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Preparing for the Hybridization of the Accounting Profession: A CISA Boot Camp Case Study

Gregory P. Tapis

Missouri State University

Kimberly S. Church

Missouri State University

Thomas Z. Webb

University of Mississippi

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Gregory P. Tapis

Missouri State University, GregoryTapis@MissouriState.edu

Kimberly S. Church

Missouri State University, KimberlyChurch@MissouriState.edu

Thomas Z. Webb

University of Mississippi, zwebb@olemiss.edu

ABSTRACT

Fortune Magazine (2019) recently touted technology as reshaping the future, resulting in the hybridization of more than 250 occupations. Within the accounting profession, Robert Half (2018) emphasizes the need for business and accounting acumen coupled with technology expertise, communication skills, leadership abilities, customer service orientation, and preparation for specialized (hybrid) roles epitomized by the integration of dual expertise (e.g., information technology and auditing). Such a change provides accounting educators the opportunity to create new programs aimed both at developing students and at upskilling existing workers for dynamic careers by offering certification boot camps that will give participants a competitive edge in the hybridization of the accounting profession. In this paper, we propose the integration of a Certified Information Systems Auditor (CISA) designation boot camp into accounting program offerings and report the results of a semester-long case study introducing the CISA designation to undergraduate students. We discuss boot camp best practices and the boot camp implementation process, and we offer recommendations for accounting programs that utilize boot camps as part of a strategy to address lifelong learning programs for developing hybridized skills within the accounting profession.

Keywords

CISA, Professional Certification, Boot Camps, Hybrid Skills

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INTRODUCTION

A 2019 *Wall Street Journal* article introduced readers to the concept of “hybrid job skills” to reduce the risk of professional obsolescence from automation by 30%, from 42% to 12%. Burning Glass Technologies¹ defines hybridized skills as the integration of new skills with traditional skills being applied in new ways. More specifically, *hybrid jobs* refers to roles that require technology and data skills in tandem with other specialized abilities (e.g., creative thinking, communication, collaboration, emotional intelligence) to coordinate complex teams across complex systems (Aoun, 2016).

New jobs emerging in the accounting profession are increasingly hybrid, resulting in pedagogical challenges and opportunities for accounting departments to increase their recruiting and the marketability of their accounting programs. The hybridization of the accounting and education environments has created a new playing field in which universities must adapt to meet the evolving demands of the profession if they are to remain relevant. As stated in a 2018 Burning Glass report, “Educational institutions must think outside the existing program boundaries to systematically prepare individuals for roles in which lifelong learning is essential” (quoted in Weber, 2019, R24). Additionally, higher education should move beyond traditional degree structures to target a generation of practitioners already in the workforce seeking to upskill² to prepare for the hybridization of their jobs or to avoid automation (Sigelman et al., 2018).

The use of technology in accounting is accelerating, with the profession calling for more technology knowledge, skills, and abilities (KSAs) to be integrated into the accounting value proposition (Lawson et al., 2014). The American Institute of Certified Public Accountants (AICPA) and the Institute of Management Accountants (IMA) recognize the need for technology KSAs and have included technology competencies in their core competency frameworks to keep pace with changes in the profession (AICPA, 2017; IMA, 2019). A 2019 ISACA³ study reported that auditors are an integral part of an organization’s technology team and that 82% of those auditors are moderately or significantly involved in technology projects.

Opportunities exist for accounting programs to meet these dynamic demands from the profession. Such programs may include badges or certificate offerings as an alternative form of academic recognition to validate a specific set of skills or may involve the use of pre-professional boot camps designed for intensive skill-building before or after graduation (Brooks et al., 2019). These models expand the education system to deliver a mechanism for lifelong learning that serves a broad set of constituents (e.g., student, alumni, business partners), while also providing the potential for additional revenue streams.

In an effort to address the need for hybrid skills in accounting programs, this paper proposes the integration of professional certification “boot camps” as part of a strategy for accounting programs to upskill current students.⁴ Specifically, we focus on ISACA’s Certified Information Systems Auditor (CISA) examination to validate KSAs for information systems auditing, assurance, control, security, cybersecurity, and governance.⁵ The CISA boot camp is an intense course designed with the sole purpose of preparing students to pass the CISA exam, one of the few certifications specifically designed for IT auditors tasked with evaluating information systems (White, 2019).

This paper provides general guidance for the use of professional certification “boot camps,” based on a CISA boot camp case study. The remainder of this paper proceeds as follows. First, we provide an overview of certifications and boot camps as an accounting program strategy for addressing the lifelong learning required for obtaining the hybridized skills for an accounting

career. Second, we discuss best practices for planning, implementing, and assessing a boot camp for specialized KSAs. Next, we provide the results of a CISA boot camp case study. Finally, we provide concluding thoughts and recommendations.

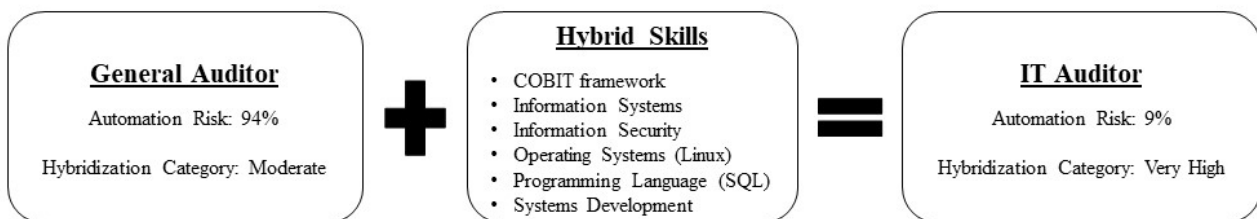
OVERVIEW

The emphasis in the accounting profession is shifting towards the importance of adapting to changes in technology and standards (Vien, 2018) and of continual lifelong learning (AICPA, 2010). Specifically, accounting and auditing employers and recruiters are increasingly looking for cross-functional experiences in technology (Half, 2020). Recently, accounting firms have encouraged employees to obtain professional designations such as a Certified Information Technology Professional (CITP) or Certified Valuation Analyst (CVA) in addition to a Certified Public Accountant (CPA) license to demonstrate ancillary specializations (Mella & Raspante, 2017). Such emphasis is consistent with prior research showing that content knowledge acquired in college quickly becomes outdated (Leauby & Brazina, 1998), thereby increasing the need for students to accept the importance of lifelong learning for acquiring skills through certification and continuing professional education (CPE) after graduation (Albrecht & Sack, 2000).

Hybridized Professional Skills

Matt Sigelman, chief executive of Burning Glass, states that “the jobs of the future don't involve just one skill... [rather] there's a breadth of skills that will be needed” (quoted in Weber, 2019, R24). Hybridized occupations are the most resistant to automation, as the amalgamation of left brain (logic and analytic thought) and right brain (intuition and creativity) functions have not yet been reproduced by technology (Weber, 2019). The need for a combination of technical and non-technical skills reshaped by technology has created opportunities for universities to develop a talent pipeline by producing new hires with abilities ahead of the market and by upskilling existing workers for current employers (General Assembly, 2015). IT audit and cybersecurity are examples of hybridized accounting career paths that require KSAs in alignment with AIS course content. The need to upskill general accounting (audit) positions to reduce automation risk is illustrated in Figure 1, which shows a reduction of 94% to 9% with hybrid skills.

Figure 1: Sample Hybridization of an Accounting Career



Source: Burning Glass Report - Sigelman, Bittle, Markow & Francis 2018

IT Audit

As we move into the next decade, the information technology (IT) auditor is considered a “Hot Position” (Half, 2018). The IT audit function is unique because it integrates the skills of an auditor, whose primary focus is on ensuring fair representation of financial statements, with the skills of an information systems (IS) professional, who is proficient in the implementation, operation, and maintenance of the IT systems within an organization (Merhout & Buchman, 2007). Axline (2015) notes IT auditors utilize hybridized skills to perform rigorous IT audits of complex systems and processes to do the following:

- Understand fundamental business processes and technology developments
- Communicate IT strategies in alignment with business objectives
- Report on IT governance and maintain legal compliance
- Identify internal control and regulatory deficiencies
- Assess [cyber] security policy and procedure effectiveness
- Consult with cross-functional teams
- Discover [cyber] security risks

Cybersecurity

According to the United States Labor Department (2018) Bureau of Labor Statistics report, information security careers are projected to grow 28% between 2016 and 2026, with faster growth and higher pay than the average for all other occupations. Defined as the “protection of data, information, devices, and systems from unauthorized or malicious attacks or access,” cybersecurity is the biggest concern for CEOs in the United States (Islam & Jiang, 2017; Peslak & Hunsinger, 2019). It is a multi-faceted domain area that requires hybridized skills for a comprehensive approach (Peslak & Hunsinger, 2019). The Protiviti IT Audit Benchmarking Survey (2019) reported that 86% of respondents had gone so far as to include cybersecurity in the audit plan (i.e., security assessment/response, access, data loss prevention, pen testing, social engineering, and cyber breaches).

Certifications

The complexity of the IS landscape provides both threats and opportunities for higher education, which is always in danger of lagging behind emerging issues in predicting employer needs (Schartz, 2019). Certification programs, which can easily be integrated into curricula, provide a supplemental means of validating evolving KSAs consistent with estimates that employers value experience 50%, academic degrees 30%, and certifications 20% when evaluating new hires (Daniels, 2011; Hunsinger et al., 2011; Wang & D'Cruze, 2019a; Wierschem & Méndez Mediavilla, 2018). Not surprising, 85% of hybridized internal or IT audit job descriptions prefer (or require) certification or that a candidate be working towards certification, which can also result in bonuses or higher starting salaries for entry-level employees (Hunsinger & Smith, 2009; Merhout & Buchman, 2007; Soileau et al., 2017).

Certified Information Systems Auditor (CISA)

Partnering with professional credentialing organizations can provide a curriculum framework in alignment with credential standards and allow educators to spend less time on “what” to teach and more time on “how” to teach hybridized skills in a developing field (Knapp et al., 2017; Nobles, 2018; Spidalieri, 2016; Wright, 2015). Aligning audit and accounting information systems curricula with specialized credentials enables programs to maintain a

competitive advantage for students who choose to pursue careers in internal and IT audit. CISA is an in-demand certification that effectively bridges the hybridized expertise of the accounting audit and IT security (Half, 2018; Islam & Jiang, 2017).

A CISA designation certifies information systems audit KSAs with an emphasis on control, assurance, and security. ISACA permits students to sit for the CISA examination prior to graduation. The requirements for the CISA designation are passing a 150 multiple choice question exam during a four-hour examination period, obtaining five years of relevant experience, maintaining CPE in alignment with lifelong learning, and complying with ethical and professional standards.⁶ The CISA exam covers five domains that are consistent with recent calls for action from the accounting profession (see Table 1).

Table 1: CISA Exam Domains

Domain	Percent of Exam
Information System Auditing Process	21%
Governance and Management of IT	17%
Information Systems, Acquisition, Development and Implementation	12%
Information Systems Operations and Business Resilience	23%
Protection of Information Assets	27%

Boot Camps

Technological advances demand stronger and more sustained cooperation between education and practice (Palmer, 2017). The genesis of a system is emerging at the nexus of developing new hires and upskilling existing practitioners for a hybridized workforce (Fisher, 2019; Palmer, 2017). Accounting programs, as trusted providers of continuing education, are well positioned to fill gaps in learning and stand to benefit from a system that develops new hires and provides upskill opportunities for existing practitioners (Glessner, 2011).

A high-level boot camp can integrate specialized learning and serve as an intensive prep course for a certification exam. It can be targeted towards those already in the professional sector who are seeking to obtain professional designations for career advancement⁷ or as an instructional tool to provide students with the necessary skills, motivation, and preparation for passing a professional examination. Existing practitioners are willing to invest in a boot camp for distilled content to overcome time constraints or to provide accountability when they are preparing to upskill through a certification exam. Student participants are still in “study mode” and benefit from the tools that are necessary to pass an in-demand entry-level certification exam, while also experiencing the importance of lifelong learning. Best practices in accounting use boot camps, dedicated resources, and academic champions to improve student retention and performance in accounting-related courses (e.g., intermediate accounting) and certification exams (Gaynor & Askew, 2017; Jackson, 2014).

In our case study, students participated in a boot camp prior to entering a corporate setting. In such situations, these boot camps can serve as methods for measuring student learning while offering students the opportunity to differentiate themselves in the marketplace. Irrespective of instructional method, facilitators should track the pass rates of participants to assess the effectiveness of the boot camp (Knapp et al., 2017). Sample planning, implementation, and assessment documents for our flex class approach are provided in Appendix B.⁸

CISA BOOT CAMP PLANNING AND IMPLEMENTATION

Robert Half (2020) reports an increased emphasis on technology in accounting and auditing by employers and recruiters, who are looking for cross-functional experiences. Consistent with these findings, the Accounting Advisory Board at a small liberal arts institution frequently calls for similar skills. Such calls for these skills serve as the impetus for offering a boot camp as a non-credit short course designed solely to prepare students for the CISA examination. Shin et al. (2019) find that while accounting program affiliation with a certification review course is associated with higher exam pass rates, offering the review course for credit is not.

A faculty member at the small liberal arts institution led a CISA examination boot camp that met for a three-hour class once a week for 10 weeks.⁹ Our experiences in developing and administering the boot camp show that success depends on a composite of factors:

- (1) the students' prerequisite knowledge,
- (2) a mentor or professor champion,
- (3) communicating the importance of the boot camp and its format,
- (4) effectively marketing the course,
- (5) reserving appropriate classroom space, and
- (6) the course materials.

Prerequisite knowledge

The participants in the CISA boot camp were accounting students also enrolled in an undergraduate Accounting Information Systems (AIS) course; some, but not all, of the students had completed an undergraduate auditing course. At a minimum, students should be enrolled in AIS or have completed AIS prior to boot camp enrollment. We recommend that accounting departments schedule the CISA boot camp to correspond with courses associated with the exam, specifically, AIS and auditing. Etnyre and Lehmann (2015) list examples of courses based on ISACA's model curriculum that can be suggested to students as electives before they take the exam: Introduction to ERP Systems, System Analysis and Design, and IT Audit and Security, along with other courses to cover information security and database management.

Mentor/Professor Champion

Interactions with educators influence students' behaviors and motivations (Dietrich et al., 2015), and student motivation is linked to positive outcomes and achievements (Dietrich et al., 2015; Dinger et al., 2013; Ryan & Deci, 2000; Spinath & Steinmayr, 2012). As such, the faculty member leading the boot camp should demonstrate positive teacher-student interactions. Positive interactions lead to higher levels of engagement by students (Jang et al., 2010; Skinner et al., 2008), increased levels of academic effort (Furrer & Skinner, 2003), and a higher rate of success (Reyes et al., 2012). All of these factors are important for a positive and successful professional examination experience.

In addition to demonstrating positive teacher-student interactions, the faculty member should be a content area expert if the boot camp is conducted by one faculty member, as was the case in our study. This faculty member should teach at least one of the courses associated with the examination (i.e., AIS, Auditing, Information Security, Database Management) as well as support the CISA designation or other professional designations.¹⁰ Alternatively, it is possible to divide the boot camp domains among various instructors. Doing so may generate more interest among the faculty in addition to dividing the workload. For example, in Domain 1, Auditing Process, there is significant overlap with financial auditing concepts; therefore, this first domain could be taught by a financial auditing professor.

Ideally, the faculty member should begin promoting the importance of obtaining a professional designation at the beginning of the related course(s). For example, in an undergraduate AIS course, the instructor may choose to reference the CISA designation and stress its importance.¹¹ Students are then informed about the boot camp and encouraged to enroll in a subsequent semester.

Furthermore, instructors can partner with professionals to help promote the CISA designation and help motivate students throughout the boot camp. Specifically, they can invite certified professionals to promote the designation in an information session, where they can answer questions about the exam, career paths, and the value of the designation, thereby motivating students to enroll in the camp. Instructors can also consider asking certified professionals to speak briefly at the beginning of weekly sessions to help keep students motivated. Such a partnership professionalizes the experience and offers further engagement between students and professionals (Nobles, 2018).

Successful implementation of any boot camp depends on faculty champions' getting credit or recognition for their efforts (Gaynor & Askew, 2017). Ideally, instructors considering the boot camp should meet with departmental leaders to discuss compensation options. The boot camp in this study was conducted at a small liberal arts college where the instructor was credited with service to offset the high expectations for the service component of the faculty workload. The faculty member and departmental leadership also discussed the alternative of soliciting outside funds towards a stipend for the instructor leading the boot camp. Because Advisory Board members were impressed with the success of the boot camp, these members were considered for soliciting donations for future camps.

As the hybridization of education persists and accounting programs evolve into continuing education providers for additional revenue streams, boot camp instructors may want to consider negotiating a traditional course load reduction. Departmental leaders should be open to some form of compensation, whether a service offset, a stipend, an overload, or a course reduction, as students do appreciate the department's dedicating resources to the boot camp. In post boot camp feedback, several students who passed the exam specifically thanked the accounting department for offering the boot camp.¹²

Timeline of Announcements

Because research demonstrates the importance of promoting learning in the "before-class stage" and its positive impact on in-class engagement and learning performance (Chen et al., 2019), the boot camp should be announced at the beginning of each related course, followed by periodic announcements throughout the semester. After each announcement, the students should receive a link to a survey requesting the following information:¹³ name, level of interest in the review course (Likert scale of one to five with five indicating the highest level of interest), grade

level (i.e., sophomore, junior, senior), preferred day for the course (from a selection convenient to the instructor offering the course), and preferred times (from a selection convenient to the instructor offering the course).

Two-thirds of the way through the semester just prior to the boot camp, the survey results were evaluated noting the students' preferred days/times and weighting them with the level of interest. The instructor formally designated the day and time of the boot camp and communicated the schedule to the students. Setting a deadline of two-thirds of the way into the previous semester's related courses for scheduling the boot camp gave students enough time to join ISACA as a student member, purchase the required course materials at member prices, and begin preparing for the boot camp the following semester.

E-mail to Students

In order to increase our "before-class stage" communications (Chen et al., 2019) and following previous research on the importance of communicating purpose and rationale to students (van der Meer, 2012), we sent e-mails to students reminding them of the upcoming boot camp. Each e-mail began with the line "Imagine Your Name, CISA" in an effort to excite students about the designation and elicit their desire to prepare for and pass the examination. For the CISA exam boot camp, the departmental leadership sent the e-mail at the beginning of the semester preceding the boot camp and followed it with reminder e-mails throughout the semester. E-mails were sent to all junior and senior accounting majors. Exhibit 2 in Appendix B includes a sample e-mail to students.

Marketing Posters

Quick Response (QR) codes have been shown to increase interest levels and engage traditional college-aged students (Sago, 2011). A QR code increases the effectiveness of posters displayed throughout a building and/or on campus and provides a convenient way for students to indicate their level of interest in the boot camp. They can also be used for online promotion through social media and organization websites. Exhibit 3 in Appendix B contains a sample poster for advertising the review course using a QR Code to increase interest.¹⁴ Based on prior research (Sago, 2011), when students see the poster, they are likely to scan the QR code, which opens a Google Documents Form survey to sign up for the boot camp information session (see Appendix B, Exhibit 4).

Reservation of Rooms

Matching faculty style with classroom layout is important, as research has demonstrated that classroom design influences learning (Dillon, 2018). Reserving a room with an appropriate layout is critical for two reasons. First, the exam material is broad in scope and often very detailed, so that covering the material in a three-hour class each week is challenging. Second, faculty members have different styles of content delivery and presentation, and the room should fit the faculty member's teaching style. From our experience with the CISA boot camp, we suggest that the classroom have an overhead projector, access to Wi-Fi, and separate whiteboard space for discussion and collaboration. Alternatively, if an adequate classroom becomes a barrier, instructors may be able to partner with a local professional ISACA chapter to secure an educational space.

Materials and Costs

It is imperative for students to understand that exam preparation materials are required components of any successful boot camp. According to Robert Half (2019), the CISA certification is worth considering for its return on investment, so any expenditures should be considered an investment in their future career. The instructor should include pricing information for the review materials and for the exam. The cost of materials varies based on the exam preparation company. For example, ISACA sells official CISA materials and test preparation guides.¹⁵ Some boot camps have successfully partnered with organizations to charge a registration fee for professional members that offsets some of the student costs.¹⁶

Planning Sessions Based on CISA Domains

At the beginning of the boot camp, the instructor clearly communicates to students the goals of the boot camp: to review the material and answer student questions and to detail the rigors of test day for the professional examination.¹⁷ In addition to “knowing” the material, students should understand that they are required to identify, apply, and analyze material within a finite amount of time (under significant time constraints). The CISA boot camp sessions follow the content areas or “domains” identified on ISACA’s website.¹⁸ Both the instructor and the students should keep in mind the percentage allocated to each content area or domain. The face-to-face meetings should correlate directly with content percentages indicated by the sponsoring organization. Exhibit 5 in Appendix B provides a sample CISA boot camp schedule utilized over ten weeks based on the most current CISA domains.¹⁹

The boot camp’s first meeting is critical for setting the tone and expectations. The faculty member begins by discussing the pass rates for professional exams and stresses that pass rates indicate why the designation is viewed as prestigious. While ISACA does not publish CISA exam pass rates, the instructor may use pass rates for other accounting designations as a parallel. It is possible and recommended to use the low passing rates as a source of motivation rather than discouragement. Transitioning from pass rates, the instructor thoroughly reviews the exam (structure, length, etc.) so that students become completely familiar with the format. Next, the instructor communicates expectations for the boot camp, including homework, required deliverables, and deadlines. This concludes the first meeting.

Subsequent meetings include lectures from the boot camp instructor, using ISACA’s *CISA Review Manual*²⁰ to cover the material on the CISA exam. The time during the subsequent meetings should be organized according to the percentage of each exam domain: for the CISA, for example, 21% is devoted to the first domain, 17% to the second, 12% to the third, 23% to the fourth, and 27% to the fifth. This division corresponds to the suggested time students spend on practice questions for each domain. In post-course feedback, one student from the senior class stated, “He went over every chapter in the review material. It was a good overview of key material in combination with... reading the CISA manual.”

Face-to-face meetings are important but by themselves are not sufficient for student success on exam day. The boot camp focuses heavily on self-regulated learning, with the instructor taking on the role of coach.²¹ Frequent monitoring of learning activities through multiple instruments and instructor feedback promotes progress towards self-regulated learning goals (Boekaerts & Corno, 2005; Schloemer & Brenan, 2010). Completing practice exams for homework enables the instructor to both monitor student progress in terms of preparation to sit for the exam and insert teacher and peer influences for adaptive help seeking to motivate students

towards successful exam performance (Newman, 2002). Students appreciated the coach/mentor approach, indicating the boot camp instructor motivated them to succeed in passing the exam.

The goal is for students to achieve a score of 85% on practice exams before sitting for the actual exam.²² It is important to let students know that achieving this score on practice exams is a process. For example, at the beginning of the boot camp, students are told to expect initial scores of thirty-three percent as a benchmark. This expectation prevents students from getting discouraged and reemphasizes the amount of time required for a successful outcome. We recommend focusing more on the number of questions students complete than on the raw scores. One suggestion for using scores is to set “benchmark scores” for each week of the boot camp, beginning with a target score of 33% and concluding the boot camp with a target score of 85%.

We encourage students to complete homework on a weekly basis. The homework focuses on taking as many domain-specific practice exams as possible over the ten-week period. Students complete ten practice exams, each with 50 questions, per week. By completing 500 questions per week (a perfect scenario), students encounter a minimum of 5,000 questions spread over the duration of the boot camp. Students hand in screenshots from their test preparation software showing the number of questions completed and their corresponding results to help them hold themselves accountable. Depending on the student’s test preparation software, the instructor may be able to monitor student progress directly through the organization authoring the materials.

Since this program is voluntary and we focus on self-regulated learning, there are no tangible repercussions for students if they do not complete these tasks.²³ However, if a student does not adequately prepare for the exam, the probability of passing the exam drops, resulting in inherent repercussions. If the student does not pass the exam or does not take the exam as a result of inadequate preparation, the student has lost the resources spent on preparation, the exam fee, and the registration fee, as well as the reputational impact of not having the certification. In alignment with self-regulated learning strategies, the instructor running the boot camp collected the screenshots individually rather than having students pass their screenshots to a central spot in the room in hopes that doing so would create pressure for students to complete the assigned tasks.

The final boot camp face-to-face meeting begins in a way similar to the first meeting. The instructor reminds students of the certification exam’s format, the time, and the strategies (i.e., time management throughout the exam) required for a passing score. Prior to the final meeting the instructor identifies the class’s weak areas using either the results of the homework handed in by students or by taking a class survey, or both. The final meeting then focuses on these weak areas. The instructor concludes the course by reminding students to focus on these areas in their remaining study time and make sure they are familiar with the strategies discussed in the boot camp. The instructor also reminds students that they put in the required work and number of hours necessary for preparation. Students who passed the exam mentioned they felt prepared to take the exam and one of these students went so far as to indicate the boot camp gave them confidence to pass (See Appendix A for student comments).

Receiving Review Boot Camp Feedback

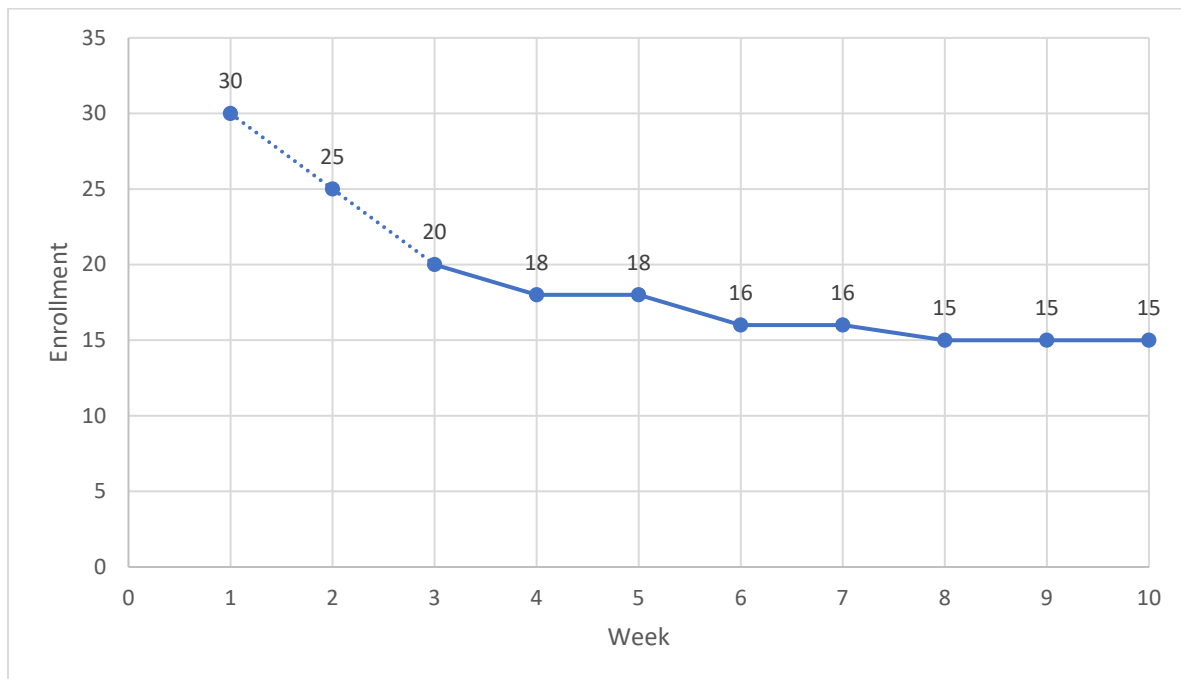
Instructors typically receive course feedback through course evaluations conducted before the end of the course. In most cases, the evaluations are not course specific, making it difficult to gauge potential changes. For the boot camp, we delayed gathering feedback until after the students had taken the exam and asked students to submit feedback anonymously to the departmental leadership after receiving their scores.²⁴ Appendix B, Exhibit 6 illustrates a sample feedback form for students to complete after sitting for the CISA examination. The feedback form gives students

an opportunity to (1) detail the boot camp’s strengths and weaknesses and (2) provide suggestions for improvement. The boot camp instructor should be familiar with the exam’s non-disclosure rules and include a caution at the beginning of the feedback form that students are not to identify specific questions on the exam. However (and only if the governing body of the exam allows), students should be encouraged to mention content areas they feel could have received more thorough attention. These feedback forms should allow for voluntary identification so that the instructor can follow up with students if necessary.

CISA BOOT CAMP RESULTS

During the initial two-week trial period,²⁵ 35% of the eligible junior and senior level students (30 students) expressed interest in the CISA boot camp.²⁶ After the trial period, 24% of the eligible junior and senior level students (20 students) committed to the boot camp, of which 75% (15 students) completed the boot camp. Figure 2 shows weekly enrollment in the boot camp. The attrition rate is consistent with previous research indicating students overestimate their abilities and/or time management (Ravenscroft et al., 2012). Initial attrition stemmed from student athletes who determined there was not enough time to complete the requirements along with coursework and athletic commitments. Subsequent attrition was due to students’ decision to defer the CISA based on the workload requirement during a regular semester or to forgo the CISA as not a “good fit” for current career aspirations. During debrief meetings, students who decided not to pursue the boot camp did not indicate that the decision was due to the financial commitment required for the exam. During subsequent academic advising meetings, students indicated they intended to pursue the CISA exam at a later date when they had more time to commit to studying for it.

Figure 2: CISA Boot Camp Enrollment



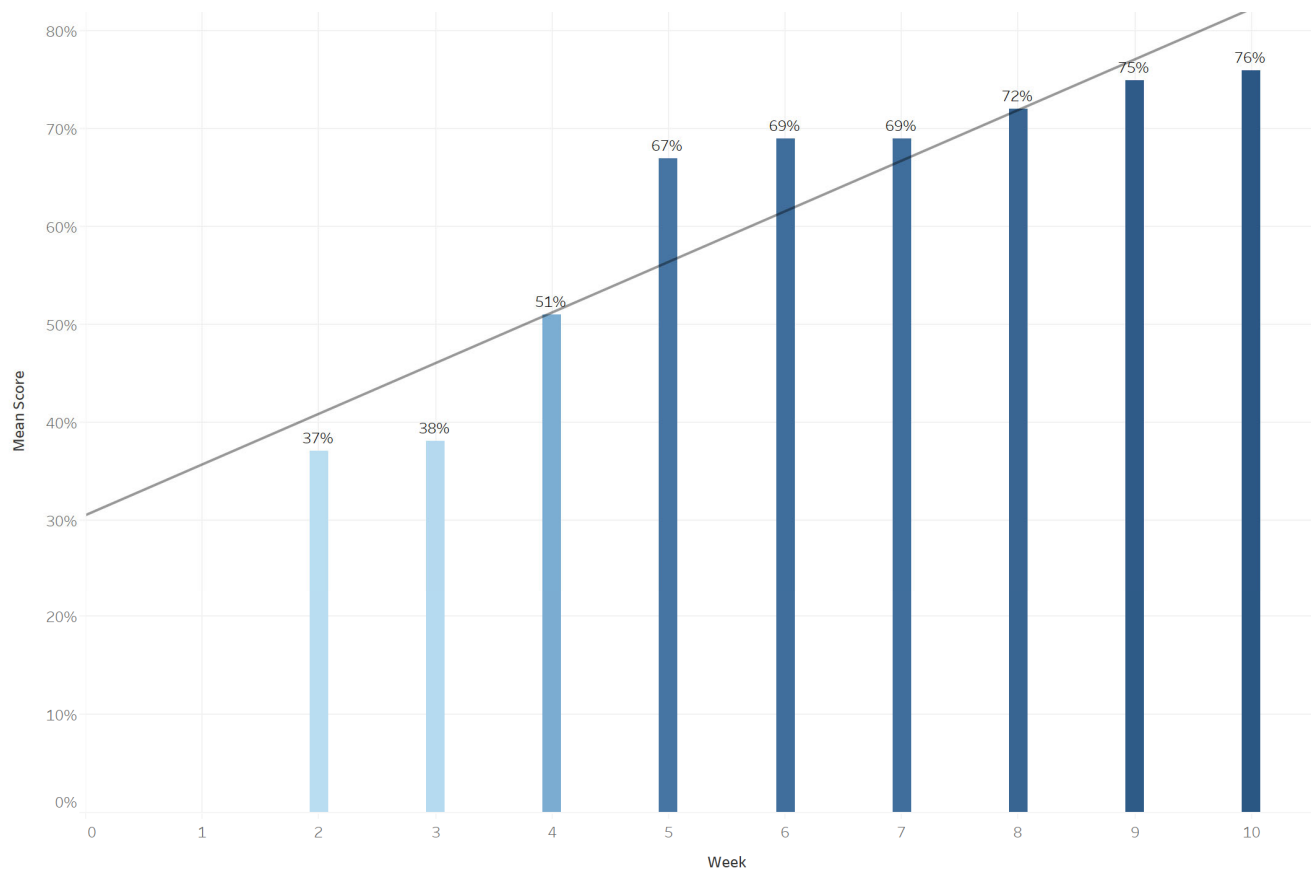
Note: The dotted line indicates the trial period while the solid line indicates after the trial period.

Figure 3 includes mean results of student performance for each week after the trial period. Students were not required to turn in work at the first meeting but were encouraged to have CISA material prior to the second meeting.

At the beginning of the boot camp, the lowest mean scores were recorded in Week 2 and Week 3 with an average of 37% and 38%, respectively.

The students improved over the course of the boot camp, with mean scores in Weeks 9 and 10 of 75% and 76% respectively. In feedback, one student mentioned the benefits of going through the CISA online database of questions and answers.

Figure 3: CISA Mean Scores on a Weekly Basis



Note: The figure presents student performance on CISA practice exams from the CISA test preparation software. Students submitted screenshots of CISA practice exam results on a weekly basis. The average score is included. No scores for practice exams were recorded during the first week. The solid line indicates the mean of all students over the course of the boot camp.

Table 2 presents the overall results of the CISA boot camp. The 35% of students [sitting for and] passing the exam is consistent with the CPA examination using a similar test preparation model (Simeone, 2018). Of the 15 students who completed the boot camp, nine sat for the CISA exam and seven students passed. Based on feedback to the instructor, the six students who did not

sit for the exam had registered and paid for the exam but did not feel ready to take it and chose to defer to a later exam date.²⁷ One of the lessons learned from this process is to make a better attempt to help students who do not pass the CISA exam on their first attempt. In future sessions, we plan to send an e-mail to students after the exam encouraging them to communicate with us. We will emphasize that if they did not pass, they should not feel embarrassed and should make an appointment with the boot camp facilitator to review the results and discuss ways to improve so they may achieve a better outcome on the next attempt. Our emphasis here will be on creating a positive experience for the student and using it as a learning opportunity.

Table 2: Summary Statistics CISA Exam Boot Camp

Number of Students Enrolled after Trial Period	20	100%
Number of Students Completing Boot Camp	15	75%
Students Sitting for Exam	9	45%
Students Passing Exam	7	35%
Passing Rate (7/9)	78%	

After the exam, students were asked to provide feedback directly to the department leadership. Appendix A, Panel A provides feedback from students who passed the exam. In an effort to further assess the impact of CISA boot camps on professional success, we contacted alumni who had passed the exam after having work experience. These alumni were asked to provide examples of how passing the CISA exam helped them professionally. Three of the seven students who were contacted responded, as reported in Appendix A, Panel B.

Three juniors and four seniors passed the CISA exam. All these students expressed gratitude for the boot camp as an integral part of their preparation and success, which agrees with prior research. One junior and one senior said that the exam results inspired them to consider the next certification (CISM and CPA), in alignment with a lifelong learning outcome. Another senior reported that the exam results had already made a difference in a job interview. Over half of the responses recounted the positive impact the academic champion had on the process, as specified in the boot camp best practices. One alum even articulated that “having a knowledgeable professor provide professional exam study tips may make a world of difference for young accountants.”

We noted a difference between student feedback submitted shortly after learning their exam results and the feedback submitted by alumni who already had work experience. The feedback from the alumni was more reflective, more detailed, and more directly related to their careers: IT assurance and cybersecurity professional (1 year), public accounting auditor (2.5 years), IT consulting firm senior IT auditor (1.5 years). Specifically, all three former students said that passing the exam prior to graduation gave them an advantage when starting their careers, whether it encouraged them to begin studying for another professional certification (CISM and CPA), placed them ahead of their peers when starting their careers, or resulted in accelerated career advancement. An alum in public accounting IT assurance and cybersecurity with one year of experience reported that the CISA exam has become a standard at their firm and attributed much of the success on the exam to the boot camp. An audit alum with 2.5 years of experience said, “[My] career has been shaped by passing the CISA exam in college,” as it resulted in a lifelong learning mindset to pursue further professional exams to expand their technical knowledge of information systems. A senior IT auditor alum with 1.5 years of experience stated that the opportunity to attend the boot camp and pass the CISA before graduation “opened up a whole new

career path for me that many of my peers did not have available to them.” We believe the work experience increased the perceived value of obtaining a professional certification.

In addition to student feedback, we also received complimentary feedback from members of the Accounting Department Advisory Board in both public and private accounting, who referenced the importance of technological skills in addition to accounting skills. One advisory board member was looking for someone holding the CISA credential and this board member’s firm hired one of the students who passed the CISA exam. Also, based on the success of the CISA boot camp, several advisory board members inquired about offering boot camps for other professional designations. Specifically, one board member at a large manufacturing company expressed the need for individuals holding the Certified Management Accountant (CMA) designation and inquired whether the Accounting Department would consider offering CMA boot camps in addition to the CISA boot camp.

LESSONS LEARNED

While this boot camp was successful in exposing students to the CISA exam as well as students passing the CISA exam, we learned critical lessons for improving the boot camp and for enhancing our ability to motivate students to pursue the CISA designation. First, the number of face-to-face sessions was ideal for a standard semester, since the boot camp can begin a few weeks into the semester after students have settled in and end a few weeks before the end of the semester so that students are not distracted with finals and other end-of-semester course projects. Furthermore, providing students with a schedule and frequently checking in with them helped motivate students through adaptive help seeking. This was coupled with students all taking the exam on the same day together, which served as motivation for them to be prepared in time for the exam.

Future Implications

While we were pleased with several aspects of the boot camp, we will consider several modifications before executing another boot camp. We will begin with a CISA-certified industry practitioner to inform participants of the advantages of a specialized certification, including career preparation and advancement opportunities. Beginning with such a speaker will serve dual purposes. First, we believe having a professional, especially an alum, emphasizing the importance of the designation will increase motivation. Second, this speaker will serve as an initial introduction for students to someone in the field of IT and may provide a networking opportunity for a future job lead. If available, the professional could come throughout the boot camp to motivate the students and, if interested, possibly review topics for the CISA examination.

In the initial information sessions, students did raise cost as a concern in their not committing to the boot camp. We will investigate whether the boot camp could qualify for course credit as an elective, similar to the structure used for CPA review courses offered for credit at other universities. The boot camp we offer meets three hours per week for ten weeks, which is two-thirds of the semester and could approximate a two-credit hour AIS capstone course that students could schedule around an internship or other courses and still pursue the CISA designation. If the boot camp is a credit course, traditional financial sources (e.g., scholarships, grants, loans) could cover the expense of the course and required “lab material.”

As previously mentioned, the cost of the review materials and exam is significant for students, and we believe more students will pursue the designation if boot camp scholarships are

available to offset some of the investment. We will use this experience, coupled with the boot camp data, to seek funding opportunities for student scholarships from external stakeholders. Additionally, we recommend working with the continuing or executive education group within the college to extend the boot camp to practitioners willing to pay for a review course to upskill as a means of establishing a scholarship fund to offset student expenses. Integrating experienced practitioners and students in the boot camp would enrich the experience for both parties and address the evolving demands for higher education to move beyond traditional degree structures to prepare the current workforce for hybridized skills.

Based on the success of this strategy, the authors are using the framework to propose the use of boot camps at other institutions. This guidance has been provided to accounting program decision makers to enhance program reputations through certified graduates and provide an alternative program education model as a continuing education provider to address ubiquitous budget issues.

CONCLUSION

A turbulent hybridized job market has created millions of employees seeking to advance careers and avoid automation. These dynamic changes have resulted in a wide community of occupations turning to trusted learning partners in higher education to upskill. This provides an opportunity for higher education to “realize the long unmet promise of lifelong learning” through boot camps, certificates, and CPE (Sigelman et al., 2018).

Simultaneously, few accounting students are aware of the diversity of career options and the hybridized skills required beyond the age-old choice of “tax or audit.” Even fewer students have considered the differences in salary, work load, qualifications, advancement opportunities or job security between public accounting, industry, non-profit, and governmental accounting career paths (Laufer & Crosser, 2004). It is the responsibility of faculty to provide students with adequate information about accounting career options and the corresponding academic preparation and certification requirement/preferences so that students can make informed decisions about their future.

Professional certifications provide supplemental validation of formal education or specialized training and encourage lifelong learning for further professional development, including continuing education and training maintenance (Wang & D’Cruze, 2019b). Professional certifications for hybridized KSAs can also give potential employees confidence, self-efficacy, and a sense of inclusion (Brooks et al., 2011). Mapping a boot camp’s curriculum to certification domains for exam preparation informs relevant course design and maintenance (Wang & D’Cruze, 2019a).

Because both the demand for and supply of accounting majors are changing, and employers are demanding more hybrid skillsets from employees, the importance of distinguishing oneself on the job market is increasing. Through the AICPA and IMA, the profession is calling for more increased use of technical KSAs as part of the professional association core competency frameworks (AICPA, 2017; IMA, 2019; Lawson et al., 2014).

In this paper, we demonstrate one way for educators to respond to this call: by providing a boot camp for professional certification exam preparation as part of a new era of higher education—one focused on helping participants understand the networked systems of people and machines joined together in the workplaces (Aoun, 2016). We recommend focusing on a CISA as a technology KSA instructional tool to prepare participants to pass an introductory professional

examination and build toward more challenging credentials through developing a lifelong learning mindset. We provide a detailed approach for a boot camp that can be adapted and modified to fit the instructor, the participants, and the specific professional certification exam. With a commitment to resources, a dedicated mentor/professor champion, and effective communication, both the participants and accounting programs can benefit from a certification exam boot camp. Our alum feedback stated it best: “The study skills and habits developed during my CISA boot camp have been [a] valuable and integral” part of passing additional certification exams (CPA),” and “a boot camp is not only about learning the material, it is the extra motivation you receive from your instructor pushing you to keep working toward your goal.”

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Appendix A: Feedback on CISA Examination

Panel A – Student Feedback Received After Passing Exam

Student	Year	Feedback
1	Junior	<i>I was very pleased to find out that I passed. Big thanks to [Redacted] and the accounting department for making the review course possible.</i>
2	Junior	<i>I PASSED! I am still in shock. But I really have to thank [Redacted] because he did a great job with his boot camp. He went over every chapter in the review manual. It was a good overview of key material in combination with the database and reading the CISA manual. He was extremely motivating throughout the term and constantly reassuring my success. I am extremely grateful for the time he devoted to his students.</i>
3	Senior	<i>I took the exam in June and found out today that I passed! Thank you for all the hard work and extra hours you put in helping us prepare for the exam, it speaks highly of your dedication to your students. Your encouragement helped me stay motivated and on track to pass the exam.</i>
4	Senior	<i>I wanted to let you know that I passed the CISA exam that I took in June! If students in the future are going to take this exam, I would highly recommend that they take advantage of the study sessions with [Redacted]. They helped me a lot.</i>
5	Senior	<i>When I started taking Accounting Systems, I never thought I would get to the point of passing the CISA exam. I still cannot believe it. I have already had one interview where this came up and the interviewer was impressed because he told me he is encouraging his staff to take the exam and if I get the job I will be one of two who have passed the exam.</i>
6	Junior	<i>I want to let you know I found out today I passed the CISA Exam! Thank you and the accounting department for offering the review sessions. They were a huge help and I felt prepared going into the exam. I have already started thinking about the CISM.</i>
7	Senior	<i>I just received my results for the CISA exam and I PASSED! I actually PASSED! I updated my LinkedIn and am applying for IT Audit and Assurance jobs. I hope the accounting department continues offering the CISA course. Thank you [Redacted] for all the time he took and confidence he gave me to pass. My next step is the CPA!</i>

Panel B – Alumni Feedback Received After Work Experience*

<i>Alumnus</i>	<i>Experience</i>	Employer and Area <i>Feedback</i>
1	1 year	<p>Public accounting firm in IT Assurance and Cybersecurity <i>I passed the Certified Information System Auditor (CISA) exam June my Junior year of college and owe much of my success to the boot camp I took with [Redacted]. Not only did the CISA boot camp teach me skills necessary in understanding the concept of business risk and IT audit, but also helped me build confidence when searching for a job or engaging with my clients. The CISA exam, an exam recognized by my industry, has become a standard at my firm. Since I have already passed the exam, I have the capacity to focus on the next certification. With this valuable credential in my back pocket and over a year of experience, opportunities continue to present themselves. My ambition and potential is endless. I can see the growth in my career and the truth is, with a little guidance from knowledgeable professionals, anyone can find success. A boot camp is not only about learning the material, it is the extra motivation you receive from your instructor pushing you to keep working toward your goal. Passing the CISA exam has changed my life. I cannot express enough, how grateful I am for the boot camp I took almost three years ago and the time [Redacted] spent on developing me as a professional.</i></p>
2	2.5 years	<p>Public accounting firm in Audit <i>Passing the CISA while still in college was one of the best things I could have done to advance my early career. Studying for the exam allowed me to understand what an information system auditor does on a day-to-day basis. This knowledge has helped me plan the first five years of my career. It helped me get interviews at many different companies and it ultimately helped me get a job at a top public accounting firm. Once I began work with my provisional CISA status, I had a baseline knowledge of the field I was entering. I knew terminology and topics that many of my peers did not. As my career has progressed, I am increasingly thankful that I took the CISA test while in college. The CISA has been a gateway, opening many doors, including allowing me to take other exams to help further my career. Since passing the CISA I have also passed the CISM, which can help me transition out of the audit function if I so choose. Currently, I am deciding between a few other professional exams that can help deepen my technical knowledge of information systems. Ultimately, my career has been shaped by passing the CISA exam in college, and it continues to play a large role in where I see my career progressing.</i></p>
3	1.5 years	<p>IT Consulting Firm as IT Auditor <i>Deciding to take the CISA exam has shaped my career more than any other decision up to this point in its young life. I went into college knowing I wanted to be an accounting major due to the job security</i></p>

	<p><i>accountants have; however, I also developed a passion for technology while still in school. My part-time summer job was working for the tech help desk at my local community college. While not something I wanted to do for the rest of my life, I thoroughly enjoyed my position and felt the desire to work with technology in some aspect when it came to developing my career path. After my second summer of working for the tech help desk, I took my accounting AIS class. I knew this was the mix of technology and accounting that I was looking for. My professor, [Redacted], generously offered a CISA boot camp to help prepare students for the exam. I did not exactly know what the CISA entailed, but I decided to take a chance.</i></p> <p><i>After a ten-week boot camp and many multiple choice questions, I took the CISA in the summer between my junior and senior [years] of college. I was more than prepared for the test and was able to pass on my first try. This opened up a whole new career path for me that many of my peers did not have available to them. I accepted a full-time job as an IT auditor before I graduated from college, mainly due to already having passed the exam. This was the first time my boss had hired someone who had passed the CISA exam prior to being hired. I was able to work on audits right away without spending time studying for and taking the exam. Now, about one and one-half year later, I have already been promoted to Senior IT auditor.</i></p> <p><i>Not only did the CISA boot camp and exam boost start my career, but it also provided me with valuable studying skills. I am nearly finished taking the CPA exam with just one more section to go. The study skills and habits that I developed during my CISA boot camp have been valuable and integral assets in the CPA exam sections I have passed thus far. Having a knowledgeable professor provide professional exam study tips may make the world of difference for young accountants.</i></p>
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* Panel A feedback prior to work experience or degree conferment was obtained from Exhibit 6 and Panel B's open-ended feedback obtained by e-mail. Exhibit 7 provides a more formal survey which can be sent to alumni.

Appendix B: Exhibits for Boot Camp Implementation

Exhibit 1 – Professor/Mentor Checklist for CISA Exam Boot Camp

<u>Item</u>	<u>Note</u>	<u>Example</u>
1	Evaluate professional examination and requirements to sit for professional examination.	
2	Document cost of membership fees, materials, exam registration, and annual membership fees for the professional examination.	
3	Mention professional examination options to students during class.	
4	E-mail students regarding professional examination boot camp.	Exhibit 2
5	Post boot camp poster regarding professional examination for students in College with QR Codes, contact information, and deadlines. (Note any prerequisite knowledge necessary to enroll in boot camp, expected cost, and budgeted time requirement.)	Exhibit 3
6	Post Google Forms survey with deadline to coordinate logistics for boot camp.	Exhibit 4
7	Coordinate with facilities management and College to reserve classroom space for boot camp. (Note number of seats needed, day of week, duration, and technology/workspace requirements.)	
8	Communicate with students the meeting time and room number and duration of boot camp.	
9	Prepare schedule based on content specifications of professional examination.	Exhibit 5
10	Communicate schedule and homework requirements to students.	
11	Request feedback from students for continuous improvement.	Exhibit 6
12	Request feedback from alumni for continuous improvement.	Exhibit 7

Exhibit 2 – Sample E-mail for CISA Boot Camp

Dear Student:

Imagine “Your Name, CISA”

The Accounting Department is offering a boot camp for the Certified Information Systems Auditor (CISA) exam administered by ISACA. The CISA exam is a four-hour, one-part exam consisting of 150 multiple-choice questions. The majority of the material on the CISA exam was covered in your Accounting Information Systems (AIS) Course. Therefore, at a minimum you should have taken AIS or be enrolled in AIS during the boot camp. You are eligible to take the exam while still a student but must fulfill the experience requirements before you can designate yourself as a CISA.

You are required to purchase the course materials. The required materials for the course are [CHOICE OF EXAM PREPARATION BY INSTRUCTOR]. The materials can be purchased here:

[PROVIDE A LINK FOR STUDENTS]

The boot camp will take place one evening a week during the semester for ten weeks. To sign up and/or suggest days and times please click on the following link:

*[Link to Google Doc, **Sample in Exhibit 3**]*

I strongly urge you consider this boot camp, as passing this exam can separate yourself on the job market and in your career. I personally experienced this when I was working in public accounting. The CISA designation allowed me the opportunity to work on engagements I may not have been able to work on without the CISA. It is an excellent designation complementing the CPA.

The cost of the exam is \$575²⁸ for ISACA members. For more information about the exam, please refer the CISA portion of ISACA’s website at:

<https://www.isaca.org/Certification/CISA-Certified-Information-Systems-Auditor/Pages/default.aspx>

If you have any questions or concerns, please contact me at: [include contact information here].

Imagine:

Your Name, CISA

Interested in becoming a Certified Information Systems Auditor
(CISA)?

Attend a Boot Camp to Prepare for the Exam!

You may take the exam while still in school and are awarded the
designation after you obtain the necessary work experience!!!

Duration: Ten Weeks

When: Meets three hours, one evening per week;
Day and Time TBD

Where: Classroom Location

Who: Instructor

Pre-Req: ACC XXX – Accounting Information Systems (Note: You may take the
boot camp if currently enrolled in AIS during the boot camp.)

**For more information, please contact Instructor at [email] or book an appointment by
scanning the QR Code below.**

[insert QR code]²⁹

Exhibit 4 – Google Forms³⁰ Information Survey

- 1) Please indicate your level of interest in the CISA boot camp with 1 indicating little to no interest and 5 indicating a high level of interest:
 - a. 1 2 3 4 5
- 2) What year are you currently in?
 - a. Sophomore
 - b. Junior
 - c. Senior
- 3) If interested, which day of the week is best for you?
 - a. Monday
 - b. Tuesday
 - c. Wednesday
 - d. Thursday
- 4) If interested, which of the following three-hour time slots works best for you?
 - a. 5:00 PM-8:00 PM
 - b. 5:30 PM-8:30 PM
 - c. 6:00 PM-9:00 PM
- 5) Do you have any specific questions about the CISA exam or the boot camp?

Exhibit 5 – Sample Schedule for CISA Boot Camp

Week	Boot camp topic	Estimated Time
1	a. Boot camp orientation (materials, examination, strategies, homework)	1.0 hour
	b. Domain 1: The Process of Auditing Information Systems (21%)	2.0 hours
2	Domain 1: The Process of Auditing Information Systems	3.0 hours
3	a. Domain 1: The Process of Auditing Information Systems (conclude)	1.0 hour
	b. Domain 2: Governance and Management of IT (16%)	2.0 hours
4	Domain 2: Governance and Management of IT	3.0 hours
5	Domain 3: Information Systems Acquisition, Development and Implementation (18%)	3.0 hours
6	a. Domain 3: Information Systems Acquisition, Development and Implementation	2.0 hours
	b. Domain 4: Information Systems Operations, Maintenance and Service Management (20%)	1.0 hour
7	Domain 4: Information Systems Operations, Maintenance and Service Management	3.0 hours
8	a. Domain 4: Information Systems Operations, Maintenance and Service Management (conclude)	2.0 hours
	b. Domain 5: Protection of Information Assets (25%)	1.0 hour
9	Domain 5: Protection of Information Assets	3.0 hours
10	a. Domain 5: Protection of Information Assets	2.5 hours
	b. Boot camp concluding remarks	0.5 hour

Notes: CISA Domains based on CISA Boot Camp delivered for 2017 exam.

Exhibit 6 – Survey for Student Feedback Form for CISA Review Course

Name: _____

As you fill out this feedback form, please remember the nondisclosure agreement you signed when taking the CISA exam.

- 1) Did you pass or fail the CISA exam?

- 2) Looking back on your exam experience (and keeping in mind the nondisclosure agreement above), what was the best thing about the CISA Review Course?

- 3) Looking back on your exam experience (and keeping in mind the nondisclosure agreement above), what was the worst thing about the CISA Review Course?

- 4) Please rate the balance of the face-to-face class meetings. Was there an appropriate balance between time spent on exam content, multiple-choice practice questions, and essays?

- 5) Please provide any additional feedback you may have to improve future review courses.

Exhibit 7 – Survey for Alumni Feedback for CISA Examination

Name: _____

As you fill out this feedback form, please remember the nondisclosure agreement you signed when taking the CISA exam.

- 1) What is the name of your current employer?
- 2) What is your current job title?
- 3) How many months of work experience do you have?
- 4) Has the CISA helped your career? Please elaborate.
- 5) If you had to do it again, would you still take the CISA boot camp and pursue the CISA designation?
- 6) Do you feel passing the CISA exam has given you an advantage compared to your peers at your organization?
- 7) Have you passed any other professional examinations? If yes, please elaborate.
- 8) Please provide any additional comments/feedback.

¹ Burning Glass Technologies is an analytics software company that delivers job market analytics for employer, worker, and educator data-driven decisions across a dynamic labor market: <https://www.burning-glass.com/>. (last accessed May 15, 2020).

² Upskill is defined as learning new skills or teaching workers new skills: <https://dictionary.cambridge.org/us/dictionary/english/upskill> (last accessed February 29, 2020).

³ ISACA is a global association that provides IT professionals with knowledge, credentials, training and community in audit, governance, risk, privacy and security. The association offers many certifications in information technology and IT audit, including the CISA. <https://www.isaca.org/> (last accessed February 29, 2020).

⁴ In the context of this paper, “boot camp” is defined as an intense training short course and could be extended to other university constituents, stakeholders, or practitioners needing to upskill for career advancement.

⁵ Based on discussions at semi-annual advisory board meetings with firms hiring accounting graduates, as well as the increased emphasis on technology, this proposal emphasizes the CISA exam. The boot camp may be adapted for professional designations emphasized by any school’s alumni, advisory boards, and faculty.

⁶ ISACA requires a minimum of five years of “professional information systems auditing, control or security work experience” before the CISA designation is awarded. Experience substitutions and waivers are available for IT-based degrees. For more information, visit ISACA’s website at: <https://www.isaca.org/Certification/CISA-Certified-Information-Systems-Auditor/How-to-Become-Certified/Pages/default.aspx> (last accessed February 14, 2020).

⁷ Other professions offer intense study for licensure examinations. For example, Barbri offers law school graduates state bar or Uniform Bar Examination reviews at select law schools. Each weekday for a month, study sessions lasting 210 to 240 minutes focus on a bar exam topic (Barbri.com, Massachusetts, last accessed December 27, 2019).

⁸ To assist the mentor or academic champion for the professional examination, the authors will make available the Exhibits contained in Appendix B in a Microsoft Word format. This format allows champions to edit the documents for the professional examination that best fits their college, department, or expertise area.

⁹ The program is modelled after a live on-campus Becker CPA review course with over a decade of documented certification exam preparation success: <https://www.becker.com/cpa-review/firms-universities-partners/universities> (last accessed March 1, 2020).

¹⁰ Similar designations for example include a Certified Public Accountant (CPA), Certified Information Security Manager (CISM), Certified Information Systems Security Professional (CISSP) or Certified Management Accountant (CMA). For a listing of professional designations, please refer to the “New Accountant’s Guide to Certifications” available at: <http://www.renpublishing.com/Guide-to-Certifications.pdf> (last accessed March 1, 2020).

¹¹ Undergraduate AIS textbooks may discuss professional certifications. For example, Richardson, Chang, and Smith’s (2018) *Accounting Information Systems* references the following certifications in AIS: CISA, Certified Information Technology Professional (CITP), and Certified Internal Auditor (CIA). Another leading AIS textbook, Romney and Steinbart’s (2016) *Accounting Information Systems*, references the Certified Information Technology Professional (CITP) and Certified Fraud Examiner (CFE) certifications.

¹² For full student feedback received after students passed the exam, see Appendix A, Panel A and for full feedback from students received after graduation, see Panel B.

¹³ We recommend using Google Forms for this survey. <https://www.google.com/forms/about/> (last accessed February 29, 2020).

¹⁴ QR codes were created using the QR Code Generator available at: <https://www.qr-code-generator.com/> (last accessed February 29, 2020).

¹⁵ In addition to the time involved in the boot camp, there is a monetary cost. Costs (current as of February 29, 2020) based on becoming an ISACA member are as follows: ISACA’s student membership fee, \$25; the CISA Review Manual (published by ISACA), \$129; and the CISA Review Questions, Answers & Explanations Database – 12-month subscription (published by ISACA), \$299. The CISA exam registration fee is \$575. The authors suggest working with local firms and employers to fund scholarships to help offset the costs related to sitting for the examination.

¹⁶ For ISACA, this approach has been most effective when leveraging a partnership between a student and a professional chapter.

¹⁷ Some students have difficulty understanding what a professional examination involves, so we stress the difference between a professional exam and [what do you compare it to?] throughout the course.

¹⁸ <https://www.isaca.org/Certification/CISA-Certified-Information-Systems-Auditor/Job-Practice-Areas/Pages/CISA-Job-Practice-Areas.aspx> (last accessed February 29, 2020).

¹⁹ The current domains for the CISA exam are the same domains and percentages tested when we ran this boot camp.

²⁰ The CISA Review Manual (currently in its 27th Edition) is available directly through ISACA at: [https://www.isaca.org/search#sort=relevancy&f:@credentialsfacet=\[CISA%C2%AE\]&f:Language=\[English\]](https://www.isaca.org/search#sort=relevancy&f:@credentialsfacet=[CISA%C2%AE]&f:Language=[English]) (last accessed February 19, 2020).

²¹ For additional details on self-regulated learning see Zimmerman (1990) and Zimmerman and Paulsen (1995).

²² The CISA uses a scaled scoring system: a CISA candidate needs a minimum scaled score of 450 on a scale of 200 to 800. Candidate scores are reported as a scaled score by converting the candidate's raw score to a common scale. Per ISACA's Certification Exams Candidate Guide, a score of 200 represents the lowest score possible and signifies only a small number of questions were answered correctly while a score of 800 represents a perfect score with all questions answered correctly. "Sub-domain scores are reported only to provide a relative performance in each area. Dividing the reported scores by the number of domains for an average does not accurately reflect the total score. It is possible to achieve low scores in multiple domains and still pass and high scores in certain sub-domains but still fail" (ISACA Certification Exam Candidate Guide, 2019, p. 15). Since ISACA does not identify the passing percentage, we recommend 85% as an aspirational goal for motivation, as this is ten points above the 75% often mentioned when referring to other exams.

²³ The concept of repercussions in a voluntary, self-regulated learning environment is discussed in further depth in the section "Lessons Learned."

²⁴ Since some of these students were currently enrolled in courses with the boot camp instructor, we had boot camp participants submit feedback to the departmental leadership in order to avoid any potential bias in the opinion of the boot camp instructor.

²⁵ The first two weeks were considered the "trial period," where students could sit in on the boot camp to decide if they wanted to pursue the CISA designation.

²⁶ The boot camp was conducted at a small liberal arts institution in the Midwestern United States. The department averaged 85 junior and senior accounting majors during the time the boot camp was offered.

²⁷ Attempts to follow up with these students were unsuccessful.

²⁸ Current as of February 2020.

²⁹ QR codes were created using QR Code Generator available at: <https://www.qr-code-generator.com/> (accessed February 29, 2020).

³⁰ To create a Google form (Personal), refer to: <https://www.google.com/forms/about/> (last accessed February 29, 2020).