ISSN: 2473-3857
v2 n4007

The Role of Industry Certifications in an AACSB-Accredited Institution

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Abstract

Instructors, practitioners, and students have different goals, and as such, different perspectives on industry certifications. University and technical school programs focusing solely on certifications struggle to retain relevance and compete against boot camp certification programs; yet programs without certifications may not be serving the needs of their students as well as they could be. This paper explores possible roles for certification in an Information Systems program at an AACSB-Accredited College of Business. Using mixed-methods to analyze survey results from recent graduates, the role of certifications as a signal of continued learning is supported

Keywords: Education, certifications, assurance of learning.

1. INTRODUCTION

The Association to Advance Collegiate Schools of Business (AACSB) accreditation provides "the longest standing, most recognized form of specialized/professional accreditation an institution and its business programs can earn" ("AACSB Accreditation," n.d.). AACSB provides schools with a framework to ensure a quality education for students and continuous improvement. And AACSB accreditation provides students, future employers, and other schools to which the student may later apply with evidence of a program's quality.

Standard 8 of the 2016 update to the 2013 AACSB eligibility procedures and accreditation standards requires schools to "demonstrat[e] that degree program learning goals have been met" ("Eligibility procedures and accreditation standards for business accreditation," 2016, p. 29). This assurance of learning occurs at the program level rather than at any course level. This assurance of learning should signal to external stakeholders that the school meets program goals and assist the school to improve courses and programs.

In information technology (IT), professionals can demonstrate their knowledge through industry certifications. These can be vendor-specific certifications (such as certifications provided by Microsoft, Cisco, Oracle, IBM, etc.) or vendor-neutral (such as certifications provided by CompTIA, $(ISC)^2$, SANS, etc.). The vendor-specific certifications provide name recognition for commonly-used solutions while vendor neutral certifications provide some level of general knowledge that should be applicable to solutions from multiple vendors.

Some employers require that employees maintain certification to qualify for jobs. For instance, the United States Department of Defense directive 8570 lists certifications required to qualify for Information Assurance work, both at the technical and managerial level. These certifications include vendor-specific options (such as Cisco Certified Network Administrator-Security certification) and vendor-neutral certifications (such as the $(ISC)^2$ Certified Information Systems Security Professional) with different certification options for different job levels ("DoD Approved 8570 Baseline Certifications," n.d.).

Four-year schools have been slower than community colleges and high schools to embed IT

ISSN: 2473-3857
v2 n4007

certifications within programs (Randall & Zirkle, 2005). This should concern faculty, as certifications impact both the hiring and earning potential of graduates (Quan, Dattero, & Galup, 2007). Some attempts have been made to provide model curricula to enable the embedding of certifications into courses (Al-Rawi, Lansari, & Bouslama, 2006), but with a few notable exceptions (Shackleton & Bentley, 2008), the certifications have been tied to a course rather than a program. And AACSB accreditation standards are "concerned with broad, program-level focused learning goals for each degree program, rather than detailed learning goals by course or topic, which must be the responsibility of individual faculty members" ("Eligibility procedures and accreditation standards for business accreditation," 2016, p. 30). Finding a certification that includes all of the over-arching goals for a degree program can be problematic. Certifications often fit within a few courses rather than across the curriculum.

If accreditation bodies such as AACSB do not expect to see certifications that cover specific topic areas found in a single course, does that mean that such certifications are unlikely to benefit students or the programs? This leads to the following research questions:

RQ: Do industry certifications provide value to graduates of an AACSB-accredited institution, and if so, which certification(s) provide the most value?

This study uses the lenses of signaling theory and the resource-based view to address this research question. A mixed-methods survey of recent graduates from an AACSB-accredited information systems program in the American Midwest supports the use of industry certifications as a signal to employers of student quality, though the certifications do not provide sufficient value to be the focus of the program.

2. THEORETICAL DEVELOPMENT

When two parties interact, there is a natural information asymmetry. This is true at both the organizational level and the individual level. When two people are flirting, each knows their own level of actual interest in the other party; however, they can only guess at the other party's actual interest in them. Similarly, when an organization is selling a service or product, the customer does not know the capabilities and processes within the bidding organization and therefore the resulting quality likely to be achieved. Yet people and organizations must make decisions based on incomplete information. Signaling theory focuses on this asymmetry between two people, groups, or organizations (Spence, 2002). It provides a mechanism through which parties articulate intangible benefits to potential partners (Bird & Smith, 2005). Upon interpreting these signals, recipients leverage the information to discriminate between different options in selection problems (Connelly, Certo, Ireland, & Reutzel, 2011). When a bird wishes to attract a mate, that bird signals that it has ideal characteristics making it desirable for the mate (Bird & Smith, 2005). When people want to know if a product has quality, they look at the warranty that the producer provides (Boulding & Kirmani, 1993). And when employers want to know the capabilities of a potential employee, they look at that candidate's degree information on the resume (Spence, 1973). All of these are examples of how signaling is used to overcome information asymmetry.

Spence (1973) applies signaling theory to the job market. Candidates differ in their quality and suitability for a position, but objective measurements of the candidates' abilities are unavailable to the employers. This puts employers at risk of adverse selection where a suboptimal choice is made, which is concerning due to the significant investment employers make in hiring and training new employees. This is especially true where barriers to terminating employment exist such as some European countries with strong employee protections and some unionized employers in other locations.

Candidates invest time and money to enable them to signal their knowledge, skills, and abilities by paying the signaling costs. For instance, a university education costs tens of thousands of dollars and usually about four years, so to send the signal of that education, individuals must pay those signaling costs. With the well-established accreditation system for colleges and universities, the signals provided by a university education are difficult to fake. For AACSB-accredited colleges of business, an extra layer of assurance of the quality of education is provided to potential employers.

Even with the value of a university education, employers such as the United States Department of Defense still require certifications for employment. CompTIA claims high school graduates earn 22% more with certification and associate degree holders earn 18% more than their uncertified peers ("The value of IT

certifications," n.d.). In a 2014 survey, IT executives indicate a higher preference for technology-specific training and certification courses than college courses or an MBA for advancing their careers (Salchow, 2014). Surprisingly enough, this holds true for those in managerial positions as well as those in technical positions. In IT certification rankings, it is claimed that employers want both degrees and certifications, though no underlying sources are provided (Tittel, 2014). While locating a systematic review of the marginal value of IT certifications for college graduates proves difficult, it is expected that some value will probably still stem from earning the certifications.

This leads to our first hypothesis:

H1: IT Certifications will provide some benefit to graduates from an AACSB-accredited program.

In the resource-based view (RBV), resources which are valuable, rare, inimitable, and non-substitutable can lead to a sustained competitive advantage (Peteraf, 1993; Wernerfelt, 1984). Thus, an organization competes based on the resources it can marshal to create unique products and services. In a similar way, IT job applicants can use IT certifications to signal skills and abilities. These certifications will differ based on the skills employers expect from a certified applicant (i.e. how valuable the employer will perceive the certification), how many professionals have obtained the certification (how rare the certification is), how difficult it is for professionals to obtain the certification (the degree to which the certification is inimitable), and how many other similar certifications are available (or how non-substitutable the certification will be perceived by employers).

While several of these dimensions are difficult to measure, some information on the number of IT professionals holding various certifications is available. Using a survey from Global Knowledge (Hales, 2014), approximate percentages are determined. For the Microsoft Professional certification, the MCSE, MCP, MCSA, MCITP, and MCTS categories are combined. For the Cisco certifications, the CCNA, CCNP, and CCENT categories are combined. The Microsoft Office User certification is not included in the survey because the target frame for the survey is IT professionals rather than for general office users. For any certification that does not appear in the report of the top 15 most common certifications, the word "rare" is inserted. This implies that fewer than 2% of IT professionals surveyed hold the certification. The only common certifications not included in this study are CompTIA's Network+ and Security+ and VMWare's certification. Table 1 provides the percentages of professionals holding the studied certifications.

Table 1: Percentages of IT Pros with Studied Certifications

A+	11.3%
Cisco	13.0%
Citrix	3.4%
ITIL	11.5%
$(ISC)^2$	Rare
Linux	Rare
Microsoft Professional	25.1%
Microsoft Office	N/A
Oracle	Rare
PMI	5.2%

This leads to our second hypothesis:

H2: Rare IT certification will provide more benefit to job applicants than common certifications.

3. METHODOLOGY

To address the research question, recent graduates from an AACSB-accredited information systems (IS) program are asked to provide information on the value of certifications. The Midwestern university has forty graduates in the last three years for which the alumni office has contact information. 22 of the 40 complete the online survey, giving a response rate of 55%. The respondents provide both scalar responses to survey questions about the value of certification in general and the relative value of specific certifications, as well as free-form response boxes. The survey instrument provided to respondents is in an online format, but a printed representation is provided in Appendix 1.

The general value questions use a scale of -10 to +10, with negative values indicating disagreement and positive values indicating agreement. The relative value of specific certifications is measured on a scale of 0 to 100, with 0 representing very unimportant and 100 representing very important. All of the questions are answered based on a slider bar, and questions where the respondent didn't click on the slider bar to adjust the value are treated as 0, as that is the default position of the slider.

The two hypotheses are tested using mixed methods, meaning a combination of quantitative

and qualitative data will be used to measure support for the hypotheses. Quantitative analysis is completed using t-tests, one-way ANOVA, and post-hoc comparisons in SPSS version 24. Because of the small amount of qualitative data, it will be analyzed through informal textual analysis.

4. FINDINGS

H1 predicts that certifications will provide benefits to job candidates. The responses to two statements are analyzed to test this hypothesis. The first statement is "Employers expect that their IT/IS employees will have certifications when they are hired" and respondents provided a rating from -10 (strongly disagree) to 10 (strongly agree). Respondents agree with this statement though not strongly. The sample mean is 2.86. Because 0 is the midpoint of the scale on the first two questions, a 2-tailed t-Test is used. The mean is significantly different from zero with a t statistic of 2.37 ($p = 0.027$).

The second statement is, "Industry certifications will help recent graduates to get a decent IT/IS job." Respondents again agree with this statement. The sample mean is 4.64. The mean is again significantly different from zero with a t statistic of 4.16 ($p < .001$). Based on the quantitative data, H1 is supported.

The comments support the finding as well. One respondent writes, "The A+ certification is very important in the IT field. It was a requirement for my hire at [the university], and other jobs." Another respondent says that when hiring, "if two candidates are equally matched, only then I might look at certifications." A third says, "Students should have some certifications coming out of college, especially if they do not have any industry experience. This shows the ability to continue learning outside of class." Another respondent writes, "Any … type of Networking Certification is a bonus."

There are some cautions about the value, however. As one respondent puts it, "As nice as the certifications are, nothing beats the hands-on training and experience that they will need. The pieces of paper are nice and may get you in the door, but it's how much experience you have and how well can you apply it that will keep you from being sent out the door you just came in." Another agrees by saying, "We see many recent grads that have certs but have no idea what they are doing, they usually dont [sic] last long. Certifications will help on the resume but you need to make sure you actually can master the content and not just cram for a certification exam." Another respondent adds, "Certifications are important. However, they don't necessarily teach to what people need to know… I think certifications should be offered in college but should not be considered or framed as the end-all-be-all."

But there is some disagreement. "The job I have taken was directly related to the quality of the education I was afforded while attending [the University]. Certifications would not change the broad education base that I received, nor would they change the type of job I was offered… if they are truly important to a specific organization on-the-job training would be available." While the points made are valid, all but one respondents agree that certifications have some value, even if only to get one in the door. Thus, qualitative data also support H1.

H2 predicts that rarer certifications will have more value than more common certifications. Respondents provide how important particular certifications are for their workplace on a scale of 0 (very unimportant) to 100 (very important). Using a one-way ANOVA, a between-groups effect is observed with an F statistics of 2.38 ($p = .014$). Table 2 presents the results of the ANOVA. Bonferroni post-hoc tests reveal that the only different means that are significantly different are between Cisco and ITIL (mean difference of 34.5, $p = 0.04$). Both Cisco and ITIL are relatively common at 13% and 11.5%, respectively. None of the rare certifications show a difference with any common certifications. Thus, H2 is not supported by the quantitative data analysis.

Table 2: ANOVA Results

	Sum of Sq.	df	Mean Sq.	F	Sig.
Between Groups	25127	9	2792	2.38	.014
Within Groups	243895	208	1173		
Total	269022	217			

Qualitative analysis also does not support H2. One participant states that, "'Certification bootcamps' have cheapened the effect of any IT/IS certification, in my opinion." Another respondent suggests that, "A CCNA level certification doesn't make it significantly easier to get a job since so many people have the entry level certifications." These statements suggest the inverse of H2, which is that common certifications do not have much value but do not directly address the hypothesized value of rare

certifications. Based on this, H2 is not supported, though some qualitative evidence suggests that future research should further examine the interplay between rarity and value of certifications.

5. DISCUSSION

The research question that this study attempts to address is the value of certifications for graduates from AACSB-accredited institutions. Certifications can signal aspects that are different from those of the degree. Both have value for job seekers and the best solution seems to be some combination of both education and certification. Respondents discuss how certifications can signal a continued learning beyond the classroom, and that certification can signal real-world skills to potential employers. Also, while certifications are not enough to enable job seekers to compete for some opportunities, it can be a tie-breaker when multiple well-qualified applicants compete for an interview.

This study could not differentiate the relative value of multiple certifications, which is unexpected. Based on RBV, rare certifications should provide more value; however, the only statistically significant difference in value occurs between two common certifications. In qualitative analysis, different respondents have starkly contrasting opinions. For instance, one respondent feels that the A+ is an important foundation and opens doors for entry-level positions while another respondent suggests it is worthless and should be omitted from resumes.

One potential explanation for how this seeming discrepancy can be resolved is that there may not be a certification in particular that provides value; rather, the fact that there is any certification held by the applicant provides the symbolic value needed. If the certification is about signaling continued learning, or the application of school knowledge to a real-world skill, then any certification may be as good as another. Perhaps it is more important to be certified than to be certified in anything in particular.

As more students graduate from undergraduate studies, the need to prepare students in tie-breaker situations is increasingly important. Adding opportunities to the curriculum can make students eligible for jobs that require certification, such as the DoD requirements. But even for students destined for the private sector, the certification can differentiate the graduate from the other scores of students graduating at the same time. For students graduating from high-quality programs, the signaling cost is likely to be low. Students should already understand the foundations that will be tested on an exam, giving them the opportunity to pass the certification exam with minimal extra study. And if students find themselves unprepared to pass the certification exams, it's possible that students are not retaining the information that instructors are delivering. In such cases, updating pedagogy to ensure students fully understand the topics will help improve student prospects and make university programs higher quality. In the end, certifications can become part of the assurance of learning program, though they may not rise to the level for reporting to AACSB when the certification domain only covers a few courses.

However, respondents to the survey urge caution in focusing too strongly on IT certification. They suggest that IT certification cannot substitute for a broad education because employers do not completely trust the signals sent by IT certifications. The signal that an IT certification was designed to send has been tempered in the minds of respondents for two potential reasons: boot camps and cheating.

IT certifications are a big enough business that several training providers have created intensive courses to help students cram for certification exams. In such programs, students typically live in a hotel for a week and participate in all-day classes, an experience which culminates in sitting for the exam on the last day of the training. Commonly called boot camps, these training sessions often come with a guarantee of passing the certification exams on the first attempt. Any person can join a course and learn strategies to enable passing certification exams, even when starting with no experience or formal education. Certifications do not differentiate between people with real-world experience and those with a conceptual knowledge sufficient to pass the exams. In addition, the proliferation of boot camps has led to a proliferation of certified professionals.

Another possible explanation for participants being unable to differentiate the value of certifications involves potential cheating. Individual self-interest can create challenges. This is not new. The prisoner's dilemma is a famous game where two individuals have to choose to cooperate or compete. The first player to compete (i.e. turn on the other prisoner) receives a payout while the other player gets nothing or a negative payout. If both players

choose to cooperate, they each get something smaller than the payout for competing. In cases where two players will only play against each other a finite number of times, players tend to cooperate until the last few rounds of the game, whereas with infinite (or an unknown number of) rounds, players tend to cooperate rather than compete (Selten & Stoecker, 1986). Because applying for jobs is usually a one-off process, the applicants are in the final stages of the game. As such, choosing to cooperate does not work in individual self-interest. Thus cheating to send a signal of skills one may not fully possess can provide a payoff (i.e. getting the job).

Cheating occurs with signaling in the natural world. Fig wasps estimate their own ability to win a fight based on mandible size and back away from fights they are unlikely to win; however, mandible size does not estimate success in fighting (Moore, Obbard, Reuter, West, & Cook, 2009). When a fiddler crab loses a claw, which serves the dual function of attracting mates and fighting off rivals, it grows a weaker replacement, in effect signaling an inaccurate view of the crab's fitness as a mate (Backwell, Christy, Telford, Jennions, & Passmore, 2000). These situations cause the assertion that, when the cost of assessing a signal is high but the value is low, the receiver will settle for cheaper information, making signaling systems open to cheating. In fact, research suggests that complete honesty in signaling is unlikely to occur (Johnstone & Grafen, 1993). Some organisms such as the paper wasp socially enforce the signals of quality by more aggression to cheaters (Tibbetts & Dale, 2004).

Sadly, cheating occurs in IT certifications as well. This has progressed to the point that certification agencies have banded together to form the IT Certification Council (ITCC) to combat fraud (Musthaler, 2008b). And yet fraud is shown to continue to rise (Marsan, 2011; Mitchell, 2014). It can be accomplished by using "brain dumps" that include actual certification exam questions (Brodkin, 2008), paying someone else to take the exam (Marsan, 2011), or using training from an "unauthorized third party" that was obtained either illegally or from a brain dump ("CompTIA Unauthorized third-party training sites," n.d.). Tales of cheating are rampant on social media, including unintentional cheating where a boot camp instructor passed out brain dumps as study materials, and certification agencies are using analytics to clamp down on cheaters (Brodkin, 2008; Marsan, 2011; Musthaler, 2008a).

As students enter the workforce, it is important that they have the tools to succeed. This goes far beyond simple certification. They need skills to prevent, as one respondent discussed, being sent out the same door they came in. There is a remarkable similarity between the paper wasps (Tibbetts & Dale, 2004) and certified IT professionals. When someone signals a high level of proficiency through certification, the expectations are higher. In the wasps, this means that the fraudulently signaling wasps meet more aggression than those with honest or underestimated signals of dominance. As one respondent put it, "it's how much experience you have and how well you can apply it that will keep you from being sent out the door you just came in." Lacking skills in which one is certified would indicate a mismatch between performance and the signals sent. If the students do not have proficiency, certification could be a disservice to them and their potential employers.

This leads to the caution reiterated by several participants: schools cannot afford to focus solely on the certification. Such a myopic view would rob students of what they value most: a broad education that teaches them to think carefully through problems. This equips the students to continue to succeed as the world changes and leads to long-term success. Certification can help signal skills and qualities that students possess, but it can only be one of a portfolio of signals.

6. CONTRIBUTIONS

This research discusses the value of IT certifications for graduates from an AACSB-accredited university. It demonstrates that certification has value for graduates, even if no particular certification emerges as the most valuable. This research contributes to three groups of stakeholders: the researcher, the faculty in charge of programs, and students.

For researchers, the present study applies signaling theory to certifications, extending the prior work on university education as a signal to future employers. Certifications are demonstrated to provide value, even for graduates from education. In addition, this study provides a demonstration of why mixed methods can be valuable: for H2, quantitative findings provide little support while reviewing what the participants wrote provides far more support. Ironically, some of the comments in support of the differences in certification quality come from respondents marking the relative value of the certifications as all being 0. Thus, while those

respondents marked the survey with little variance or information, the free text responses provide more insight into their perceptions.

For faculty members that are in charge of programs, this study highlights that providing encouragement and opportunities for certification can help the student succeed in the job market upon graduation. Improving placements can help institutions to attract better students and satisfy stakeholders of the quality of the program. Additionally, certifications can assist in the assurance of learning. Thus, external stakeholders can also be assured of the quality of the program. But more importantly, gaps in instruction can be identified and rectified.

For students, this research indicates that investing time and money into certifications can provide value. The relative value of the various certifications remains unclear, but earning at least one certification can signal proficiency and an aptitude to continue learning beyond the classroom. The symbolic nature of having any certification may be higher than the value of any particular certification. Thus, to compete in the market, students would be well-advised to earn a certification. It may not guarantee a job, but it can be a tie-breaker in cases where multiple qualified candidates vie for the same position.

7. LIMITATIONS AND FUTURE WORK

There are several limitations which must be acknowledged. The first limitation is that this study draws from a single institution in the Midwestern United States. While the students found jobs throughout the nation, it is possible that idiosyncratic aspects of the organization can influence the findings. This is especially true as the program is relatively small. Only forty graduates were available to be included in the sample. Future work should examine that value of certifications across regions and institutions.

Another limitation is the focus on AACSB as the accrediting body. While the concepts cited from AACSB's standards apply to several accrediting bodies, the possibility of a systematic bias in institutions maintaining AACSB accreditation should not be overlooked. In fact, the idea that there is a systematic difference underpins the value of accreditation.

The final limitation is that the survey instrument focuses on ten certifications. This choice provides an instrument that fits on a single survey page online and allows participants to complete the survey in an average of three minutes. The chosen certifications cover the most commonly earned certifications, though the relative commonality between them is substantial. Respondents suggest the inclusion of CISSP and project management certifications in future surveys. While CISSP was indeed included because it is an $(ISC)^2$ certification, and project management is most commonly associated with Project Management Institute (PMI), respondents didn't seem to recognize those nuances.

While this work theorizes the value of certifications from a signaling perspective, it is possible that a different theoretical lens could provide value as well. Future work should look at the value of certification for graduates from multiple theoretical perspectives to build a richer understanding of the interactions of value between certification and degrees.

8. CONCLUSIONS

Students of traditional four-year IS programs benefit from earning IT certifications. This benefit appears to stem from the signals that earning certification sends to potential employers. The relative value of individual certifications may not be as important as the general signals of an ability to learn outside the classroom. Program directors should consider providing opportunities for students to become certified to give graduates an advantage in the job market. Certifications can provide an assurance of learning for classes, sequences of classes, and programs.

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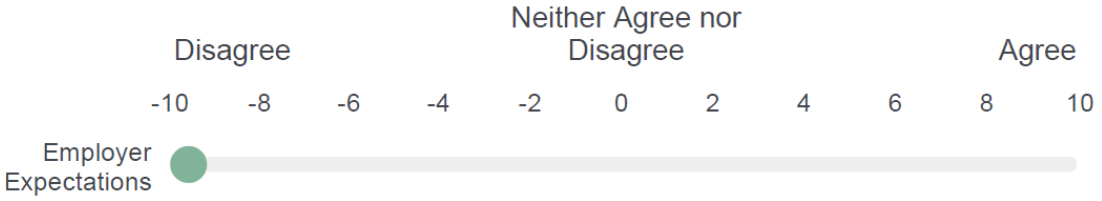
ISSN: 2473-3857
v2 n4007

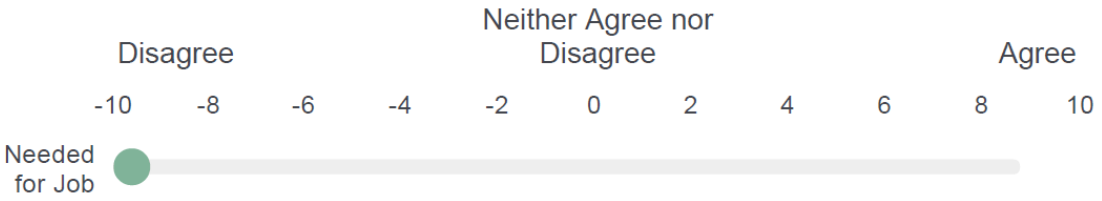
Appendix 1: Survey Instrument

We are considering changing our IS curriculum so that students can earn IS/IT certifications along the way to graduation. We would appreciate your help in answering the questions below about why a student should (or should not) work toward these certifications while also working on their degrees. Thank you for your time and help.

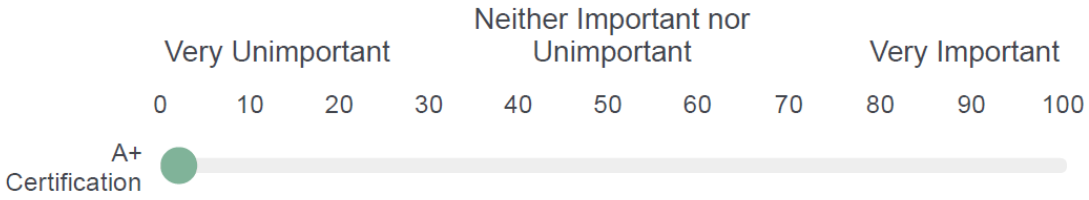
Employers expect that their IT/IS employees will have certifications when they are hired.



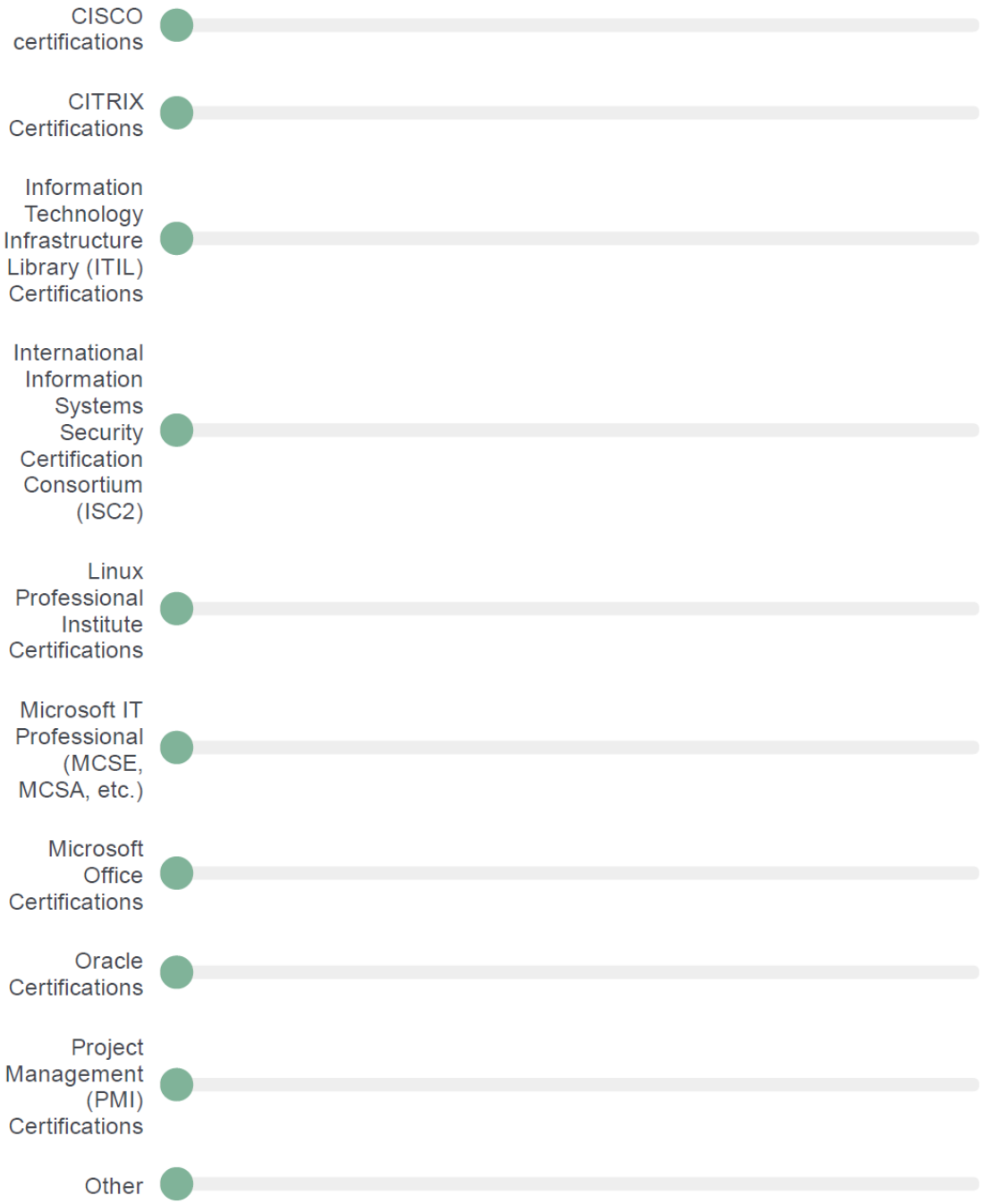
Industry certifications will help recent graduates to get a decent IT/IS job.



How important is each of the following types of computer certifications in your workplace?



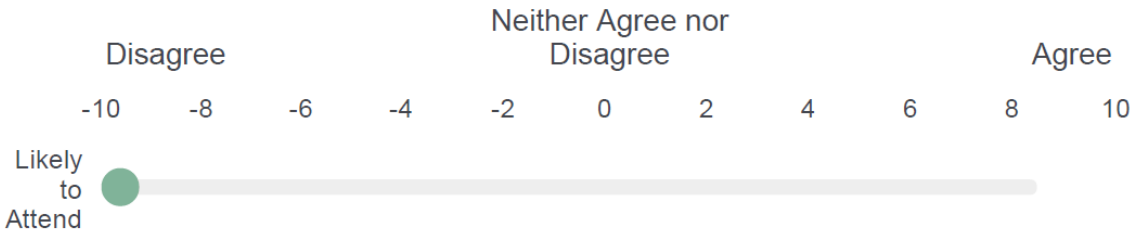
ISSN: 2473-3857
v2 n4007



If you answered "Other" please indicate which types of IT/IS certifications you would deem important.

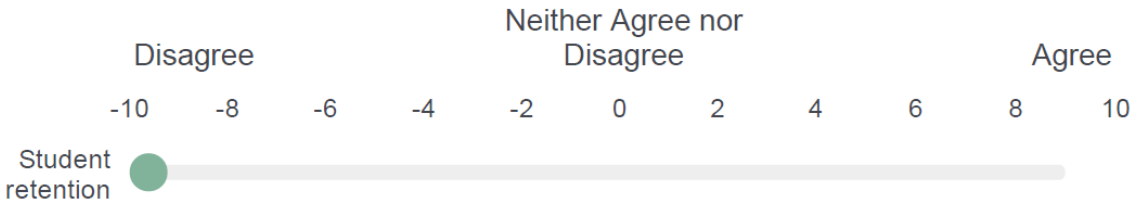
ISSN: 2473-3857
v2 n4007

Students will be more likely to attend a university if they know that they will receive useful IT/IS certification training as part of their major curriculum.



I would be more likely to recommend a university to a student if I knew that they will receive useful IT/IS certification training as part of their major curriculum.

Students will be more likely to stay in their chosen IT/IS major if they have the opportunity to accomplish certifications while earning their degree.



If you have any other recommendations or comments about IT/IS certifications and the curriculum, please comment here. Thank you for your time and help.