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Technology in Accounting: A qualitative study of undergraduate preparedness

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Technology in Accounting: A qualitative study of undergraduate preparedness

By

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Abstract

Throughout history, technology has had a major impact on every profession and how certain tasks are performed. In recent years, technology has accelerated at an astonishing rate causing a total shift in the valuable skillsets of young professionals. Accounting is no exception to this shift and, as technology continues to advance, emerging accounting professionals will no longer be expected to enter the workforce only with basic pen-and-paper accounting knowledge. Instead, they will also be expected to possess analytical skills and be prepared to apply and learn the newest technology on the market. However, the traditional accounting curriculum does not focus on technological skills. Rather, it focuses on the basics of accounting, theory, and manual journal entries. Although these basics are certainly fundamental to accounting knowledge they are no longer the most important skills in an accountants repertoire. This raises the following question: are accounting programs adequately preparing graduates to use technological skill in the workplace once they graduate? This research paper seeks to answer that question through a qualitative study of recent Tennessee accounting undergraduates.

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Chapter One

Introduction

As the landscape of the business world changes and advances, so do the duties and responsibilities of business professionals. Accountants in particular are no longer just bookkeepers and tax preparers. They are expected to be business advisors, data preparers, and experts in interpreting financial information. The demand for bookkeeping knowledge is being overshadowed by the need for communication, problem-solving, and technological competency (Diller-Haas, 2004). The ability to produce and interpret data and then provide advice are increasingly important skills for accountants (Howieson, 2003). The demand for a cross-functional employee who is experienced in technologically advanced processes and data interpretation is at an all-time high. Technological skills are no longer specialized skills for accountants, but instead they are generic skills that are increasingly important. This means a basic grasp on computer applications such as Microsoft Excel and Access will no longer be sufficient when entering the workforce (Sithole, 2015). Although Excel will always be an important tool for accountants, it is no longer the only technology used in the business world. Graduates should enter the workforce with an excellent understanding of Excel and its data manipulation capabilities, but they should also be able to use and understand newer technologies with greater data manipulation capabilities, such as PowerBI, Alteryx, and Automation Anywhere to name a few.

Traditionally, accounting education has been limited to learning the basics of accounting and preparing financial information on paper rather than learning how to implement technology to manipulate data. Although a solid understanding of the fundamental accounting concepts are

incredibly important for any accountant, a focus on perfectly balanced pencil-and-paper problems discourages critical data analysis and inhibits the use of more advanced technological data preparation. With a lack of technology in accounting curricula, the focus becomes centered on memorization and how to record transactions rather than on how to apply technological skill and interpret the resulting data (Diller-Haas, 2004). Failing to equip students with adequate technological skills also inhibits their ability to critically analyze and apply the resulting data. Students must be equipped with the skills necessary to analyze, evaluate, and synthesize large volumes of data and then apply the information to real-world situations (Franklin & Morrow, 2017).

Without an emphasis on technological proficiency, accounting graduates may be entering the workforce lacking the needed for the synthesis and interpretation of important data. This could leave graduates unprepared to take on the new accounting role of the future and raises the question: are accounting programs keeping up with the demands of businesses and sufficiently preparing graduates to use technology in the workforce? This research paper seeks to answer this question by focusing on the perceived preparedness of undergraduates to implement technological skills in the workplace upon graduation. By reaching out specifically to recent graduates, student voices will be added to the call for an overhaul of the accounting curriculum.

Chapter Two

Literature Review

The debate surrounding the relevance of accounting curricula has been ongoing since the early 90s when modern technology and globalization really took hold of the world. Even as far back as 1993 researchers have commented that accounting education must be redesigned to better prepare students for the true nature of practice (Williams, 1993). Although accounting curricula have been under scrutiny for over 25 years, many researchers feel that not enough is being done to keep them up to date. Consequently, there are arguments for several different focus areas for improvement, namely communication, critical thinking, and technology.

The biggest focus area of current research is the improvement of critical thinking skills. Current accounting programs rely heavily on perfectly balanced problems, structured data sets, and neatly organized journal entries. The real world of accounting is not as black and white. Even though an understanding of the basics of accounting is fundamental and these types of problems help build that understanding, they also inhibit a deeper more analytical understanding of accounting. More importance should be placed on understanding when things are right and wrong and why they may not balance perfectly (Ackerman, 2019). Accountants are called upon daily to apply judgment and deal with "messy" or incomplete data (Williams, 1993). Real-world problems require assumptions and estimations that are not commonplace in traditional accounting curricula. Along the same lines, a Botswanan survey of professors and practitioners suggests that students should be taught using unstructured problems that focus on problem solving and research technology use (Wally-Dima, 2011). In this way, accounting education

needs to be restructured to provide more experience with real-world problems and, therefore, stimulate the use of critical thinking and data analysis skills.

Furthermore, simple tasks such as month-end closing and tax work are increasingly being offshored to employees in other countries. This implies that new employees should be prepared to face increasingly complex tasks as entry level employees as well as be able to communicate with coworkers from different cultures (Fennema, Dickins, & Daugherty, 2012). In fact, new graduates will need above average skills in both communication and technology if they wish to stand out to employers who hunt for highly qualified new hires. Although many perceive accountants as backroom number crunchers, communication is a very important skill especially in the field of audit. Being able to communicate with clients clearly, personably, and effectively is a key auditing skill. Outside of auditing, accountants also need to be able to communicate with industry partners or to their various clients.

A survey of academics and practitioners in the UK showed academics and practitioners alike rated written and oral communication skills just below critical thinking skills in importance. Practitioners also rated presentation skills, a visual communication form, ahead of written and oral communication skills (Crawford, Helliar, & Monk, 2011). This indicates a clear preference for employees who, not only provide unique solutions to problems, but who can also communicate their ideas with coworkers worldwide. However, in a recent study in California which incorporated educator and practitioner opinions, communication was determined to be the weakest skill of new graduates surveyed (Milliron, 2012). The same study showed that practitioners placed the highest importance on analytical thinking and communication skills. Discussions centered around remedying this weakness in communication skills led to

recommendations including team building exercises and more presentation-based projects which demonstrate students' ability to present findings eloquently.

In addition to communication skills, accountants must have a firm grasp on technological skills. As previously mentioned, technological skills are no longer bonus skills for accountants, but instead they are mandatory skills that should be incorporated into university coursework. A study in Ghana found that employers require entry-level accountants to at least have command of word processing, spreadsheet, database, and basic accounting software packages before being hired (Awayiga, Onumah, & Tsamenyi, 2010). The same study found that while employers rated technological skills as highly important, only 38% of employer respondents rated graduates as being good or very good in information technology. As indicated before, many studies have returned the same results of high importance and underwhelming results indicating a shortcoming in accounting education concerning technological skill.

Accounting curriculum that is outdated does not only affect students negatively by underpreparing them for the workforce. It also impacts businesses which must spend more time and resources simply bringing new hires up to date and the overall perception of the accounting profession is impacted as well. Researchers claim that the top problem accounting firms face today is recruiting and retaining talent, which is largely affected by the large skills gap between the skills businesses need and the skills colleges are teaching (Ackerman, 2019). The training process for new employees is shorter than ever and employers want their new hires to be skilled enough to "hit the ground running" and be introduced to complex problems sooner (Siegel, Sorensen, Klammer, & Richtermeyer, 2010). The stagnation of accounting curricula has also caused the public perception of accountants to remain outdated. This suggests that students are entering programs expecting a straight forward job of balancing numbers when in reality

accountants are expected to be business advisors and problem solvers. This also leads highly creative and qualified students to avoid what they believe is an unchallenging profession (Diller-Haas, 2004). By not evolving to meet the needs of employers, accounting instruction has influenced students to bypass the accounting major for other majors such as information systems, finance, logistics, supply chain management, e-commerce, and strategy (Sack & Albrecht, 2001). This suggests that, not only are most current accounting graduates falling flat as far as meeting skills expectations, but other students are losing interest in the programs that refuse to change and keep up with the modern world's demands. A recent exploratory study has identified three main reasons for this expectation-performance gap: a difference in educator expectations and employers expectations, institutional setbacks such as lack of funds, and substandard performance from professors (Bui & Porter, 2010). It is theorized that this substandard performance stems from a disconnect between accounting professors and the ever changing reality of the profession. The assumption is that curricula are being shaped by faculty interests which may be focused on what was relevant during their own working experience. This leads to narrow and sometimes irrelevant topics being taught, leaving students unexposed to other important topics (Watty, McKay, & Ngo, 2016).

It is evident that accounting programs are in great need of an immediate overhaul. Although most researchers and educators can agree on this point, many seem to be neglecting the importance of technology education in redeveloping accounting curricula. Incorporating technological skills into accounting curricula will support the development of critical thinking skills. The continued implementation of increasingly complex forms of technology can lead to a strong basis in technological skill and can pave the way for more complex data preparation as well as a deeper understanding of what the numbers really mean. This gives graduates the ability

to leverage and manipulate data through their own understanding of technology and allows them to contribute to decision making efforts within a business. Additionally, if taught to sufficiently utilize technology in the workforce before they graduate, students will have a head start on utilizing existing technology and learning new technology as it becomes available.

According to a 2013 survey at a Midwest university, technology skills are some of the top cited skills needing improvement according to employers. This survey found that employers rated new hire and intern technology preparedness, spreadsheet skills, and communication skills the lowest of the surveyed categories (Yu, Churyk, & Chang, 2013). Even though students in the same study rated their technology and spreadsheet skills very highly, alumni who had the opportunity to actually use their skills in the workplace soon rated their preparedness lower than before. Like other research suggests, it seems educators have largely fallen out of touch with employer needs regarding technology and often refuse to incorporate technology due to a personal lack of experience or skill in the field or the fact that there are too many different technologies at play to teach students (Senik, Broad, Mat, & Kadir, 2013). Howieson insists educators prefer an emphasis on technology "as a bookkeeping system rather than on how 'technology can be leveraged to make business decisions'" (Howieson, 2003).

Furthermore, recent discussions on the importance of "Big Data" further support the importance of technological skill for accountants. The term "Big Data" describes the large volumes of structured and unstructured data available to a business on a day to day basis (Big Data Wiki, 2020). Being able to harness and manipulate the information available through Big Data is widely regarded as the next frontier for many different aspects of business. In fact, 51% of corporate leaders rank Big Data as a top ten business priority (Gamage, 2016). It includes high volume, high velocity, high veracity, and high variety information that can be intimidating and

confusing to use because of the sheer volume of data available. However, when manipulated properly, it can provide enhanced insight for decision makers in a business. As accountants are now expected to be decision makers in the business world, it will be increasingly important for them to be able to gather, transform, and analyze data (Janvrin & Watson, 2017). As such, having the technological skill to be able to store, manage, and analyze Big Data will allow accountants to make better informed decisions. A significant aspect of working with Big Data is, not only being able to operate the software, but to understand where the data comes from and the implications it carries (Janvrin & Watson, 2017). This further supports the importance of a solid technological background in accounting education. Without an understanding of how the software works, where the data comes from, and how it can be used, students will be underprepared to apply critical thinking knowledge when provided with copious amounts of data. If accounting programs incorporate the technological skills necessary to deal with Big Data, as well as other types of accounting software, the relevancy of their program will be enhanced in the eyes of students looking for promising career pathways (Warren Jr, Moffit, & Byrnes, 2015). Students majoring in accounting will be able to provide useful, dynamic real time data to their employers and demonstrate their importance to a company.

As it stands, the body of literature related to evaluating accounting curricula and their effectiveness has only included data from accounting employers, tenured practitioners, and accounting professors. The research focuses on what graduates are lacking, what the programs are failing to include, and perhaps why there is resistance to changing programs so drastically. While it is apparent that these voices are incredibly valuable, student voices are being neglected during one of the most crucial times of need for their input. Accounting educators are struggling to meet the demands of the future and they are also struggling to keep students attracted to the

major. Technological skills are incredibly valuable to future accountants not only as tools of the trade but to help develop and hone critical thinking skills. For this reason, this research aims to expand the body of knowledge by gathering and analyzing student opinions focused specifically on the state of Tennessee. The opinions of recent graduates about the effectiveness of their respective graduating accounting curriculum in regards to how they were prepared to use technology effectively upon graduation is the focus of this study.

Chapter Three

Methodology

Introduction

The purpose of this chapter is to introduce the qualitative research methodology chosen to evaluate the effectiveness of Tennessee undergraduate accounting curricula in preparing graduates to use technology and answer the question: are accounting curricula sufficiently preparing graduates to use technology in the workforce? Because the research question revolves around students' perceptions of their respective programs and their resulting preparedness for the accounting profession, a qualitative approach was deemed to be the most appropriate research methodology. It allowed for a more in-depth analysis of why students did or did not feel prepared by their undergraduate programs and allowed participants to suggest improvements. This chapter will cover participant selection, instrumentation, the data collection process, data analysis methods, and the challenges encountered through the process.

Researcher

The researcher is a senior accounting student who chose this research subject to fulfill the thesis requirement for the honors college of East Tennessee State University. Some participants may have had a direct relationship with the researcher; however, the researcher has no way of

identifying or singling out the responses of those parties therefore minimizing concern in regards to conflict of interest or bias exists in this study.

Study Participants

The target population of this research includes recent graduates of undergraduate accounting programs in Tennessee's public universities. "Recent graduates" was defined as those who had graduated within the past three years and implies anytime between the Fall 2017 and Spring 2020 semesters. "Public universities" includes Tennessee's nine public, four-year universities: University of Tennessee Knoxville, University of Memphis, Tennessee Tech University, Middle Tennessee State University, University of Tennessee Martin, East Tennessee State University, Austin Peay University, Tennessee State University, and University of Tennessee Chattanooga. To select an appropriate, unbiased sample, a set of inclusion and exclusion criteria were established. Participants had to be at least 18 years of age, recieved their undergraduate degree in accounting or accounting and finance from a public Tennessee university in the last three years, and currently reside in the United States. Graduates of private or two year institutions, those who received their degree in something other than accounting or accounting and finance, and those who graduated more than three years ago were not eligible to participate in this survey. Students who double majored in accounting and finance were included in order to capture the experience of all students who experienced both upper and lower level accounting courses. No exclusions surrounding the gender or ethnicity of participants were made. In this way, the target audience of recent accounting undergraduates was established accurately and fairly. The sample size included 25 total responses. This sample will be used to represent the experiences of students in Tennessee accounting programs over the past three years.

Instrumentation

The variables in this study were measured with a web survey (Appendix C). The first part of the survey collected data on respondent graduation year, graduating university, major, and current professional field. The rest of the survey, comprised primarily of Likert scales and open ended questions, sought to collect data that would help answer the research question. The Likert scales asked participants to rank several technology platforms based on frequency of use and their preparedness level to use the technology platform. The short answer questions addressed the same technology platforms and included questions specifically about the participants respective program. These questions were designed to give the researcher information on participants' most used software, software their university prepared them for the most, and their overall feelings about technological preparedness at their university. In this way, the survey method of data collection allowed the participant to reflect on their experience and consider what implications it had on their preparedness to use technology upon graduation. Before data was collected through the survey, the researcher received approval from East Tennessee State University's Institutional Research Board (IRB).

Data Collection

Once approval was granted, the researcher was able to collaborate with several organizations to arrange distribution of the survey. Those organizations included the Tennessee Society of Certified Public Accountants (TSCPA), the Eta Omega Chapter of Beta Alpha Psi, and universities including East Tennessee State University and University of Tennessee Chattanooga. The TSCPA has members from all public universities across the state. By distributing the survey through the TSCPA, graduates from the universities who did not distribute the survey were able to be included in the population. Distributors were asked to assist

the researcher by providing the email information for members or alumni who met the inclusion criteria and sending them a request to take the survey. By keeping potential participant name and email information confidential from the researcher, an added layer of privacy encouraged honest answers and helped ensure anonymity. All organizations were provided with a standard email outline (Appendix A) which briefly explained the aim of the survey and gave potential participants a response deadline. The organizations distributed the survey at several different points throughout the summer and early fall semester which involved a moving deadline; however, participants were usually given two weeks to access and answer the survey. Neither the organizations or the researcher provided any incentive for participation and participation was voluntary. The survey was hosted on the site SurveyMonkey which allowed for IP address collection to be disabled and provided a user friendly interface that worked across multiple devices. After clicking the link, potential participants were directed to an informed consent document (Appendix B) which outlined their rights as human subjects, the goal of the survey, potential risks or benefits, and the researcher's contact information. The survey itself (Appendix C) included 15 questions and no personally identifiable information was collected.

Data Analysis

Analysis of the data included thematic analysis of the surveys and an overview of the individual curricula for the universities in question. First, responses from participants who indicated they were currently employed in the accounting field were coded by the sector of accounting in which the participant worked. "P" for public accounting, "G" government accounting, "F" forensic accounting, "I" for private or industry accounting, and "N/A" for those who are not currently employed in the accounting field. Responses were then separated by university and graduation year so that a comparison within a university could be done first. Next,

responses from two Likert scales were grouped by response rating to give descriptive statistics related to the respondents frequency of technology use and preparedness. Nine different technological platforms (Microsoft Excel, PowerBI, SAP, Oracle, Access, Tableau, Cloud Computing, Blockchain Technology, and Automation Technologies) were listed in both Likert scales. The first Likert scale asked respondents to rate these technologies on a scale from one to ten as it related to their current usage of the technologies with one being "never use" and ten being "used multiple times a day". The scale was grouped with rankings of (1-4) indicating "Very little usage", (5-7) indicating "Moderate usage", and (8-10) indicating "Heavy usage". Question seven was added as an open ended opportunity for respondents to list and rank any commonly used technological platforms that were not listed.

The next Likert scale asked respondents to rate the same technologies on a scale from one to ten in terms of their preparedness to use them immediately upon graduation with one being "Totally unprepared" and ten being "Very well prepared". The scale was grouped with rankings of (1-4) indicating "Unprepared", (5-7) indicating "Moderately prepared", and (8-10) indicating "Very prepared". Question nine was added here as an open ended opportunity for respondents to list and rank important technologies they felt prepared to use immediately upon graduation. In combination with the coding based on accounting industry, the first Likert scale allowed the researcher to determine the most commonly used technologies for accounting graduates overall as well as within each field. The second Likert scale then allowed the researcher to determine whether respondents felt prepared to actually use the most commonly found technologies upon graduation. Because the rating is based upon their preparedness immediately upon graduation, this can be translated into whether or not their university's program adequately prepared them. Question 10, 11, and 13 - 15 were open-ended questions. Respondents were asked to consider

which technological skills they felt they were lacking and which skills they felt most prepared to use upon graduation. Respondents were also asked to list what they thought would be helpful changes to their graduating program overall, what it did well concerning technology, and what it could improve upon concerning technology. These responses were reviewed and analyzed and notes of any recurring themes were made. The notes were then reviewed determine whether or not graduates felt prepared to use technology upon graduation. In this way, these questions helped give the researcher insight into the experience of recent accounting graduates and how this translated into their perceived preparedness to use technology in the accounting field.

After analyzing the survey results, the researcher began to analyze the curricula of public Tennessee universities. The researcher only reviewed curricula from the universities that had participants and only considered the year(s) relevant to the respondent(s) in question. The accounting curricula were analyzed and the researcher noted: how many technology focused or technology incorporated classes were required, the technological focus of said classes, whether these classes were introduced in upper or lower levels, and the amount of recommended elective technology courses offered to accounting students. A rubric was used to denote the above factors and included any significant notes on the curricula. This helped the researcher identify whether or not schools were increasing or decreasing their technology focus over the years. The schools were then evaluated based on their overall planned incorporation of technology. “Planned incorporation” is a key word in the overall evaluation of the curricula as what educators intended for the focus to be does not always carry through to the course execution. This in turn was used to help identify whether the technological skills identified by the program were also identified by graduates as strong points in their skill set. The combination of curricula analysis and thematic

analysis of survey results allowed the research to make connections between the universities intentions concerning technology and graduates actual preparedness.

Limitations

There were limitations in the survey involving non-response bias early on in the data collection process. It took several rounds of the survey being sent out over several months for a significant amount of responses to be received despite it being sent to copious amounts of potential participants. The open ended nature of the survey contributed to this problem. In the future, a more quantitative evaluation could yield more data so a more definite trend could be established. In addition, many universities never responded to the research request and some denied to take part in the research altogether. This put some universities at risk of having little to no alumni participation in this research project which in turn hampered the researcher's efforts to sample all public universities across the state. Although these challenges changed the course of the research project in some ways, they did not hinder the study significantly. These challenges are noted here for future researcher reference on this topic or any other related topic.

Summary

The goal of this chapter was to provide a layout of the methodology used to explore whether or not accounting curricula are preparing their graduates to use technology upon graduation. An in-depth look at the target population, sample size, approval procedure, and data collection procedure provided information on who the participants were and how the researcher protected their rights. The data analysis process and the challenges faced during the course of the research are laid out in detail in order to aid any future researchers wishing to replicate or build upon this body of work. The goal of the next chapter is to provide the results of the aforementioned methodology.

Chapter Four

Results

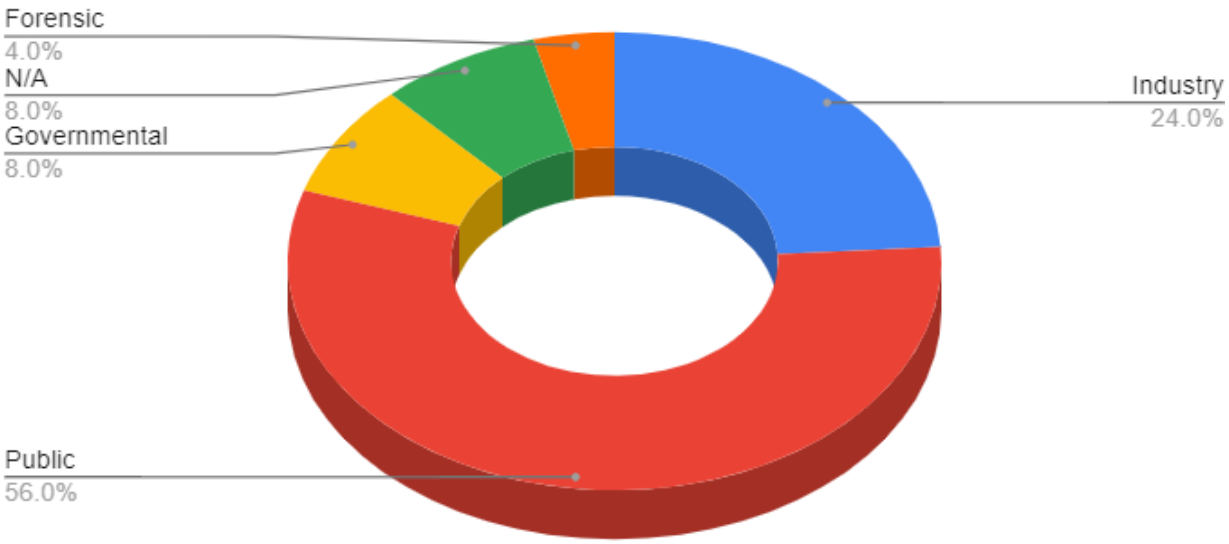
The goal of this chapter is to analyze the results of qualitative research study performed to answer the question: Are accounting curricula adequately preparing graduates to use technology upon graduation? This chapter will begin by giving descriptive statistics of the participants. Then, themes and responses common across all universities will be presented before analyzing the open-ended questions specific to each university. Finally, applicable university curricula will be broken down and evaluated as they relate to technological incorporation.

Participant Description

In total, there were 25 survey participants. Figure 1 shows the percentage of participants employed in public accounting, private or industry accounting, governmental accounting, forensic accounting, and those not employed in accounting. Figure 2 shows the percentage of participants who attended each university.

Figure 1

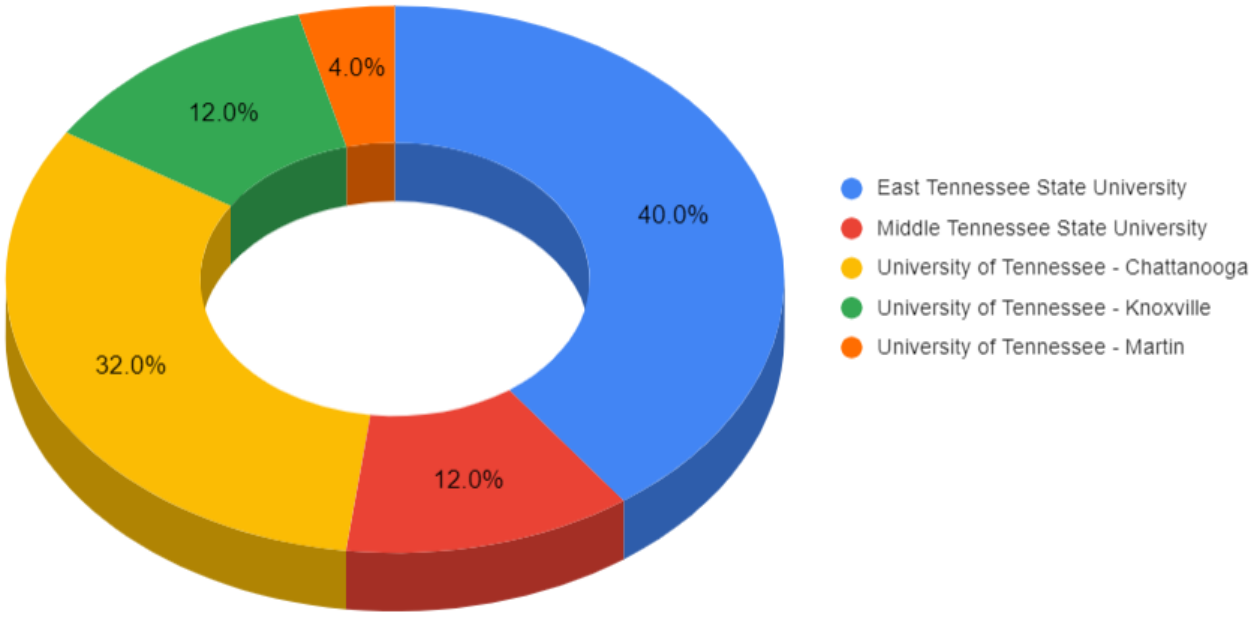
Percentage of participants employed in each accounting sector



Note. 56% of participants were employed in public accounting

Figure 2

Percentage of participants from each university



Note. 40% of participants attended East Tennessee State University

Survey Results

Overall Observations

As was to be expected, Excel was the overall most frequently used software with 92% of respondents saying they used very frequently. However, when it came to preparedness only 56% of respondents rated themselves as feeling very prepared to use Excel upon graduation. The next two most frequently used of the software listed were automation technologies and cloud computing with 40% and 24% respectively rating their frequency of use as very to moderately frequent (Figure 3). Consistent with the level of Excel preparedness, 84% of respondents felt

unprepared for automation technology and 72% unprepared for cloud computing technology (Figure 4). All other software listed (PowerBI, SAP, Oracle, Access, Tableau, Cloud Computing, Blockchain, Automation) received a ranking of very infrequently used from between 80% and 96% of respondents (Figure 3). Interestingly enough, 40% and 28% of respondents felt very to moderately prepared to use Access and Tableau respectively (Figure 4).

Figure 3

Participant ranking of technology Usage

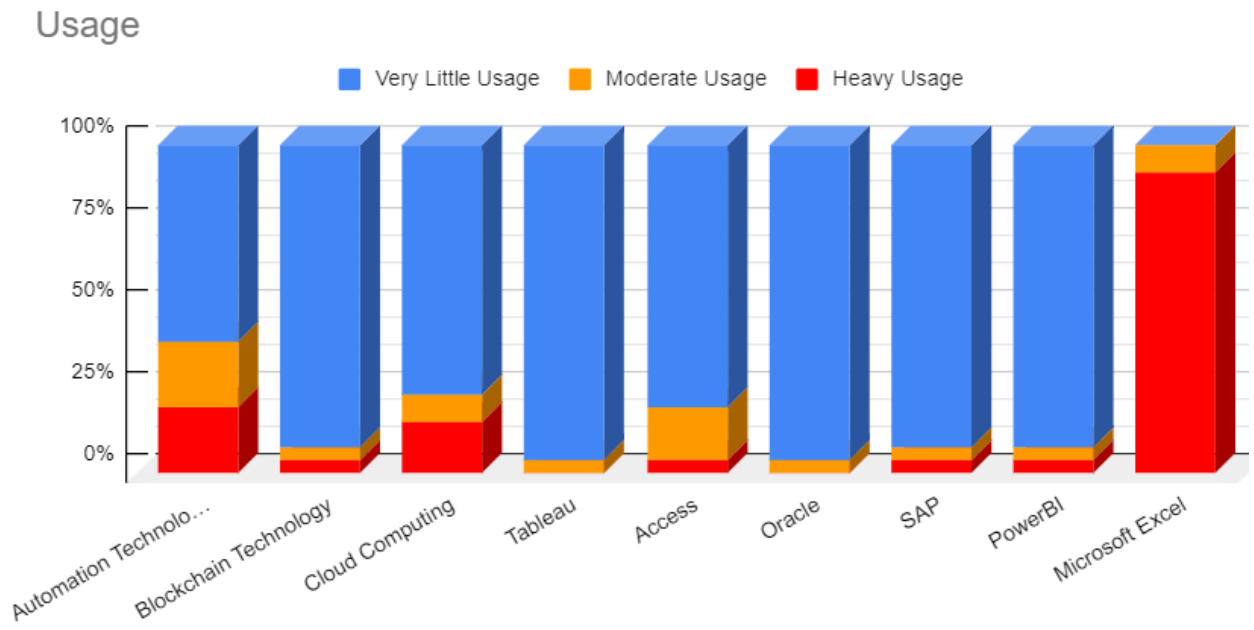
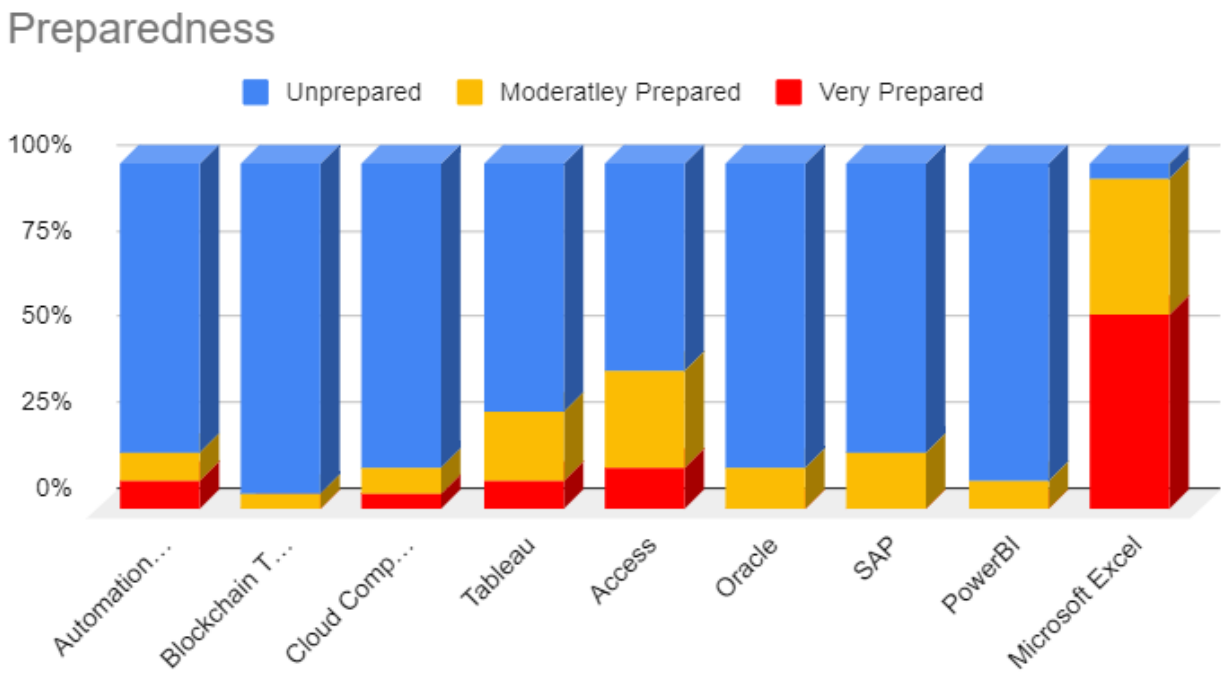


Figure 4

Participant ranking of preparedness to use technology



Already, there appears to be a disconnect between the technology that is receiving the most focus in accounting programs and the technology most frequently used in the workplace. The open ended responses resulted in respondents reporting the following software as the ones they use most frequently: Jira, Microsoft NAV, VBA and SQL programming, Caseware, Prosystems, XCM Workflow, various tax software, IDEA, Alteryx, and several firm specific programs. The three most commonly mentioned software were Caseware, Prosystems, and tax programs. These programs aid most in the audit and tax pathways; however, a deeper understanding of how these programs work and what accounting looks like in the real world would be incredibly beneficial to any graduate. Tax software was the only mentioned software to have a moderate preparedness rate while respondents reported being totally unprepared to use any of the others. Combined

with the results from the Likert scales, this suggests that students rarely use older, generalized data analysis platforms and instead are in need of exposure to more complex, accounting oriented software. Further examination of university specific questions will continue to build upon this implication.

East Tennessee State University

This analysis begins with East Tennessee State University. Questions 11 and 14 asked respondents to explain what technology they felt the most familiar with upon graduation in addition to what technology their university best prepared them to use. All participants indicated that they were most familiar with Excel and thought the university focused most on Excel and other Microsoft products. While Excel is certainly an accountants main tool, other disruptive technologies are sweeping the world and allowing accountants to deal with more complex data as evidenced by the overall Likert scale results. Questions 10 and 13 asked respondents what technological skills they felt they were lacking upon graduation and respondents were given the opportunity to explain what they would have liked their program to have focused on more concerning technology. Respondents felt they were lacking exposure to relevant technology other than Excel and Tableau. They also felt that their understanding of data cleansing and manipulation was sub-par. Participants addressed several main areas needing increased focus including more in depth exploration of Excel's capabilities, real world application of software, and exposure to accounting specific software. While respondents had previously answered that they felt strongest in Excel upon graduation, it appears that their preparation only went as far as basic formulas and functions within Excel. While this indicates a good foundation in Excel, it leaves more to be desired when it comes to real world applications and functionality. Additionally, the lack of exposure to accounting specific software indicates a disconnect from

real world demands. Many participants addressed this in question 15 when asked how they felt the curricula needed to be changed overall. Reponses focused on updating the curricula entirely to have a more "real world" based focus rather than a theoretical focus. As the CPA exam and the industry become more data driven, many students felt they were falling behind the new expectations for accounting graduates.

University of Tennessee – Chattanooga

As was the case with ETSU respondents, students from the University of Tennessee Chattanooga felt they were most prepared to use Excel and other Microsoft suite programs. Likewise, they felt the university taught basic Excel capabilities well. Although respondents did not report feeling very familiar with applying any other programs, they did mention that their professors ensured they had a good foundational knowledge of the functionality of any technology to which they were introduced. However, respondents again felt they were lacking advanced Excel skills as well as exposure to current accounting technologies. A common recommendation among students from both universities was to obtain a better working knowledge of Virtual Basic Applications (VBA) and Structured Query Language (SQL), which are both programming languages. This gives the impression that, although the University may have exposed them to several software, some technologies were not taught in their full capacity and may not have been relevant to current job uses. Overall, respondents desired less emphasis on pen-and-paper principles courses and more emphasis on real world application and data analytics courses in the program. Respondents not only wanted technology to be heavily incorporated into existing courses but recommended having at least two free standing, accounting specific technology course. It is apparent that respondents recognize the importance of technology to the changing landscape of accounting.

Middle Tennessee State University

Respondents from Middle Tennessee State University reported being most familiar in Excel. However, a continuing theme of being unfamiliar with advanced Excel skills and an absence of accounting specific software was still present. Not only did respondents want more in depth Excel knowledge, but they also believed the program should include more problem solving skills when it comes to technology. Instead of teaching students to use technology for specific assignment related tasks, respondents wanted to see more open ended critical thinking assignments that incorporated technology. Overall, respondents felt that the curriculum of Middle Tennessee State University is outdated and not aligned with the current demands of the business including data analysis, technological skill, and problem solving. Some respondents wished to see multi-application, real world problems being incorporated into class to solidify the skills being taught and to increase their knowledge of real world accounting.

University of Tennessee – Knoxville

Respondents from the University of Tennessee Knoxville followed many of the same response patterns as the other universities; however, there seemed to be more overall positive responses about the program's incorporation of technology. Respondents felt familiar with Excel, Tableau, and Access. However, as with the other universities, they felt they were lacking an in-depth understanding of Excel and exposure to tax related software. Despite this lack of exposure, respondents felt that problem solving skills and the opportunity to learn different technological applications were always present in their program. This indicated that, although graduates may not have been fully prepared to use certain technologies upon graduation, they at least had the opportunity to learn about them in some capacity. As was seen with other

universities, respondents wanted an overall greater incorporation of real world problems and technology uses in the program.

University of Tennessee – Martin

The University of Tennessee Martin had only one graduate response and therefore this respondent's input on program specifics shall be weighted differently than that of the other respondents. They reported that they were lacking in advanced Excel skills but felt prepared to use the basic Excel capabilities as was seen with almost every survey participant. They reported that their university offered a hands-on Microsoft applications class that benefitted them greatly. As far as improvements to the program overall, the respondent reported no improvements for the program explaining that they believed employers expected to have to teach new hires about technology; therefore, a general program was sufficient for an undergraduate.

Curricula Evaluation

Assuming a four year, eight semester degree pathway, curricula were evaluated by finding the appropriate catalog year based on the respondent's graduate year. For example, a student graduating in spring of 2018 would have most likely followed the 2014-2015 catalog. For additional analysis, the most recent year accounting curriculum was also evaluated. The universities are listed below in order of most proposed technology incorporation to least.

University of Tennessee – Knoxville

Excluding the latest catalog year, two years of curricula were evaluated for the University of Tennessee Knoxville, 2014-2016. UT Knoxville is unique in the number of technology electives offered directly to accounting students. According to the UT Knoxville catalogs, from 2014-2016 there were two required technology classes and three technology electives offered.

The required classes (Business Software Applications and Business Process Analysis) focused on the real world application of spreadsheets and database software and how to strategically use information technology information in business processes. The available technology electives (Intro to Database Systems, eEnterprise, and Business Applications and Tools) offered the ability to learn about database design and implementation, e-business processes, and advanced spreadsheet usage. The amount of technological classes available to UT Knoxville accounting students corroborates the responses that indicated the opportunity to learn about new software was always present in the program. However, based off the survey responses received, it seems students may not be aware of the amount of technological electives available to them. It could be that these courses are either not very well advertised within the university, or are not taught in their fullest capacity, especially the advanced spreadsheet usage skills. These classes still remain in the latest curriculum, but with the addition of an Intro to Cybersecurity in Business elective. This class focuses on the implementation and design of cybersecurity technology. Based on these factors, it seems the University of Tennessee has a solid foundation in planned technology incorporation.

Middle Tennessee State University

Excluding the latest catalog year, three years of curricula were evaluated for Middle Tennessee State University, 2013-2016. From 2013 to 2015 there were three required technology focused courses and no clearly defined electives. Two of the required courses (Introduction to Microcomputing and Principles of Management Information Systems) are general business degree requirements. The microcomputing course is described as focusing on microcomputer applications and their environment while the management systems course focuses on the role of IT in organizations. Although these two courses are not directly related to accounting, they are

unique offerings for a basic undergraduate business degree and may have some use in incorporating technology for accounting students. The accounting systems course promises an introduction to business process modeling, accounting cycle controls, and database design within the accounting information systems realm. The 2016 and 2021 catalogs included the addition of one more required course (Introduction to Business Analytics). This course focuses on spreadsheets and related analytical modeling tools. However, respondents were vocal about a lack of real world application and the outdated course material of their program. So, while the intention of the courses may be to boost IT knowledge and the application of data modeling tools it seems the material isn't quite up to date with today's real-life applications. Additionally, respondents remarked about a lack of opportunity to develop problem solving skills. So, these courses may be offering a look at technology application but in an assignment specific way that offers no broader learning opportunities. Despite this, the high volume of technology focused courses at Middle Tennessee State University demonstrates high expectation for their planned technology incorporation.

University of Tennessee – Chattanooga

Excluding the latest catalog year, three years of curricula were evaluated for the University of Tennessee Chattanooga, 2014-2017. No noted technology electives were listed in their accounting catalogs. From 2014-2017 only two technology focused classes were required in the accounting curriculum (Accounting Information Systems and Business Computers). These courses focused on current accounting technology, implementation of said technology to the accounting cycle, and general spreadsheet application using microcomputer hardware. Because the business computer class, which teaches the application of spreadsheets and databases, is a general business course requirement it is understandable that respondents felt they had no real-

world application experience using Excel and other technology in accounting specifically. The latest catalog includes two different technology courses: Data Modeling for Business and Accounting Data Analytics, and Accounting Information Systems. The Data Modeling course covers importing and manipulating data, sensitivity analysis, and writing macros in order to analyze data in spreadsheets. Accounting for Data Analytics details a hands on course that deals with data modeling, preparation, and analytics for accounting specific problems. The addition of these courses could address the participants concerns about not being exposed to real world software application scenarios. Based on the addition of two updated accounting technology courses, the University of Tennessee Chattanooga seems to be increasing their planned technology incorporation.

East Tennessee State University

Excluding the most recent catalog year, four years of curricula were evaluated for East Tennessee State University from 2013-2016. Across this entire time period, East Tennessee State University had one required technology centered course (Accounting Information Systems) and no recommended technology electives. This course was focused on foundational information systems concepts and the application of accounting information systems in several areas. In recent years, ETSU has altered the curriculum to include two technology centered courses (Information Technology for Accounting and Data Analytics for Accounting). These courses focus on productivity software applications, data mining and creation, sorting, and reporting on data sets. These more recent additions may help address the respondents concerns for a complete lack of data manipulation skills as well as exposure to other accounting software. Because of the few required technology courses, East Tennessee State University seems to have lower planned incorporation goals than other universities.

University of Tennessee – Martin

The respondent from the University of Tennessee Martin used the 2014 catalog. In both the newest catalog, and the 2014 catalog only one technology centered course was required of students. This course (Accounting Information Systems) is an introductory course that emphasizes the analysis, design, and implementation of computerized accounting software packages. There was also one identifiable technology elective, Business Analysis Using Financial Statements although no information on the course objectives was provided. The respondent from the University of Tennessee Martin only reported feeling prepared for Excel and other Microsoft suite programs. However, the description of the required technology course points to the integration of accounting specific software. So, this may imply that the actual applications used in class are catered towards ease of use and professor familiarity rather than industry advances. Although the respondent had no qualms with how technology was integrated into their program, the complete lack of technology focused courses means the University of Tennessee Martin has placed little importance on the planned incorporation of technology.

Chapter 5

Conclusion

This research project set out to answer the question: Are accounting curricula adequately preparing graduates to use technology upon graduation? Based on the qualitative analysis performed for this study, it was concluded that public universities in the state of Tennessee are not preparing graduates adequately. Combining curricula evaluations with survey responses, it can be reasoned that, while many universities have a desire to incorporate technology in the classroom, they are failing in practice. This could be caused by a lack of insight into the current needs of the accounting professions. This can be seen in the survey responses that indicated high usage of Excel and other newer accounting software (Prosystems, Caseware, etc) but low preparedness to use them. Excel is an accountants first tool of the trade so being able to use it to its full capacity should be at the forefront of technology incorporated into accounting curricula. However, there had been little to no exposure to the accounting specific software the graduates use the most in their careers.

Accounting in the real world is evolving every day and while it would be easy to dismiss this point by stating that accounting curricula simply cannot teach everything, it is imperative to recognize that even exposure to these software could benefit a graduate. Another factor affecting accounting curricula could be professors who are out of touch or uncomfortable teaching the technological skills required of graduates today. The most prevalent indication of this comes from the fact that, while most students reported feeling prepared to use Microsoft Excel, none of them felt comfortable using the more advanced capabilities upon graduation. This may indicate that professors rely on or feel more comfortable with the more basic functions Excel provides

rather than the more advanced applications. There were also responses from several participants indicating that they felt the professors assigned to teach technology were not up to date on the skills themselves. From an internal viewpoint, universities should ensure the most competent professors are assigned the task of teaching technology as it relates to accounting.

Finally, not making technology centered courses and assignments a priority in the curriculum and simply adding them as an afterthought is a hinderance to students ability to learn and apply technology in the real world. By incorporating technology into all courses, from introductory accounting courses to advanced audit courses, students will have exposure to all levels and types of accounting software. This prepares them not only for the software specifically introduced, but also allows them to gain a better understanding of how many platforms actually work and the type of data manipulation required to use most software. This in turn allows graduates to apply this knowledge to the next and newest technology when they enter the profession.

In order to address these deficiencies, an internal review of the program should be performed. This will allow the necessary changes to be made and updates to course requirements added. However, technology in the accounting curricula is not a one-time evaluation. Universities should make an effort to evaluate their programs every few years to ensure that the appropriate software types are still being taught and in what capacity. As was evidenced by the survey, many graduates were exposed to the exact same technology as their peers from years earlier. To truly fix the problem of under prepared graduates and improve accounting curricula in general, routine analysis and updates to the curricula will be needed. To aid in this analysis, partnerships within the community and with leading accounting employers will need to be

forged. Advisory committees with current professionals, business leaders, professors, and students will need to be formed to guide technology needs and other necessary skills.

Based on these results it is highly recommended that all accounting programs in the state conduct research to determine the most current software and technological skills desired by employers and students alike. Further study will be needed to determine whether or not these changes to the curricula are being applied. Additionally, the researcher believes it may be beneficial to include interviews with department chairs and department heads to determine technological goals. Another detail to consider is how technology is being incorporated within normal accounting courses in addition to the technology specific courses. This combined with graduate input once again, will help identify where disconnects exist between course objectives and actual skills learned. In conclusion, accounting curricula in the state of Tennessee has a long way to go to adequately prepare students for their future careers. However, the researcher is hopeful that persistent and immediate action will help remedy the deficiencies identified here.

Appendix A – Email Outline

Attention young accounting professionals,

You are being asked to participate in a research study conducted by Principal Investigator Alyssa Dingus, undergraduate of East Tennessee State University in the Department of Accountancy. This research seeks to analyze undergraduate accounting curricula for adequacy in preparing recent graduates to apply technological skills in accounting and thereby identify possible areas of improvement needed in current accounting curricula as they relate to technology.

To participate, you must be 18 years or older, have graduated in the past 3 years with your undergraduate degree (Fall 2017- Spring 2020), be a graduate of a public four year university in Tennessee, and have majored in accounting or doubled majored in accounting & finance. Participation is completely voluntary and you may discontinue your participation at any time. By choosing to participate you can help identify possible shortcomings in current accounting curricula and therefore help improve the standard of accounting education in Tennessee for future graduates.

Your responses will be strictly anonymous and the researchers will have no access to any personally identifiable information. If you choose to participate, you should click on the link below which will take you to an informed consent document. You should read it carefully and make sure you fully understand the consent form before continuing into the 15 question survey. The survey will remain open until October 24th. Please contact Principal Investigators Alyssa Dingus at dingusam@etsu.edu with questions.

Survey Link: https://www.surveymonkey.com/r/7KYSFNN

Appendix B – Informed Consent

This page explains about being a participant in a research study. Please read this carefully. This will help you decide if you would like to volunteer to join this study.

Study Details

The objectives of this study are:

-To analyze undergraduate accounting curricula for adequacy in preparing recent graduates to apply technological skills in accounting.

-To pinpoint areas of needed improvement in accounting curricula.

-To highlight the potential need for greater focus on technological training in accounting curricula**.**

The data will be gathered by surveying recent graduates of Tennessee undergraduate accounting programs to get a sense of how prepared they felt after finishing their respective programs. This data, along with an interview of select university department heads, will be used to guide an analysis of the curriculum from each university to see which methods seem to be working/not working in favor of students when they graduate.

Those wishing to participate must meet the following criteria:

a. Must be 18 years or older as of the date this form is received.
b. Must be a graduate of a public four year university in Tennessee.
c. Must have majored in accounting or double majored in accounting & finance.
d. Must have graduated in the last 1-3 years (Fall 2017 – Spring 2020).
e. Must currently reside in the United States.

If you decide to volunteer for this study, you will be asked to complete the following 15 question survey to the best of your ability. This survey should take approximately 15-20 minutes of your time. The questions will relate to your perceived experience in the accounting program from which you graduated and how that has impacted your readiness to use technology in the accounting field. No identifiable information will be collected.

There are no expected risks or direct benefits for you, however taking part in this survey could potentially benefit the state of Tennessee by identifying shortcomings in public university accounting programs. There is no cost to you if you decide to be part of this study. You will not be paid for joining this study as this study is voluntary. ***You may decide you do not want to***

participate. If you join this study and then change your mind, you can quit at any time. You may quit by simply exiting the survey.

We will make every effort to keep your study records confidential. The results of this study may be published and/or presented at meetings. You will not be named as a participant. Although your rights and privacy will be maintained, the ETSU IRB, the principal investigator Alyssa Dingus, and her research team have access to the study records. Your records will be kept completely confidential according to current legal requirements. They will not be revealed unless required by law, or as described in this form. A copy of the records from this study will be stored in a private ETSU OneDrive folder for at least 6 years after the end of this study for possible use in future research studies. We will not ask for additional consent for those studies.

1. If you have any questions or research-related problems at any time, you may contact Alyssa Dingus (dingusam@etsu.edu)
2. If you have questions about your rights as a study participant, you may also call the Chairperson of the ETSU Institutional Review Board at 423.439.6054
3. If you have any questions or concerns about the study and want to talk to someone who is not part of the study team, or if you cannot reach the study staff, you may call an IRB Coordinator at 423.439.6055 or 423.439.6002.

By checking "I agree" below, I confirm that I have read and understand this Informed Consent Document. I confirm that I am 18 years or older and meet **all** eligibility criteria set forth above. I freely and voluntarily choose to take part in this research study. I also confirm that I had the opportunity to have it explained to me verbally. I confirm that I was able to ask questions and that all my questions have been answered.

- I agree
- I do not agree

Appendix C – Survey Questions

1) When did you graduate with your **undergraduate** degree?
   a) Spring 2020
   b) Fall 2019
   c) Spring 2019
   d) Fall 2018
   e) Spring 2018
   f) Fall 2018
   g) Summer term : please specify year

2) From what public, Tennessee university did you graduate?
   a) University of Tennessee Knoxville
   b) University of Memphis
   c) Tennessee Tech University
   d) Middle Tennessee State University
   e) University of Tennessee Martin
   f) East Tennessee State University
   g) Austin Peay University
   h) Tennessee State University
   i) University of Tennessee Chattanooga

3) Did you major in accounting or doble major in accounting & finance?
   a) Accounting
   b) Accounting & Finance

4) Are you currently employed in the accounting field?
   a) Yes
   b) No

5) If yes, what sector of accounting do you work in now?
   a) Public
   b) Government
   c) Forensic
   d) Private (Industry)
   e) Other. Please Specify.

6) On a scale of 1-10 (1 being never, 10 being multiple times a day) how often do you use each of the following software/technologies in your current job responsibilities?
   a) Microsoft Excel
   b) PowerBI
   c) SAP
   d) Oracle

e) Access
f) Tableau
g) Cloud Computing
h) Blockchain technology
i) Automation technology

7) Are there any software/technologies not listed above that you are exposed to frequently in your current job responsibilities? If so, please list them here and rate them based on frequency of use.

8) On a scale of 1-10 (1 being totally unprepared, 10 being very well prepared) how prepared did you feel to use the following software/technology for accounting purposes **immediately upon graduation**?
   a) Microsoft Excel
   b) PowerBI
   c) SAP
   d) Oracle
   e) Access
   f) Tableau
   g) Cloud Computing
   h) Blockchain technology
   i) Automation technology

9) If you listed any other software/technologies in question seven, please list and rate them here based on perceived preparedness to use them **upon graduation**.

10) What necessary technology/software skills do you feel you were lacking upon graduation?

11) What necessary technology/software skills did you feel most familiar with upon graduation?

12) Do you feel like you learned more on the job or in the classroom about technology in accounting?
   a) Classroom
   b) On the Job

13) In regards to technology, what do you wish the program at your graduating university had focused more on more comprehensively? Why?

14) In regards to technology, what did the program at your graduating university excel at teaching you? Why?

15) Overall, how would you change the accounting curriculum at your graduating university?

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