

CPA Exam: Correlative Study of Preparation Activities and Exam Results

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Abstract

CPA exam candidate pass rates remain at 50-60% (AICPA 2019b). The purpose of this study was to determine whether there was an association between candidate preparation and exam results. This study investigated inspiration for becoming a CPA, work experience, education, study preparation and earning 150 credit-hours in relation to exam results. The scope was the State of Minnesota. The findings validated the flexibility in work experience and educational requirement guidelines from the AICPA and the State of Minnesota (AICPA 2020; MNBOA 2020). The findings showed 57% indicated CPA inspiration occurred during undergraduate studies while only 20.7% attributed it to faculty. A stronger relationship was found with exam results for those studying full-time while not working, using diverse study tools, and obtaining a higher level of education.

Key words: CPA exam, exam preparation, work experience, 150 credit hour

Introduction

Demand for and Supply of Accounting Professionals with Credentials

The Bureau of Labor and Statistics (BLS) reported in the 2017 Occupational Outlook Handbook that employment of business and financial operations occupations in the United States (U.S.) was projected to grow 10% annually, adding about 139,900 new jobs between 2016 and 2026. The number of U.S. Bachelor of Arts (BA) and Master of Arts (MA) accounting graduates has been on an upward trend, nearly doubling from 45,095 in 2000 to 76,542 in 2018 (AICPA 2019a). Graduates in master's programs have been leading this growth (AICPA 2019a). At the same time, the Certified Public Accountant (CPA) "pipeline" has slowed. In 2017 only 47% of all accounting majors attempted to sit for the CPA exam (Wagaman and Maginnis 2017). Metrejean and Noland (2011) gathered the opinions of the Big-5 accounting firm recruiters about candidate qualifications. The findings of recruiter perceptions were that employment of candidates having earned a CPA designation were given higher consideration over those with only an accounting degree. Demand for accounting professionals also exists in higher education. The number of retirements in accounting academia exceeding the number of qualified replacements is well documented (Gary, Denison and Bouillon 2011; Boyle, Carpenter and Hermanson 2015) suggesting a continued need for accountants, and possibly for qualified faculty to teach accounting courses (Johnson, Larson and Demersseman 2017). A deterrent to earning the CPA credential may be the financial burden associated with preparation. All 50 states now require 150 credit hours of education to obtain the CPA license, which is 20 – 30 additional credits than earned in an undergraduate degree (Nagle, Menk and Rau 2018). Though candidates are allowed flexibility for how to earn the additional credit hours, doing so may result in a delay for the candidates' entry into the workforce.

Purpose and Significance of Research

The purpose of this study was to gain information about CPA exam candidate preparation activities, and the possible linkage to performance on exam sections (i.e., exam results). The study included novel measurements such as the inspiration to pursue the CPA, candidate's work experience, and education preparation activities. The timing of completing the 150 credit-hour requirements, and the learning platform (e.g. face-to-face and online) were also measured against exam results.

The significance of this research is the raising of awareness about the preparation requirements and strategies for individuals preparing for uniform standardized exams such as the CIA, CMA and CPA, which overlap in content. Individuals seeking candidacy may leverage the findings to develop preparation plans for the requirements to potentially reduce the likelihood of unrealistic and ineffective exam preparation (Metinko and Gray 2010). A benefit is that being better prepared could lead to reduced expenses associated with having to retake sections of the exam which are failed or expired, or the need to purchase additional study tools. Additionally, being better prepared could contribute to passing sections the first time through, leading to increased confidence when taking later sections. Finally, with the shortage of accounting professionals forecasted and the continued decline in the number of baccalaureate accounting graduates sitting for the exam (NASBA 2018), this research may contribute to increasing the number of individuals who attempt to sit for the exam.

This research expands prior literature discussing exam performance in relation to the timing of when the credit-hour requirement was met (Allen and Woodland 2006; Briggs and He 2012) to also consider the chosen area of study and the level of education where the credit-hours are earned. This study produced new research in the areas of candidate study tools, work experience and inspiration for becoming a CPA and their relationship with exam results. The findings provide value for educators to use when guiding students in their preparation for the CPA exam.

Literature Review

Certification

The CPA is the “oldest and most respected certification in the U.S. and is regarded as a symbol of trust and professionalism” (AICPA 2020). To become a licensed CPA in the U.S. individuals must meet state mandated requirements for education and professional experience and pass the Uniform CPA Examination (“the exam”). The National Association of State Boards of Accountancy (NASBA) coordinates administration of the exam; the writing and grading is the responsibility of the AICPA; State Boards of Accountancy determine the laws and rules for each state (AICPA 2020). The exam assesses primary understanding of authoritative literature in separate sections for each of the topics of Auditing and Attestation (AUD), Business Environment and Concepts (BEC), Financial Accounting and Reporting (FAR), and Regulation (REG) (AICPA 2020). The current exam is a four-part computer-based test including a combination of ways for candidates to provide evidence of competencies. On a scale of 0-99, candidates must earn a score of 75 points to pass a section (AICPA 2020). Fees for exam section and registration range from \$1,139 to \$1,484 depending on the number of sections filed for at a time (NASBA 2018).

Certified Public Accountant (CPA)

CPAs are able to move beyond the basic accounting functions such as bookkeeping, recording purchases and sales, pay accounts and record collections, bank reconciliations, and

journal entry processing (The Pinnacle from Becker, 2016; Zellman 2011). An accounting professional with CPA credentials is perceived to have the higher-order analysis and evaluation skills required for writing audit reports and controller roles, earning nearly \$40,000 more per year than accountants without CPA credentials (Zellman 2011). The CPA credential signals that the individual has the skills to be able to solve complex financial problems, prioritize work, learn new software, and plan and follow through on goals (Ovaska-Few 2017).

Becoming a CPA

Hashim and Embong (2015) studied the influences for career choices made by accounting professionals in Malaysia. They concluded that parents are most influential followed by friends for those who chose accountancy. Violette and Chene (2012) suggested that 60% of all declared accounting majors at the time of first year enrollment are motivated to do so by their high school faculty. Additional literature suggested most eventual accounting majors “hear the calling” during an early accounting course and declare the major, many times as a result of strong quantitative skills (Lin, Grace, Krishnan and Gilsdorf 2010; Pleis 2019).

To become a CPA the individual must apply for and meet the state requirements for candidacy. The educational requirement of most states for candidacy includes having completed a baccalaureate degree (B.A.) consisting of 120 credit hours to be allowed to sit for the exam. Other states require additional credits to reach 150 credit-hours for candidacy (AICPA 2020). In the State of Minnesota, the educational requirement for candidacy includes completion of a B.A. consisting of 120 credit-hours within 120 days of exam completion (i.e., the exam can be taken prior to completing the undergraduate degree and before completing the 150 credit hours if other requirements such as work experience have been achieved). The degree can be in any area of study though non-accounting majors may be required to complete upper division accounting credits to be eligible for candidacy (Minnesota Statutes 2019).

CPA certification is the acknowledgment of passing the CPA exam and fulfilling the minimum requirements to be eligible to take it. CPA licensure is issued after certification and when all AICPA and state requirements have been met. The AICPA education requirement necessitates the candidate to earn at least 150 college credit-hours (i.e., 18 - 30 more than earned in a B.A.). The purpose of the additional credit-hours is to help professionals keep pace in business and technology (AICPA 2020). In Minnesota, licensure is issued once all exam sections have been passed and other requirements have been met including having earned 150 credit-hours. There is flexibility in choice of topics and level of study in which the additional credit-hours may be earned. The assumption is that many areas of study contribute to increased critical thinking, problem solving and communication skills (AICPA 2020). Literature suggests the choice in how to earn the credit-hours provides control over the financial burden for the CPA candidate and encourages a diverse population of individuals to sit for the exam (Briggs and He 2012; Metinko and Gray 2010). The result is a wide range of knowledge levels, and in some cases confusion for candidates as to how to prepare, what courses to take, and the level of education to select.

During the early stages of planning, the candidates determine what areas to study, when to complete the 150 credit-hours if his/her state approves candidacy with less than 150, and the order that he/she will sit for each section of the exam (Bline, Perreault and Zheng 2016). Opinions in literature are mixed on the timing of earning the 150 credit-hours. By earning the 150 credit-hours prior to sitting for the first section, the candidate can avoid the burden of

completing the requirement during or after passing the exam to receive certification. Allen and Woodland (2006) suggested that earning 150 credit-hours prior to sitting for the exam has little consistent effect on the pass rates of first-time candidates' performance on the exam. Conversely, Briggs and He (2012) concluded that candidates having met the 150 credit-hour requirement before testing outperformed those who had earned only 120 credit-hours. Thus, it is unclear if candidates with only 120 credit-hours earned at the time of the exam were disadvantaged for passing versus those with 150 credit-hours.

Literature also discusses the options for the level of education in which to earn the credit-hours (i.e., community college, undergraduate, graduate, or a blend of these) (Gaynor and Askew 2017; Menk, Nagle and Rau 2017; Meyer 2016). Bline et al. (2016) evaluated candidates in graduate programs and found they earned higher exam scores than those earning the non-graduate credit-hours. Nagle et al.'s (2018) research also concluded that the institution type, admission selectivity and proportion of accounting faculty holding a CPA license were significantly associated with CPA exam pass rates. Other studies have concluded exam candidates from predominately online learning programs significantly underperformed on the CPA exam as compared to candidates from accredited face-to-face programs (Bunker and Harris 2014; De Palo, Limone, Monacis, Ceglie and Sinatra 2018).

Certification requires one year of documented work experience in the State of Minnesota (Minnesota Statutes 2019). Hairston, Harter and McKay (2020) found students completing internships had higher overall CPA exam pass rates than those who had not. The flexibility in work experience and the reality that some candidates pursue certification after a career change contributes to a diverse experience base for candidates at the start of the exam. Additional work experience above the required one year does not necessarily result in success on the exam. Franklin and Myers (2016) concluded that while those making a career change or who are non-traditional older students typically have more work experience, they struggle more when taking uniform certification exams.

Contributing Factors

There are many factors which could contribute to exam pass rates averaging around the 50% level (NASBA 2016). First, during the candidate preparation process, prediction for how planning will translate into desired results may have been underestimated (Fletcher 2009). This may include the sequencing of college coursework, types of credits earned to reach 150 (i.e., topics and level of education), and study planning. Another factor is the candidate's perception of preparedness level. Candidates accustomed to achieving relatively high marks with minimal effort in college (Arum and Roksa 2011) face higher risks of not allocating sufficient preparation time for the exam. Gaynor, Lynn and Wasternack (2016) concluded exam scores were higher when the exam was taken in the middle of the day versus when it was taken earlier or later in the day. Finally, the exam itself may be contributory. The exam is designed to protect the public interest by helping to ensure that only qualified individuals become licensed U.S. CPAs (NASBA 2018). While neither the AICPA nor NASBA report a target exam pass-rate, not all candidates are expected to successfully complete the exam.

The 150 Credit-Hour Requirement

As early as 1956 there was widespread support favoring a requirement of a graduate degree for accountants (NASBA 2018). In the 1980s a two-year Associates degree from a community college qualified candidates in some states to sit for the exam (Self, Weaver, Proctor and Hicks 2013). Throughout the 1990s the differences created confusion and barriers for CPAs

making it difficult to move to states where the credit-hour requirements differed. The educational requirement for exam eligibility continues to vary by state at the time of this study though all require 150 credit hours for licensure.

Candidates have several options to consider when meeting the 150 credit hours, and the AICPA does not provide specific guidance. The variance in state board requirements is substantial, ranging from community college and prior work experience as credits, to mandating upper division and graduate level accounting courses (CPA Exam Forum 2020). The Minnesota Administrative Rules, per the Office of The Revisor of Statutes (2019) educational requirements for initial certification, include specifics pertaining to credit-hours, institutional accreditation, and a subject list to be studied, but do not specify the courses to be taken. The timing of when the 150 credit-hours must be met is specified only in terms of exam completion timelines (i.e. the exam can be started prior to earning 150 credit hours). Most others suggest a well-balanced education to include not only accounting but other business knowledge as well, which is consistent with the requirements of the Board in Minnesota.

The AICPA's goal is to have candidates earn 150 credit-hours to increase critical thinking and analysis skills with flexibility permitting candidates to choose which path best suits them. Common ways candidates earn credit-hours include Advanced Placement (AP) during high school, at community college, traditional four-year college, graduate study and through other training programs. Of these options, earning graduate credit-hours provides accounting students the ability to add a credential to the resume and to further develop critical thinking skills (Menk et al. 2017). Master of Business Administration (MBA) and Master of Accountancy (MAcc) graduate programs frequently include a total of 30 additional credit hours creating an opportunity to meet the 150 requirement and earn a higher-level degree. The AICPA (2020) also suggests graduate programs are "an excellent way to more fully develop skills such as communication and interpersonal relations for integration with technical knowledge." Menk et al. (2017) concluded that both the average pass-rates and average scores on the exam were significantly higher for candidates who completed a graduate degree when entering candidacy as compared to candidates who had only completed undergraduate credits. Nagle et al. (2018) further concluded that individuals who had earned credits as AACSB accredited institutions earned higher exam scores than those from lower or unaccredited institutions.

Research Questions and Hypothesis

Research Questions

The primary research question of this study was: Is there a correlation or relationship between exam preparation activities and CPA exam results? This query was supported by three correlational and association sub-questions. First, did the timing of the decision, the inspiration for pursuing a CPA certification, and work experience correlate or relate to exam results? Second, which education preparation strategies such as education at the start of the exam, type of institution (i.e., community college, undergraduate, graduate, etc.), level of education, location for earning the additional credit hours to reach 150, and types of study tools and methods correlate or relate to exam results? And third, did the timing of when the additional credits to reach 150 or the learning platform (i.e. face-to-face, online or a mix) correlate or relate to candidate exam results?

Hypothesis

H1: Correlation is evident between the inspiration for and timing of the decision to pursue the CPA exam, work experience and exam results.

H2: Correlation is evident between the educational preparation strategy, i.e., education at the start of the exam, type of institution where the undergraduate degree was earned, undergraduate degree, level and location where additional credit hours were earned, study tools and methods, and exam results.

H3: Correlation is evident between timing of meeting the 150 credit-hour requirement and learning platform to earn the additional credit hours to reach 150, i.e., face-to-face, online or a mix of both, and exam results.

Research Design

The research design is a quantitative explanatory study of variables that were gathered from primary data sources. Variables were identified based on requirements for exam candidacy related to educational, earning 150 credit-hours, and work experience (MNBOA 2020) along with along with demographic and other exam preparation variables and exam results.

Target Population and Data Collection

The unit of analysis (Creswell 2012) for the primary data was persons who have successfully earned the CPA designation between 2004 and 2019 in the State of Minnesota. Excluded from the target population were individuals who were in the process of completing the CPA exam and those candidates who were unsuccessful in their attempts. The individuals were excluded because they would not be able to answer all of the questions in the survey, which would result in missing data. The MNBOA (2020) served as a source to locate and validate that individuals solicited to participate in the survey had active licensure status in Minnesota. Individuals who were identified as CPAs were cross-referenced with social media profiles and included in the target population. The instrument used in this research study to collect primary data was an online survey via Qualtrics. A pilot survey was conducted, questions were refined and reorganized, and once delivered the survey remained open online for one month (approximately thirty days). The data was gathered individually and aggregated, with personal identifiers removed to avoid identification of unique participants.

The survey included five sections to collect participant information. Note the variables are included by section in Table 3. The first section collected demographic information related to gender, age, year the exam was completed, and if the CPA license was active or inactive. The second section included variable choices related to the timing of initial inspiration to become a CPA including: it was always my intention, during high school, during undergraduate, during graduate school, and a career change. Variable choices related to the source of the inspiration to become a CPA included self-selected career path, faculty in high school, family member or close friend, faculty in college, and guest speaker in accounting field. Variable choices pertaining to work experience at the time the exam was started included the 'select all that apply' option, with choices of public accounting, private accounting, audit, governmental, tax, general accounting, general business, and no applicable work experience. Work experience was measured by types of experience and not the number of years' experience.

The third section of the survey relates to hypothesis 2. Education at the start of the exam included variable choices ranging from undergraduate degree with one major and additional credits through multiple undergraduate majors and minors to graduate degree. Variable choices

for the type of undergraduate institution included private or public. Variable choices pertaining to study method included studying full-time, part-time study while working part-time, or part-time study with full-time work. Variable choices pertaining to the use of study tools included the ‘select all that apply’ option with choices of classes face-to-face, classes online, flashcards, online based questions/simulations, and textbooks from college or from study courses.

The fourth section of the survey relates to hypothesis 3, earning the additional credit hours to reach 150. Variable choices pertaining to the learning platform by which the additional college credits were earned included classroom face to face, online, or a blend of both. Variable choices pertaining to the timing of when the total of 150 credit hours were earned included before, while or after sitting for the exam. Variable choices for the location where the additional credits were earned included the same or different institution attended for undergraduate or a blend of both. Variable choices for the level of institution where the additional credit hours were earned included AP credits, community college, additional undergraduate credits, and advanced graduate credits. Variable choices pertaining to the use of supplemental preparation courses included a fill in the blank. The fifth section of the survey asked participants to report the number of attempts required to pass each exam section.

Hypothesis Testing

The variables gathered were correlated to exam results, defined by number of attempts required to pass each section, to explain the relationship between variables (Creswell 2012). The Kruskal-Wallis test was conducted for categorical data to detect significant differences between multiple variables. Kruskal-Wallis is a ranked based parametric test used to determine if statistically significant differences exist between two or more groups of an independent variances or ordinal dependent variables (Glen 2016). Some examples of categorical data in this study included timing and inspiration for deciding to pursue the CPA, education at the start of the exam, type of institution for undergraduate study, and level, timing and location for earning the additional credit-hours to reach 150.

The one-way Chi-square goodness-of-fit test was used to compare observed frequencies of exam results (f_o) against expected frequencies (f_e) using data from a single variable within the categorical data (Steinberg 2010) to further evaluate categorical variables. Chi-square tests determine whether there was a significant difference between the expected frequencies and the observed frequencies. The formula for Chi-square is:

$$X^2 = \sum (f_o - f_e)^2 / f_e$$

The Spearman rho test was conducted to examine possible correlations of the variables where respondents were able to select multiple choices such as study tools, study methods (e.g. full time or part time while working and while not working) and types of prior work experience with exam results. Spearman rho is appropriate where data is not normally distributed and there are outliers (Creswell 2012).

Results

The findings included 101 fully completed participant records summarized in Table 1. Survey participants who completed the CPA exam between 2010 and 2019 included 54 female, 46 male and 1 preferred not to reply. The age of the participants ranged from 21 – 51 with a mean of 27 as compared to the State mean age of 26.

Table 1

<i>Summary of Participant Demographics</i>			
	n	%	Mean Exam Score
Participants	101	100%	10.70
Gender			
Female	54	53%	10.72
Male	46	46%	10.65
Preferred not to reply	1	1%	12.00
Year CPA Completed			
2010 - 2015	16	16%	10.47
2016	16	16%	11.12
2017	21	21%	10.38
2018	39	39%	10.97
2019	9	9%	9.89
Age Range			
21-25	62	61%	11.06
26-30	18	18%	10.00
31-35	12	12%	9.92
36-51	9	9%	10.67
Mean	27		
Minnesota Mean 2016 (NASB, 2016)	26		

The summary of participant exam results by section are presented Table 2. The 101 study participants reported having attempted a total of 538 exam sections. If the 101 participants had passed all sections on the first attempt, 404 exam sections would have been attempted. Thus 134 sections were repeats. AUD and REG were attempted the highest number of times at 141 (26.2% of total attempts) each. BEC required the fewest number of attempts, at 118 (21.9% of total attempts).

The percentage of participants passing sections on the first attempt reported to be AUD 48%, BEC 74%, FAR 50%, and REG 48%. The AICPA 1Q 2019 total candidate pass rates by section were AUD 49%, BEC 58%, FAR 44% REG 50% (AICPA 2019). The AICPA results do not specify the number of attempt the sections were taken, only the percentage of the section taken that were passed, which includes sections for individuals who did not successfully complete the exam. Thus, caution is advised when comparing the Minnesota survey participants to the AICPA pass rates.

Table 2

<i>Participant Exam Results by Section</i>					
	Total # of Attempts to Pass				
	AUD	BEC	FAR	REG	Total
Total # Attempts	141	118	138	141	538
% of Attempts	26.2%	21.9%	25.7%	26.2%	100.0%
Attempt	# of Attempts When Passed				
	AUD	BEC	FAR	REG	
1	68	87	69	68	292
2	26	11	27	26	90
3	7	3	5	7	22
Attempt	% of Attempt When Passed				
	AUD	BEC	FAR	REG	
1	48%	74%	50%	48%	
2	37%	19%	39%	37%	
3	15%	8%	11%	15%	
1Q 2019 Pass Rate (AICPA, 2019)	49%	58%	44%	50%	

Statistical Explanation

To answer the research questions and test the hypotheses, variables were compiled, summarized, and scored to create categorical groups and/or an ordinal scale for ranking for use in Spearman rho correlation. The codebook for CPA exam results survey is presented in Table 3.

Table 3

Codebook for CPA Exam Results Survey			
#	Item	Coding	
1	ID; Record #	From 1 – 101	
2	Gender	1 = Other, 2 = Female, 3 = Male, 4 = no reply	
3	Age at the start of exam	Selected from a drop down	
4	Year exam was completed	Selected from a drop down	
5	CPA license	Active = 1, Inactive = 2	
6	Timing of decision to pursue CPA	It was always my intention = 1 During high school = 2 During undergraduate = 3 During graduate school = 4 Career change = 5	Explanation: Timing of decision was coded as categorical data.
7	Inspiration for pursuing CPA	Self-selected career path = 1 Faculty in high school = 2 Family member or close friend = 3 Faculty in college = 4 Guest speaker in accounting field = 5	Explanation: Inspiration for pursuing the CPA was coded as categorical data.
8	Types of Professional Work Experience	Public accounting = 3 Private accounting = 2 Audit = 3 Governmental = 3 Tax = 3 General accounting = 1 General business = 1 No applicable work experience = 0	Explanation: Level of work experience can be measured by rigor, requirements, and applicability to CPA exam content. Types of experiences such as Public accounting, Tax and Audit work may expose the candidate to specialization and a wide range of experiences, followed by private accounting. general business would provide less exam related experience. No applicable work experience provides just that and scores a zero. Scores did not factor the number of years.
9	Education at Start of Exam	Undergraduate degree - single major with additional credits = 1 Undergraduate degree - 1 major with 1 or more minors = 2 Undergraduate degree - dual majors = 3 Undergraduate degree - dual majors with 1 or more minors = 4 Graduate degree(s) = 5	Explanation: Level of education can be measured by rigor, requirements, and applicability to CPA exam content.
10	Type of institution	Private college/university = 1 Public college/university = 2	Explanation: Type of institution where undergraduate degree was earned coded as categorical data.
11	Study Methods	Full-time studying while not working = 3 Part-time studying while part-time working = 2 Part-time studying and full-time work schedule = 1	Explanation: Study Method can be measured by amount of time dedicated to studying and other obligations. Scoring assumption is that more study time with less work obligations earn a higher Study Method score than less study time and increased obligations. Individuals reporting multiple study methods are assumed to have made changes during the CPA exam process. In those cases, the Study Method score weight at 50% for each as it is assumed that a change in process took place, but the timing of the change is unclear

Table 3, Continued

<i>Codebook for CPA Exam Results Survey</i>			
#	Item	Coding	
1	ID; Record #	From 1 – 101	
12	Study Tools Used	Classes - face-to-face = 1 Classes online = 1 Flashcards = 1 Online based questions/simulations = 1 Textbooks from college course = 1 Textbooks from study course = 1	Explanation: Study Tools can be measured by the number of types of tools used. Scoring assumption is that more study tools used, the more diverse ways learning was enhanced. Individuals reporting multiple study tools would have attempted different concepts and content in different ways, at different times. Methods of Study Tool were all scored at the same level as it was assumed each learning style is different, and each Study Tool provides individual specific value.
13	Learning platform to reach 150 credits	Classroom, face-to-face = 1 Online = 2 Blend of face-to-face and online = 3	Explanation: Learning platform to earn the extra credits to reach 150 was coded as categorical data.
14	When 150 credit hours were earned	Before sitting for the exam = 2 While sitting for the exam = 2 After completing the exam = 1	Explanation: Before the exam reduces added burden on candidate during exam = higher score. The data was also coded as categorical.
15	Location where credits to reach 150 were earned	Same school as undergraduate = 1 Different school from undergraduate = 2 A mix of the same and different school = 3	Explanation: Location where extra credits to reach 150 were earned was coded as categorical data.
16	Level of study w to earn the 150 credits	AP credits = 1 Community college = 1 Additional Undergraduate credits = 2 Advanced (Graduate) Degree other = 3	Explanation: Level of education can be measured by rigor, requirements, and applicability to CPA exam. The data was also coded as categorical.
17	Supplemental Prep Course	Becker = 1, Gleim = 2, Ninja = 3, Rogers = 4 Wiley = 5, None, self-study = 6	Explanation: Supplemental pre course used was coded as categorical data.
18	Exam Results	Sections passed in 1 st attempt = 3 Sections passed in 2 nd attempt = 2 Sections passed in 3 rd attempt = 1 Possible score range 4 – 12	Explanation: Exam Results are quantifiable based on number of times a section was taken to pass. Order section was taken is not a factor.

The variables gathered in the study were evaluated in relation to the candidate’s success in completing the CPA exam (“exam results”). Exam results were defined as the number of attempts required to pass each of the four sections (i.e., AUD, BEC, FAR and REG) with fewer attempts ranked with a higher result. Opinions vary as to which section of the exam is the most difficult (Bline et al. 2016; Welker 2014); therefore each section passed on the first attempt was scored 3, sections passed on the second attempt were scored 2, and sections passed on the third attempt scored 1, without consideration of actual score. The possible range of exam results was from 4 to 12 for this study. Note, the score of 4 indicated the most attempts to complete the exam sections and a score of 12 considered a perfect score with higher scores indicating greater success in passing more sections in fewer attempts. The actual participant exam results’ range was 5 to 12, with a mean of 10.7, median of 8.5, and mode of 12. The relative and cumulative relative frequency of exam results are reported in Table 4.

Table 4

<i>Cumulative Frequency for Exam Results</i>				
Score	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
12	41	41%	101	100%
11	26	26%	60	59%
10	17	17%	34	34%
9	5	5%	17	17%
8	7	7%	12	12%
7	3	3%	5	5%
6	1	1%	2	2%
5	1	1%	1	1%
4	0			

The summary findings for the Kruskal-Wallis tests for categorical groups presented in Table 5 shows the asymptotic values (Asymp. Sig) in all instances, to be greater than .05 for all groupings. This is interpreted that exam results were not affected by these preparation activities measured in this study.

To further understand the variables within the categorical groups, variables were analyzed using one-way Chi-square goodness-of-fit test to determine whether there was a significant difference between the expected frequencies of exam results, (see Table 4) and the observed frequencies in the preparation strategy variables. Table 5 shows the degree of freedom (DF) of 7 (n-1, 8 possible exam scores -1), and the critical Chi-square value (X^2) of 14.07 using a significance level of 5% (i.e., Chi-square value of 14.07 and greater is significant). For each variable, the actual number of participants earning the possible exam score was subtracted from the expected number based on the relative frequency (Table 4), then squared, divided by the expected frequency and added together to arrive at the variable X^2 .

CPA Exam: Correlative Study

Table 5

Respondents' CPA exam preparation activity, Exam Results, Kruskal-Wallis Test, and Chi Square Test							
Variable	n	Exam Score		DF	Kruskal-Wallis		Chi Sq
		Mean	Std. Dev		Asymp. X ²	Sig	X ² = 14.07 DF = 7
	101	10.70	1.553				
Timing of decision to pursue CPA				4	0.36	0.986	
It was always my intention	22	10.45	1.870				11.43
During highschool	1	11.00	n.a.				2.86
During undergraduate	57	10.82	1.351				2.18
During graduate school	6	10.17	2.639				15.90
Career change	15	10.80	1.373				2.45
Inspiration for pursuing CPA				4	2.57	0.632	
Self-selected career path	50	10.70	1.644				3.56
Faculty in highschool	8	10.75	1.389				1.47
Family member or close friend	20	10.65	1.631				5.17
Faculty in college	21	10.62	1.431				3.65
Guest speaker from accounting field	2	12.00	0.000				2.90
AP credits transferred from high school to college				3	6.326	0.0968	
AP credits 0	55	10.36	1.660				4.87
AP credits 1-5	8	10.50	2.390				12.88
AP credits 6-15	23	11.22	1.085				2.83
AP credits 16-21	15	11.27	0.799				3.23
Education at the start of Exam				4	7.00	0.136	
Undergrad 1 mjr + misc. credits	33	10.21	1.781				5.60
Undergrad 1 mjr 1+ mnr	19	11.11	1.049				2.86
Undergrad 2 mjr	26	10.96	1.399				2.38
Undergrad 2 mjr, 1+ mnr	6	10.33	1.366				3.33
Graduate degree(s)	17	10.94	1.713				8.26
Undergraduate Major - Area of Study				3	3.4995	0.3208	
Accounting	61	10.51	1.670				1.40
Major = Accounting + Business Related Major	28	10.86	1.433				0.96
Major = Accounting + Non Business Major	6	11.17	1.169				1.39
Major = Non Accounting	6	11.5	0.837				3.17
Undergraduate Minor - Area of Study				3	4.79	0.188	
No Minors	72	10.53	1.670				1.51
Business Related Minors	16	10.81	1.33				2.79
Non Business Related Minors	7	11.57	0.79				2.77
Math & Statistics Related Minors	6	11.50	0.55				2.33
Education: Type of institution				1	0.58	0.447	
Private college/university	39	10.49	1.730				4.20
Public college/university	62	10.84	1.428				2.64
Timing of when 150 credits were earned				2	1.17	0.557	
Before sitting for the exam	72	10.78	1.522				2.09
While sitting for the exam	23	10.48	1.702				7.96
After completing all sections of the exam	6	10.67	1.506				1.61
Level of study to earn the 150 credits				2	4.38	0.112	
Community college	9	11.33	1.118				4.15
Undergraduate	66	10.58	1.447				8.35
Graduate	26	10.81	1.898				7.39
Location where extra credits to reach 150 were earned				2	2.20	0.332	
Same school as undergraduate	69	10.88	1.312				2.76
Different school from undergraduate	24	10.46	1.865				5.54
A mix of the same and a different school	8	9.88	2.232				15.40
Learning platform to earn the extra credits to reach 150				2	2.02	0.365	
Classroom, face-to-face	70	10.57	1.584				2.44
Online	10	10.90	1.287				6.94
Blend of face-to-face and online	21	11.05	1.564				7.08
Use of Supplemental Exam Preparation Course				5	6.87	0.231	
Becker	71	10.87	1.379				3.57
Gleim	4	9.50	2.517				27.53
Ninja	1	5.00	n.a.				99.01
Rogers	4	10.25	2.363				7.24
Wiley	18	10.72	1.320				7.05
None, I self-studied from sources I had	3	10.33	0.58				2.90

Bold values represent a differences at 7 DF for Chi Square

Spearman rho correlation was used to assess the relationship between work experience, study methods and study tools, all variables where participants could select the option “all that applied.” Variables were coded (Table 3) resulting in participants earning higher categorical scores with multiple selections. Tests were performed using Spearman rho correlation coefficient

to indicate strength and direction of the correlation, with a p-value < .05 to indicate the statistical significance and n-1 to indicate the degrees of freedom. The Spearman rho correlation for this study, followed guidelines denoting the strength of the association: 0.70-1.0 strong, 0.40-0.69 moderate, 0.0-0.39 weak (Cohen 1992). The results are presented in Table 6 below.

Table 6

<i>Spearman's (r_s) rho Correlation and Significance</i>		
		<u>Exam Results</u>
Type of Work Experience	Spearman	-0.033
(public/private accounting, audit, gov't, tax, general accounting, business, no experience)	Sig. (2-sided)	0.744
	N	101
Study Methods	Spearman	0.319
(full time/not working, part-time/working full-time, part-time/working part-time)	Sig. (2-sided)	0.001*
	N	101
Study Tools	Spearman	0.095
(classes face-to-face/online, flashcards, online questions, textbooks from college courses/study courses)	Sig. (2-sided)	0.346
	N	101

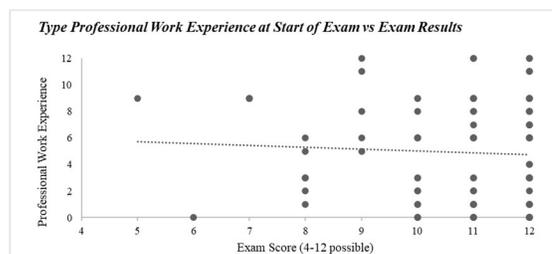
* Correlation is significant at the .05 level (2-tailed).

Hypothesis Analysis

Hypothesis 1 examined the timing of and the inspiration for pursuing the exam and work experience at the start of the exam. Kruskal-Wallis analysis was used as reported in Table 5. Note, the Kruskal-Wallis test reports results by stipulating the degrees of freedom represented with an " $H(\#)$." The results showed no statistically significant effect on exam results for the timing of the decision to pursue the CPA, $H(4) = .36, p = .986$, nor inspiration for the decision, $H(4) = 2.57, p = .632$, thus we cannot accept the hypothesis. Results showed only 20% of the participants indicated having been inspired by faculty; Chi-square results showed no statistical significance.

Spearman's rho correlation test was used where participants were able to select multiple responses to indicate work experience at the start of the exam. Results in Table 6 showed no significant correlation between work experience and exam results with a negative correlation; $r_s = -.03, p = .74, n = 101$. The trendline in Figure 1 below also indicated a negative correlation; exam results became weaker (i.e., more attempts were required to pass) when the professional work experience was diversified consistent with the conclusions of Franklin and Meyers (2016).

Figure 1

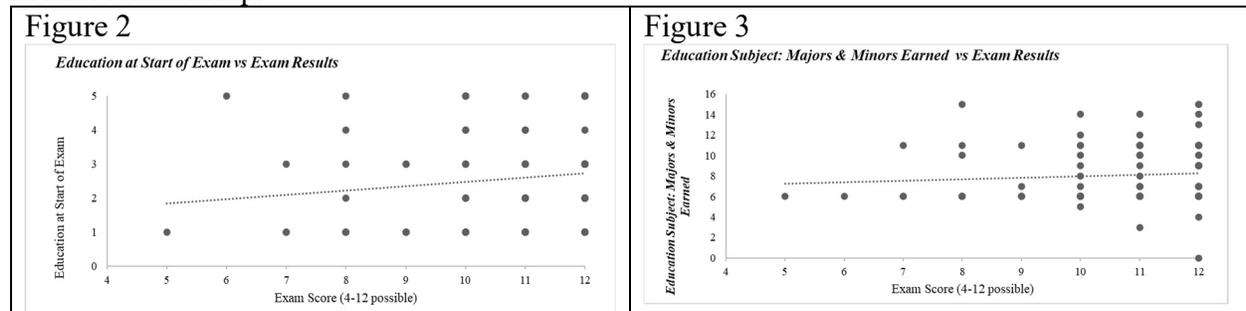


CPA Exam: Correlative Study

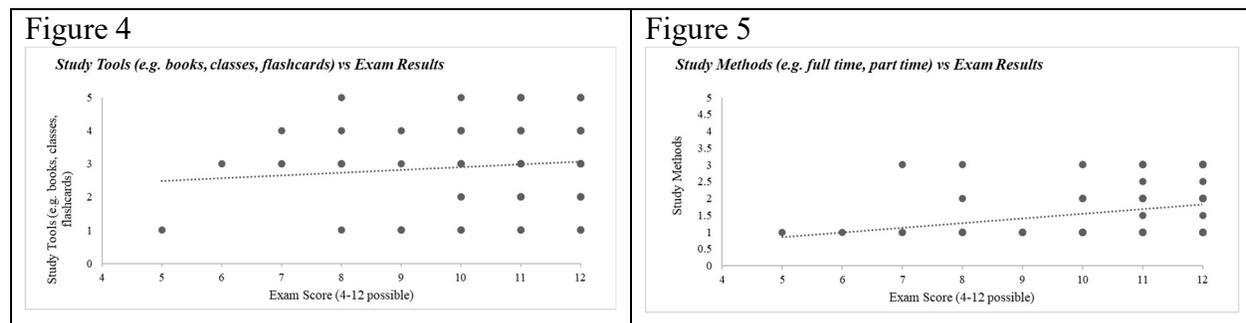
Using Chi-square as a test for timing of the decision to become a CPA, statistical significance was observed only for those making the decision during graduate school, $X^2(8, n=6) = 15.9, p < .05$.

Hypothesis 2 examined educational preparation for the exam. The Kruskal-Wallis (see Table 5) results showed no statistically significant effect on exam results for education at the start of the exam, $H(4) = 7.00, p = .136$, type of institution where undergraduate degree was earned, $H(1) = .58, p = .447$, undergraduate major, $H(3) = 3.50, p = .321$, undergraduate minor, $H(3) = 4.79, p = .188$, level of education where additional credits were earned toward 150 hours, $H(2) = 4.38, p = .112$, nor location where extra credits were earned, $H(2) = 2.20, p = .332$. Thus, we cannot accept the hypothesis based on these results.

The level of education at the start of the exam ($p = .136$) merited further review, despite the lack of significant results. Notice that Figure 2 below reflects the trendline indicating some positive correlation with exam results when the education level increased with additional majors, minors or advanced degree(s). The chosen area of study (majors and minors related to topics associated with accounting, finance, analysis, and business) (Figure 3) trendline indicated a near neutral relationship.



Other educational preparation activities included study tools, study methods, and supplemental preparation courses. Spearman's rho correlation test was used where participants were able to select multiple responses. Results in Table 6 showed no significant correlation between study tools (e.g. books, classes, flashcards) and exam results $r_s = .10, p = .35, n = 101$, is consistent with the trend line in Figure 4. Results in Table 6 for study methods (e.g. full time, part time) and exam results $r_s = .32, p = .001, n = 101$ suggesting studying full time correlated to higher exam results consistent with the trendline in Figure 5.



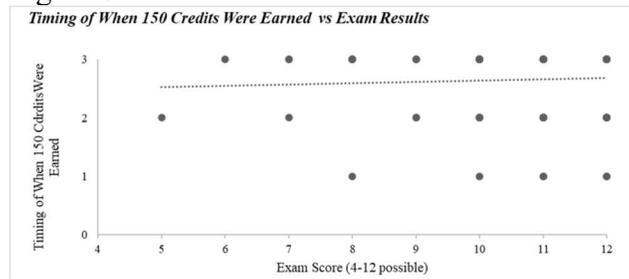
The Chi-square results in Table 5 for variables related to supplemental exam preparation courses were not significant.

Hypothesis 3 examined meeting the 150 credit-hour requirement. The Kruskal-Wallis (Table 5) results showed no statistically significant effect on exam results for the timing of when

the credits were earned, $H(2) = 1.17, p = .557$, nor the learning platform to earn the additional credits, $H(2) = 2.02, p = .365$. Thus, we cannot accept the hypothesis. Chi-square results showed no statistical significance. It is noteworthy that the mean exam results (Table 5) for online learners (10.9), and a blend of face to face and online (11.05) were above that of classroom face-to-face (10.57).

The timing of reaching the 150 credit-hour (Figure 6) trendline also indicated a near-neutral correlation with exam results.

Figure 6



Discussion

In this study 20% of participants reported having been inspired by family and friends to pursue accounting contradicts Hashim and Embong's (2015) findings of friends and family having significant influence on the decision. Additionally, 8% of participants reported having been inspired by faculty in high school contradicting Violette and Chene's (2012) suggesting higher inspiration during high school. More than half (57%) of the participants indicated making a choice to become a CPA during undergraduate study, supporting literature suggesting a vast majority of individuals first learn of the CPA during an early accounting course in college and declare the major (Merrill 2017).

Gaynor and Askew (2017) suggested that university faculty serve as the main point of contact for exams and licensure information. However, in this study only 20% of the participants indicated having been inspired by faculty. Chi-square results showed no statistical significance. An explanation could be that those who have been successful in completing the exam were also more independent and self-directed or able to locate the information they require. This study found statistical significance only for those making the decision to pursue the CPA during graduate school, supporting prior studies by Menk et al. (2017) and Meyer (2016).

The level of education trendline (Figure 2) findings supported Menk et al.'s (2017) theory that degreed graduate candidates outperform on the exam, and further, the theory that earning multiple undergraduate majors and minors also was positively associated to exam results. The results also concur with Crawford's (2011) findings that faculty preference for a graduate level degree. Unexpectedly the respondents who reported earning the additional credit hours at the community college level showed the highest mean exam results score (11.3) in the group $n=9$, (Table 5). The chosen area of study near neutral relationship with exam results supports the AICPA's (2020) theory that a wide range of education is an acceptable exam preparation strategy. Consistent with this is noting that respondents earning non-accounting majors ($n=6$) and those with non-business-related minors ($n=7$) reported mean exam results scores of 11.5 and 11.6 respectively, the highest in that variable group (Table 5).

De Palo et al. (2018) found statistically significant differences in exam results for online learners over face-to-face learners. This study differed in that the learner degree of comprehension was not measured, instead only the type of learning platform where the additional credit hours were earned to reach the requisite 150 credit-hours in relation to exam results. Different from De Palo et al. (2018), this study found methods used to earn the 150 credit-hours resulted in exam results to be similar for online learning, in class face-to-face, and a blend of both. It is noteworthy that the mean exam results (Table 5) for online learners (10.9), and a blend of face to face and online (11.05) were above that of classroom face-to-face (10.57), suggesting more acceptance for online learning than discussed by Bunker and Harris (2014). The findings of the timing of reaching the 150 credit-hour indicated a near-neutral correlation supporting Allen and Woodland's (2006) findings of flexibility and oppose Briggs and He (2012) suggestion to completed credits prior to the start of the exam.

Conclusions and Recommendations

In 2017 only 47% of all accounting majors attempted to sit for the CPA exam (Wagaman and Maginnis 2017). The level of flexibility on the part of the AICPA (2020) for candidate preparation created an opportunity to learn if there were strategies that may contribute to a more efficient path to completing the CPA exam. The flexibility assumes that many approaches contribute to requisite skills of critical thinking, problem-solving, and communication, all of which are tested in the exam.

In Minnesota, the Board of Accountancy (BOA) advises individuals to mitigate the risk of exam failure by obtaining guidance from the accounting faculty at their institutions (MNBOA 2020). Of the 101 study participants, 57% indicated their inspiration to pursue the CPA exam took place during undergraduate studies. In comparison, 20.7% reported having been inspired by faculty. The findings supported having quality faculty teach the early undergraduate accounting courses. Instruction should include incorporating quality tools such as demanding textbooks to stimulate students to become accounting thinkers (Zeff 2018). Instruction in the first accounting course should include recognizing the best students with encouragement of continued study of accounting and rewarding careers in the field (Zeff 2018).

The results of this study support the AICPA (2020) MNBOA (2020) and NASBA (2018) flexibility as to the nature of the work experience at the start of the exam. The surprising finding in this study was that participants with less specifically accounting-related work experiences required fewer attempts to pass the exam. The results of this study showed a stronger relationship with exam results for those who studied full-time while not working (Figure 1), leveraged a diverse set of study tools (Figure 4), and obtain a higher level (i.e., graduate level, or undergraduate with dual majors and minors) before sitting for the exam (Figure 2).

This study furthered literature by evaluating the relationship of exam results with topics candidates studied as defined by major(s) and minor(s) earned during undergraduate school. The findings support the State of Minnesota flexibility in educational preparation, and the AICPA's suggestion that a wide range of areas of study contributes to increased critical thinking, problem-solving, and communication skills all tested on the exam (AICPA 2020). The results also reflected a neutral (no) relationship between the level of study where the credit-hours were earned and exam results, further supporting the MNBOA's flexibility for the education requirement. This study supports the AICPA and other literature recommending flexibility in preparation strategy to reduce candidate costs (Briggs and He 2012; Metinko and Gray 2010) in that the mean exam results (11.3) for the 9 participants earning the additional credit hours at community colleges was the highest of the variable group.

The MNBOA allows the candidate a degree of flexibility as to the timing of completing the requisite 150 credit-hours. The results of this study reflected a neutral (no) relationship between when the credit-hours were earned and exam results, nor the level were the credit-hours were earned and exam results, each supporting the MNBOA's (2020) flexibility for this requirement.

In light of these findings, educators have an opportunity to improve support to decrease candidate confusion about exam preparation. Suggesting credit-hours that support skill development of critical thinking, problem-solving, and communication align with the AICPA (2020) assumption of skills that contribute to exam results.

Limitations of the Study

Limitations included scope which included only individuals who had completed the CPA exam; excluded were individuals who were unsuccessful or who had abandoned the CPA exam. Also, the survey instrument and data coding when using an online survey tool to conduct this research study required data re-coding and creation of data ranking to be able to perform Spearman rho, Kruskal-Wallis, and Chi-Square analysis. Scoring of exam results were defined as a score earned based on the number of times a participant took the section. Sections passed the first attempt earned a higher score than sections passed through additional attempts. Alternative methods for evaluating exam results could result in different findings.

References

- Allen, R. D., and A. M. Woodland. 2006. The 150-hour requirement and the number of CPA exam candidates, pass rates, and the number passing. *Issues in Accounting Education*, 21(3), 173-193
- American Institute of Certified Public Accountants (AICPA). 2020. Becoming A CPA. <https://www.aicpa.org/becomeacpa.html>.
- American Institute of Certified Public Accountants (AICPA). 2019a. 2019 Trend Report. <https://www.aicpa.org/content/dam/aicpa/interestareas/accountingeducation/newsandpublications/downloadabledocuments/2019-trends-report.pdf>.
- American Institute of Certified Public Accountants (AICPA). 2019b. CPA exam pass rates. 2019 pass rates. Retrieved from <https://www.aicpa.org/becomeacpa/cpaexam/psychometricsandscoreing/passingrates.html>
- Arum, R., and J. Roksa. 2011. *Academically adrift: Limited learning on college campuses*. Chicago, IL, The University of Chicago Press.
- Bline, D., S. Perreault and X. Zheng. 2016. An exploratory examination of order effects on CPA exam passage timeliness. *Journal of Accounting Education*, 36,65-74. doi:10.1016/j.jaccedu.2016.05.003.
- Boyle, D., B. Carpenter, and D. Hermanson. 2015. The accounting faculty shortage: Causes and contemporary solutions. *Accounting Horizons*, 29(2), 245–264. <https://doi-org.xxproxy.smumn.edu/10.2308/acch-50967>
- Briggs, G. P., and L. He. 2012. The 150 credit-hour requirement and CPA examination pass rates-a four-year study. *Accounting Education: An International Journal*. 21(1), 97-108.
- Bureau of Labor Statistics Occupational Employment Statistics. 2017. (BLS). Occupational employment and wages. <http://www.bls.gov/oes/current/oes251011.htm#nat>.

- Bunker, R. B., and D. Harris. 2014. Online accounting degrees: An empirical investigation of CPA exam success rates. *Journal of Business and Accounting*, 7(1), 86–93.
- Cohen, J. 1992. “A Power Primer.” *Psychological Bulletin*, 112, 155-159.
- CPA Exam Forum. 2020. another 71. <https://www.another71.com/cpa-exam-forum/>.
- Crawford, D. L. 2011. Practitioner and educator preferences regarding accounting curriculum meeting the 150-hour requirement. *Academy of Educational Leadership Journal*, 15(4), 47-66.
- Creswell, J. W. 2012. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Chennai: Pearson India.
- De Palo, V., P. Limone, L. Monacis, F. Ceglie, and M. Sinatra. 2018. Enhancing E-learning in old age. *Australian Journal of Adult Learning*, 58(1), 88–109.
<http://ezproxy.smumn.edu.xxproxy.smumn.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1180489&site=eds-live>
- Fletcher, D. 2009. Standardized testing. *Time*.
<http://content.time.com/time/nation/article/0,8599,1947019,00.htm>
- Frankin, M., and J. Myers. 2016. Enhancing CPA exam pass rates for second career students. *Journal of Business and Educational Leadership*, 6(1), 27-36
- Gary, R., C. Denison, and M. Bouillon. 2011. Can obtaining an accounting Ph.D provide a positive financial return? *Issues in Accounting Education*, 206(1), 23.
- Gaynor, G., and S. Askew. 2017. How accounting programs can help students pass the CPA exam. *Journal of Accountancy*, 224(3), 16-18.
- Gaynor, G., S. Lynn, and O. Wasternack. 2016. Debits, credits and circadian rhythms: The effect of CPA exam start time on performance. *Advances in Accounting Education Teaching and Curriculum Innovations*. 19, 37-60. [https://search.ebscohost-com.xxproxy.smumn.edu/login.aspx?direct=true&db=nlebk&AN=1353345&site=eds-live](https://search.ebscohost.com.xxproxy.smumn.edu/login.aspx?direct=true&db=nlebk&AN=1353345&site=eds-live).
- Glen, S. 2016. Kruskal Wallis H test: Definition, examples & assumptions. *Statisticshowto.com: Elementary statistics for the rest of us!* <https://www.statisticshowto.com/kruskal-wallis/>
- Hairston, S., C. Harter, and B. McKay. 2020. Bridging the CPA exam gap: Do internships matter? *American Journal of Business Education*, 13(1), 9–18.
- Hashim, H. and A. Embong. 2015. Parental and peer influences upon accounting as a subject and accountancy as a career. *Journal of Economics, Business and Management* 3(2) 252-256.
- Johnson, N., F. Larson, and A. Demersseman. 2017. Whose taking my accounting class: Leveraging professional skepticism while teaching accounting online. The Clute Institute: *Journal of Business Cases*, 13(2).
- Lin, P., D. Grace, S. Krishnan, and J. Gilsdorf. 2010. Failure to communicate. Why accounting students don’t measure up to professionals’ expectations. *The CPA Journal*, 80(1), 63.
<http://ezproxy.smumn.edu.xxproxy.smumn.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=f5h&AN=51338753&site=eds-live>.
- Menk, K. B., B. Nagle, and S. Rau. 2017. Does earning a graduate degree impact CPA exam performance? *Academy of Business Research*, 1(17).
- Merrill, K. 2017. The importance of the CMA. *Strategic Finance*, (9), 72.
<http://ezproxy.smumn.edu.xxproxy.smumn.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsgea&AN=edsgcl.490551837&site=eds-live>.
- Metinko, T. R., and D. Gray. 2010. Decrease in the number of people taking the CPA exam not due to the 150-hour requirement. *American Journal of Business Education*, 3(11), 45-52.

- Metrejean, E., and T. Noland. 2011. An analysis of CPA firm recruiters' perceptions of online masters of accounting degrees. *Journal of Education for Business*, 86(25), 20.
- Meyer, C. 2016 Community colleges are an avenue to licensure. *Journal of Accountancy*, Newsletter, CPA Insider.
<http://www.journalofaccountancy.com/newsletters/2016/apr/community-colleges-an-avenue-to-licensure.html#sthash.fhKSzR7n.V1gALqo6.dpuf>.
- Minnesota Board of Accountancy (MNBOA). 2020.
<http://www.boa.state.mn.us/applicants.html#examinationsection>.
- Minnesota Statutes. 2019. <https://www.revisor.mn.gov/statutes/cite/326A.03#stat.326A.03.3>
- Nagle, B., K. Menk, and S. Rau. 2018. Which accounting program characteristics contribute to CPA exam success? A study of institutional factors and graduate education. *Journal of Accounting Education*, 45, 20–31. <https://doi-org.xxproxy.smumn.edu/10.1016/j.jaccedu.2018.09.003>
- National Association of State Boards of Accountancy (NASBA). 2018.
<https://nasba.org/exams/cpaexam/>
- NASBA Report Jurisdiction. 2016. Candidate performance on the uniform CPA examination; Jurisdiction edition 2015. <https://nasba.org/app/uploads/2018/03/2015-Jurisdiction-Edition-Final.pdf>.
- Ovaska-Few, S. 2017. What large firms expect from new accounting grads: Recruiters at large firms prioritize work-readiness, the ability to learn new software, and plans to pass the CPA exam. *Journal of Accountancy*, 223(3), 28.
- The Pinnacle from Becker. 2016. Advantages of have a CPA in corporate America.
<https://www.beckerpinnacle.com/accounting-and-finance/cpa-exam-review/advantages-of-having-a-cpa-in-corporate-america/2016>.
- Pleis, L. M. 2019. Beyond the CPA: The need to map your accounting department's program to various professional certifications. *Business Education Innovation Journal*, 11(2), 71-76
- Self, S., D. Weaver, J. Proctor, and M. Hicks. 2013. Candidate performance on the certified public accountant exam: Empirical analysis. *International Journal Of Education Research*, 8(1), 76-88.
- Steinberg, W. 2010. *Statistics Alive! (2 ed.)* Thousand Oaks, CA: Sage.
- Violette, G., and D. Chene. 2012. Factors influencing students' choice of the accounting major. *CPA Journal*, 82(9), 14-15.
- Wagaman, D. and J. Maginnis. 2017. When the CPA pipeline slows to a drip, how do you get the flow going? *Pennsylvania CPA Journal*, 88(2), 22-26.
- Welker, B. 2014. Which section of the CPA exam should I take first?
<http://crushthecpaexam.com/first-cpa-exam-section/>.
- Zeff, S. A. 2018. Instilling historical perspective and a critical faculty in the first undergraduate course in financial accounting. *Issues in Accounting Education*, 33(3), 95. <https://search-ebscohost-com.xxproxy.smumn.edu/login.aspx?direct=true&db=edsgea&AN=edsgcl.556932650&site=eds-live>.
- Zellman, M. 2011. Salary differences for a CPA & non-CPA. Sapling.
<https://www.sapling.com/8463688/salary-differences-cpa-noncpa>.