

# **Academic Course Curriculum and Administrative Alignment With Considerations for Certification Requirements: An Empirical Study of Exam Preparation Methods and Exam Results**

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*This study assesses how institutions of higher education can successfully leverage their instructional infrastructure to prepare students for certification exams. A survey was constructed and administered to 103 participants over a year to test our hypotheses concerning exam takers' study methods and habits in relation to the certification success rate. We found that age, test anxiety, and work status were significant factors that adversely affected test-takers certification exam performance. Conversely, instructor-led (face-to-face) courses with mock exam material incorporated in the course training resources were the most effective certification exam preparation method. By examining control variables to identify specific correlations that positively and negatively impact certification exam results, higher education institutions can successfully leverage their instructional infrastructure to prepare students for certification exams. Such understanding may provide curriculum and tangential teaching pedagogical impact indicators that positively contribute to certification exam success. The assimilation of traditional academic and certification course training may increase the value of college degrees for both students and employers alike.*

*Keywords: embedding industry certification and curriculum alignment, certification training with administrative alignment and support, certification exam teaching pedagogy, exam preparation, testing techniques, exam study tips, passing certification exams*

## **INTRODUCTION**

The twenty-first century has wrought disruptive and evolving technologies, changing demographics, and digital business models that are altering the workplace at an unprecedented pace, unlike ever before. Meanwhile, nascent and existing technologies are reshaping instructional delivery modality and learning consumption. Academicians and employers share a common goal of training a future-ready workforce capable of understanding which innovations matter and how to apply them. To this end, this research seeks

to understand course training curricula that integrate a new blend of theoretical learning and certification methods in a way that produces a T-shaped graduate—with both a specialist certification in some area and a generalist or liberal arts soft skills set. Seemingly industry certification/academic training curricula relies on tried-and-true methods that remain essential to a liberal art learning experience and the ever-changing domain-specific knowledge.

To contextualize this study, the researchers surveyed one hundred and three students to learn what factors contributed to their certification exam success or failure by interviewing several representatives from the Texas Workforce Commission (TWC) to identify the top employment trends in the Dallas/Fort Worth region. Also, the researchers reviewed the most authoritative publications on training trends across several business industries, as noted by the Workforce Innovation and Opportunity Act (WIOA).

More precisely, this study compared various exam preparation techniques and strategies to its corresponding exam results across several industry certification exams. Specifically, this research analyzes control variables to identify specific correlations that positively and negatively impact exam results. Such understanding may provide tangential pedagogical impact indicators that positively contribute to certification exam success. Moreover, such knowledge can aid in creating an innovative two-prong course curriculum that assists students in preparing for an industry certification exam while providing a theoretical framework that supports the requisite skills for workplace advancement.

## **LITERATURE REVIEW**

According to National Center for Education Statistics (NCES) data, the ratio of certificates conferred by public institutions increased from fifty to seventy-one percent between 2009–10 and 2018–19. The ratio conferred by private for-profit institutions decreased from forty-six to twenty-six percent. Private nonprofit institutions' data showed no coherent trend in the proportion of certificates granted over the same period. The number of certificates conferred by private nonprofit institutions decreased by fourteen percent between 2009–10 and 2013–14 (from 35,700 to 30,700). It peaked in 2014–15 at 46,100 before dropping by forty-four percent between 2014–15 and 2018–19 (from 46,100 to 25,900). While demand for business training has shown some decline, computer-related certification training has increased interest in IT-related jobs leads to certification increases. NCES projects increased demand for medical, legal administration practitioners, data analytics, and security over the next five years.

Increasingly research shows an overall trend since 2005 toward industry-based certifications (Shackelford, 2005). Forbes has described obtaining certifications as one of the most sought-after industry skills and an excellent way to jumpstart or accelerate a career in technology. As such, IT certification training has mushroomed into a multi-billion-dollar business (Forbes, 2020). Experts from the National Academies of Sciences (2020) stated: “The education system will need to adapt to prepare individuals for the changing labor market. At the same time, recent IT advances offer new and potentially more widely accessible ways to access education.” Job advertisements continue to indicate a preference for industry certifications along with or in some instances above a bachelor's degree as a condition for employment. The top fifty certifications account for two-thirds of all requests in job postings, according to Burning Glass Technologies, a real-time job market analytics service (2021).

Recent college graduates seeking entry-level jobs face a disheartening conundrum—companies are asking new graduates to show years of experience for entry-level positions. Interestingly, some college graduates are finding a certification is a requisite employment criterion in place of experience (Maurer, 2019). This employment trend presents a paradoxical pedagogical issue when creating course curricula for industry certification. At the heart of the matter are the challenges of balancing course objectives to accommodate an academic (liberal arts) curriculum and assessing professional or technical certificate specialization requirements.

Recent data indicates that professional certifications, licenses, and educational certificates have labor market value, especially for people without bachelor's degrees and professional degrees. Workers with the required knowledge, skills, and abilities are more productive and adaptable in a volatile, highly competitive economy. Routine jobs continue to cede toward work responsibilities requiring higher-order

communication and analytical skills to stay competitively viable. Consequently, employers use educational and occupational certifications in the hiring process to find the most qualified workers. And certification credentials are becoming a proxy for adaptability and trainability (Ganzglass, 2014).

## **OBJECTIVE OF THE STUDY, AND HYPOTHESES**

This study aims to assess how higher education institutions can leverage their instructional infrastructure to prepare students for certification exams. To achieve this goal, we first examined which study methods and study habits are helpful to be successful in passing these certification exams. Then, we identify the relationship between the test-takers psychological, physical well-being and the likelihood of passing the exam. We also test the relationship between demographic factors and the possibility of passing the exam.

We examined five hypotheses to understand the correlations between demographic factors, study methods, study habits that test-takers used to prepare for professional certification exams, and psychological and physical well-being of exam takers, and the success rate. These hypotheses are significant because understanding the research findings will allow for improved certification exam performance and provide direction for higher education institutions to integrate certifications into degree programs that will generate the best long-term earnings and employment outcomes.

It is essential to understand whether there is a significant relationship between the demographic factors and the likelihood of passing certification exams. The test takers' age, gender, and work status are the three crucial demographic factors that may impact the success rate. The average age for students enrolled full-time in undergraduate programs is twenty-two years old. Hypothetically, suppose age is a significant factor and positively related to the likelihood of passing a certification exam. In that case, several implications may emerge, such as the lack of college students understanding the importance of earning an industry certification. Gender is also another essential demographic factor that might impact the likelihood of passing a certification exam. Therefore, this study tested whether there are gender differences in exam performance. Lastly, work status, which has three categories (not employed, part-time and full-time), may also impact a test taker's exam performance. Thus, if the work status of a test taker is a barrier that prevents test takers from being successful, this could be a consideration by faculty and administrators when developing program admission policies. Therefore, our first hypothesis is as follows:

***H1: There is a significant relationship between a) the age; b) the gender; c) the work status of the respondent, and whether the respondent passes or fails the exam.***

The survey instrument asked participants to identify their primary study method for the certification exams in this study. There are five options: self-paced book, computer-based training, instructor-led training (online), instructor-led training (face to face), and practice tests. Also, in the survey, participants responded to a question about the number of days, on average, spent using the study method chosen. Additionally, exam takers replied to whether they would use this study method to study for another exam. The efficacy of instructor-led courses (online or face to face) and practice tests was analyzed by understanding the exam taker's confidence using their preferred study method(s) and their success in doing so.

The preferred and effective study methods are essential when creating and administratively aligning a course curriculum or program that creates a win-win for students and employers. Therefore, this study deems it appropriate to test two hypotheses examining the relationship between the most effective and preferred study method and exam performance.

***H2: The test takers who choose the instructor-led (face-to-face) study method are more likely to pass the exam on average.***

**H3:** *Likeness to pass the certification exam is a) positively related to choosing instructor-led (face to face) study method, b) negatively correlated to choosing practice test study method as the primary study method.*

Test takers' study habits appear to be a significant factor correlating to successfully passing certification exams. Study habit characteristics analyzed for this study included the following:

- Did the test taker study alone or in a group,
- The study location (home, at a coffee shop, at the library, or other), the preferred time of day to study (12 am – 8 am, 8 am – 4 pm, or 4 pm – 12 am),
- How long was each study session (less than two hours, two to four hours, or more than four hours),
- Before taking the exam, the amount of preparation time (1-2 weeks, 3-4 weeks, 1-2 months, or more than two months).

Again, these findings may aid faculty when designing their teaching methods and curriculum to accommodate successful study habits best. That being the case, this study tested the hypothesis examining the relationship between the time of the day a test taker prefers to study, the length of the study session, how much in advance a test taker starts to prepare for the exam and the exam performance.

**H4:** *There is a significant relationship between a) the time of the day a test taker prefers to study; b) the length of study session; c) how much in advance a test taker starts to prepare for the exam and whether the respondent passes or fails the exam.*

The test anxiety (combination of physical symptoms and emotional response) and the well-being of a test taker might influence the test performance of the test taker. Physical symptoms include headache, panic attacks, difficulty breathing, nausea, excessive sweating, rapid heartbeat, dizziness, and faintness. Emotional response symptoms consist of rumination of past poor performances, fear of failure, stress, inadequacy, and helplessness.

Test takers often face a host of competing anxieties; for some, exam pressure can be motivating, yet it can be detrimental for others. Test anxiety adverse effects may have implications in the examination process and during the exam. Such anxiety can affect understanding and content association, which may impede the test taker's ability to recall information. Given the effects of test anxiety, measuring its impacts on exam performance seems prudent.

Therefore, this study used a condensed version of Spielberger's (1980) Test Anxiety Inventory (TAI) self-report psychometric scale to measure the test anxiety among test takers. Since TAI is respected among scholars for measuring high school and college students' test anxiety, this study also used the instrument. To further support the use of TAI, Chapell et al. (2005) found a negative and significant relationship between undergraduate and graduate students' test anxiety and grade point average (GPA). Davis et al. (2008) found a strong correlation between test anxiety and SAT scores.

Ill-being is the opposite of well-being and includes characteristics such as fatigue, hunger, personal problems, momentary lapses of memory, or daydreaming, which may affect an exam taker's performance. Sievertsen et al. (2016) found that exam scores of school children decrease if the exam is given later in the day. Thus, cognitive fatigue plays a role in exam performance.

Anxiety can be problematic when it prevents test takers from taking or doing their best on an exam. Extreme feelings of test anxiety before and during an exam may contribute to an unfavorable result. This study examined the relationship between test anxiety and exam performance and the association between the well-being of a test taker and exam performance.

**H5:** *There is a) a significant negative relationship between test anxiety; b) a significant positive relationship between the well-being of test-takers and whether the respondent passes or fails the exam.*

## DATA AND EMPIRICAL RESULTS

We constructed and administered a survey to collect data to test our hypothesis, that is, to analyze the study methods and habits of exam takers in relation to the certification success rate. The survey consists of twenty-six questions and was administered from June 2020 through June 2021. We collected one hundred and three surveys that were distributed through the Qualtrics online survey tool.

The survey used in this study was administered to two population groups. The population groups are (1) junior and senior students taking online management courses and computer information systems hybrid certification courses and (2) displaced adult workers in the North Texas Area that qualified for the Workforce Innovation and Opportunity Act (WIOA) program offered by The Texas Workforce Commission (TWC). The WIOA program ([twc.texas.gov/partners/workforce-innovation-opportunity-act-wioa](http://twc.texas.gov/partners/workforce-innovation-opportunity-act-wioa)) assists job seekers in obtaining employment, education, training, and support services needed to land a position in the labor market and equip employers with industry-certified workers needed to compete in the globally changing economy.

The survey was constructed to study the possible relationship between whether a participant passed or failed the certification exam, and the participant's demographics, primary study method, days spent studying, study habits, and their anxiety and general well-being. The results of each relationship will be discussed below.

### The Relation Between Participants' Demographics and the Success Rate

We will first discuss the demographic factors of our participants and if there is a link between these demographic factors and whether one passes or fails the certification exam. Specifically, age, gender, employment status, and funding source are factors that we examined to identify if these factors influence one's performance when taking certification exams (see table 1 results below).

**TABLE 1**  
**CROSSTABULATION: AGE, GENDER, WORK STATUS, AND SUCCESS RATE**

Variables		Pass	Fail	
Age				Total
	<i>18-24 years</i>	13 <b>31.71%</b> 27.08%	28 <b>68.29%</b> 56.00%	<b>100%</b>
	<i>25-34 years</i>	7 <b>36.84%</b> 14.58%	12 <b>63.16%</b> 24.00%	<b>100%</b>
	<i>35-44 years</i>	2 <b>28.57%</b> 4.17%	5 <b>71.43%</b> 10.00%	<b>100%</b>
	<i>44-55 years</i>	10 <b>71.43%</b> 20.83%	4 <b>28.57%</b> 8.00%	<b>100%</b>
	<i>55-64 years</i>	13 <b>92.86%</b> 27.08%	1 <b>7.14%</b> 2.00%	<b>100%</b>
	<i>65 years and older</i>	3 <b>100.00%</b> 6.25%	0 <b>0.00%</b> 0.00%	<b>100%</b>
Total		<b>100%</b>	<b>100%</b>	
Gender				

	<i>Female</i>	17 <b>41.46%</b> 35.42%	24 <b>58.54%</b> 48.00%	<b>100%</b>
	<i>Male</i>	31 <b>54.39%</b> 64.58%	26 <b>45.61%</b> 52.00%	<b>100%</b>
Total		100%	100%	
Work Status				
	<i>Not Employed</i>	33 <b>58.93%</b> 68.75%	23 <b>41.07%</b> 46.00%	<b>100%</b>
	<i>Part-time</i>	4 <b>25.00%</b> 8.33%	12 <b>75.00%</b> 24.00%	<b>100%</b>
	<i>Full-time</i>	11 <b>42.31%</b> 22.92%	15 <b>57.69%</b> 30.00%	<b>100%</b>
Total		100%	100%	

Regarding the participant's age, we broke this characteristic down into six groups, namely 18-24 years of age, 25-34, 35-44, 44-55, 55-64, and over 65 years of age. The younger the participant, the more likely the participant would fail the certification exam. Notably, we found that the highest percentage of participants who did not pass the certification exam is the first age group (18-24). As age increases, the rate of participants in the fail group decreases.

The academic performance of mature-age college students has been studied in literature dating back to Philips and Cullen (1955). Their study results revealed that those aged twenty-four and over tended to do better than the eighteen- and nineteen-year-old age group in a college setting. DiBiase and Kidwai (2010) reference that the difference in the age groups can be attributed to the "three Dimensions of Learning" model—cognition, emotion, environment—as a "comprehensive learning theory" (Illeris, 2003), and Illeris acknowledged that adults differ from children in their ability to take responsibility for their lives and actions. Older students are more motivated to succeed academically (Bye et al. 2007), possibly because their academics better align with their life goals and let them advance in their careers. They know their jobs' demands and what skills they need to excel in their professional duties.

Our results are consistent with mature college students and instructors need to use techniques that help the traditional students do better on the certification exams. Instructors need to design courses that motivate and inspire students and help them understand the importance of certifications and their relevance on the job market. It can be communicated that new degrees and certifications should translate into higher paychecks and different lifestyles for their families. AACU (2002) recommends that courses create an incentive for learners and convince them that the course is valuable to their current or prospective job. Learning objectives need to be communicated by thoroughly explaining exercises in detail, using analogies relating new ideas to what learners already know, and providing concrete examples.

We also found a statistically significant relationship between whether one has part-time employment and the success rate on the certification exam. Specifically, 68.75% of participants who passed the exam are not employed. The percentage of not employed test takers who passed the exam is higher than the percentage of not employed test takers who failed the exam. For part-time and full-time workers, the opposite is true.

Carney et al. (2005) found that working more hours increased the probability of a student negatively affecting academic performance. They recommended that several measures be implemented to help students organize study and part-time work to the best effect. A recommendation by Carney et al. (2005), based on a study published by the Scottish Executive (2000), is that students work no more than a term-

time maximum of 10 hours per week. Students need to be taught skills related to time management and managing time commitments better, as working fewer hours is not necessarily more beneficial if the student is not making the most of the time, they must fulfil their responsibilities. If students are working because of college debt it might be helpful for students to find jobs that allow more flexibility.

However, we found additional results of interest not statistically significant, that 68.75% of the participants who passed the exam have a funding source from the workforce commission. The percentage of females who failed the exam is higher than the percentage of females who passed the exam. For males, the opposite is true.

We statistically test hypothesis 1: *There is a significant relationship between a) the age, b) the gender, c) the work status of the respondent, and whether the respondent passes or fails the exam*, these results can be found in Table 2. The Pearson Chi-Square test was conducted to assess the relationship between age, gender, work status, and pass/fail in the first hypothesis. As Table 2 shows, the relationship between age and pass/fail and work status and pass/fail are statistically significant. They are not independent, whereas the relation between gender and pass/fail is not statistically significant at the 5% level.

**TABLE 2**  
**PEARSON CHI-SQUARE ANALYSIS:**  
**AGE, GENDER AND WORK STATUS AND SUCCESS RATE**

	Value	Asymptotic Significance (2-sided)
Age	23.9156	0.00***
Gender	1.5936	0.207
Work Status	6.3629	0.042**

\*\*\*, \*\*, \* represents significance at 1%, 5%, and 10% level respectively.

### **The Relation Between Participants' Primary Study Method, Days Spent and the Success Rate**

We examined the relationship between participants' primary study method, days spent studying, and the success rate. The study methods choices include Self-paced Books, Computer-based Training, Instructor-led courses (face to face), Instructor-led courses (online recorded), Practice Tests, and Other (Combination). See Table 3.

We found that many certification test-takers, that is, 40.82% of participants, the primary method of study is practice tests. Those that use practice tests to prepare for their certification exam were satisfied with this study method (specifically, 55% of participants who used this method as their primary source find this method helpful), and many of the students who used this method reported that they would use this method again to study for future certification exams. On average, the certification exam participants spent nineteen days studying for their exam using this method: practice tests. Although this study method is popular among test takers, 55% of test-takers who use this method as their primary source failed the test. Additionally, 44% of test-takers who failed the test chose practice tests as their primary resource to study.

Practice tests are a vital component to prepare for a certification exam as they create a benchmark for participants to gauge their preparedness for the real certification exam. These exams enable one to familiarize themselves with the testing format, better understanding of strengths and weaknesses, aid in learning the material, ease testing anxiety, and increase mental stamina. However, as our results show, participants need to complement this study methodology with additional methods, including an approach to study for and learn the material, especially the weaknesses identified in the practice tests.

The second most abundantly used study method is an instructor-led online course. Although this method is the second most popular study method, 53.85% of test-takers who chose instructor-led online courses as their primary method failed the test. Specifically, 28% of survey respondents who failed the test used this method as their primary source. On average, the participants spent twenty-seven days studying

for their certification exam using this method. Interestingly, half of the survey participants did not find this method helpful.

The instructor-led face-to-face classes are not as popular as practice tests and instructor-led online courses. Still, this study method is the most effective method to be successful on the certification exams. All participants who chose this study method would use this method again for another exam. Although the test takers spent the most time preparing for the certification exam using this study method (on average, the participants spent thirty-eight days studying for their certification exam using this method), 75% of test-takers who chose this study method passed the certification exam. The highest percentage of test-takers who failed the test stated that they had wished they used the instructor-led face-to-face class as a study method to prepare for their exam.

Although practice tests and instructor-led online courses are popular among test takers, more than 70% of participants who failed the exam used either of these methods. Suppose online courses are more popular, especially for students juggling other commitments such as work and family. In that case, there need to be significant improvements in the quality and delivery of these online exam preparatory courses. Students also might need assistance in learning to become active learners as opposed to passive learners. Instructor-led online courses are an excellent learning methodology that comes along with convenience, greater flexibility, and greater accessibility. Lessons can be completed around your schedule without leaving home or having flexibility while traveling.

There might be a bias in face-to-face courses in that it appears to attract a test taker who is more motivated, dedicated, and committed to succeeding. The online courses that test-takers enroll in need to be dedicated to ensuring that the course's quality, relevance, and discipline is the same offering as a face-to-face course. Exam preparers need to ensure they enroll in a quality course designed and taught by an industry professional.

We will discuss our results in relation to H2: The test takers who choose the instructor-led (face-to-face) study method are more likely to pass the exam on average, and H3: Likeness to pass the certification exam is a) positively related to choosing instructor-led (face to face) study method, b) negatively correlated to choosing practice test study method as the primary study method. Table 4 reports the alternative hypothesis (H2) and the results of the t-test. *H2 is the test takers who choose the instructor-led (face-to-face) study method are more likely to pass the exam, on average.* We reject the null hypothesis of no difference at the 10% level. Thus, although the relation is weak, we claim that the instructor-led face-to-face study method makes a difference in successfully passing certification exams.



**TABLE 3**  
**PARTICIPANT'S PRIMARY STUDY METHOD, DAYS SPENT, AND SUCCESS RATE**

Primary Study Method	Percentage of participants who chose this study method as their primary source	Percentage of participants who will use this method for another exam	Days	The percentage of participants who find the primary method is helpful or more.	Percentage of Participants who use this method among Pass and Fail Group		Percentage of Pass and Fail among study methods	
					Pass	Fail	Pass	Fail
<b>Self-paced Books</b>	4.08%	75.00%	19	50.00%	4.17%	4.00%	50.00%	50.00%
<b>Computer-based Training</b>	14.29%	71.43%	26	50.00%	12.50%	16.00%	42.86%	57.14%
<b>Instructor-led Course (face to face)</b>	8.06%	100.00%	34	62.50%	12.50%	4.00%	75.00%	25.00%
<b>Instructor-led Course (online recorded)</b>	26.53%	69.23%	27	46.16%	25.00%	28.00%	46.15%	53.85%
<b>Practice Tests</b>	40.82%	65.00%	19	55.00%	37.5%	44.00%	45.00%	55.00%
<b>Other (Combination)</b>	6.12%	100.00%	31	20.12%	8.33%	4.00%	66.67%	33.33%

**TABLE 4**  
**RESULTS OF T-TEST FOR H2: INSTRUCTOR-LED FACE-TO-FACE INSTRUCTION AND PASS AND FAIL**

Alternative Hypothesis	Mean difference	P-Value	Reject H0 at 10% Level
$\mu_1 - \mu_2 < 0$	0.283333	0.0635*	Yes

\*\*\*, \*\*, \* represents significance at 1%, 5%, and 10% level respectively.

A Tetrachoric correlation was used to measure the correspondence between respondent likeliness to pass the certification exam and their choice of primary study method. Six dummy variables are created, one for each study method, and Tetrachoric correlation is used to measure correlation. Tetrachoric correlation estimates what the correlation would be if measured on a continuous scale. There is a positive correlation, referring to Table 5, between the instructor-led (face to face) study method and the likelihood of passing the exam. In contrast, there is a negative correlation between the practice test study method and the likeliness of passing the certification exam. However, this correlation is weak and not significant at the 5% level. Since the correlations are not significant, we do not accept H3.

**TABLE 5**  
**TETRACHORIC CORRELATION ANALYSIS FOR H3:**  
**STUDY METHODS AND SUCCESS RATE**

	Correlation coefficient (Rho)
Self-paced Books	0.0119
Computer-based Training	-0.0973
Instructor-led Course (face to face)	0.3585
Instructor-led Course (online recorded)	-0.0574
Practice Tests	-0.1047

### **The Relation Between Participants' Study Habits and the Success Rate**

Hypothesis 4 (H4) states that there is a significant relationship between a) the time of the day a test taker prefers to study; b) the length of study session; c) how much in advance a test taker starts to prepare for the exam and whether the respondent passes or fails the exam. To test this hypothesis, we collected data on the most desired study location (home or other), preferred study time (12:00 am-8:00 am, 8:00 am-4:00 pm, 4:00 pm-12:00 am), the length of each study session (less than 2 hours, 2 to 4 hours, more than 4 hours), and how far in advance one would start to prepare for the exam (1-2 weeks, 3-4 weeks, 1-2 months, more than two months).

Referring to Table 6, the test takers prefer to study alone. With 94% of test-takers who passed the exam and 91.67% of the test-takers who failed the exam prepared for the exam independently. Thus, we claim that studying alone is the preferred method of study habit of survey participants. Test takers also prefer to study at home rather than in other locations such as the library or coffee shop. More than half of the participants prefer to study in the evening between 4:00 pm, and 12:00 am, however 62% of test-takers who studied in this period failed the test. For the remaining study periods, the percentage of test-takers who passed the test is higher than the percentage of the test takers who failed the test.

Regarding the length of a study session, we found that the longer the study session, the higher the success rate. For example, 63.16% of test-takers who studied more than four hours in each study session passed the test, whereas 31.82% of test-takers who studied less than two hours passed the test. The majority of the test takers prefer to prepare for the exam four weeks before the exam.

**TABLE 6**  
**CROSSTABULATION: TEST TAKERS STUDY HABITS AND SUCCESS RATE**

<b>Study Habits</b>		<b>Pass</b>	<b>Fail</b>	
<i>Study alone or with a group</i>				Total
	<i>Alone</i>	<b>48.35%</b> 94.00%	<b>51.65%</b> 91.67%	<b>100%</b>
	<i>With 1+ people</i>	<b>50.00%</b> 2.00%	<b>50.00%</b> 2.08%	<b>100%</b>
<i>Where did you study the most?</i>				
	<i>Home</i>	<b>46.24%</b> 100.00%	<b>53.76%</b> 89.58%	<b>100%</b>
	<i>Other</i>	<b>0.00%</b> 0.00%	<b>100.00%</b> 4.17%	
<i>What time of the day you study the most?</i>				
	<i>12:00 am-8:00 am</i>	<b>54.55%</b> 12.50%	<b>45.45%</b> 10.00%	<b>100%</b>
	<i>8:00 am-4:00 pm</i>	<b>56.25%</b> 37.50%	<b>43.75%</b> 28.00%	<b>100%</b>
	<i>4:00 pm-12:00 am</i>	<b>40.38%</b> 43.75%	<b>59.62%</b> 62.00%	<b>100%</b>
<i>How long was each study session?</i>				
	<i>Less than 2 hours</i>	<b>31.82%</b> 29.17%	<b>68.18%</b> 60.00%	<b>100%</b>
	<i>2 to 4 hours</i>	<b>59.38%</b> 39.58%	<b>40.63%</b> 26.00%	<b>100%</b>
	<i>More than 4 hours</i>	<b>63.16%</b> 25.00%	<b>36.84%</b> 14.00%	<b>100%</b>
<i>How much in advance of the exam did you start preparing?</i>				
	<i>1-2 weeks</i>	<b>50.00%</b> 58.33%	<b>50.00%</b> 56.00%	<b>100%</b>
	<i>3-4 weeks</i>	<b>43.48%</b> 20.83%	<b>56.52%</b> 26.00%	<b>100%</b>
	<i>1-2 months</i>	<b>33.33%</b> 12.00%	<b>66.67%</b> 6.25%	<b>100%</b>
	<i>More than 2 months</i>	<b>50.00%</b> 6.25%	<b>50.00%</b> 6.00%	<b>100%</b>

We conducted the Pearson Chi-Square tests to assess the relationship between the time of day a test taker prefers to study, the length of the study session, and pass/fail in the fourth hypothesis. As Table 7 shows, the relation between the time of day the test takers prefer to study, and pass/fail is not statistically

significant. In contrast, the relationship between the length of the study session and pass/fail is statistically significant at a 5% level. How much in advance a test taker starts preparing for the exam is independent of the test taker’s performance in the exam.

**TABLE 7**  
**PEARSON CHI-SQUARE ANALYSIS: TIME OF THE DAY, LENGTH OF STUDY SESSION**

	Value	Asymptotic Significance (2-sided)
Time of the Day	2.2571	0.324
Length of Study Session	8.0180	0.018**
How much in advance a test taker starts preparing for the exam	2.1371	0.711

\*\*\*, \*\*, \* represents significance at 1%, 5%, and 10% level respectively.

### **The Relation Between the Participants’ Anxiety and Well-Being and Success Rate**

This section of the paper will discuss H5: There is a) a significant negative relationship between test anxiety; b) a significant positive relationship between the well-being of test-takers and whether the respondent passes or fails the exam. First, we will discuss H5a) a significant negative relationship between test anxiety and whether the respondent passes or fails the exam. We use Test Anxiety Inventory (TAI) to measure test anxiety. The original TAI comprises twenty items and three subscales: Test Anxiety-Total, Test Anxiety-Worry, and Test Anxiety-Emotionality. Taylor and Deane (2002) constructed a short version of TAI, which is only five items. The authors claim that this five-item short version is reliable and valid, and it composes a balance of items from the Worry and Emotionality subscales. Following the authors, we use TAI short to measure the test anxiety of participants. The five items are “*During the test, I feel very tense,*” “*I wish examinations did not bother me so much,*” “*I seem to defeat myself while working on an important test,*” “*I feel very panicky when I take an important test,*” and “*During examinations, I get so nervous that I forget facts I really know.*” All items are responded to on a Likert scale of 1-4, where 4 = Very Much and 1 = Not at all.

We also examine the well-being of test-takers during the examination that may affect a test taker’s performance testing H5b) *a significant positive relationship between the well-being of test-takers and whether the respondent passes or fails the exam.* The well-being of the test taker is measured by whether a test taker experiences hunger, is fatigued, daydreams, has mental block or trouble focusing, and deals with personal issues or not. All questions are responded to on a Likert scale of 1-4, where 4 = Very Much and 1 = Not at all.

We use Cronbach’s alpha to measure the internal consistency of items for the same construct on the survey. We have two constructs: test anxiety and the well-being of a test taker. Five items measure the test anxiety, and four questions measure the well-being of a test taker. Responses are reverse scored so that the opposite is true. Therefore, a high score on a question indicates the better well-being of a test taker.

For test anxiety, Cronbach’s alpha is 0.94 and above 0.7, representing an excellent internal consistency. Inter item correlations between the items are above 0.3 and less than 0.9. Consequently, all five items correlate with the others and measure the same thing: The test anxiety of the exam taker. The Kaiser-Meyer Olkin (KMO) measure of sampling adequacy is 0.88 and significant at 1%. Given these overall indicators, factor analysis with Principal Component Analysis (PCA) is deemed suitable with five items. Initial eigenvalues indicate that the first three factors explain 81%, 8%, and 4% of the variance, respectively. Only the first factor has eigenvalues over one, and a solution for one factor is examined using varimax rotation. The one-factor solution, which explains 81% of the variance, is preferred because of the “leveling off” of eigenvalues on the scree plot after the first factor.

The second PCA application highlights one factor for the well-being of test-takers. The alpha score for this construct is 0.82, indicating a good internal consistency. The inter-item correlations of this construct are between 0.3 and 0.8. The KMO measure of sampling adequacy is 0.7, and it is significant at 1%. The first three factors explain 65%, 17%, and 10% of the variance. The first factor has the eigenvalues over one; thus, all four questions measure the physical well-being of the test taker. The one-factor model is chosen since the scree plot shows that the one-factor model is the best for these four items.

**TABLE 8**  
**FACTOR LOADINGS WITH PRINCIPAL COMPONENT ANALYSIS**

Item	Test Anxiety	Well-Being
During the test, I feel very tense	0.93	
I wish examinations did not bother me so much	0.93	
I seem to defeat myself while working on an important test	0.91	
I feel very panicky when I take an important test	0.90	
During examinations, I get so nervous that I forget facts I really know	0.84	
Do you feel that being hungry affected your test performance?		0.68
Do you feel that being tired or fatigue affected your test performance?		0.66
Do you feel that being daydreaming, mental block or trouble focusing affected your test performance?		0.70
Do you feel that personal issues affected your test performance?		0.58

Table 8 shows the factor loadings for each construct. For the test anxiety, the first two items contribute the most, whereas for the well-being of test-takers, daydreaming and feeling hunger contribute the highest. Table 9 summarizes the pairwise correlation between the constructors and the pass/fail. There is a significant negative correlation between being successful in the exam and test anxiety. In this instance, H5a is accepted because the direction of the relationship is negative, meaning that if test anxiety increases, the likelihood of passing the exam decreases. There is also a positive and weak correlation between a test taker's well-being and pass rate. Therefore, H5b is rejected.

**TABLE 9**  
**PAIRWISE CORRELATION: TEST ANXIETY, WELL-BEING AND SUCCESS RATE**

	Value	P-Value
Test Anxiety	-0.229	0.023**
Well-Being	0.112	0.272

\*\*\*, \*\*, \* represents significance at 1%, 5%, and 10% level respectively.

## DISCUSSION OF FINDINGS

Demographic factors, such as age and work status, are significant barriers that inhibit test takers from successfully passing their certification exams. It may be beneficial for academic advisors to introduce college students to the benefits of industry certifications and certification programs and discuss the pros and cons of working part-time or full-time during exam preparation. There is a negative relationship between working part-time and full-time with exam performance. Educators are encouraged to target improvement programs in their courses for younger and/or are employed, such as time management techniques and study techniques.

The instructor-led face-to-face seminar study method is the most effective study method to ensure success when sitting for a certification exam. However, practice mock tests are the most preferred study method, with online courses being a close second. Online courses offer students more flexibility and

convenience, especially for those working part-time and/or full-time. Instructors can incorporate test preparation materials into their lectures, especially exam preparation content with practice tests. We claim that the combination of instructor-led courses with practice mock tests will be the most effective way to prepare students for the certification exams.

It is recommended that students take a structured course, whether it be face to face or online. Since test-takers expressed a preference to prepare for exams with online classes, these courses need considerable improvement to help students maximize their return on investment and lead to success when sitting for certification exams. If students take an online course, the course needs to be delivered with high standards by an industry professional. We recommend taking these courses with an accredited University program. eLearning courses need to be designed in a way that engages learners the way they are hooked to their favorite TV show or feel compelled to carry on reading a book or playing a video game. Courses need to simulate the face-to-face experience and focus on practice and sharing rather than just content. Younger learners need help learning how to be self-directed learners to get the most out of an online course.

We also found that the length of the study session is related to the certification success rate since the percentage of test-takers who passed the test increases with the increasing length of their study sessions. Thus, it is essential that higher education instructors include certification exam curriculum in their course content and assign homework to prepare students for the certification exams. Instructor-led courses combined with homework assignments might increase a students' time studying on a particular day. Most of the students started preparing for the exam one month before the exam. Thus, the instructor who prefers to incorporate certification exam preparation into the course content may consider designing a one-month intense program enhanced by practice tests and instructor-led online videos.

Test anxiety is another barrier for test-takers preventing them from being successful when taking certification exams. Test anxiety might be overcome by mock exams in the class or workshops covering test-taking strategies. Instructors can help students adopt effective certification test-taking strategies by devoting class time to teach test-taking strategies, and not assuming students possess or will attain these skills independently. An instructor can further test the test-taking strategy's effectiveness by implementing the test-taking strategy with a control group and comparing the certification test results with participants who completed the certification test taking strategy results to see if they outperformed their peers in a control.

## **CONCLUDING REMARKS**

Several studies have examined a range of factors affecting students' course performance. Notably, Walck-Shannon's (2021) study looked at students' study sessions outside class, study times, and strategies. This study found that, on average, students started studying six days before an exam, but how early a student started studying was not related to exam performance. Our study extends these findings by determining that demographic factors (age and work status) are also performance impediments for test-takers. These findings may suggest that academic course curriculums and administrative efforts should be aligned with considerations for the challenges students encounter while preparing for certification exams.

Similarly interesting is the adverse relationship between exam performance and students working, part-time or full-time. This finding was also borne out by a Carney et al. (2005) study that determined that working more hours increased the probability of negative academic performance, which is a conundrum for some small colleges or universities like Texas Wesleyan University, whose student population is predominantly non-traditional working students. Approximately half of Wesleyan students taking certification courses are working out of necessity. To encourage or require students not to work while taking certification courses would be untenable to implement or monitor, and research suggests we should. Perhaps a more viable approach to addressing the adverse effects of working students is time management training within the certification exam courses, adding yet another course objective.

Our research showed that instructor-led (face-to-face) courses that extensively used mock certification exams yielded the most significant exam performance efficacy. While online course modality generally attracted a broader audience given the asynchronicity of its delivery, which allows for more flexibility, and

freedom to watch and rewatch class sessions as needed. Either course training modality appears effective if the course is well structured with mock certification exams fully integrated into the course curriculum.

Mock exams provide a much-needed reality check or assessment tool for students on the effectiveness of their preparation. Mock exams are similar to the actual exam and should be taken repetitively before taking the certification exam. Moreover, mock exam simulations provide the students with a feel for the actual exam, which may help to reduce test anxiety. The simulated exam trial runs may inculcate some degree of self-diagnostic capacity and confidence for test-takers. These exam trial runs may also lessen pre-exam anxiety while increasing study time, which bodes well toward improving student exam performance.

This study explores the value of innovation through the assimilation of traditional academic and certification course training. Without such curriculum innovation, there is potentially decreased value in a college degree. Through innovation in curriculum and pedagogy, stakeholder value is derived from job marketability and critical thinking skills that create employment-ready graduates. What value lies in developing critical thinking skills when recent undergraduate students lack the necessary qualifications to meet employers' needs in the job search process?

Value, in this study, is viewed as first developing the capability to earn an industry certification, which affords the student the ability to compete in the current job market, and second, using critical thinking skills in a business environment. The job market is continuously changing and evolving. Without an academic curriculum that focuses on creating a valuable degree and a valuable graduate, the degree program value is questionable. Industry-based certifications are becoming a requirement within the hiring process for many industries, especially in the information technology sector. And without an innovative curriculum that prepares students for an ever-changing employment market, value delivery is questionable by some. Since certifications are trending, degree programs should evaluate the implications of integrating certification training into courses curriculum and teaching pedagogy.

## LIMITATIONS AND FUTURE RESEARCH

This study did not examine the nuances of the various certification exams. Some exams require students to go beyond remembering and recalling information, while others are based on a higher level of thinking that uses Bloom's application, analysis, synthesis, and evaluation skills. Nor did this study examine student learning styles (visual, auditory, reading and writing, kinesthetic) or the appropriate teaching style (authority, delegator, facilitator, demonstrator, hybrid) given the certification exam rigor. Further research is required to provide evidence of the effectiveness of certification exam training using various teaching styles vis a vis student learning styles.

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**APPENDIX**

**TABLE 1  
LISTED PROJECT MANAGER POSITIONS WITHIN LAST 30 DAYS AND WITHIN 5 MILES  
OF FORT WORTH, TX**

<b>Last 30 days, within 5 miles of Fort Worth, TX</b>	
<b>Monster (Project Manager positions open)</b>	
<b>Require PMP</b>	
1	IT Project Manager at Kenneth Copeland Ministries
<b>Don't require PMP</b>	
1	Senior Project Manager - Fort Worth from System One
2	Homes Project Manager at Opendoor
3	Project Manager at KPS Global, LLC
4	Senior Project Manager at Johnson Controls
5	Project Manager at Addison Group
6	Project Manager at Landmark Structures
7	Project Manager at OQSIE
8	Architectural Project Manager - Commercial at Placement By Design
9	Senior IT Project Manager at Infinity Consulting Solutions, Inc.
10	Municipal Project Manager at Kismet Recruiting
11	Project Manager - II at Artech Information Systems LLC
12	Project Manager at ICONMA, LLC
13	Project Manager - Water & Wastewater at AECOM
14	Project Manager - Land Development at TK Consultants
15	Geotechnical Project Manager at ECS Limited
16	Tilt-Wall Project Manager - Commercial at The Brazos Group
17	Engineering Project Manager - (Job Number: 2005845) at D.R. Horton, Inc.
18	Project Manager at Electro Acoustics
19	Senior Project Manager/Practice Builder at Bartlett & West
20	Sr. Project Manager – North Texas Construction at TDIndustries, Inc
21	Industrial Piping-Project Manager at Gulfstream Strategic Placements
22	Estimator/Project Manager (22743) at Binswanger Enterprises, LLC
23	Residential Construction Manager/Project Assistant at Braswell Homes
24	Wireless Network Project Manager at Accrue [PPC]
25	Facilities/Special Projects Manager at Silver Creek Materials
26	Water Infrastructure Project Manager at Enhance Recruiting

- 27 Senior Product Owner at Ryder System
- 28 HVAC Controls Project Manager at Nenni and Associates
- 29 Project Manager- H&H at Kismet Recruiting

**Recommend/Strongly Preferred PMP**

- 1 Project Manager at Taylor Corp
- 2 Project Manager - IT (Maximo Chief) at DynCorp International - WRSS
- 3 Senior Mechanical Project Manager at Nenni and Associates
- 4 Project Manager - HR at Interactive CAD Services, Inc.
- 5 Project Manager at Textron
- 6 IT Project Manager I at Health Management Systems, Inc.
- 7 Project Manager, HRPM at Leadstack Inc.
- 8 Senior Project Manager - Higher Education Construction at CBRE
- 9 IT Project Manager IV at TalentBurst Inc.
- 10 Project Manager at The Omni Group

**Last 30 days, within 5 miles of Fort Worth, TX**

**Indeed (Project Manager positions open)**

**Require PMP**

- 1 Project Manager, Enercon Services, Inc.
- 2 Senior Construction Project Manager, HARTZ Search
- 3 IT Project Manager-Kenneth Copeland Ministries

**Don't require PMP**

- 1 Architectural Project Manager, Rogue Architects
- 2 Project Manager, Panther City Arbor & Patio LLC
- 3 Project Manager - 100% travel, NPSG Global
- 4 Marketing Project Manager, The Mom Project
- 5 Associate Project Manager, Sabre Industries Inc
- 6 Project Manager, US Department of the Army
- 7 Project Manager, Summit Employment Professionals
- 8 Project Manager - GME, JPS Health Network
- 9 Project Manager, University of North Texas Health Science Center
- 10 Project Manager, Flower Mound Pool Care and Maintenance
- 11 Project Manager, PMG Worldwide LLC
- 12 Project Manager, Transglobal Services, LLC.
- 13 Landscape Designer/Project Manager, New Horizons Landscape Management
- 14 Event Project Manager, Naylor, LLC
- 15 Project Manager, Electro Acoustics
- 16 Project Manager - Residential Reconstruction-Dry Force Corp

- 17 Project Manager Disaster Restoration, Fire Damage Reconstruction, Restoration XP
- 18 Sales Representative/ Project Manager, TC Roofing & Restorations, LLC
- 19 Real Estate Services Assistant Project Manager, HDR
- 20 Project Manager, GPAC
- 21 Project Manager-Thornton Steel Company LLC
- 22 Natural Resources Project Manager/Team Leader, Stantec
- 23 Project Manager, CyberCoders
- 24 Construction Project Manager, Yesway
- 25 Estimator/Project Manager, Binswanger Enterprises LLC
- 26 Demolition Project Manager Estimator-McDonagh Demolition, Inc.
- 27 Senior Project Manager, Utility Coordination, Cobb Fendley
- 28 Senior Project Manager - FLRAA, Bell Textron Inc.
- 29 Senior Project Manager, EnumSys Technology
- 30 Project Manager, E4H Architecture
- 31 Routing and Siting Project Manager, Stantec
- 32 Senior Project Manager/Practice Builder, Bartlett & West
- 33 Procurement Project Manager, Trinity Metro
- 34 Site Project Manager, Material Handling Systems Inc
- 35 Project Manager, PLUMMER
- 36 Structural Project Manager, PE, gpac
- 37 Municipal Project Manger/ Project Engineer, Shield Engineering Group
- 38 SR. PROJECT MANAGER – WATER RESOURCES, Dunaway Associates

**Recommend/Strongly Preferred PMP**

- 1 AMI Project Manager / Utility Industry, Scope Services Inc
- 2 Strategic Project Manager, Allied Electronics & Automation
- 3 Project Manager, Textron Airborne Solutions (ATAC)
- 4 Project Manager, Sentech Architectural Systems
- 5 Project Manager - Construction, Cook Children’s Health Care System
- 6 Project Manager, Westwood Contractors Inc
- 7 Project Manager - Construction, Lochridge-Priest Inc
- 8 Wireless Network Project Manager, AccruePartners