, and reporting structures reflected in this study paints a picture of the changing nature of IT in higher education. Enterprise architects (EAs) carry artifacts of software development, infrastructure, and compliance with them as they move into the EA role from previous roles. This depth of experience enables EAs to provide strategic guidance and a holistic view of technology solutions, investments, and partnerships as both technology and higher education continue to evolve.

—Paul Erickson, Assistant Director for Enterprise Architecture, University of Nebraska
Introduction

Colleges and universities are the original learning organizations. By their very nature, institutions of higher education foster learning and mastery. The irony, however, is that while institutions of higher education excel at promoting learning for individuals and for disciplines, they are often less efficient at promoting learning within the organization itself.¹

Enterprise architecture is a relatively new area of practice and, as such, is evolving rapidly. As is the case with many emerging areas, there is some disagreement about exactly what enterprise architecture is. The Federation of Enterprise Architecture Professional Organizations (FEAPO) suggests that, on the one hand, “the practice of enterprise architecture is not really a new discipline but rather a collection of older, existing practices.”² On the other hand, enterprise architecture has consolidated and formalized this collection of practices into a consistent and systematic whole. Lapalme points out that there are three main approaches to enterprise architecture: a focus on the enterprise-wide IT platform, on the enterprise as a sociocultural system, and on the environment in which the enterprise operates.³ Gartner has published a definition of enterprise architecture on which much of the subsequent literature rests; it emphasizes the first of Lapalme’s approaches, as a way of enabling the second and third:

Enterprise architecture is the process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key requirements, principles and models that describe the enterprise’s future state and enable its evolution.⁴

The Open Group, in its TOGAF (The Open Group Architecture Forum) standard,⁵ defines enterprise architecture as encompassing several “sub-architectures,” including business architecture, information systems architecture, and technology architecture. The term architecture here means the framework, or underlying logic, of the approach to solving problems in a specific domain. Enterprise architecture, therefore, is an approach to developing the architecture to deploy solutions across the enterprise.

To that end, the Gartner definition emphasizes strategy and change. To engage in strategic thinking and planning about an enterprise, and to work for change, those engaged in enterprise architecture must collect data, harness resources, manage politics, and collaborate. Taking on these tasks at the enterprise level requires someone who can manage both up and down the organizational hierarchy, work with stakeholders both inside and outside the institution, and see both the forest and the trees. Who are these versatile individuals? EDUCAUSE sought to find out.
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 enterprise architects (EAs). This study sought to identify the characteristics and functions of EAs: what background and training these individuals possess, their scope of work and responsibilities, and the personal and professional characteristics that contribute to their success. The audiences for this report are EAs themselves, those who aspire to be EAs, and those to whom EAs report. This report can help all of these stakeholder groups understand the job of EA—at their local institution and elsewhere—and compare it to a higher education-wide “baseline.”

EDUCAUSE has a well-established Enterprise IT Program. FEAPO, however, positions IT architecture (along with several other areas of architecture) as a subset of enterprise architecture. The Enterprise, Business, and Technical Architects in Academia (Itana) constituent group of EDUCAUSE, as its name indicates, also takes this broader approach across architectures. This ECAR study therefore took this wider focus suggested by FEAPO and Itana and surveyed EAs along with all of the other architecture positions contained therein.

Despite the broad focus, only 26 senior EAs completed the survey. While this is not an adequate sample for drawing statistically significant conclusions, it is adequate for understanding the nature of the role. In lieu of statistical robustness, ECAR worked closely with enterprise architecture subject-matter experts to summarize the survey findings in a directionally accurate manner.
Key Findings

- **Enterprise architects have a wide range of job titles.** As an emerging area of practice in higher education, enterprise architecture has yet to settle on standardized job titles.

- **EAs in institutions of higher education most commonly report to the chief information officer.** Some report to the director of administrative computing, and a few report to other positions.

- **In addition to reporting to the CIO, many EAs have dotted-line reporting relationships with other institutional leaders.** These informal reporting relationships enable EAs to have input into decision making across all campus units.

- **The majority of EAs have five or fewer total reports.** With many informal reporting relationships and few reports, EAs must wield soft power on campus.

- **EAs’ scope of responsibility is diverse and uneven.** Individual EAs have responsibility for different areas of enterprise architecture–related work. The most commonly shared areas of responsibility are those related to the various flavors of IT architecture and areas related to the strategic direction of the institution.

- **The most common gaps in EAs’ scope of responsibility concern project governance and alignment with the institution’s strategic plan and business architecture.** On the other hand, some EAs have responsibility for functions that may more logically fall under the scope of other offices on campus.

- **EAs have been at their current institution for a long time but in their current position for a much shorter period of time: 13 years and 3 years, respectively.**

- **EAs are overwhelmingly hired from within their current institution.** EAs primarily come from other enterprise IT positions, as well as IT operations positions, although they are also hired from across the entire organization.

- **EAs are predominantly male and white.**
There are opportunities here for professional organizations to engage in outreach and promotion of professional development opportunities to EAs in higher education:

- Few EAs hold professional certifications, even though many professional certifications exist for EAs. On the other hand, EAs engage in many informal professional development activities and intend to engage in even more.
- EAs consider almost all enterprise architecture–related skills to be important for their success. However, EAs don’t consider themselves to have high levels of expertise in all of these skills.

The job of EA requires a highly diverse skill set. EAs consider critical thinking and credibility to be among the skills most important for their success and in which EAs are strongest.
The State of Enterprise Architecture in Higher Education

The published literature on enterprise architecture comes entirely out of the business and government sectors. Empirical studies have focused primarily on the corporate sector, while much of the work on defining the scope of enterprise architecture has come out of the U.S. government and military. Indeed, as of this writing, we in ECAR have been able to identify only a single empirical study of enterprise architecture in higher education: a recent study of the maturity of enterprise architecture in higher education in Finland. Itana maintains an extensive library of resources for EAs that includes case studies, best practices documents, and the outputs of Itana working groups. But even that valuable resource does not contain empirical research on enterprise architecture in higher education. The Council of Australian University Directors of Information Technology (CAUDIT) recently launched the Enterprise Architecture Commons for Higher Education, which promises to be another valuable resource for EAs in higher education—and their institutions—worldwide. However, this initiative is still in its early days. It has produced standardized business and data reference architectures for enterprise architecture in higher education, but there has yet to be empirical research to accompany it. This section, therefore, is intended to establish the current state of the art of enterprise architecture in higher education.

ECAR studies of the IT workforce in higher education mostly focus on the people. However, because so little information exists on enterprise architecture in higher education, we tried to fill that void a bit. To that end, we asked respondents about the metrics used by their institution to evaluate the success of enterprise-scale initiatives. Respondents were asked about the importance of several categories of metrics to enterprise architecture–related work at their institution. The most important category—important to two-thirds of the respondents’ institutions—is IT-related metrics. This includes such specific metrics as systems performance, IT support, the cost of upgrades, the total cost of IT ownership, and other metrics concerning the costs and benefits of deploying and maintaining enterprise-scale IT systems. Two categories are important to just under two-thirds of respondents’ institutions: customer metrics and business/strategy metrics. While institutions of higher education generally do not think in terms of “customers,” the collaborative nature of enterprise architecture work lends itself to metrics such as service value to campus stakeholders.
The Enterprise Architect at the Institution

Gartner differentiates between “enterprise architecture” as a noun and as a verb—in other words, as a set of deliverables and as a process. This process is often led by one individual within an organization, the enterprise architect. As in many emerging areas, however, the individual who fills this role in an organization does not always have this specific title. Cameron and McMillan found a wide range of job titles held by those doing enterprise architecture work in corporate and government organizations; the current study found the same in higher education. “Enterprise architect” was the job title most common among our respondents, though a long list of other titles was also in evidence. Some job titles focus on the enterprise side (e.g., “director of enterprise applications” or “director of enterprise information services”), while others focus on the architecture side (e.g., “chief IT architect” or “director of application architecture”). Some individuals doing enterprise architecture work in higher education even have job titles that include neither word (e.g., “chief technology officer” or “director of infrastructure”). Nevertheless, most respondents agreed that their current title accurately reflects the scope and nature of their responsibilities. Figure 1 shows the wide range of job titles held by those doing enterprise architecture work. The categories reflect broad concepts from The Open Group’s TOGAF standard; the common terms in the title are color-coded by their frequency in our respondents’ job titles.
Figure 1. Job titles of individuals doing enterprise architecture–related work

Whatever title this individual has, the EA probably reports to the chief information officer or equivalent position. Nearly half of respondents said they report to the CIO, with a few reporting to the director of administrative computing. The majority (79%) of respondents agreed that they should report to the CIO. That majority includes all of the EAs who already report to the CIO, as well as several who report to other positions.

Following the questions about reporting relationships, respondents were asked an open-ended question about how their enterprise architecture position fits into the leadership structure at their institution. Even though most respondents agreed that the CIO is the appropriate reporting relationship, several respondents
suggested that this reporting line is deliberately loose: One respondent, for example, has a dotted-line reporting relationship with the institution’s chief operating officer, while another has a dotted-line reporting relationship with the chief digital officer.

These dotted-line reporting relationships, according to these EAs, enable them to have input into governance across a range of strategic programs and projects. Several respondents emphasized the collaborative and cross-cutting nature of enterprise architecture work, not just “across all IT divisions,” but also across all of “the major administrative units on campus.” As one respondent wrote, the role of the EA is to “advise the CIO and support him in his role and activities with the leadership” by providing a holistic view of the enterprise. This advisory capacity, however, apparently stops there—almost none of the respondents are required to attend meetings of the institution’s board of regents or board of governors.

If EAs are limited in their reach up the institutional hierarchy, many are equally limited in their reach down it as well. About a quarter of respondents reported that they have no reports, either direct or indirect, and another third have five or fewer total reports.

The picture that emerges here of the role of EA is a complex one: a direct line to the CIO, interaction with other institutional leadership, and a voice in strategic projects, but no direct interaction above the level of the CIO and, for the most part, few or no staff. Given these constraints, one might expect EAs to feel limited in their influence at the institution, but by and large this is not the case: The majority of EAs said they have significant influence at their institution. EAs may therefore be the poster children for wielding soft power on campus: In an advisory role, without direct representation in strategic decision making, EAs apparently are able to very effectively exert influence via their dotted-line reporting relationships and their collaborations across campus.
Scope of Work

Areas of Responsibility

Enterprise architects wield significant influence, and this is reflected in the breadth of activities for which they are responsible. Respondents were asked a set of three questions about their responsibilities, with 20 possible responses (plus an “other” option):

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

As with the rest of this survey, the number of responses to these questions was small; even so, the diversity in these responses is remarkable. The most common responses to the first question, about respondents’ current scope of work, were those having to do with the many types of architecture: A majority of EAs are responsible for applications architecture, information architecture, solution architecture, and technology architecture. That these were the top responses is perhaps unsurprising, as they are among the sub-architectures identified by The Open Group as being foundational to EA. These were followed by a set of responses concerning the business and strategic direction of the institution:

- **Process improvement** and **transformation of legacy systems** are concerned with helping the institution divest from practices whose effectiveness may be waning and adopt those that better fit the current world.

- **Improving interoperability with institutional partners** is concerned both with breaking down the silos that inevitably arise in an institution of higher education and with working smarter with external organizations in order to enable the adoption of new practices.

- **Business architecture** is concerned with strategic planning and alignment across the institution.

- **Innovation exploration** is concerned with looking to the future of technology and processes to achieve these strategic business goals.

Figure 2 shows the frequency of all responses to the three questions about scope of responsibility.
Job responsibilities for EAs are uneven: Many areas of enterprise architecture–related work are the responsibility of many EAs, but no area is the responsibility of every EA.

The second and third questions, about misalignment in respondents’ current scope of work, received far fewer responses. This is first of all a function of our small number of respondents. But it could also mean that the scope of EAs’ responsibilities is typically in the “Goldilocks Zone”: It’s just right. In any case, most of the items in the list of possible responses were selected by respondents for one or both questions. In other words, job responsibilities for EAs are uneven: Many areas of enterprise architecture–related work are the responsibility of many EAs, but no area is the responsibility of every EA, and half the areas are the responsibility of only a third or fewer of our respondents.
What gaps exist in EAs’ job descriptions? What areas of enterprise architecture–related work are EAs not currently responsible for but believe they should be? The top 3 responses to this question were innovation exploration, improving interoperability with institutional partners, and business architecture. One additional EA said he is not currently but should be responsible for project governance. On the one hand, bear in mind that these responses were provided by only a handful of EAs. On the other hand, these four responses constitute a well-defined set of strategic functions: Project management relies on good governance, as well as on smooth collaboration and interoperability with institutional partners. It is of course also crucial for projects to align with the institution’s strategic plan and business architecture. And looking to the future of the institution, innovation exploration must inform strategic planning. The published literature agrees that enterprise architecture must align with business priorities; an EA must therefore work to align projects with the institution’s business architecture. This finding indicates that EAs are well aware of the level of managerial authority required to achieve the goals and objectives of their position but that not all EAs have that level of authority.

What areas of enterprise architecture–related work are EAs currently responsible for but believe they should not be? Three responses to this question also make a well-defined set, though for a different reason: IT procurement, solution architecture, and satisfying compliance requirements are all functions that may more logically fall within the scope of other offices on campus. IT procurement often is the responsibility of a central campus IT unit, as is solution architecture (the strategic planning for and implementation of a particular IT solution in the context of a particular project). Compliance often falls under the institution’s office of general counsel.

**Time on Tasks**

The 20 possible response options to the questions about areas of responsibility were aggregated into a smaller set of four broad activities (plus an “other” option) to which EAs may allocate time. Figure 3 presents the amount of time allocated by EAs to these various activities. The median is the amount of time spent by the “typical” EA, while half of all EAs are contained between the first and third quartile. As with the rest of the questions in this survey, the number of responses to this question was small; nevertheless, the diversity in these responses is remarkable.
As observed above, job responsibilities for EAs are highly uneven: Some EAs spend most of their time in planning/innovation and oversight activities, while some spend none at all. This unevenness of job responsibilities is demonstrated even better by the wide variety of “other” responses: Some of these responses encompass providing leadership, both to an enterprise architecture team and to campus administration; some encompass collaboration and strategic planning across institutional units and between the institution and external partners; and some encompass building the enterprise architecture program itself.
Enterprise Architect Experience Profile

Enterprise architects are, demographically speaking, a fairly homogeneous lot. EAs are white and male to the tune of 87% (96% white, 88% male, 87% both). The median age of our respondents is 53, with most falling between 40 and 60. These findings are consistent with the overall higher education workforce demographics published in the ECAR study The Higher Education IT Workforce Landscape, 2016. EAs are also fairly uniform in their educational background. A bachelor’s is the highest degree earned by approximately 40% of EAs; approximately 40% have a master’s degree.

EA Career Trajectory

The IT workforce landscape study also found that many institutions like to “grow their own” leadership by grooming employees over their career at the institution to fill progressively higher positions. EAs are a prime example of this, as they predominantly come from within: The previous position held by 86% of EAs was at their current institution. What’s more, the position prior to that was also at the same institution for 73% of EAs.

Given that such a large percentage of EAs are hired from within, what positions should institutions look to for potential future EAs? Many EAs’ previous position was an enterprise IT position of some variety. Other positions held previously include systems analyst and project manager. Although those are the most common areas from which EAs are promoted, they account for only about half of current EAs. The other half were promoted from across the entire organizational structure of IT. This diverse background speaks to the many unique skills found among successful EAs. In other words, institutions hoping to hire an EA should look within, starting with candidates in enterprise IT and IT operations positions. But they should open the search to the entire IT organization—even the entire institution—and consider the merits of each candidate’s unique skill set.

The IT workforce landscape study found that IT managers have been at their current institution for a median of 12 years. In a remarkable degree of consistency, this study found that EAs have been at their current institution for a median of 13 years. However, enterprise architecture is a relatively new area of practice, particularly in higher education, and EAs have been in their current position for a median of just 3 years (though this, too, is consistent with the 2016 landscape study’s findings for managers). A small handful of EAs have been in their current position for a decade or more, though most of these individuals, perhaps unsurprisingly, are employed at research universities, which may have had the resources to adopt enterprise architecture practices earlier than other types of institutions. By contrast, a larger number of EAs worked in other
enterprise architecture–related positions prior to their current position, many at their current institution, presumably having been promoted during their time at the institution. Most of the EAs with the longest experience in other enterprise architecture–related positions came from outside their current institution, many from outside higher education. Figure 4 presents the median and the middle half of the number of years EAs have worked in various positions.

Figure 4. Years of experience in various positions

Professional Development

A large number of professional certifications exist for EAs, but almost none of our respondents held any of them. The only EA-specific professional certification that any respondents held was the Enterprise Architecture Center of Excellence (EACOE) Enterprise Architect, the first of four grades of certification available to EACOE members. A few respondents said they aspire to earn the next level or even two of the EACOE certifications, the Senior and Distinguished Enterprise Architect certifications. Several respondents also held various ITIL certifications, though these are concerned with IT service management generally and are not specific to enterprise architecture. Given the popularity of the ITIL certifications (and certifications generally) in the private sector, one wonders if this finding is evidence of higher education’s emphasis on “traditional” credentials (that is, degrees) over sector-generated certifications.

Even if EAs are not earning professional certifications, they are nevertheless engaging in less formal professional activities. Respondents were asked which of a set of activities they engage in to stay current on enterprise architecture–related issues. The most common activity was reading enterprise architecture–related publications, followed closely by following other EAs on social media. Certainly reading, whether professional publications or personal blogs, is an easily accessible and timely form of professional development. Following these are attending EA-specific conferences (such as the Worldwide Summit on the
Enterprise Architecture Profession, the Gartner Enterprise Architecture Summit, and the EDUCAUSE/NACUBO Enterprise IT Summit) and other EA-related events. Finally, many EAs maintain a membership in Itana and participate in the Itana constituent group.

Not only are EAs engaging in professional activities, but they also want to engage in even more. Respondents were asked which of a set of activities they plan to engage in to develop their career. Three activities tied at the top of the list:

- Researching enterprise architecture training and certification options
- Volunteering for opportunities at enterprise architecture–related conferences
- Joining an Itana conference call (Itana conference calls are not simply calls; each also usually includes a presentation and discussion of a specific enterprise architecture–related topic. 25)

Next on the list of popularity was identifying opportunities to work in a consulting or advisory role with a nearby institution, followed by volunteering for an Itana working group (also focused on specific enterprise architecture–related topics). Given that few have earned an EA-specific professional certification, it is clear that there is room for certifying organizations to engage in outreach and promotion to EAs in the higher education sector.

Skills

Even though EAs are not engaging in the types of formal training and certification we asked about in this survey, they nevertheless have broad sets of skills. Respondents were asked to rate their level of expertise on a list of skills relevant to enterprise architecture specifically and IT leadership generally. Among the areas in which respondents believe they are proficient or expert were several types of skills: thinking (critical thinking, creative thinking, innovative thinking), strategic planning (strategic and long-term perspectives), and reliability (accountability and credibility). Written communication was also a top-rated skill, with oral communication following slightly behind.

There are, of course, always skills that one needs to improve. The skill at the bottom of the list—the skill that the largest number of respondents rated themselves as having little or no expertise in—is software quality assurance. Rated just above are skills having to do with financials (budgeting and cost-benefit analysis), project management (including business process analysis), and the perennially challenging skill of conflict resolution.
In addition to their level of *expertise* with a set of skills, respondents were asked about the *importance* of those skills for an EA to be successful in higher education. These two questions had identical sets of possible response options. Critical thinking, strategic perspective, long-term perspective, and ability to promote collaboration are at the top of both sets of responses, and it is difficult to argue with their importance. Other than that, however, as shown in figure 5, the order in which respondents rated many items for these two questions was quite different. There is a disconnect between the skills that EAs said are important for success in the role and those in which EAs said they have high levels of expertise. Given the small sample size for this study, it would be inappropriate to read too much into these differences. That said, this disconnect is potentially problematic because most items were rated very or extremely important by most respondents. From a list of 36 skills, 32 were rated very or extremely important by at least half of respondents. Given that this list of skills and expertise covered a broad swath—everything from communication to budgeting to leadership to business acumen—it’s clear that the job of enterprise architect requires a particularly diverse skill set, containing both technical and people skills.
Figure 5. Proficiency and mean importance of various skills for success
Making Future Enterprise Architects

As of this writing, the subscribership to the Itana listserv is 630. Although the focus of Itana is not exclusively enterprise architecture (recall that the full name of Itana is Enterprise, Business, and Technical Architects in Academia), this number is a reasonable starting point for estimating the adoption of enterprise architecture by higher education (or at least institutional interest in adoption). Until a greater percentage of the 4,664 U.S. institutions of higher education identified by the Carnegie Classification of Institutions of Higher Education incorporate an EA role, however, there is clearly room for the expansion of enterprise architecture in higher education. Given the apparent gap between the importance of enterprise architecture–related work and the current level of activity in this area, developing new EAs should be a collective priority across all of higher education. Along with the background and skills possessed by EAs, of interest too is what these individuals believe is best and most important about the job. Aspiring EAs, take note.

Our respondents find their work interesting and rewarding. Respondents were asked what they enjoy most about being an EA. Although their answers were extremely diverse, fundamentally they all addressed the function of the job—helping make sense of the complex sociotechnical system that is an institution of higher education. Several responses emphasized the changing nature of the work: “The diversity of problems I get to work on,” “something different every day,” and “dynamic set of problems.”

Not only are the problems diverse, but so are the solutions. Several respondents pointed out that enterprise architecture involves deploying and integrating a range of technologies “to form a comprehensive solution.” Because these are, by definition, enterprise-scale solutions, they cut across the institution. Such cross-cutting work, as several respondents pointed out, requires seeing the “big picture” and engaging in interaction across the “scope and breadth of the university environment.” Identifying and deploying solutions across the institution requires consensus building and influence. EAs do not wield influence for its own sake, however; influence is used “to bring exceptional service” to the institution. This kind of influence across the institution requires that the EA have a deep understanding of “the business of higher education and how IT enables it.”

Fundamentally, enterprise architecture is an exercise in organizational sensemaking—developing a contextually relevant understanding of the way forward in the ambiguous world of technological change. One respondent illustrated this sensemaking process powerfully with the observation that they enjoy being involved in developing new models that come to be “viewed as
common sense that should have been in place all along.” Another respondent expressed a similar sentiment in a more tongue-in-cheek fashion: The job of the enterprise architect is “making things slightly less terrible than they otherwise would be.”

The job of enterprise architect, as revealed by our respondents, requires a diverse set of skills. The job might also require a particular personality type, one that embraces change and ambiguity. This combination of skills and characteristics in a single individual is relatively rare. Respondents were asked to identify one thing about themselves that they would change to make themselves a more effective EA. Some answers were personal—respondents wished for greater patience, a better memory for details, and more youth and energy. And indeed, who couldn’t use more of those qualities regardless of their job? Some answers concerned professional development—respondents wrote that they need to seek out a mentor or invest more time in leadership training. Some answers concerned the development of specific skills or competencies that would aid in doing the job, such as improving communication skills to diverse audiences, cultivating the ability to more easily build trust, and developing more effective influence among institutional leaders. Finally, some answers concerned the needs of the institution rather than those of the respondent—creating more and better documentation of the enterprise architecture work across the institution or developing more formalized processes and standards for enterprise architecture–related work at the institution. Given the breadth of scope and the cross-cutting nature of their work, it is only appropriate that EAs have such a wide range of thoughts about what would make them more effective.

The diversity of skills required by EAs must surely make it challenging to find individuals to fill these positions, interesting and rewarding as they are. In order for this report to facilitate the necessary professional development, respondents were asked what advice they have for those aspiring to become EAs. The responses were equally diverse. Several suggested focusing on the business of higher education—that is, maintaining a focus on how IT can advance the business and the strategic goals of the institution. Possessing technical expertise is of course important for understanding the capabilities of the technology. But it is relationship building and communication skills that enable the EA to build trust across the institution and help all stakeholders realize institutional goals. And, as one respondent wrote, “The farther up in the institution, the more important ‘people’ or ‘soft’ skills become.” Even so, the job of enterprise architect is not always well understood, so communication skills are critical to help others understand the role. Part of this understanding must be that the EA operates first and foremost at an enterprise level. As one respondent wrote, “Recognize
The enterprise architect is responsible for architecting the enterprise, not providing solutions architectures for enterprise systems.” Institutions of higher education are extremely long lived and therefore generally have had greater luxury for long-term strategic planning than many types of organizations. In an increasingly technological world, however, maintaining this long-term focus grows ever more challenging. Architecting the enterprise requires a long-term strategic vision that can accommodate and respond to rapid change in enterprise systems. One last piece of advice from a respondent highlights this dichotomy: “It’s a strange job—almost everything is long term with no immediate win. So be patient.”
Conclusion

According to Gartner, enterprise architecture is “the process of translating business vision and strategy into effective enterprise change”—an approach to developing an enterprise-wide vision of technology and services, and the implementation of this vision in alignment with an organization’s strategic plan. Enterprise architecture is a relatively new area of practice in the business and government sectors, and the scope of EAs’ work, as well as the skill sets necessary to do that work, continues to evolve. Enterprise architecture is even newer in higher education, so much so that, while the position of EA is becoming more common, this is only the second empirical study ECAR is aware of that addresses enterprise architecture in the higher education sector.

This novelty of enterprise architecture in higher education is reflected in the remarkably broad range of titles held by individuals doing enterprise architecture–related work, in the unevenness of these individuals’ job responsibilities, and in the range of skills deemed important for success in the role. Like many new areas of practice, enterprise architecture is evolving rapidly, though (as in the business and government sectors) we are starting to see it stabilize in higher education, thanks to the work of Itana working groups and the CAUDIT Enterprise Architecture Commons for Higher Education.

As in the business sector, EAs in higher education largely report to the CIO and have few staff. The position of the EA in the organization is, however, considerably more complex than these simple findings about reporting relationships suggest. EAs in higher education interact broadly with others in IT leadership positions and have a great deal of influence in strategic IT decisions. However, this influence is largely indirect. Enterprise architecture requires a holistic view of the institution and is highly collaborative and cross-cutting, but it often affords little overt power. Enterprise architects must therefore be masters of soft power to an extent that few IT leaders are. In conclusion, the organizational sensemaking that EAs do is absolutely critical—often behind the scenes but essential for the functioning of their institution. We suggest that this enterprise-level view of the complex sociotechnical system that is an institution of higher education makes current EAs good future candidates for higher leadership roles on campus, in particular the CIO.
Advice for Current EAs

- Consider the appropriate scope of responsibility for your position. This should depend on the alignment that your position needs to have with your institution’s strategic planning process and existing business architecture.

- Consider the appropriate percentage of time that you should allocate to specific activities.

- Develop a vision for the future of your role.
  - Do you have responsibility for any of these additional four areas that EAs thought should be part of their job (project governance, innovation exploration, improving interoperability, and business architecture)? If not, should you?
  - Is your line of reporting optimal? How might it be improved to benefit the institution via formal and dotted-line reporting relationships?
  - Do you have sufficient resources, including staff, to conduct enterprise architecture work at your institution? What critical value might you be able to add with more staff?

- Identify areas of enterprise architecture–related work in which you believe that your knowledge is not as strong as in other areas. Seek out professional development opportunities to strengthen your skills in these areas.

- Seek out enterprise architecture training and certification options, as well as opportunities for volunteering with enterprise architecture–related organizations, to strengthen your skills.

- Exert influence via soft power and informal relationships to build the enterprise architecture program on campus according to these determinations and your institution’s strategic planning process.

- Since EAs are often hired from within the institution, work to gain experience in a range of positions in enterprise IT and IT operations at your institution.

- Credibility is one of the skills EAs rate as most important to their success. Ensure your contributions are relevant and substantive. Work to establish trust with other IT leaders at your institution.
Advice for the EA's Supervisor

- Determine the appropriate job title for the EA. While a job title is, to a certain extent, arbitrary, it reflects and signals the position's scope of work and the nature of its responsibilities.

- Understand the full benefits enterprise architecture can provide to your institution. In collaboration with your EA, review the EA job description and charge, and consider how it might be changed to add more value.

- Determine the appropriate size of the enterprise architecture unit at the institution. This should depend on the EA's current and ideal scope of responsibility at the institution.

- Discuss with the EA areas of professional development that would benefit the EA. Provide time and resources for the EA to pursue appropriate professional development opportunities, including professional certifications and volunteer opportunities.

- When seeking to hire an EA, look for candidates both within and outside your institution. Look for existing EAs, as well as individuals in enterprise IT and IT operations positions.
Advice for Aspiring EAs

- Gain experience with the many different architectures that are foundational to EA: applications, business, information, solution, and technology architecture. Gain experience with areas of enterprise architecture–related work that bear on the business and strategic direction of the institution.

- Develop a network of EA colleagues. Participate in Itana, FEAPO, CAUDIT, and other groups.

- Develop an understanding of the mission and strategic direction of the institution and how to leverage enterprise-scale IT systems to support them.

- Develop the ability to exert influence via soft power and informal relationships, across institutional silos and outside formal reporting relationships.

- Gain experience in as broad a range of areas of enterprise IT and IT operations as possible. Seek out appropriate professional development opportunities, including professional certifications and volunteer opportunities.

- Credibility is one of the skills EAs rate as most important to their success. Work to establish trust with other IT leaders at your institution.
Methodology

Survey invitations were sent to a pool of 537 individuals with profiles in the EDUCAUSE member database indicating that they were EAs or held an equivalent position, to subscribers to the Itana listserv, and to others involved in enterprise architecture–related work who were identified by respondents to other ECAR studies of IT leadership in higher education. A total of 26 respondents completed the survey, for a response rate of 5%, representing 26 institutions of higher education. Respondents were from 17 states, spanning most regions of the United States, and from 5 English-speaking countries (United States, Canada, United Kingdom, Australia, and New Zealand). U.S. respondents made up 81% of the sample; non-U.S. respondents made up the other 19%. Data collection took place in May 2016.
Notes


6. The Enterprise IT Program focuses on four themes: ways to gain efficiencies through effective sourcing strategies, business process management, the better understanding and defining of costs, and how to add strategic value through analytics and business intelligence.


8. The alert reader will have noticed that Itana is not an acronym for “Enterprise, Business, and Technical Architects in Academia.” When Itana was founded, the focus was on IT architecture in academia, but in 2012 the organization expanded its focus to include enterprise architecture and business architecture.


11. Nestori Syynimaa, Patrik Maltusch, and Esa Suominen, “State of Enterprise Architecture Practice in Finnish Higher Education Sector,” EUNIS 22nd Annual Congress Book of Proceedings, 2016: 82–91. This study found that even though the Finnish federal government passed an act in 2011 (the Act on Information Management Governance in Public Administration) mandating that all Finnish public sector organizations adopt enterprise architecture by 2014, only 50% of Finnish institutions of higher education had achieved the mandated level.

12. Council of Australian University Directors of Information Technology (CAUDIT), Enterprise Architecture Commons for Higher Education.

13. Responses to this question were on a Likert scale, ranging from “not at all important” to “extremely important.” These metrics and categories were derived from those used in Cameron and McMillan, “Enterprise Architecture Valuation and Metrics.”

14. Lapkin et al. suggest that these deliverables are outputs—for example, “requirements, models, principles, guidelines, standards.” However, they also argue that focusing on these artifacts is a mistake if they are not “connected to the strategic imperatives of the enterprise” and that “the most important deliverable of enterprise architecture is change.”

16. According to IT Leadership in Higher Education, 2016: The Chief Information Officer, 71% of respondents have the title chief information officer; most of the rest were split between two titles: vice president and director.


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


21. The findings in this section are results of a reanalysis of data from the 2016 higher education IT workforce landscape survey (see Pomerantz and Brooks, The Higher Education IT Workforce Landscape Report, 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.

22. The 53 EAs who responded to the 2016 higher education IT workforce landscape survey reported about 30 different previous positions, from within 11 of the 12 sectors identified in the landscape survey question about one’s previous position.


24. See Enterprise Architecture Member Certifications, Enterprise Architecture Center of Excellence.


26. See the 2015 Update Public File at the Downloads page of the Carnegie Classification of Institutions of Higher Education.


28. CAUDIT, Enterprise Architecture Commons.