THE PREDICTIVE ROLE OF READING LEVEL AND MOTIVATION IN MIDDLE AND HIGH SCHOOL STUDENTS' MOS CERTIFICATION PERFORMANCE

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ABSTRACT

The purpose of this dissertation is to determine if student performance on MOS certification exams is affected by other factors, specifically motivation based on expectancy, value, and cost factors, and reading comprehension, based on the Lexile level. The study examined if there is a relationship between the motivation level of students and their performance on the MOS certification exams, focusing on the MOS Word, MOS Excel, and MOS PowerPoint certification exams. The study also examined if there is a relationship between the reading comprehension levels of students and their performance on the MOS certification exams. The literature indicates researchers have examined the existence of a relationship between motivation and reading comprehension in other areas in school, but have not researched these factors on the MOS Certification exams or any other industry credential exam.

The present study investigated all three variables in the expectancy-value-cost theory of motivation model (expectancy, value, and cost) to determine if differences in student motivation towards each of the MOS program areas and how these differences relate to performance on the MOS certification exams. The present study also investigated how the reading comprehension level of students (determined by the Lexile level) related to performance on each of the MOS Certification Exams. The sample of this study came from three diverse public high schools and one public middle school in Northeast Georgia ($N = 258$). Analyses included preliminary demographics analysis, inferential statistics including Pearson's Correlation, a sig. (2-tailed value) or p-value, and a multiple linear regression model (ANOVA) after testing all assumptions of homoscedasticity, multicollinearity, and linearity.

Results of this study suggest that expectancy-value-cost factors, particularly expectancy and cost impacted student performance on the MOS certification exams. Furthermore, the results of this study suggest that reading comprehension impacted student performance on the MOS certification exams. This study may prompt further research on the impact of the expectancy-value-cost factors of motivation and reading comprehension to focus on performance on industry certification credentialing exams.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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First, I would like to thank God for not only the opportunity to take on this challenge, but also the strength and ability to stay focused and committed to seeing this process through. Trusting the path God has for me helped me fight through all the obstacles and

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Chapter I

INTRODUCTION

Through Perkins IV Legislation states are required to implement assessments tied to industry standards (CTAE-Georgia-Assessments, 2020). The assessment component of the career pathways in Georgia schools is the end-of-pathway industry certification or credential. The Carl D. Perkins Career and Technical Education Act was designed to ensure all students receive the opportunity to receive training in the skills and knowledge necessary to be competitive in their post-secondary education and in the workforce (CTAE-Georgia-Assessments, 2020). The end-of-pathway assessments offer industry certifications and industry-recognized credentials.

Sass (2011) discussed the importance of career and technical education (CTE) changing its image by creating a learning experience that will allow students to prepare for future education and the workforce. The economy is changing and becoming more competitive, requiring people to stay competitive by earning certifications in their area of expertise (Zeng, 2004). The certifications show students have the skills necessary to be productive in today's workforce with productivity programs. These certifications indicate to employers the student's level of skills and knowledge in a specific industry (Foster & Pritz, 2006).

For one pathway, the Business and Technology pathway in the Business Management and Administration career cluster, the industry certification is the Microsoft Office Specialist (MOS) certification (Georgia Department of Education, 2017). A MOS

certification shows you have the skills and knowledge necessary to be productive in all job types (Certiport, 2013). According to the Microsoft Office Specialist Productivity Study conducted in 2012, students and employees are both more productive as they increase their skills in the Microsoft office programs. Becoming certified in MOS "helps you present yourself as truly knowledgeable and differentiates you in a competitive job market" (Certiport, 2013). Overall, earning Microsoft Office Specialist Certification will help students be more productive and will help the students become more proficient and effective and will increase their confidence in their ability to perform productivity tasks on the job.

As students earn their MOS Certification, the students become more employable after graduation. Craig Bushman, vice president of Certiport, said if students "can demonstrate that they have a high aptitude of knowledge in Microsoft Office, that gives them greater productivity skill when they go into their careers or it can prepare them better for college" (Balingit, 2017, p. 1). Increasing the number of students graduating with their MOS Certification will help ensure the Georgia Department of Education's vision of "Educating Georgia's Future" (CTAE = Education + Workforce Development). The number of professional certifications students in Georgia earned during the school year 2015–2016 increased over 22% (CTAE = Education + Workforce Development) (Georgia Department of Education, 2016a, 2018a). Increasing the number of students earning certifications provides more students with proof of expertise in Microsoft Office programs, equipping them with skills necessary to be successful on the job and in post-secondary education, and will help create a more productive and competitive job force for Georgia.

Students preparing for and taking the MOS certification exams through their courses are more likely to have a deeper understanding of the software and are more likely to remember the skills and knowledge they learn while preparing for the MOS certification exam (Certiport, 2013). Currently, MOS certification exams are low stakes tests and do not have much bearing on the success of the students in the classroom, for promotion to the next grade, or for graduation. Educators might agree with any test with the potential of earning a certification is a high-stakes test.

When students are the ones taking the tests, the level of importance placed on the test lies solely on the students. The motivation level of the test taker could influence performance on the test. Low motivation could result in the underperformance of students, resulting in lower scores. High motivation could result in better performance of students, resulting in higher scores. The motivation of students is affected by both internal and external motivation. When students are motivated they are "stimulated to successfully complete an assignment" (Amria, Motlagh, Zalani, & Parhon, 2011, p. 399). The external motivation pushes the individual to partake in the activity, while the internal motivation pushes the individual to successfully complete the task (Amria et al., 2011, p. 400). Motivation for academic achievement has been associated with an increase in behaviors associated with learning.

It is also important to note that the MOS certification exam is an exam for not only secondary students but also post-secondary students as well as professionals (Certiport, 2013). The reading level of the test questions is geared towards examinees, including professional adults and college-level students. The reading level of the test taker could influence the performance on the test as well. A study conducted by

Cimmiyotti (2013) encouraged further research in the reading comprehension skills of students affecting scores on tests and suggested students not reading on grade level struggle with high-stakes tests because they do not know what the questions are asking them.

Problem Statement

The problem being studied is to determine how students' motivation and reading comprehension predict their performance on the Microsoft Office Specialist (MOS) certification exams. No literature can be found concerning the factors affecting student performance on MOS certification exams. Many studies recently focused on an increased emphasis of testing in education (Ballard & Bates, 2008; Brookhart, 2015; Lesnick, Goerge, Smithgall, & Gwynne, 2010; Smith, & Szymanski, 2010). Rowell and Hong identified how influential motivation is in the academic performance of students and how a lack of motivation negatively the performance of students (Rowell & Hong, 2013).

Purpose

The desire to determine if student performance on MOS certification exams is affected by other factors is the driving force for this study. There are two purposes of the study. The first purpose is to determine if there is a relationship between the motivation level of students and their performance on the MOS certification exams, focusing on the MOS Word, MOS Excel, and MOS PowerPoint certification exams. The second purpose is to determine if there is a relationship between the reading comprehension levels of students and their performance on the MOS certification exams, focusing on the MOS Word, MOS Excel, and MOS PowerPoint certification exams. If such a relationship

exists, teachers of students preparing for the MOS certification exams will be better able to prepare students for the exams, improving exam results, therefore providing students with a certification to increase employability and productivity skills for future careers and post-secondary education.

Scope

The study examined the predictive role of two variables, motivation and reading comprehension levels, on the performance of MOS certification exams in middle and high school students from three rural school systems in Northeast Georgia. The scope of this study also did not include large school districts from metropolitan areas. An attempt to include numerous school systems across the northeast Georgia area was made. However, only these three school systems were willing and/or able to participate in the study. All three school systems in the study use the training software GMetrix as part of the test preparation for students prior to taking the Microsoft Office Specialist (MOS) certification exam. Therefore, the results of this study were not comparable to students taking the Microsoft Office Specialist (MOS) certification exam without the use of GMetrix as a training tool. The study did not examine test anxiety as a factor that affects the performance on MOS certifications since it is outside the scope of this study and did not look at other forms of standardized or high-stakes testing since they are not in the scope of this study.

Research Questions

To determine how student's motivation and reading comprehension levels relate to their performance on MOS certification exams, the following research questions were developed:

- RQ1: What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?
  - What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS Word certification exams?
  - What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS Excel certification exams?
  - What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS PowerPoint certification exams?
- RQ2: What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?
  - What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS Word certification exams?
  - What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS Excel certification exams?
  - What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS PowerPoint certification exams?
- RQ3: How do students' motivation and reading comprehension predict their performance in MOS exams?
  - Does gender predict performance in MOS exams?
  - Does grade predict performance in MOS exams?

- Does school predict performance in MOS exams?
- Does ethnicity predict performance in MOS exams?

Theoretical Framework

The theoretical framework for the study is based on a combination of theories. The first question to be answered in the study, is there a correlation between the motivation of middle and high school students and their scores on MOS certification exams, draws on the Expectancy Value Theory of Achievement Motivation by Wigfield and Eccles (Wigfield, 1994; Wigfield & Eccles, 2000). The Expectancy Value Theory of Achievement Motivation identifies four areas of values when measuring motivation including 1) attainment value or importance, 2) intrinsic value, 3) utility value or usefulness of the task, and 4) cost (Wigfield & Eccles, 2002, p. 94). Attainment value or importance is the amount of importance given to doing well on a task. Intrinsic value refers to how much one enjoys the task they are participating in. Utility value or usefulness is how one sees the task as helping them succeed in the future, whether in future classes or in a future career. Cost is what one must give up in order to be successful in the current task.

The second question to be answered in the study, is there a correlation between the reading comprehension levels of middle and high school students and their scores on MOS certification exams, is based on a combination of the Schema Theory and the Lexile framework for reading (Seymour, 2017). The Schema Theory is based on the belief that readers use the knowledge they already possess to help comprehend what they are reading (Seymour, 2017). The Lexile Framework for Reading relates the reading

ability of the reader with text complexity and comprehension (Swartz, Burdick, Hanlon, Stenner, Kyngdon, Burdick, & Smith, 2014).

Methodology

The purpose of this research was to examine how the students' motivation and reading comprehension predict their performance on MOS certification exams in middle and high school students. Motivation was measured with the Motivational Survey for MOS Certification Exams (Barron, Hulleman, Getty, & Taylor, 2017). Reading level was obtained from the Lexile Level reported on the student's most recent EOG (end-of-grade) or EOC (end-of-course) test administered to all Georgia public school students. Special attention was given to quantifiable traits of the participants including grade, gender, ethnicity, and how they correlated to survey responses and reading level.

Participants in the study received an information letter explaining the nature of the study and assurance that the information obtained will be anonymous and that no identifiable information will be collected during the study. The information letter will also inform participants that all of the results of the study will be reported as aggregate figures and that no individual participant's results will be singled out or distributed. The information letter explained the purpose of the study is for academic research and that the researcher has the right to post, publish, and/or quote the information obtained in the study. Permission for the individuals to participate in the study is to be obtained by the students obtaining signed parental consent on the information letter.

The approach will use a bivariate correlation and regression model to determine the relationship between each of the two variables. First, the two variables, motivation and performance, on MOS certification exams will be used to determine the relationship

between the two. Next, the two variables to be used will be reading comprehension level and performance on MOS certification exams to determine their relationship.

The approach will use a bivariate regression model to show how the independent variable (motivation level of students) can be used to predict the dependent variable (performance on the MOS certification exam) and how the independent variable (reading comprehension level of students) can be used to predict the dependent variable (performance on the MOS certification exam). The data will be collected, organized, and analyzed using a quantitative approach. Descriptive statistics will be collected and calculated to determine the information needed to see the big picture, including average MOS exam scores and Lexile scores. The information collected will also show any patterns or themes from the Likert scale questions used to measure motivation for the MOS Certification Exams.

Analysis Overview

A correlational analysis of the variables was conducted to determine the strength of the relationship, if any relationship, between the variables of motivation with performance on MOS certification exams, including Word, Excel, and PowerPoint. The analysis included a focus on the strength of the relationship, if any relationship, between the variables of motivation with performance on MOS certification Word exam, with performance on MOS certification Excel exam, and with performance on MOS certification PowerPoint exam. The motivation variables measured in the study included expectancy, value, and cost, derived from the expectancy-value-cost model of motivation.

A correlational analysis of the variables was conducted to determine the strength of the relationship, if any, between the variables of reading comprehension, as measured

by Lexile scores, with performance on MOS certification exams. The analysis included a focus on the strength of the relationship, if any relationship, between the variables of reading comprehension with performance on MOS certification Word exam, with performance on MOS certification Excel exam, and with performance on MOS certification PowerPoint exam.

A correlational analysis was conducted to determine the interactions, if any, between motivation, reading comprehension, and MOS scores. The analysis included a focus on the interactions, if any, between the variables of motivation (including the motivation variables of expectancy, value, and cost), reading comprehension (indicated by the Lexile score), and MOS certification Word exam scores, MOS certification Excel exam scores, and MOS certification PowerPoint exam scores in students.

Significance

The Carl D. Perkins Career and Technical Education Act was enacted to guarantee students will receive training to allow them to obtain the skills and knowledge necessary to be competitive in the workforce or in their postsecondary education (CTAE-Georgia-Assessments, 2020). One way the Georgia Career, Technical, and Agricultural Education with the Georgia Department of Education is addressing this is by incorporating end-of-pathway assessments like the MOS certification exams in the Business and Technology department. Students obtaining MOS certification(s) will be more employable. Examining the variables of motivation and reading comprehension and how they may help or hinder a student earning their MOS certification will help Business and Technology educators understand how to better prepare students for the exams. Being able to better prepare students should result in more students earning

certifications and becoming more employable for employers. The results could also encourage further studies regarding other professional certification exams in other pathways.

Definitions

Career, Technical, and Agricultural Education (CTAE) Pathway Assessments – a measurement mechanism used to ascertain the skill attainment of CTAE career pathway completers through "national industry certifications, national occupational assessments, and state licensures and state-developed assessments", ensuring students graduate with credentials employers are looking for in employees (Georgia Department of Education, 2017).

Career, Technical, and Agricultural Education (CTAE) Pathways – Georgia CTAE pathways are designed to prepare students for the workforce, offering over 130 career pathways in a total of seventeen career clusters in Georgia (Georgia Department of Education, 2017).

Lexile – the measurement of the comprehension level expected of a student based on a corresponding comprehension measure at a 75% rate (Lennon & Burdick, 2014).

Microsoft Office Specialist (MOS) Certification Exams – industry-recognized assessments used to evaluate the user's skills and knowledge of Microsoft Office programs to better equip the user for postsecondary education and employment (Certiport, 2018).

Motivation – the process of stimulating or driving students to want to act upon accomplishing goals (Juneja, 2018).

Reading Comprehension – the level of ability to process and understand the material being read (Blachowicz & Ogle, 2008, p. 1).

Chapter II

LITERATURE REVIEW

In this chapter I projected to review the literature relevant to my study in the areas of student motivation, reading abilities, and the effects it can have on academic achievement, the Lexile Framework, and the relationship between factors and academic motivation. The main emphasis was to examine how important student motivation is to the success of academic achievement and how reading ability affects performance on academic achievement. The review also functioned as the basis for the conceptualization of this study.

Student Motivation

According to Singh (2011), motivation drives people to reach their goals with excitement which leads to higher goals (p. 161). It is "the person's effort to accomplish his/her duties, dedicating the needed effort, and continuing it (Muhammad, Bakar, Mijinyawa, & Halabi, 2014, p. 222). It plays a substantial part in a person's academic career and directly affects achievement. Even though what motivates a person is different, the motivation a person has pushes them to greater heights and pushes them to achieve more by activating a drive in a person that helps give them direction. The motivation can be for both personal and professional goals and can come from both internal and external sources.

Internal motivation, referred to as intrinsic motivation, "is driven by an interest or enjoyment in the task itself, and exists within the individual rather than relying on any

external pressure" (Singh, 2011, p. 162). External motivation, referred to as extrinsic motivation, is the motivation that comes from outside of the person. Achievement motivation is the push a person has to accomplish goals and tasks set before them (p. 162).

Solak (2012) stated "motivation pushes the individual to do whatever it takes to become successful" (p. 241). Motivation directly relates to why people do what they do, how much time they are willing to spend on the task, and how hard they are going to work at the task. Atkinson, the first to define achievement motivation, defined it as comparing one's performance with another person's performance on the same task (Singh, 2011). It is what drives one to stay focused, determined, and persistent throughout a task, even if the task becomes challenging. It has been determined through research studies students high in academic motivation are more likely to have increased levels of academic achievement.

Eccles and Wigfield's expectancy-value theory states a student's expectations of success play a crucial part in the achievement performance of a student, influencing both the student's feelings of competence and the goals the student sets (Wigfield & Eccles, 1989). A student's motivation reflects how the student answers three questions about themselves: can I do it, do I want to do it, and what will it take for me to succeed (Muhammad et al., p. 222). And when a student has expectations of success, the achievement outcome will be directly affected. In education, motivation "is a tridimensional phenomenon consisting ofindividual's beliefs in ability in carrying out a specific task, reasons, and goals of the individual in doing the task and the emotional response concerning carrying out the task" (Sharma & Sharma, 2018, p. 2).

Rowell and Hong (2013) identified motivation as one of the most influential elements for academic performance in students. Academic motivation is detrimental to learning and development in people. When students are academically motivated, they see the importance of education and enjoy learning. Research has shown students lacking academic motivation underachieve. Rowell and Hong (2013) studied components of academic motivation, ways to increase academic motivation, and how counselors can promote academic motivation. They discovered students experience a decrease in academic motivation due to negative educational experiences, causing these students to doubt their academic ability.

Several components identified in the study to affect learning in students included individual student beliefs, the goals and values of the students, and intrinsic as well as extrinsic motivation. The study revealed educators could positively affect the motivation of students and improve academic performance (Rowell & Hong, 2013). They can affect motivation by helping students believe in themselves and their competency, believe academic success is in them, see value in the tasks and helping them develop learning goals, by helping students create autonomy in their education, and by helping develop relationships with peers and educational faculty.

A study by Muhammad et al. (2014) looked to see if a relationship existed between the motivation of a student and the academic performance of the student. The study consisted of 281 randomly selected students at the University Sultan Zainal Abidin. Using a questionnaire to measure motivation and the students' grade point averages, the study revealed the motivation of a student does have a positive effect on the academic

performance of the student. As the motivation of the student increases, so does the GPA of the student.

Another study by Sharma and Sharma (2018) examined the relationship between motivation, self-concept, and academic achievement. The objective of the study was to determine if a relationship exists in motivation and academic achievement and if differences exist in gender, locale, and school type. The study revealed students were more intrinsically motivated when they are self-determined and confident in challenging situations. When a student is self-determined and motivated, the academic achievement of the student typically follows.

In 2012, Kusurkar, Cate, Vos, Westers, and Croiset examined how motivation related to academic performance. The study collected data on motivation and grade point averages from 383 medical students at the VU University Medical Center Amsterdam and analyzed it using a Structural Equation Modelling analysis technique. The study based its hypothesis on the Self-determination Theory of Ryan and Deci. For data collection, the study utilized an electronic survey the Academic Motivation Scales, to measure the motivation of the students based on the Self-determination Motivation Scale. The academic achievement data was based on the GPA and European Credits. The GPA of the students did show a positive association with the motivation level of the students. The results revealed motivation does positively correlate with academic performance due in part to study strategies and effort. More specifically, the study revealed the quality of motivation is a good indicator of study strategy and effort, which does typically equate to increased academic achievement as seen in the GPA.

A study by Solak (2012) examined the role motivational factors play in the academic achievement of EFL students. The goal of the study was to identify how motivational factors play a part in influencing the academic achievement of Turkish Foreign Language learners. The study consisted of 230 freshmen students in a teacher program in an English class. The results indicated gender, academic achievement, and the major of the students had a part in motivating the students. The study found females to be more motivated than males in most factors. The study also revealed a significant difference in motivational factors and the academic achievement of the students. The main conclusion of the study revealed motivational factors do impact the academic achievement of the students.

A study by Rutkowshi and Wild (2015) focused on the growing concern of the use of student scores on tests for evaluating teachers and how student motivation affects the validity of the concept. The research discussed the views of two experts (Wigfield & Eccles) in the area of student motivation. The two stated student motivation comes from the belief in themselves to succeed and how students place value on assessments. Literature proved students placed a higher value on high-stakes tests as opposed to assessments on a smaller scale and increased motivation to perform better on high-stakes tests. The results of the study proved students performed better on high-stakes tests when they thought the score would affect their final grade and they performed better when they thought the results would reflect the performance of their teacher. The findings suggested motivation is key in the academic performance of students when measured by their results on high-stakes tests.

The motivation of students is impacted by the values the students place on tasks (Rollins, 2014, p. 119). When students place a high value on a task, and when students have the confidence in themselves in completing the task, students are more likely to be engaged in the task and are more likely to stay motivated in the task. However, when students place a low value on a task and when they lack the confidence in themselves in being able to complete the task successfully, the students become less motivated in the task and try to avoid the task. When students are struggling to achieve academic success, it is important to build the motivation level with the students to encourage improved academic success. Rollins identified several ways to build motivation in students including using tasks that engage students, ensuring the learning environment is positive, and provides the students with a sense of security. When a student is motivated, academic performance is more achievable, while an unmotivated student is more likely to experience academic difficulty.

A study by Amrai et. al (2011) examined the correlation between academic motivation and academic achievement. The study examined the relationship between academic motivation and academic achievement by looking at 252 students at the University of Tehran. The participants in the study completed the Inventory of School Motivation-ISM, which was a five-point Likert scale consisting of 43 items on eight components including interest in task, effort, competitiveness, social power, affiliation, social concern, praise, and token. The findings from the study did find a relationship between motivation (based on the results of the survey) and academic achievement (based on the average mark as reported by students). The researchers of the study determined "learners who believe that tasks are worthy and valuable are more concerned

with cognitive activities and use more cognitive and monitoring strategies and have basically more academic achievement" (p. 401).

A study Simmons (2014) set out to determine how self-aware students were of their own motivation and how their self-awareness motivated their drive and performance. Part of the theoretical framework for this study was also the self-determination theory of motivation to explain what motivates students in academic achievement. The participants in the study were 18 students from the Ocean Beach School District, using a purposeful selection technique to represent all levels of achievement. The procedure of the study centered on a grounded theory methodology and an interviewing technique, with the researcher sitting down with each of the participants in the study individually. The results of the study indicated the motivation of students is linked to the amount of engagement the student demonstrates, affecting academic performance.

Grades can affect the motivation of students differently. In her book *Learning in the Fast Lane,* Rollins (2014) pointed out grades can negatively affect lower-achieving students by leading them to see themselves as academic failures. Higher-achieving students feel more positive about their academic ability, encouraging themselves to stay focused and work through tests better, resulting in better test-taking skills. An article on student engagement identified motivation to be at the center of education (Appleton, Christenson, & Furlong, 2008, p. 378). Students, once seen as machines, then recognized as individual decision-makers, to becoming identified as the meaning creator, where students became in control of creating their perception of what is a value to them. The

study highlighted the importance for educators to understand what motivates students in academics to encourage a higher degree of learning.

A study on reading motivation suggested the motivation level of students can have an effect on how well they perform academically in different areas of achievement (Mucherah & Yoder, 2008). The level of motivation of a student affected how persistent a student was in school their school work as well as the types of challenging tasks the student chose to participate in. The study discovered a positive correlation between the motivation of the student to read and the academic performance of the student. The study highlighted the need to examine the motivation of students to read in middle school to performance on high-stakes tests and then completed the study using 388 sixth-grade and eighth-grade students. The study used the Motivation for Reading Questionnaire created by Wigfield and Guthrie to measure the students' level of motivation for reading and the Indiana Statewide Testing for Educational Progress (ISTEP+) in reading to measure the academic performance of the students. The study revealed specific aspects of reading motivation in students, including students with high self-efficacy and students with interest in reading a variety of literature, do positively influence academic performance.

Reading Ability and the Effects It Can Have on Academic Achievement

Being able to read is a fundamental skill needed for academic performance as well as being able to function in the world (Cimmiyotti, 2013, p. 8). In the study Cimmiyotti examined the relationship between reading and math, pointing out a relationship between reading and all subject areas should logically exist because of the utilization of reading skills in all subject areas. As students grow and advance from grade to grade, the ability to read and comprehend material grows as well. By the time students

reach high school, they are expected to be able to read and comprehend text on their own without the assistance of the teacher. It is detrimental for students to have the reading comprehension skills necessary for the material presented to them to allow for academic performance.

High-stakes tests students are required to take throughout school necessitates the need for reading comprehension skills to be at grade level or better. Cimmiyotti (2013) stated, "students are not performing well on their tests; it could be because they are struggling to read and comprehend the test questions that they are being confronted with" (p. 9). The study focused on the relationship between reading performance (including comprehension as well as reading fluency and vocabulary) with academic performance (which focused on mathematics based on performance on summative assessments) of students at the elementary level. The literature reviewed during the study revealed an existence in the relationship between reading skills and the academic success of students in subject areas including science and math and tasks needing logical reasoning to solve. The literature reviewed in the study also revealed students with a higher reading comprehension level were able to advance in their problem-solving skills quicker than students with a lower reading comprehension level. The study focused on 95 students in second – fifth grade. The study revealed an increasingly stronger correlation in the performance of reading and math as the students advanced from second to fifth grade, beginning as a moderate correlation in second grade and becoming a strong correlation by fifth grade. The study suggested further research in the area of studying the relationship between student performance in reading and math to determine if other

factors could affect the relationship and to determine what is needed to prevent discrepancies from increasing as students advance in grades.

All teachers must prepare their students for high-stakes tests (Allen, 1999). One key ingredient to academic success on high-stakes tests is reading comprehension. Increasing the reading comprehension skills of a student will help prepare them for high-stakes testing and academic success. Increased reading comprehension is in part related to an increase in vocabulary, including specialized vocabulary, which helps students with reading comprehension, high-stakes testing, and overall academic success. But, students do not just need to be able to read the Words and decode the meanings. Students need to master the art of reading, being able to understand and comprehend what they are reading (McEwan, 2007). Students do not always have the vocabulary knowledge or the background knowledge they need to fully understand and comprehend what they are reading . Almost forty percent of middle and high school students are not able to read and comprehend material on their grade level. Less than five percent of middle and high school students are advanced readers and able to read and comprehend advanced reading material. With these low levels, students will not be able to be academically successful in the classroom or on high-stakes testing. The low levels of reading comprehension for too many students will prevent them from being academically successful. If students were able to increase their vocabulary knowledge and increase their background knowledge, their test scores would increase.

When students are unable to read and understand the material presented to them in materials in the classroom, the opportunity for academic success is minimized (Urquhart & Frazee, 2012). In fact, this inability to read and comprehend the material

can also impair success on the jobs with employers ranking it as one of the number one deficiencies in newly hired employees. Students are leaving high school without developing the skills needed to understand and comprehend challenging text that is common in both post-secondary education and in the workplace. This is in part due to the level of complexity of the reading material in schools becoming less complex. Students often have trouble understanding and comprehending reading material when it is in a subject area they are not familiar with or they have no prior experience in the area. It is important for students to be able to read material they can relate to and material that is content literate for the academic discipline the student is in.

Several other studies reviewed expressed the relationship between reading level and ability to perform on high-stakes tests. One study focused on calculating the readability on certification exams (Neuhoff, Feeser, Sutherland, & Hovatter, 2016). The authors pointed out high-stakes tests require students to have a knowledge of the content being tested as well as the ability to comprehend the questions on the tests to know what they are required to do. The study examined the readability of the Certified Nursing Assistant's (CNA) certification exam taken by students seeking certification in CNA. Ensuring the reading level of the high-stakes test corresponds to the reading level of the students taking the test is crucial. The ability for test-takers to read and comprehend a test determines how useful of an assessment tool a test is.

Another study focused on the academic performance of trainees in a primary teacher trainee program to see if a relationship exists between reading ability and academic performance of the students as well as how reading attitudes and perceptions affect reading ability in Swaziland (Lukhele, 2013. The study included 84 teacher

trainees in either their first or third year in the program. Research conducted for the study revealed a positive correlation between a student's reading level and their performance academically. The results of the study indicated a strong relationship between the reading level and the academic performance of students which the author found to be remarkable.

Another study conducted by Lesnick et al. (2010) examined the relationship between the reading level of students in third grade to academic performance. The study examined if educational outcomes, based on the four measurements used, could be predicted for a student based on their third-grade reading level. The results from the study indicated students reading above grade level in third grade are more apt to graduate from high school and attend college. The results from the study also indicated a student's reading level in third grade is a strong indicator of their reading level in eighth grade. Research from the literature for the study found students struggling with reading in third grade are more likely to struggle in ninth grade. The research also revealed reading ability is a deciding factor in the success of a student academically, socially, as well as economically. Learning to read by the end of third grade is so important because students are learning to read up through third grade but then begin reading to learn from fourth grade and up. If the students struggle with reading classroom material to learn course content, the students have a more difficult time keeping up with the students reading on or above grade level.

The research from the study also revealed struggling readers become less motivated and begin to experience a decline in their self-esteem. The study observed third-grade students from the Chicago Public School District with 86% of the students

qualifying for free or reduced lunch, 45% African American students, and 41% Latino students. The study used descriptive statistics and used measures from a high-stakes test, the Iowa Test of Basic Skills (ITBS), to determine whether a student was on grade level, above grade level, or below grade level. The results of the study revealed a student's reading level in third grade does relate to the educational performance of the student in the future. The study revealed students are reading above grade level in third grade or more likely to read above grade level in eighth grade. The reading level of students in third grade is related to the performance of the students in ninth grade courses. The study also revealed the performance of students in their courses in ninth grade is a major indicator of high school graduation and enrollment into college. The conclusions of the study revealed the importance of early intervention for improving the reading ability of students to better prepare them for academic success including high school graduation and college enrollment. The study suggested further research to better study the effects of improving the reading skills of students to determine increased academic performance.

Mucherah and Yoder (2008) discovered the amount students read is a strong indicator of academic performance. The literature reviewed in their study predicted performance on standardized tests in the area of reading as a result of the quantity of reading and the extensiveness of reading by the student. Rollins (2014) discussed issues faced by students while taking high-stakes tests. She discussed how reading and comprehending questions on tests causes issues for some students, making it difficult for them to comprehend what the question is asking them to do and hence affecting performance. She discussed the importance for students to understand the vocabulary used in school to be successful.

Rollins (2014) stated, “vocabulary touches every aspect of students’ development as academically literate learners, strongly influencing their reading, writing, and conversational proficiencies” (pp. 77-78). She linked understanding the vocabulary to comprehension, resulting in students lacking a strong vocabulary to struggle with comprehending text. Rollins (2014) mentioned the Matthew effect where the gap between the weak readers and the stronger readers grows as the struggling readers struggle more and the stronger readers continue to improve on their already strong skills. Rollins (2014) stressed the importance of building strong vocabularies in students to improve academic performance. She exemplified the importance of reading ability for academic performance by stating “good readers connect to the Words on a page, forming relationships with the text-based on prior experiences” (p. 100).

Lexile Framework

The research reviewed signified the importance of increasing the reading level of students. The following research reviewed explored measuring reading level. Lennon and Burdick (2014) reviewed the use of the Lexile Framework for measuring reading achievement. The Lexile Framework is a scientific approach to measuring the reading ability of students by using a Lexile measure. The framework measures based on the Lexile scale which ranges from BR (beginning reader) up to 1600L (advanced reader). The Lexile Framework is used to measure both the reading ability of students as well as the difficulty of the text, then allowing the reader and text to be matched based on Lexile level. Two factors are used when determining Lexile measures to predict the difficulty of text comprehension: semantic difficulty (Word frequency) and syntactic complexity

(sentence length). The Lexile Framework is a scientific approach to ensuring the reading ability of students by using a Lexile measure.

The Lexile level of text is analyzed by using a software program, the Lexile Analyzer (Lennon and Burdick, 2014). The Lexile level of students (the readers) can be measured in a couple of ways. The majority of standardized tests in reading provide the Lexile measure of the student on the scoring report for the students. Students may also be administered a standardized assessment known as the SRI (Scholastic Reading Inventory) to measure the reading ability of the students. The SRI was administered as an assessment with pencil and paper but became available on the computer. The Lexile measure of the student measures the comprehension level anticipated by the student reading text that corresponds to the Lexile measure at an expected comprehension rate of 75% (p. 8). Lennon and Burdick (2014) added additional factors that affect reading comprehension including motivation and background knowledge of the student (reader) and should be considered.

A study by Hanover Research reviewed monitoring tools in reading and math, including the SRI (Scholastic Reading Inventory) (Hanover Research, 2016). The review described the SRI as a reading comprehension tool for students in grades kindergarten through twelfth grade. The study revealed positive ratings on both reliability as well as validity in several areas including performance level score, alternate forms, the sensitivity to the improvement of the student, benchmarks at the end-of-the-year, and the specified rates of improvement. However, the study did not find any ratings on the reliability of the slope or for the slope of improvement predictive validity, an indication of the rate of improvement for the student.

Relationship Between Factors and Academic Performance

The literature reviewed examined the research previously conducted on student characteristics and how it related to academic performance. High-stakes tests and grades proved to be the most often used measure of academic performance, even though the use of each proved negatively affected achievement (Ballard & Bates, 2008; Brookhart, 2015; Croft, Roberts, & Stenhouse, 2016; Gross & Hill, 2016; Koretz, Linn, Dunbar, & Shepard, 1991; Nichols, Glass, & Berliner, 2005;Rollins, 2014). Motivation levels of students were found to influence the academic performance of the students (Appleton et al., 2008; Mucherah & Yoder, 2008; Rowell & Hong, 2013; Rutkowski & Wild, 2015).

Reading ability was examined and found to be related to performance on tests in multiple tests (Cimmiyotti, 2013; Lesnick et al., 2010; Lukhele, 2013; Neuhoff et al., 2016). Support was evident for the relationship between student characteristics in motivation and reading ability as issues affecting academic performance. Further research will provide additional support to encourage more school systems to realize that the issues exist and to encourage school systems to provide students the support needed to allow them to succeed on tests. Further research will also provide additional support specifically in the area of industry certification exams to help determine what students need in order to be successful in these career-readiness exams.

Chapter III

RESEARCH DESIGN AND METHODOLOGY

This chapter explains how the data collection and analysis used to answer the research questions. The chapter begins by explaining the research design chosen for the study. A description and analysis of the population and sample for the study are also included. Next, a detailed description of the instrumentation to use in the collection of the data, the procedures to use in the collection of the data, and a description of the data analysis procedures to use are all detailed. Finally, the chapter concludes with a limitations section, explaining any limitations with the study.

To accomplish the goals of this study, three research questions were used: (1) What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?; (2): What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?; and (3): How do students' motivation and reading comprehension predict their performance in MOS exams?

Research Design

The research design followed a correlational design approach. The design allowed examination of the degree of relation between motivation and MOS certification exam scores and between reading level and MOS certification exam scores. The degree to which the variables relate to one another was used to help predict MOS scores of participants. The correlational design approach provided insight to determine how

changes in one variable explained changes in the second variable, including if an increase in motivation of students is related to possible increases in MOS certification exam scores as well as if an increase in the reading level of students leads to an increase in MOS certification exam scores.

Population and Sample

The Population and Sample section is in two sections. The first section, population, describes the student populations where the sample for the study was obtained. The second section, sample, describes the sample of the populations included in the study.

Population

The data collected were from students at the middle and high school levels from three different school systems. The three school systems in the study were D School System, M School System, and W School System. While these three systems were not comparable in size, the demographics for each were similar. Demographic data retrieved from The Georgia Department of Education (2018b) reported the following data under Data and Reporting. D school system had 4,987 students (2,590 males or 51.9%). Out of the 4,987 students, 59.45% of the students were on free/reduced lunch. M School System had 3,047 students (1,580 males or 51.8%). Out of the 3,047 students, 42.64% of the students were on free/reduced lunch. W School System had 1,471 students (782 males or 53.2%). Out of the 1,471 students, over 95% of the students were on free/reduced lunch.

Table 1 below identifies the number of students in each grade for each of the three school systems in the study from the most recent data collect by the state in October 2018.

Table 1

Number of Students in Each Grade (6–12) for Each School System

Grade	D School System	M School System	W School System
6th	381	249	119
7th	367	231	105
8th	384	263	195
9th	418	233	123
10th	372	248	105
11th	309	230	90
12th	330	213	97

Table 2 below classifies the ethnical make-up of the three school systems in the study from the most recent data collected by the state in October 2018.

Table 2

Ethnical Make-up of Students

Ethnicity	D School System	M School System	W School System
# of Students	4,987	3,047	1,471
American Indian	0	0	0
Asian/Pacific Islander	119	15	0
Black	442	806	806
Hispanic	530	196	126
Multi-Racial	236	108	84
Caucasian/White	3,606	1,925	524

Table 3 indicates the number of students by area of disability for the three school systems in the study from the most recent data collected by the state in October 2018.

Table 3

Number of Students by Area of Disability

Disability Area # of Students	D School System 4,987	M School System 3,047	W School System 1,471
AUT (Autism Spectrum Disorder)	65	31	12
EBD (Emotional and Behavioral Disorder)	40	37	n/a
MID (Mild Intellectual Disability)	47	n/a	17
MoID (Moderate Intellectual Disability)	17	n/a	n/a
OHI (Other Health Impairment)	108	53	20
SDD (Significant Development Delay)	156	57	41
SI (Speech-Language Impairment)	138	25	40
SLD (Specific Learning Disability)	286	130	43

Table 4 indicates the academic performance of each of the school systems, based on information collected from the Governor's Office of Student Achievement (2018).

Table 4

Academic Performance of Each School System

	D School System	M School System	W School System
Proficient or > in (%)			
Middle School English	44.4	53.1	36.0
Middle School Mathematics	58.9	46.2	47.5
Middle School Science	60.5	49.5	39.3
Middle School Social Studies	48.2	57.4	36.6
Reading at or above Grade Target Level (%) (8th Grade students with Lexile measure > 1050)	64.5	75.1	57.9
College Readiness (%)	57.7	69.7	83.5
Accelerated Course Taking (%)	35.5	74.4	26.4
Four-Year Graduation Rate (%)	90.4	89.7	80.5

Sample

The sample for the study included students enrolled in courses in the Business and Technology pathway. The study used a purposeful sampling technique where the sole criterion was enrollment in a MOS-related course. The only students able to take the MOS certification exams were the students enrolled in one of the three courses in the Business and Technology pathway, including Introduction to Business and Technology, Business and Technology, and Business Communications. The number of students enrolled in these courses was relatively low, so all students in each of the school systems currently taking courses in the pathway classes were included in the study. The number of participants in the sample included two hundred fifty-eight students from the three school systems.

Table 5

Number of Students Enrolled in MOS-Related Courses

MOS-Related Course # of Students	D School System 4,987	M School System 3,047	W School System 1,471	Total
Introduction to Business and Technology (MOS Word)	23	19	63	105
Business and Technology (MOS Excel)	24	22	55	101
Business Communications (MOS PowerPoint)	18	14	20	52
Total	65	55	138	258

D school system had one school participating in the study, D High School. D High School offered the Introduction to Business and Technology course, the Business and Technology course, and the Business Communications course. In total, all three

courses were offered in the D school system. In the Introduction to Business and Technology course, 23 students took the MOS certification exam in Word. In the Business and Technology course, 24 students took the MOS certification exam in Excel. In the Business Communications course, 18 students took the MOS certification exam in PowerPoint.

M school system had one school participating in the study, M High School. M High School offers the Introduction to Business and Technology course, the Business and Technology course, and the Business Communications course. In total, three courses are offered in the M schools. With one Introduction to Business and Technology course, 19 students taking the MOS certification exam in Word will be available for the study. With one Business and Technology course, 22 students taking the MOS certification exam in Excel will be available for the study. With one Business Communications course, 14 students taking the MOS certification exam in PowerPoint will be available for the study.

W School System will have two schools participating in the study, including W Middle School and W High School. W Middle School offers two Introduction to Business and Technology classes, providing 43 students taking the MOS certification in Word. W Comprehensive High School offers one of the Introduction to Business and Technology courses (with 20 students taking the MOS certification in Word), two of the Business and Technology courses (with 55 students taking the MOS certification in Excel), and the Business Communications course (with 1 student taking the MOS certification in PowerPoint).

In all, 105 students testing in Word, 101 students testing in Excel, and 52 students testing in PowerPoint were available for the study. The specific MOS certification exam

taken by the students determined by the course they were in. Students in the Introduction to Business and Technology course took the MOS certification exam in Word. Students in the Business and Technology course took the MOS certification exam in Excel (and Access, which will not be included in this study due to very few students taking this exam). Students in the Business Communications course took the MOS certification exam in PowerPoint. Contact was made with eight other districts in Northeast Georgia. Unfortunately, no other districts were able to participate in the study for various reasons.

Demographic Characteristics

The number of students who took the Microsoft Word exam was 105, the Microsoft Excel exam was 101, and 52 participants took the PowerPoint MOS exam. As such, the total participants that took all the exams were 258 students. Concerning the percentage composition of the sample, the highest percentage (40.7%) of the participants in this study took part in the Microsoft Word exam type. 39.1% of the participant took the Microsoft Excel exam, whereas the remaining 20.2% of the total participant in the study took the PowerPoint MOS exam. The results are as shown in Table 6.

Table 6

Type of Exam distribution of the sample

	Frequency	Percent	Cumulative Percent
Excel	101	39.1	39.1
PPT	52	20.2	59.3
Word	105	40.7	100.0
Total	258	100	

Regarding the gender composition of the sample, 55% of the participants in this study were female, while the remaining 45% were males. Since the difference between

the number of males and females was relatively small, this implies that there was no gender bias in administering the tests.

Breaking down the gender distribution by exam shows more variation. The percentage of female students (45%) taking the Word exam was slightly lower than the percentage of male students (55%). However, the percentage of female students (70%) taking the Excel exam was much higher than the percentage of male students (30%). The percentage of female students (46%) taking the PowerPoint exam was again only slightly lower than the percentage of male students (54%). Table 7 shows the gender composition by the type of exam.

Table 7

Gender Distribution by Exam

Gender	Word	%	Excel	%	PowerPoint	%	Total
Female	47	45%	71	70%	24	46%	142
Male	58	55%	30	30%	28	54%	116
Total	105		101		52		258

Although the highest number of participants in the target population were from the white, the results showed that the highest percentage (40.7%) were from the black ethnic group. However, the participants from the white ethnic group contributed a relatively higher percentage as compared to other ethnic groups with 36.8%. Despite the fact that no American Indian was recruited in the target population, the results showed that there was one participant who was an American Indian. The Asian and Hispanic ethnic groups constituted 3.9%, and 13.6% of the total participants, respectively. In line with the target population, the results showed that a small number of Asian participants

took part in the tests. Moreover, those with more than one race constituted of 4.7% of the total respondents. The results are shown in Table 8 below.

Table 8

Ethnicity Distribution of the Sample

Ethnicity	Frequency	Percent	Cumulative Percent
American Indian	1	0.4	0.4
Asian/Pacific	10	3.9	4.3
Black	105	40.7	45.0
Hispanic	35	13.6	58.5
Multi-Racial	12	4.7	63.2
White	95	36.8	100.0
Total	258	100	

The participants in this study were from five distinct middle and high school grades. Based on the distribution of the sample, the highest percentage (27.9%) of the participants was from the 10th grade. This was consistent with the total number of 10th-grade students in the target population. This implies that the administration of the exams in the various grades was proportionately allocated. In this case, the larger the total numbers of students in a certain grade, the higher the number of participants in the sample. The pattern was also evident in the other grades, where, 23.3%, 15.5%, 16.7%, and 16.7% were from the 11th, 12th, 9th, and 8th grades, respectively. The results are shown in Table 9 below.

Table 9

Grade Distribution of the Sample

Grade	Frequency	Percent	Cumulative Percent
10	72	27.9	27.9
11	60	23.3	51.2
12	40	15.5	66.7
8	43	16.7	83.3
9	43	16.7	100.0
Total	258	100	

Instrumentation

The Instrumentation section includes an explanation of each of the primary sources of data used for this research study. The primary sources of data chosen provided the information needed to address the research questions posed most effectively. The first sub-section describes the instrumentation to be used to measure motivation. The second sub-section describes the instrumentation used to obtain the reading comprehension levels of the students in the study. The third sub-section describes the measure used to determine the score on the MOS certification exam.

Motivation

The motivation levels of the students were obtained through the Expectancy Value Cost Survey Inventory, a 6-point Likert scale survey (from 1 = strongly disagree to 6 = strongly agree) to determine the level of motivation for each student (Barron et al., 2017). The Expectancy Value Cost Survey measured motivation based on the Expectancy Value Cost model of motivation by Eccles and colleagues. The survey returned a measure indicating the level of motivation of each student which, based on research, can relate to academic performance. The survey had been used in numerous

studies, including over 15,000 students ranging from elementary age children through college, from 15 different studies. Obtaining the motivation level of the students allowed an analysis of the relationship between the motivation levels of the students with performance on the MOS certification exams.

Research question one, "what is the correlation between the motivation of middle and high school students and their scores on MOS (Word, Excel, PowerPoint) certification exams?", was examined using data obtained from the survey. A six-option Likert scale was used for all questions on the survey. Using the 1 to 6 scale, students indicated their response to each of the items listed. The survey questions were divided into the three components of the Expectancy Value Cost model of motivation by Eccles and colleagues, including expectancy (as depicted by E in the survey), value (as depicted by V in the survey), and cost (as depicted by C in the survey) (See Figure 1). Keeping with the model by Eccles and colleagues, the averages of the answers for each section were computed and used as the measure for each area (expectancy, value, and cost).

Whereas the survey was adapted into three different surveys, each survey was identical in all aspects other than specifying Word, Excel, or PowerPoint in the questions. The survey administered to the students was specific to the MOS certification exam the student was taking. Each of the surveys is included in Appendix A. The survey was administered in print form.

Figure 1, below, shows the survey questions used to measure motivation along with the scale to indicate the student's level of motivation.

Question #	Word	Excel	PowerPoint
E1	I know I can learn the material in Microsoft Word.	I know I can learn the material in Microsoft Excel.	I know I can learn the material in Microsoft PowerPoint.
E2	I believe I can be successful in Microsoft Word.	I believe I can be successful in Microsoft Excel.	I believe I can be successful in Microsoft PowerPoint.
E3	I am confident that I can understand the material in Microsoft Word.	I am confident that I can understand the material in Microsoft Excel.	I am confident that I can understand the material in Microsoft PowerPoint.
V1	I think Microsoft Word is important.	I think Microsoft Excel is important.	I think Microsoft PowerPoint is important.
V2	I value Microsoft Word.	I value Microsoft Excel.	I value Microsoft PowerPoint.
V3	I think Microsoft Word is useful.	I think Microsoft Excel is useful.	I think Microsoft PowerPoint is useful.
C1	My Microsoft Word classwork requires too much time.	My Microsoft Excel classwork requires too much time.	My Microsoft PowerPoint classwork requires too much time.
C2	Because of other things that I do, I don't have time to put into Microsoft Word.	Because of other things that I do, I don't have time to put into Microsoft Excel.	Because of other things that I do, I don't have time to put into Microsoft PowerPoint.
C3	I'm unable to put in the time needed to do well in Microsoft Word.	I'm unable to put in the time needed to do well in Microsoft Excel.	I'm unable to put in the time needed to do well in Microsoft PowerPoint.
C4	I have to give up too much to do well in Microsoft Word.	I have to give up too much to do well in Microsoft Excel.	I have to give up too much to do well in Microsoft PowerPoint.

Figure 1. *Motivational Survey Questions by Motivation Category and MOS Certification Area*

The teachers administered the surveys to the students prior to taking the MOS certification exam. No questions were asked after the students had taken the certification exam. The surveys are in Appendix A.

Reading Comprehension

The reading comprehension levels of the students were obtained from Lexile scores students received on their most recent end-of-grade or end-of-course test. All students in Georgia were required to take end-of-grade (EOG) tests in grades third – eighth and end-of-course (EOC) tests in grades ninth through twelfth (Georgia Department of Education, 2017). Lexile scores were included in the results on the ELA end-of-grade test or an ELA end-of-course test (Georgia Department of Education, 2016b). The Georgia Department of Education (2018c) stated the test development process is key in establishing the validity of the assessments. Reliability indices signify the results were consistent and the results of the assessments were vindicated (Georgia Department of Education, 2018c). The strength of the reliability was another indicator of the validity of the assessment as well. The end-of-grade tests and end-of-course tests measured how prepared students were for the next grade, course, or post-secondary school or work (Georgia Department of Education, 2016b). The tests provided measures of student achievement and served as a measure of growth and progress for each student. In 2015, the Georgia Department of Education went through the process of linking the Georgia Milestones (end-of-grade and end-of-course tests) to the Lexile Framework. By merging and matching the questions on both the ELA portion of the Georgia Milestones and the Lexile Framework, the ELA section of the Georgia Milestones returned a Lexile measure for all students completing the ELA section (Georgia Department of Education,

2016b). These Lexile scores helped measure student proficiency for each student. Obtaining the reading comprehension levels of the students allowed for an analysis of the relationship between the reading comprehension levels of the students with performance on the MOS certification exams.

Performance on MOS Certification Exam

The performance on MOS certification exams was based on the score obtained from the MOS certification exam. At the time of this study, there were nine separate exams for the software products, one for each program including Word, Word Expert, Excel, Excel Expert, PowerPoint, Outlook, Access, SharePoint, and OneNote (Certiport, 2018). Administration of the MOS certification exam, developed by Microsoft, occurred through the testing agency Certiport (Georgia Department of Education, 2017). The Microsoft Office Specialist (MOS) certification exam was an appraisal of skills in the Microsoft Office productivity programs. The exams were designed to gauge the understanding level of the examinees and serve as an indication of expertise in these programs. Psychometric data on the MOS certification exams was not available. The value of these certifications extends passed the classroom and become valuable as students enter the workforce. Potential employers view these certifications as a measure of how well the students can understand and utilize the Microsoft Office programs in the real world. Obtaining scores on the MOS certification exams allowed for a measure of performance on the exams, determining the relationship between the motivation level of the students with performance on the MOS certification exams and the relationship between the reading comprehension levels of the students with performance on the MOS certification exams.

Methods

The following section begins with a detailed explanation of data collection for the study. It continues with an explanation of how data analysis answered the research questions: what is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?; what is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?; and how do students' motivation and reading comprehension predict their performance in MOS exams??

Data Collection Procedures

All data collected was after permission was granted from the parents of the student participants in the study. Before the collection of any data, the researcher provided the Business and Computer Science teachers with parental consent forms for all students participating in the study. The parents had to complete and return the consent forms before any data was collected on the students (the parental consent form is in Appendix B). The students also completed the student consent form (the student consent form is in Appendix C). The Business and Computer Science teachers at the four schools collected all of the consent forms. The teachers at each of the school systems mailed the completed consent forms to the researcher once all were collected. VSU IRB approval was obtained prior to the data collection (Appendix D).

The first step in collecting the data was the collection of the survey data to measure students' motivation levels. The motivation levels of students were obtained through the Expectancy Value Cost Survey Inventory. The students completed the survey prior to taking the MOS certification exam to ensure performance on the exam

does not influence how the student responded to the survey. The teachers in the classes administered the surveys to the students prior to the administration of the MOS certification exam. The survey administration was on the day before the administering of the MOS certification exam to ensure the students had ample time to complete the survey and the MOS certification exam during the class period.

The second step included collecting the data for the dependent variable, performance on MOS certification exams. This data were collected by recording scores from the MOS certification exams, including which MOS certification exam was taken (Microsoft Word, Microsoft Excel, or Microsoft PowerPoint), and the date of the exam. The teachers in the classes collected this data as the students take the MOS certification exams, which was taken later in the semester once students had completed the course material for the Microsoft programs.

The last step in data collection included collecting the Lexile scores on each of the students. The teachers collected the information for the second independent variable, reading comprehension levels of the students. The reading comprehension levels of the students were measured by obtaining the Lexile levels of the students. Lexile scores for students were obtained from results of the end-of-grade tests for middle school students and end-of-course tests for high school students (taking the most recent Lexile score available for each student). The teachers retrieved the data from SLDS, the State Wide Longitudinal Data System. If teachers did not have access to SLDS for their students, the researcher would contact the school district's Curriculum Director to obtain the most recent EOG or EOC test Lexile data for each student. All teachers were able to collect the data from the SLDS.

All the data collected, including the survey, demographic information (including grade, gender, and ethnicity), the MOS certification exam score, and the Lexile level, was on one form per student (See Appendix A). Once all data were collected on each of the students participating in the study at a school, coordination was made with the representative Business and Computer Science teacher at the school to obtain the forms. Arrangements for transfer of the forms involved the researcher personally picking up the forms from each of the school systems to ensure all forms are complete prior to taking them from each of the school systems.

Data Analysis Procedures

Statistical data including correlation and descriptive analysis were calculated using Statistical Package for the Social Science (SPSS) (Arkkelin, 2014). Before any data analysis occurred, all data were coded accordingly.

The data compiled in SPSS allowed for the removal of incomplete and missing data. Pairwise deletion in SPSS was utilized for all missing data and determined no data were missing in the data set. Since no data were missing, no need existed for replacing missing values. The data were then compared to identify any similarities of the groups (by district and by exam) and tested for normality of distributions to ensure all assumptions associated with the proposed statistical procedures were met. No violations existed, therefore, there was no need to address the violations. Measures of central tendencies were analyzed for descriptive data including frequency, mean, mode, median, variance, range, and standard deviation.

For research questions one and two, a correlation and regression analysis was conducted using description correlation to describe the relationship between the

motivation and reading comprehension level of students and performance on the MOS certification exams. Pearson's correlation coefficient (r) determined how closely motivation and reading comprehension levels relate to performance on the MOS certification exam.

A multiple linear regression analysis determined how student motivation (measured in terms of expectancy, value, and cost) and reading comprehension levels predict performance on the MOS certification exams. The correlation coefficient, *r*, was used to measure the strength and direction of the relationship between the variables. A scatterplot was used to graphically display and depict the relationship between the motivation of a student and score on the MOS certification exam as well as the reading level of the student and score on the MOS certification exam visually before running the regression analysis. Before performing the regression analysis, all assumptions were tested including normality, homoscedasticity, multicollinearity, and linearity.

To help control for potential threats to the validity and reliability of the data, the researcher met with each of the teachers prior to the administration of the survey to ensure data collection procedures were consistent and made sure the MOS certification exams administered follow the guidelines provided by Certiport. Through Certiport, the teacher has to personally sign each student into the Certiport exam and must ensure the student does not have any help or use any resources while taking the Certiport exam. By entering their username and password at the beginning of the Certiport MOS exam, the teacher is verifying the students are following these guidelines while testing.

One potential threat to control for included ensuring the students completed the survey prior to taking the MOS certification exam. Another potential threat included

making sure the students answered each question on the survey honestly, with no threat for answers they felt would not be welcome by the teacher. I collected the student's forms from the teachers and entered the results into SPSS by hand.

Limitations

The major limitation of this study is the lack of consistency of instruction provided to the students. The students are from different school systems. Teachers may not promote the importance of the MOS certification exams the same. One teacher may stress the importance of the MOS certification exams stronger than other teachers may. The difference in how much stress is given to the importance of the MOS certification exams by the teachers can have an impact on the motivation levels of the students. As the motivation level of the student is affected, the level of performance on the MOS certification exams may also be affected.

Chapter IV

RESULTS

The main aim of this chapter was to present the results and findings regarding the phenomena under study. To comprehensively understand the research problem, the proposed research questions were analyzed through inferential statistical tests. The results of the variables from the study are presented. The main variables were motivation, Lexile scores, and MOS exam scores. The purpose of the study was first to determine if reading level and motivation in middle and high school students play a predictive role in performance on MOS certification exams. The research questions guiding the analysis for this study were:

1. What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?
2. What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?
3. How do students' motivation and reading comprehension predict their performance in MOS exams?

The chapter is organized into various sub-sections to enhance reader's understanding of the flow ideas. Descriptive results for the demographic variables are first presented with their implications. The chapter then presents the main inferential tests to address the proposed research questions.

Missing Data Analysis and Assumption Tests

Before performing any statistical analysis to address the research questions, missing data analysis was conducted. Each survey form was visually analyzed and all of the information on each form was complete. The results showed no missing value. Thus, the data were ready for statistical analysis.

Furthermore, before performing any analysis, several assumptions were tested. If the normality assumptions were met, parametric tests were conducted. On the other hand, if the assumptions were not met, non-parametric tests were conducted. The following is a detailed test for normality as well as regression analysis.

Normality

This assumption was tested using a normal q-q plot. This plot helps in determining whether the error terms are normally distributed. If they are normally distributed, they tend to conform to the diagonal normality line indicated in the plot. The data points, designated by small circles, seem to follow the normality line (See Figures 2-7). As such, we accept the assumption that the data were normally distributed.

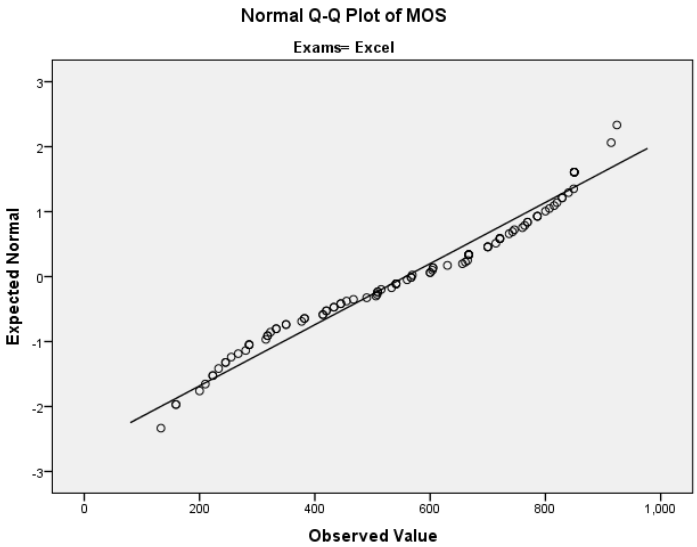

Figure 2. *Normality test of the data using the q-q plot for Excel MOS scores*

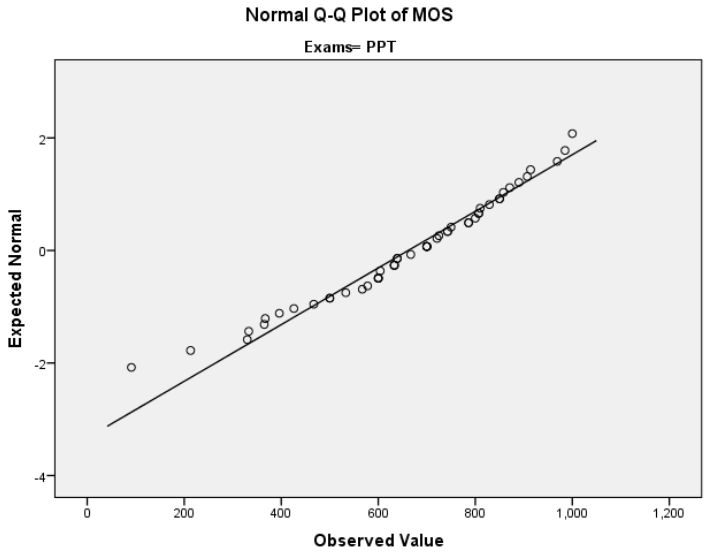

Figure 3. *Normality test of the data using the q-q plot for MS PPT MOS scores*

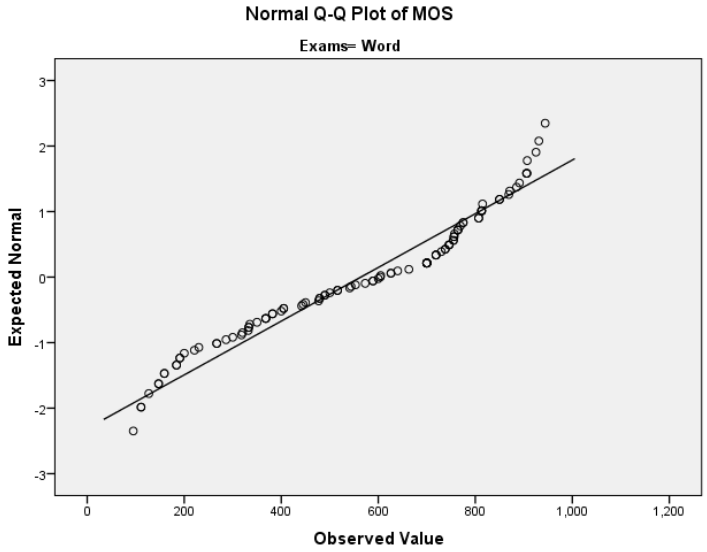

Figure 4. *Normality test of the data using the q-q plot for MS Word MOS scores*

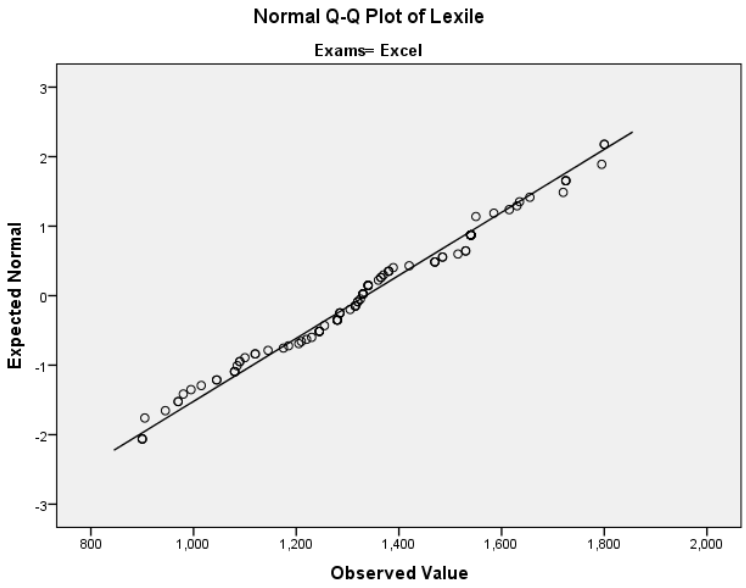

Figure 5. *Normality test of the data using the q-q plot for MS Excel reading comprehension scores*

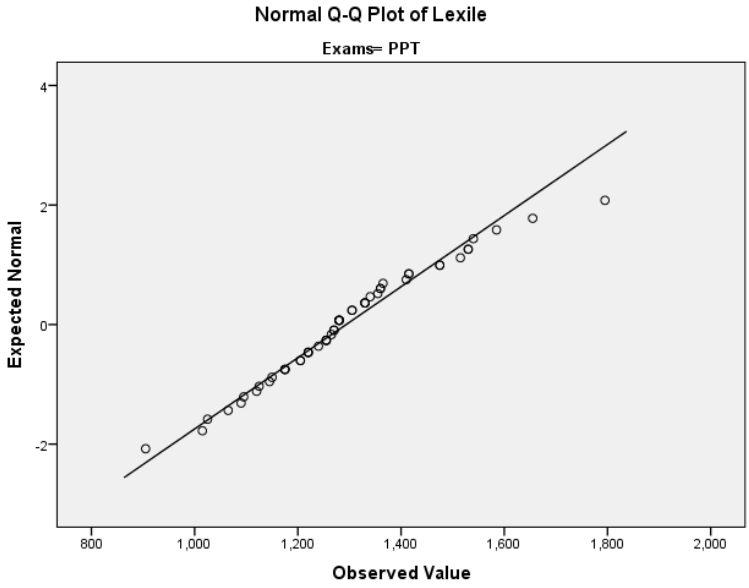

Figure 6. *Normality test of the data using the q-q plot for MS PPT reading comprehension scores*

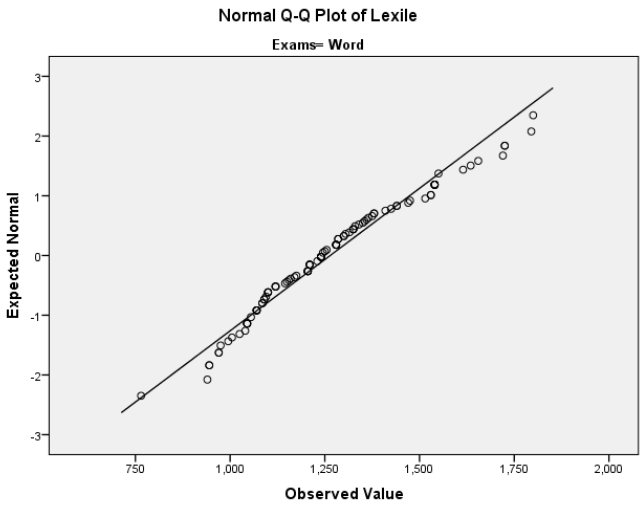

Figure 7. *Normality test of the data using the q-q plot for MS Word reading comprehension scores*

Homoscedasticity

Homoscedasticity mainly tries to test whether the residuals (the differences between the predicted and the observed values) are equally distributed or whether they bunch together at some values than at others. The scatter plot of residuals is used to test this assumption. The data in the scatter plot should not be in an obvious pattern but should be points equally distributed above and below zero on the X-axis and to the left and right of zero on the Y-axis. This is the case in our dataset (See Figure 8-13).

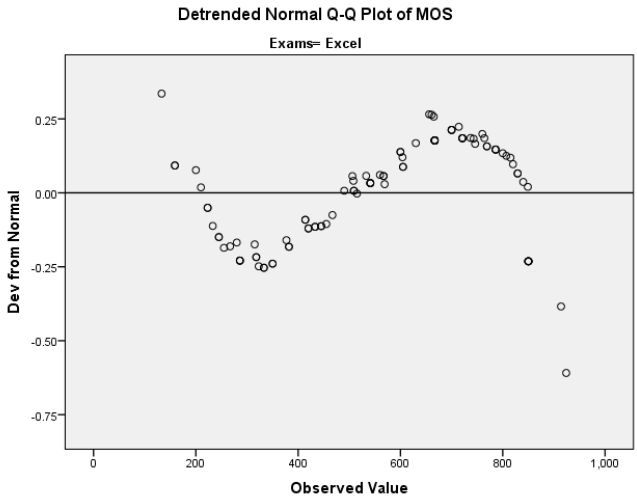

Figure 8. *Scatter plot of residual for MS Excel MOS scores*

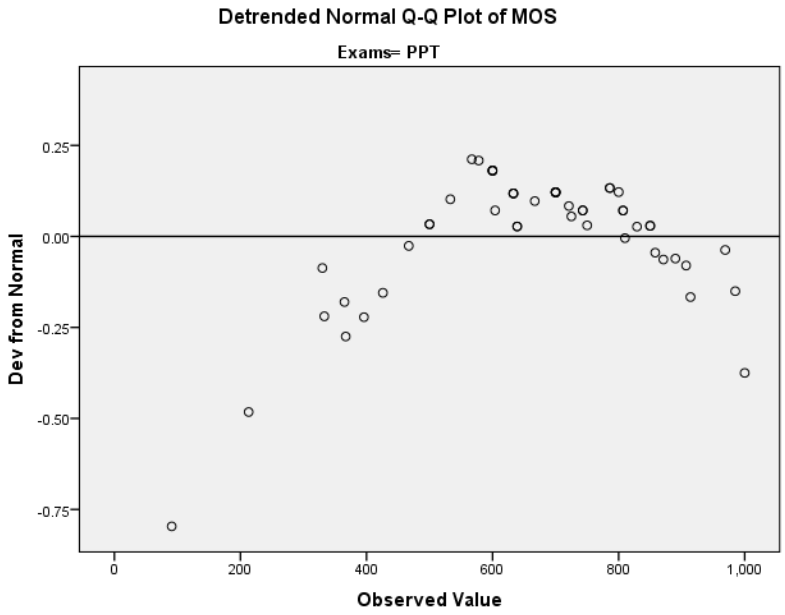

Figure 9. *Scatter plot of residual for MS PPT MOS scores*

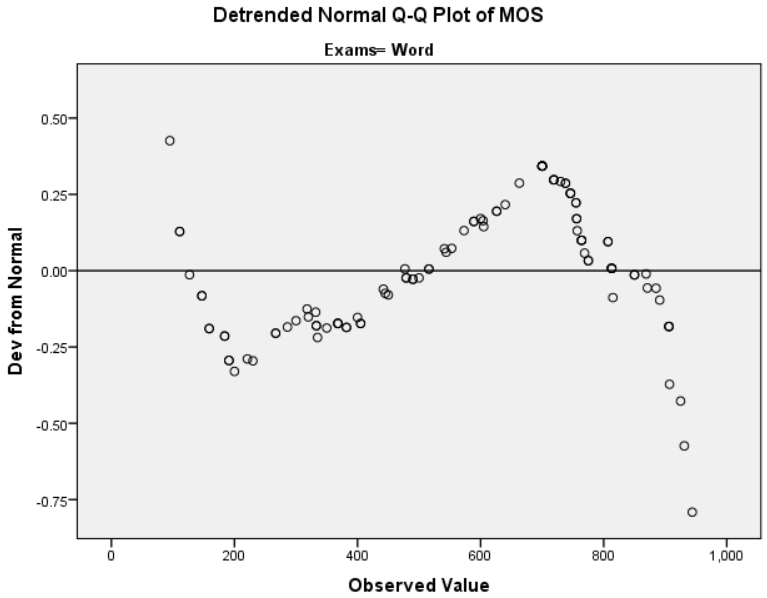

Figure 10. *Scatter plot of residual for MS Word MOS scores*

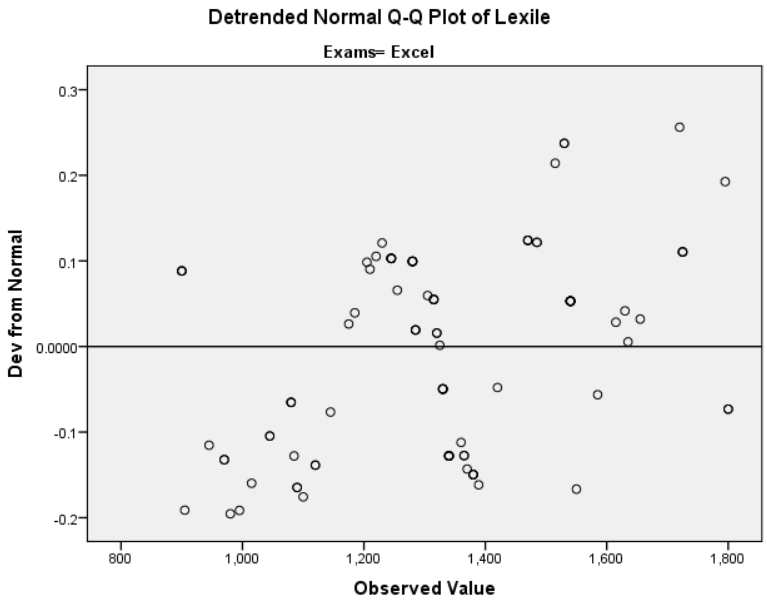

Figure 11. *Scatter plot of residual for MS Excel Lexile scores*

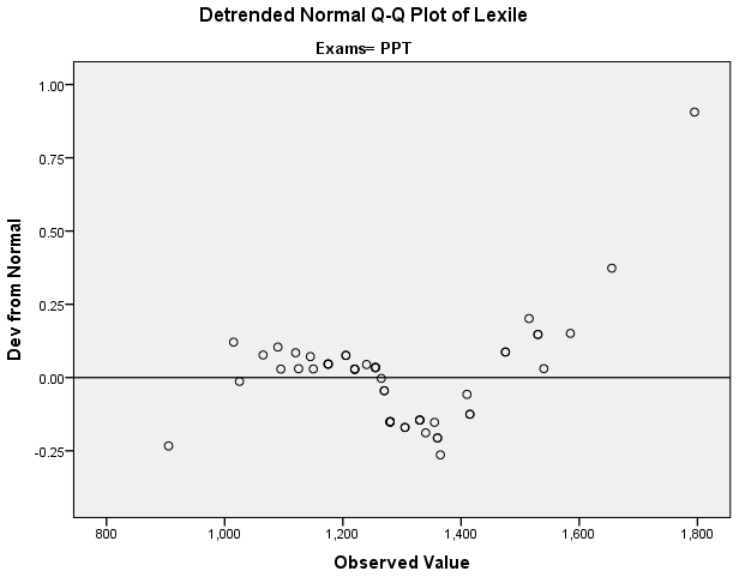

Figure 12. *Scatter plot of residual for MS PPT Lexile scores*

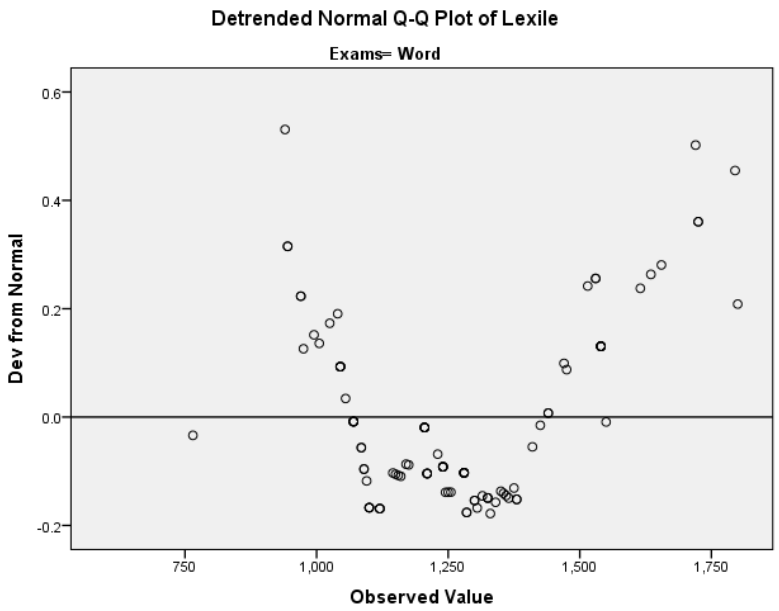

Figure 13. *Scatter plot of residual for MS Word Lexile scores*

Multicollinearity

Multicollinearity can be defined as the condition when the predictor variables are highly correlated with each other. If there is multicollinearity in the data, the regression model may not accurately associate variance in the dependent variable with the correct independent variable. This may lead to mixed-up results and incorrect inferences. In the current study, the Variance Inflation Factor (VIF) was used to check for this assumption. According to Mansfield and Helms (1982), VI F values below 10 indicate the absence of multicollinearity. Mansfield and Helms further recommended these values to be less than 5. In our case, the VIF for the predictor variables is less than 5, indicating that the assumption is met (See Table A1, Appendix E).

Linearity

This assumption requires that the independent variables in the regression have a straight-line relationship with the dependent variable. According to Uyanık and Güler

(2013), this assumption is always met if normality and homoscedasticity assumptions are met. In this case, since these two assumptions were met, we can assume that there was a linear relationship between the predictors and the response variable. Thus, since all the assumptions were met, parametric tests were used.

Descriptive Statistics

This section presents a descriptive analysis of demographic variables in relation to students' performance in their MOS exams and reading comprehension scores. The demographic variables presented in this section include gender, ethnicity, school, and the students' grade. The section begins with the presentation of descriptive statistics and then performance comparison for each group to assess whether there was a statistically significant difference in students' performance based on the demographic variables.

Gender

For the reading comprehension scores, the average score of the 142 female participants was (M =1308.65*,* SD = 216.60) whereas that of the 116 male students was (M = 1285.00, SD = 196.61*)*. When comparing students' performance in reading comprehension using independent t-test, the Levene Test for Equality of Variances revealed that the groups' variances were not statistically significant in their differences, p = 0.08. The t-test results showed that there was no significant difference in their reading comprehension between males and females, t (256) = 0.907, p = 0.37, d = 0.1143. This suggests that although the female students performed slightly higher than the male students, the difference was not statistically significant.

While comparing the performance in MOS scores, the average MOS score for male students was (M = 605.87*,* SD = 223.41) whereas that of female students was (M =

561.08*, SD* = 227.29). The results revealed that although the mean performance of male students was slightly higher than that of female students, the difference was not statistically significant, t (256) = -1.59, p = 0.11, d = 0.19875. Based on performance on individual exams, the average MS Word scores for male students was (M = 577.57*, SD* = 234.51) whereas that of the female students was (M = 547.38, SD = 256.84). The results showed that although the mean performance of male students was slightly higher in MS Word exams than that of female students, the difference was not statistically significant*, t* (103) = -0.63, p = 0.53, d = 0.122198. In their MS Excel exams, the average score for male students was (M = 558.03, SD = 217.67) whereas that of the female students was (M *= 557.35, SD = 211.78*). The results from the t-tests showed that although male students scored slightly higher in MS Excel exams than the female students, the difference was not significant, t (99) = -0.02, p = 0.99, d = 0.003171. Based on their performance in MS PowerPoint exam scores, the average score for the male students was (M = 715.75*, SD* =168.80) while that of the female students was (M = 598.92, SD = 215.28). The results from the t-test revealed that male students performed significantly higher in MS PowerPoint Exams than the female students, t (50) = -2.19, p = 0.03, d = 0.596771 (See Table 10).

Table 10

MOS Scores by Gender

Exams	Genders	*N*	*M*	*SD*	*Df*	*t-test*	*P-value*
Excel	Female	71	557.35	211.78	99	-0.02	0.99
	Male	30	558.03	217.67			
	Total	101	557.55	212.45			
PPT	Female	24	598.92	215.28	50	-2.19	0.03
	Male	28	715.75	168.80			
	Total	52	661.83	198.61			
Word	Female	47	547.38	256.84	103	-0.63	0.53
	Male	58	577.57	234.51			
	Total	105	564.06	244.02			
Combined	Female	142	561.08	227.29	256	-1.59	0.11
	Male	116	605.87	223.24			
	Total	258	581.22	226.15			

Ethnicity

The descriptive statistics for the ethnic groups are first presented and the significance of the differences compared using a one-way ANOVA. Regarding the reading comprehension scores, Asian students performed better than all the other ethnic groups, with an average Lexile score of (*M* = 1459.09, *SD* = 137.95*)*. The higher performance in reading comprehension scores among the Asian students compared to the White and any other ethnic group could be attributed to their cultural perceptions that cognitive abilities be achieved through efforts, unlike the White students who have the perceptions that cognitive abilities are inborn. The average reading comprehension score for students from the White ethnic group was (*M* = 1399.57, *SD* = 205.86) whereas that of the students from the Black ethnic group was (*M* = 1203.76, *SD* = 161.31). In addition, the average reading comprehension score for the Hispanic group was (*M* =

1291.43, *SD* = 196.13) whereas that of students from the Multi-race ethnic group was (*M* = 1190.42, *SD* = 222.27) (See Table 11).

Table 11

Mean Lexile Scores by Ethnicity

Ethnicity	*N*	*M*	*SD*
Asian	10	1459.09	137.95
Black	105	1203.76	161.31
Hispanic	35	1291.43	196.13
Multi-Racial	12	1190.42	222.27
White	95	1399.57	205.86

Based on the students' performance in their aggregate MOS exams, the average score for students from the Asian ethnic groups was (*M* = 706.90, *SD* = 196.50). Besides, the average score for students from the White ethnic group was (*M* = 672.28, *SD* = 206.47). Based on their performance in the specific MOS exams, the average MS Word score for the Asian students was (*M* = 680.25, *SD* = 196.50). In the same exams, the average score for the White students was (*M* = 666.75, *SD* = 235.05). In addition, the average performance of the Hispanic students in MS Word exams was (*M* = 560.43, *SD* = 200.71), whereas that of the Multi-race was (*M* = 551.50, *SD* = 157.59). The average MS Word score for the black students was (*M* = 470.79, *SD* = 257.13).

Based on MS Excel exam results, the Asian students were still the best performers compared to other ethnic groups with an average score of (*M* = 653.25, *SD* = 263.18). The average MS Excel score for the White students was (*M* = 631.53, *SD* = 192.83), whereas that of the Multi-race was (*M* = 591.50, *SD* = 251.02). In addition, the average MS Excel score for the Hispanic students was (*M* = 539.19, *SD* = 201.44). Further, the

Black students performed slightly lower than all the other ethnic groups in MS Excel exams with an average score of (M = 477.67, SD = 209.75).

As for the performance in MS PowerPoint exams, the Asian students were still the best performing ethnic group with an average MS PPT score of (M = 867.50, SD = 166.17). The Hispanic students attained an average score of (M = 790.60, SD = 116.57). The average score for the White students in these exams was (M = 768.58, SD = 145.20), whereas that of the Black students was (M = 548.30, SD = 168.29). However, the students from the Multi-race ethnic group performed relatively low grades than other groups with an average score of (M = 506.50, SD = 194.56) (See Table 12).

Table 12

Mean MOS Scores by Ethnicity

Group Name	*M* (Word)	*M* (Excel)	*M* (PPT)	*M* (MOS)
Asian	680.25	653.25	867.50	706.90
Black	470.79	477.67	548.30	490.32
Hispanic	560.53	539.19	790.61	583.60
Multi-race	551.51	591.50	506.50	550.67
White	666.75	631.53	768.58	672.29

Furthermore, overall MOS scores and Lexile scores were analyzed to determine whether there was a significant difference in the students' performance in aggregate MOS scores and reading comprehension based on ethnicity. Two one-way analysis of variance was used to examine the variances between and within groups for a single variable. From the results, the reading comprehension scores, as measured using the Lexile, had significant differences in reading comprehension among the five ethnic groups, F (4, 253) = 16.801, $p < 0.01$, $f = 0.5154$. These significant differences in the reading comprehension scores could be attributed to large group-size differences. Moreover,

concerning the aggregate MOS certification scores, there were significant differences in certification exams among the five ethnic groups, F (4, 253) = 9.987, $p < 0.01$, f = 0.3974.

Since the one-way ANOVA established that there were significant differences in reading comprehension and aggregate MOS score, Post hoc analysis using Least Significant Difference (LSD) was conducted to determine the specific ethnic groups that the students performed differently. The post hoc analysis results showed that the students' reading comprehension differed in Asian and Hispanic, Asian and Black, Asian and Multi-race, where Asians performed better than the Hispanic and the Multi-race ethnic groups. Hispanic performed better than the Black. White performed better than the Black, Hispanic, and the Multi-race. However, there was no significant difference in the reading comprehension performance between the other group combinations.

Based on the aggregate MOS certification exam scores, the post hoc analysis results indicated that Asian, Hispanic, and White performed better than the Black, White performed better than the Hispanic, Black, and Multi-race. The difference in aggregate MOS scores between the groups suggests that different ethnic groups perform differently in their MOS exams (See Table A2, Appendix E).

Furthermore, a one-way ANOVA was performed to assess whether there was a significant mean difference in individual exam performance between the five ethnic groups. Based on the MS Excel exam scores, the results showed that there was a significant mean difference in MS Excel exam scores between the different ethnic groups, F (4, 96) = 3.071, p = 0.02, f = 0.3577. To examine which individual ethnic group performed significantly different from the other, post hoc analysis using LSD was

performed. The results showed that students from the White ethnic group performed significantly better in MS Excel exams as compared to those from the Black ethnic group. However, all the other groups did not perform significantly differently from each other in MS Excel exams. The results are shown in Table 13.

Table 13

Post-hoc Analysis of MS Excel Exams by Ethnicity

(I) Ethnicity1	(J) Ethnicity2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Asian/Pacific	Black	175.583	107.187	0.105	-37.18	388.35
	Hispanic	114.063	114.129	0.320	-112.48	340.61
	Multi-race	61.750	176.808	0.728	-289.21	412.71
	White	21.725	107.063	0.840	-190.79	234.24
Black	Asian/Pacific	-175.583	107.187	0.105	-388.35	37.18
	Hispanic	-61.521	60.612	0.313	-181.84	58.79
	Multi-race	-113.833	148.019	0.444	-407.65	179.98
	White	-153.858*	45.943	0.001	-245.06	-62.66
Hispanic	Asian/Pacific	-114.063	114.129	0.320	-340.61	112.48
	Black	61.521	60.612	0.313	-58.79	181.84
	Multi-race	-52.313	153.120	0.733	-356.25	251.63
	White	-92.337	60.392	0.130	-212.21	27.54
Multi-race	Asian/Pacific	-61.750	176.808	0.728	-412.71	289.21
	Black	113.833	148.019	0.444	-179.98	407.65
	Hispanic	52.313	153.120	0.733	-251.63	356.25
	White	-40.025	147.928	0.787	-333.66	253.61
White	Asian/Pacific	-21.725	107.063	0.840	-234.24	190.79
	Black	153.858*	45.943	0.001	62.66	245.06
	Hispanic	92.337	60.392	0.130	-27.54	212.21
	Multi-race	40.025	147.928	0.787	-253.61	333.66

Note. * The mean difference is significant at the 0.05 level.

Regarding the students' performance in MS Word exams, the results showed that students from various ethnic groups performed significantly different in MS Word exams, $F(4, 100) = 3.757$, $p = 0.007$, $f = 0.3877$. Since there was a significant mean difference in MS

Word performance between students from the five ethnic groups, post hoc analysis using LSD was performed. The results showed the White students performed significantly better in MS Word exams than the Black students. This significant difference could be attributed to the fact the White students come from higher-income families than Black students, and hence, they may have access to computer practice. However, all the other ethnic groups did not perform significantly differently from each other, in MS Word exams (See Table 14).

Table 14

Post-hoc Analysis for MS Word Exam by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Asian/Pacific	Black	209.459	121.292	0.087	-31.18	450.10
	Hispanic	119.821	131.549	0.365	-141.17	380.81
	Multi-race	128.750	142.089	0.367	-153.15	410.65
	White	13.500	122.291	0.912	-229.12	256.12
Black	Asian/Pacific	-209.459	121.292	0.087	-450.10	31.18
	Hispanic	-89.638	71.398	0.212	-231.29	52.01
	Multi-race	-80.709	89.341	0.368	-257.96	96.54
	White	-195.959*	52.417	0.000	-299.95	-91.96
Hispanic	Asian/Pacific	-119.821	131.549	0.365	-380.81	141.17
	Black	89.638	71.398	0.212	-52.01	231.29
	Multi-race	8.929	102.837	0.931	-195.10	212.95
	White	-106.321	73.083	0.149	-251.32	38.67
Multi-race	Asian/Pacific	-128.750	142.089	0.367	-410.65	153.15
	Black	80.709	89.341	0.368	-96.54	257.96
	Hispanic	-8.929	102.837	0.931	-212.95	195.10
	White	-115.250	90.694	0.207	-295.18	64.68
White	Asian/Pacific	-13.500	122.291	0.912	-256.12	229.12
	Black	195.959*	52.417	0.000	91.96	299.95
	Hispanic	106.321	73.083	0.149	-38.67	251.32
	Multi-race	115.250	90.694	0.207	-64.68	295.18

Note. * The mean difference is significant at the 0.05 level.

Regarding the students' performance in MS PowerPoint exams, the results revealed that students from these ethnic groups performed significantly different in MS PowerPoint exams, $F(4, 47) = 6.085$, $p < 0.01$, $f = 0.7196$.

Table 15

Post-hoc Analysis for PPT Exam by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Asian/Pacific	Black	319.196*	123.794	0.013	70.15	568.24
	Hispanic	76.900	140.494	0.587	-205.74	359.54
	Multi-race	361.000*	167.923	0.037	23.18	698.82
	White	112.350	124.535	0.372	-138.18	362.88
Black	Asian/Pacific	-319.196*	123.794	0.013	-568.24	-70.15
	Hispanic	-242.296*	82.859	0.005	-408.99	-75.61
	Multi-race	41.804	123.794	0.737	-207.24	290.85
	White	-206.846*	51.341	0.000	-310.13	-103.56
Hispanic	Asian/Pacific	-76.900	140.494	0.587	-359.54	205.74
	Black	242.296*	82.859	0.005	75.61	408.99
	Multi-race	284.100*	140.494	0.049	1.46	566.74
	White	35.450	83.961	0.675	-133.46	204.36
Multi-race	Asian/Pacific	-361.000*	167.923	0.037	-698.82	-23.18
	Black	-41.804	123.794	0.737	-290.85	207.24
	Hispanic	-284.100*	140.494	0.049	-566.74	-1.46
	White	-248.650	124.535	0.052	-499.18	1.88
White	Asian/Pacific	-112.350	124.535	0.372	-362.88	138.18
	Black	206.846*	51.341	0.000	103.56	310.13
	Hispanic	-35.450	83.961	0.675	-204.36	133.46
	Multi-race	248.650	124.535	0.052	-1.88	499.18

Note. * The mean difference is significant at the 0.05 level.

The post hoc results suggested that the Asian students performed significantly better than the Black students and students from Multi-race ethnic group. In addition, the Hispanic students performed significantly better in MS PowerPoint exams as compared to the Black and Multi-race students. Furthermore, students from the White ethnic group

performed significantly better in these exams as compared to the Black students. However, all the other groups' combinations did not perform significantly differently from each other (See Table 15).

School Groups

In this study, four different schools were investigated, which include DHS, WMS, MHS, and WHS. The descriptive statistics for these schools are first presented, followed by a breakdown to assess which school performed significantly better than others. To assess whether the schools performed significantly differently in their exams, a one-way ANOVA was performed. Further, to examine which specific school performed significantly better than the other, post hoc analysis was performed. Based on the reading comprehension scores, MHS school was the best performing with an average score of (*M* = 1534.72, *SD* = 172.37). The average score for the DHS students was (*M* = 1333.42, *SD* = 167.08), whereas, that of WHS School was (*M* = 1300.75, *SD* = *203.75*). However, WMS performed poorly in reading comprehension than the other schools with an average score of (*M* = 1174.88*, SD* = 161.92).

As for the schools' performance in their aggregate MOS certification exams, MHS was still the best performing school with an average MOS score of *(M* = 807.50, *SD* = 130.81). The average score for DHS School in overall MOS exams was (*M* = 618.16, *SD* = 237.02), whereas, that of WHS was (*M* = 591.29, *SD* = 210.24). WMS performed poorly in these exams with an average score of (*M* = 428.49, *SD* = 220.90).

Based on individual exam performance, MHS was the best performing in MS Word exams with an average score of (*M* = 766.71, *SD* = 107.93). Moreover, the average score for WHS School was (*M* = 647.96, *SD* = 215.88), whereas that of DHS was (M =

597.00, *SD* = 317.42). However, WMS school performed poorly in these exams as compared to other schools with an average score of (*M* = 428.49, *SD* = 220.90).

Based on students' performance in their MS Excel exams, the best performing school was MHS with an average score of (*M* = 743.60, *SD* = 158.99). The average score for WHS school was (*M* = 553.14, *SD* = 210.83), whereas that of DHS was (*M* = 468.67, *SD* = 216.45). However, WMS school did not participate in MS Excel exams.

Based on students' performance in MS PowerPoint exams, WMS school did not participate in these exams. MHS was still the best performing school with an average score of (*M* = 909.33, *SD* = 73.24). Also, the average score for DHS school was (*M* = 727.22, *SD* = 170.20). However, WHS performed poorly in PowerPoint exams as compared to other schools with an average score of (*M* = 605.95, *SD* = 185.18). Generally, MHS School performed better in all the exams than other schools. This could be due to differences in the availability of facilities between the schools and the different teaching methods. Also, these differences between the schools could be attributed to the differences in environmental factors such as distractions during these exams.

To determine if students' performances were significantly different across schools, one-way ANOVAs were conducted for reading comprehension and MOS performances, respectively. Based on the reading comprehension scores (Lexile), the students performed differently in at least one of the schools, $F(3, 254) = 9.775$, $p < 0.01$, $f = 0.3398$. Similarly, the students performed differently in their MOS exams in at least one of the schools, $F(3, 254) = 15.946$, $p < 0.01$, $f = 0.4340$. These differences in MOS scores are attributable to such factors as the time taken during exams, age, and the reading levels associated with those ages, among other factors.

Since the one-way ANOVA established that there were significant differences in reading comprehension, post hoc analysis using Least Significant Difference (LSD) was conducted to determine the specific schools that the students performed differently in MOS scores.

Table 16

Post-hoc Analysis for Students' Performance in Reading Comprehension and MOS Exam for the Four Schools (LSD)

Dependent Variable	(I) School	(J) School	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Lexile	DHS	MHS	-121.891*	36.332	0.001	-193.44	-50.34
		WHS	-48.105	31.921	0.133	-110.97	14.76
		WMS	88.070*	38.981	0.025	11.30	164.84
	MHS	DHS	121.891*	36.332	0.001	50.34	193.44
		WHS	73.786*	33.600	0.029	7.62	139.96
		WMS	209.961*	40.367	0.000	130.46	289.46
	WHS	DHS	48.105	31.921	0.133	-14.76	110.97
		MHS	-73.786*	33.600	0.029	-139.96	-7.62
		WMS	136.175*	36.448	0.000	64.40	207.95
	WMS	DHS	-88.070*	38.981	0.025	-164.84	-11.30
		MHS	-209.961*	40.367	0.000	-289.46	-130.46
		WHS	-136.175*	36.448	0.000	-207.95	-64.40
MOS	DHS	MHS	-87.793*	38.232	0.022	-163.08	-12.50
		WHS	39.398	33.590	0.242	-26.75	105.55
		WMS	200.717*	41.020	0.000	119.94	281.50
	MHS	DHS	87.793*	38.232	0.022	12.50	163.08
		WHS	127.191*	35.357	0.000	57.56	196.82
		WMS	288.510*	42.478	0.000	204.86	372.16
	WHS	DHS	-39.398	33.590	0.242	-105.55	26.75
		MHS	-127.191*	35.357	0.000	-196.82	-57.56
		WMS	161.319*	38.354	0.000	85.79	236.85
	WMS	DHS	-200.717*	41.020	0.000	-281.50	-119.94
		MHS	-288.510*	42.478	0.000	-372.16	-204.86
		WHS	-161.319*	38.354	0.000	-236.85	-85.79

* The mean difference is significant at the 0.05 level.

The results from the post hoc analysis showed that the students' performance in their reading comprehension differed in DHS School and MHS School, where MHS

School performed better than DHS. DHS School was also found to perform better than WMS School. MHS performed better than WMS School. However, there was no significant difference in the reading comprehension performance between DHS and WHS School. The difference in reading comprehension may be attributed to such factors as the age of the students.

Based on the MOS certification exam scores, the post hoc analysis results indicated that MHS schools performed better than DHS schools, DHS also performed better than WMS schools, and MHS performed better than WMS schools. Additionally, WHS outperformed WMS schools. However, there was no significant difference in performance as measured in terms of MOS scores between DHS and WHS School. The difference in reading comprehension may be attributed to such factors as age difference among the students.

Furthermore, examining whether there was a significant mean difference in students' performance in the individual exams. The results revealed that there were no significant mean differences in MS Excel performance between different schools, F (2, 98) = 1.796, p = 0.171, f = 0.1915. In addition, the results showed that there was a significant mean difference in MS Word performance between the four schools, F (2, 101) = 13.843, $p < 0.01$, f = 0.6412. The Post hoc results showed that DHS School performed significantly better in MS Word exam than WMS, MHS School performed significantly better than WMS and WHS School performed significantly better than WMS. However, all the other schools did not perform significantly different in MS Word exams (See Table 17).

Table 17

Post-hoc Analysis for MS Word Exam by School

(I) School	(J) School	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
DHS	MHS	-76.526	65.283	0.244	-206.03	52.98
	WHS	-7.762	63.593	0.903	-133.91	118.39
	WMS	235.256*	54.640	0.000	126.86	343.65
MHS	DHS	76.526	65.283	0.244	-52.98	206.03
	WHS	68.764	66.000	0.300	-62.16	199.69
	WMS	311.782*	57.423	0.000	197.87	425.69
WHS	DHS	7.762	63.593	0.903	-118.39	133.91
	MHS	-68.764	66.000	0.300	-199.69	62.16
	WMS	243.018*	55.494	0.000	132.93	353.10
WMS	DHS	-235.256*	54.640	0.000	-343.65	-126.86
	MHS	-311.782*	57.423	0.000	-425.69	-197.87
	WHS	-243.018*	55.494	0.000	-353.10	-132.93

Note. * The mean difference is significant at the 0.05 level.

Based on school performance in MS PowerPoint exams, the results showed that there was a significant mean difference in school performance in these exams, F (2, 49) = 6.87, p = 0.002, f = 0.5334. The Post hoc results revealed that DHS School performed significantly better than WHS School, MHS performed better than WHS School. However, the other schools' combinations did not perform significantly differently (See Table 18).

Table 18

Post-hoc Analysis for MS PPT Exam by School

(I) School	(J) School	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
DHS	MHS	-77.897	63.708	0.227	-205.92	50.13
	WHS	145.689*	58.084	0.015	28.96	262.41
MHS	DHS	77.897	63.708	0.227	-50.13	205.92
	WHS	223.586*	62.298	0.001	98.39	348.78
WHS	DHS	-145.689*	58.084	0.015	-262.41	-28.96
	MHS	-223.586*	62.298	0.001	-348.78	-98.39

Note. * The mean difference is significant at the 0.05 level.

Performance in Different Grades

The participants in this study include students from grade 8 to grade 12. The descriptive statistics for these grades are first presented, followed by a breakdown to assess which Grade performed better than others. To investigate whether there was a significant mean difference between the different grades, one-way ANOVA was performed. Besides, post hoc analysis using LSD was performed to establish the specific grade performed better than the other.

Table 19

Mean Lexile by Grade

Grade	***N***	Avg Lexile	***SD***
8	43	1174.88	161.92
9	43	1339.42	180.99
10	72	1314.10	178.06
11	60	1281.48	264.42
12	40	1381.75	178.84

As per the reading comprehension scores, students from grade 12 were the best performing group in reading comprehension tests with (M = 1381.75, SD = 178.84). This is as expected since students in higher grades tend to have experience with various English terms as compared to those from lower grades. The average reading comprehension score for grade 9 students was (M = 1339.42, SD = 180.99). Besides, the average reading comprehension scores for Grade 10 students was (M = 1314.10, SD = 178.06), whereas that of Grade 11 was (M = 1281.48, SD = 264.42). This differs from assumptions that higher grade students perform better than low-grade students. However, the lowest-performing grade in reading comprehension tests were students from the eighth grade (M = 1174.88, SD = 180.99). This was as expected because they may not have experience in attributes that determines reading comprehension Lexile scores (See Table 19).

From the results of the performance of the different grades in aggregate MOS scores, Grade 11 was the best performer (M = 643.82, SD = 217.24). Grade 12 ranked second (M = 620.12, SD = 200.76), Grade 10 ranked third (M = 606.90, SD = 210.67), whereas Grade 9 ranked fourth (M = 567.40, SD = 230.55). The average score for Grade 8 students was (M = 428.49, SD = 220.90). This supports the obvious assumption that students from higher grades have higher comprehension of exam questions as compared to those from lower grades. In addition, there was a possibility that they might have more experience with the software having used it more in their classes for reports and projects.

The results on the performance of these grades in individual MOS exams showed that Grade 8 students only participated in MOS Word exams and scored lowest in these exams. Based on the MOS Word exams, Grade 12 students were the best performers in

overall MOS exam scores with an average score (M = 717.50, SD = 131.77). The average scores for Grade 11 was (M = 714.53, SD = 196.59), whereas that of Grade 10 was (M = 673.30, SD = 197.92). However, Grade 9 performed poorly in MS Word exams relative to other Grades with an average score of (M = 530.57, SD = 261.36). This was as expected since higher grade students have more experience while doing assignments in MS Word as compared to that those from lower grades. Also, high-grade students have more understanding capacity compared to low-grade students.

From the MOS performance in MOS Excel exams, Grade 11 students were the best performer with an average score of (M = 572.79, SD = 218.15). The average score for Grade 10 students was (M = 561.80, SD = 207.68), whereas that of Grade 9 was (M = 560.65, SD = 215.36). Grade 11 scoring the best is as anticipated since they may have done more assignments in MS Excel than Grade 8 and 9 students. However, Grade 12 students scored lower than other grades in MOS Excel exams with an average score of (M = 502.92, SD = 225.52). Their poor performance in MS Excel is questionable. Thus, the low performance could be attributable to such factors as reduced tutoring as compared to other grades based on the assumptions that they are competent with the MS Excel.

Based on the performance of students from different grades on PowerPoint exams, Grade 9 students proved to have better knowledge in presentations compared to other grades (M = 797.67, SD = 53.53). This can be explained by the fact that these students feel motivated to explore and learn presentations as compared to higher grade students. As such, they are more likely to set extra time for practice.

Table 20

Mean MOS Scores by Grade

Group name	M Word	*M Excel*	*M PPT*	*M MOS*
8	428.40			428.49
9	530.57	560.65	797.67	567.40
10	673.30	561.80	610.57	606.90
11	714.53	572.79	696.27	643.82
12	717.50	502.92	651.50	620.12

The average scores for Grade 11 was (M = 696.27, SD = 209.34), whereas that of Grade 12 was (M = 651.50, SD = 182.15). However, Grade 10 students scored lowest in PowerPoint exams with an average score of (M = 610.57, SD = 223.60). Despite high-grade students having more experience in presentation skills, they may become reluctant to practice and hence scoring low grades (See Table 20).

Examining whether there was a significant difference in reading comprehension scores between the different Grades, the results showed a statistically significant difference in performance between the groups, F (4, 253) = 6.520, $p < 0.01$, f = 0.3211. This implies that at least one of the grades had a statistically significant mean difference in reading comprehension scores.

The Post hoc results revealed that that students from the 10th grade outperformed the 8th grade, 12th grade outperformed in the 11th grade, 11th grade outperformed the 8th grade, 12th grade outperformed the 8th grade, whereas 9th grade outperformed the 8th grade. However, among the 10th and 11th grades, 10th and 12th grades, 10th and 9th grades, 11th and 10th grades, 11th and 9th grades, and 12th and 9th grade, there was no significant mean difference in their reading comprehension exams.

Regarding the grades' performance in aggregate MOS exams, there were significant differences in MOS scores among the five grades, F (4, 253) = 6.520, $p <$ 0.01, f = 0.3389. This suggests that at least one of the groups had a statistically mean difference in MOS scores. The Post hoc results showed that the 10th grade students outperformed the 8th grade, 11th grade outperformed the 8th grade, 12th grade outperformed the 8th grade, and 9th grade outperformed the 8th grade students. This implies that the 9th, 10th, 11th, and 12th grade students outperformed the 8th grade students in the MOS certification scores. All the other grade combinations did not have significantly different MOS scores (See Table A3, Appendix D).

Furthermore, to examine whether the five grades performed significantly differently in the individual exams, the results revealed that there was no significant mean difference in MS Excel scores between the five grades, F (3, 97) = 0.312, p = 0.816, f = 0.0983. Based on the performance in MS Word exams by grade, the results showed that there was a significant mean difference in MS Word scores between the four grades, F (4, 100) = 9.108, $p < 0.01$, f = 0.6036. The Post hoc results showed that Grade 10 performed significantly better than Grade 8 students. Grade 11 students performed significantly better than Grade 8 and Grade 9 students. In addition, Grade 12 students performed significantly better than Grade 8 in MS Word exams.

Generally, the results showed that high-grade students perform significantly better than low-grade students. This is expected since high-grade students have more experience in MS Word exercises students. However, students from the remaining grades did not perform significantly differently from different grades (See Table 21). For the performance of students from different grades in MS PowerPoint Exams, the results

showed that there was no significant mean difference between the different grades, F (3, 48) = 0.944, p = 0.427, f = 0.2429.

Table 21

Post-hoc Analysis for MS Word Exam by Grade

(I) Grade	(J) Grade	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
10	11	-41.225	68.145	0.547	-176.42	93.97
	12	-44.196	87.451	0.614	-217.70	129.30
	8	244.816*	55.038	0.000	135.62	354.01
	9	142.733	72.221	0.051	-0.55	286.02
11	10	41.225	68.145	0.547	-93.97	176.42
	12	-2.971	91.346	0.974	-184.20	178.26
	8	286.041*	61.039	0.000	164.94	407.14
	9	183.958*	76.892	0.019	31.41	336.51
12	10	44.196	87.451	0.614	-129.30	217.70
	11	2.971	91.346	0.974	-178.26	184.20
	8	289.012*	82.034	0.001	126.26	451.77
	9	186.929	94.426	0.050	-0.41	374.27
8	10	-244.816*	55.038	0.000	-354.01	-135.62
	11	-286.041*	61.039	0.000	-407.14	-164.94
	12	-289.012*	82.034	0.001	-451.77	-126.26
	9	-102.083	65.559	0.123	-232.15	27.98
9	10	-142.733	72.221	0.051	-286.02	0.55
	11	-183.958*	76.892	0.019	-336.51	-31.41
	12	-186.929	94.426	0.050	-374.27	0.41
	8	102.083	65.559	0.123	-27.98	232.15

Note. * The mean difference is significant at the 0.05 level.

Summary of Demographic Findings

In summary, the findings related to the study's demographics revealed that was no significant difference in the average students' performance (both in reading comprehension and in MOS certification scores) between males and females. In other words, males and females performed similarly both in the reading comprehension tests

and in MOS certification exams. Based on the analysis of the data, students from the various ethnic groups perform differently both in the reading comprehension and MOS exams. In the reading comprehension, Asian and Hispanic, Asian and Black, as well as Asian and Multi-race performed significantly different from each other. In the case of the different ethnic groups' performance in aggregate MOS scores, Asian, Hispanic, and White performed better than the Black. In contrast, White performed significantly better than the Hispanic, Black, and Multi-race. In addition, the four different schools performed differently in both reading and MOS exams. In the reading comprehension exams, MHS School performed significantly better than DHS. DHS School performed significantly better than WMS School, and MHS performed significantly better than WMS School. However, there was no significant difference in the reading comprehension performance between DHS and WHS School. The significant differences in reading comprehension between schools could be attributed to different reading strategies and programs utilized in different schools.

Based on the MOS certification exam scores, the post hoc analysis results indicated that MHS schools performed significantly better than DHS schools, DHS also performed better than WMS schools, and MHS performed better than WMS schools. Additionally, WHS performed significantly better than WMS schools. However, there was no significant difference in performance as measured in terms of MOS scores between DHS and WHS School. The students were also identified to perform differently (both in the reading comprehension and MOS exam) between the various grades. The differences in performance between the schools could be attributed to different teaching methods.

Findings Related to Research Question 1

The first research question, *"What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?"* aimed to investigate the relationship between motivation of middle and high school students and their MOS certification exams scores. The motivation of the students was measured using three aspects (expectancy, value, and cost), as described in the expectancy-value-cost survey. To assess the relationship between motivation and MOS Word Certification scores, Pearson's correlation was performed. The results showed that there was a significant positive correlation between expectancy motivation level of students and their MOS Word certification scores, $r\ (105) = 0.461$, $p < 0.01$, $r^2 = 0.2125$. This implies that if students' expectancy motivation rises, there will be a corresponding increase in their MOS Word certification scores. Conversely, if it decreases, their MOS Word certification scores will also decrease. This suggests that students that strongly believe that they can perform in MOS Word exams are associated with better performance relative to those that do not feel strong about their performance.

Additionally, there was a significant positive correlation between the value motivation level of students and their MOS Word certification scores, $r\ (105) = 0.319$, $p < 0.01$, $r^2 = 0.102$. This implies that if student's value motivation rises, there will be a corresponding increase in their MOS Word certification scores. Conversely, if it decreases, their MOS Word certification scores will also decrease. This suggests that students who are more willing to participate in MOS Word exams are associated with better performance compared to the less willing students. However, there was a significant negative correlation between the cost motivation level of students and their

MOS Word certification scores r (105) = -0.408, $p < 0.01$, $r^2 = 0.166$. This implies that if the cost associated with student's motivation increases, there will be a corresponding decrease in their MOS Word certification scores. Conversely, if the cost decreases, their MOS Word certification scores will increase. This further posits that when the costs of acquiring resources for practicing typing is high, students are less likely to do thorough revisions and practice. As a result, they are likely to perform poorly in MOS Word exams. The results are shown in Table 22.

Table 22

Pearson's Correlation between Motivation of Students and their MOS Word Certification Scores

	Expectancy	Value	Cost
MOS	.461**	.319**	-.408**
	0.000	0.001	0.000

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exam = word.

MOS Excel Certification scores were also analyzed to assess whether they were significantly associated with motivation scores. The results showed that there was a non-significant positive correlation between expectancy motivation level of students and their MOS Excel certification scores r (101) = 0.194, $p = 0.052$, $r^2 = 0.038$. This suggests that students' expectations about their performance in MOS Excel exams have no significant impact on performance. Additionally, there was a non-significant negative relationship between the value motivation level of students and their MOS Excel certification scores, r (101) = -0.018, $p = 0.861$, $r^2 = 0.0003$. This further posits that students' willingness to do MOS Excel exams does not necessarily imply better performance. However, there was a significant negative correlation between the cost

motivation level of students and their MOS Excel certification scores, r (101) = -0.34, p < .01, $r^2 = 0.116$. This implies that the high-cost motivation level of students is associated with low MOS Excel certification scores. Conversely, the low-cost motivation level of students is associated with high MOS Excel certification scores. In practice, if the costs for acquiring the resources necessary for practicing MS Excel exercises are high, students are less likely to do thorough practices. This consequently leads to poor performance. The results are shown in Table 23 below.

Table 23

Pearson's Correlation Between the Motivation of Students and Their MOS Excel Certification Scores

	Expectancy	Value	Cost
MOS	0.194	-0.018	-.341**
	0.052	0.861	0.000
	101	101	101

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exam = Excel.

MOS PPT certification scores were analyzed to determine whether they were significantly linked to the motivation scores. The results showed that there was a significant positive correlation between expectancy motivation level of students and their MOS PowerPoint certification scores, r (52) = 0.596, $p < 0.01$, $r^2 = 0.355$. This implies that a high expectancy motivational level of students is associated with high MOS PowerPoint certification scores. Conversely, a low expectancy motivational level of students is associated with low MOS PowerPoint certification scores. In practice, this implies that students with higher expectations of performing in MOS PowerPoint exams tend to score better than those with low expectations. Additionally, there was a significant positive relationship between value motivation level of students and their MOS PowerPoint certification scores, r (52) = 0.485, $p < 0.01$, $r^2 = 0.235$. This means

that high-value motivational level of students is associated with high MOS PowerPoint certification scores. Conversely, a low expectancy motivational level of students is associated with low MOS PowerPoint certification scores. In a teaching context, this implies that students with higher willingness to participate in MOS PowerPoint Exams perform better than those who do not value PowerPoint exams. However, there was a significant negative correlation between the cost motivation level of students and their MOS PowerPoint certification scores, r (52) = -0.439, $p < 0.01$, $r^2 = 0.193$. This means that when the cost motivation level of students decreases, there is a corresponding increase in the MOS PowerPoint certification scores. In practice, when the costs associated with practicing and doing presentation is high, students do not get enough practice, which results in poor performance. Also, if the time required to train presentations is high, teachers tend to be more reluctant and may perceive the process as wastage of time. This is, in turn, reflected in the poor performance of students. The results are shown in Table 24.

Table 24

Pearson's Correlation between the Motivation of Students and their MOS PPT Certification Scores

	Expectancy	Value	Cost
MOS	.596**	.485**	-.439**
	0.000	0.000	0.001
	52	52	52

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exam = PowerPoint

Findings Related to Research Question 2

The second research question *"What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?"* aimed to examine the relationship between comprehension

level (measured using Lexile score) of middle and high school students and their MOS certification exams scores.

Reading comprehension scores were analyzed to examine whether there were significantly related to MOS Word certification scores. The results showed a positive correlation between reading comprehension level and their MOS Word certification scores, $r\,(105) = 0.547$, $p < 0.01$, $r^2 = 0.299$ (See Table 25). This implies that students with an increase in reading comprehension abilities were also associated with an increased performance in MS Word exams.

Table 25

Pearson's Correlation between Reading Comprehension Level and MOS Word Certification Scores

	Lexile	Word MOS
Lexile	1.000	.547**
		0.000
		105

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exams = Word.

Reading comprehension scores were also analyzed to assess whether they were significantly correlated with MOS Excel certification scores. The results showed a positive correlation between reading comprehension level and their MOS Excel certification scores, $r\,(101) = 0.344$, $p < 0.01$, $r^2 = 0.118$. Since the p-value for the relationship was less than 0.05, we reject the null hypothesis and conclude that the relationship between students' reading comprehension level and their MOS Excel certification scores was significant at a 5% significance level. This implies that an increase in reading comprehension scores is associated with an increase MOS Excel scores. Conversely, a decrease in reading comprehension scores is associated with low performance in MOS Excel exams. In practice, this implies that students with proficient

reading comprehension scores are also associated with better performance in MOS Excel exams (See Table 26).

Table 26

Correlation between Reading Comprehension Level and MOS Excel Certification Scores

	Lexile	**Excel MOS**
Lexile	1.000	.344**
		0.00
		101

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exams = Excel.

Reading comprehension scores were further analyzed to determine whether they were correlated with MOS PPT certification scores. The results showed a positive correlation between reading comprehension level and their MOS PPT certification scores, $r\,(52) = 0.590$, $p < 0.01$, $r^2 = 0.348$. Since the p-value for the relationship was less than 0.05, we reject the null hypothesis and conclude that the relationship between students' reading comprehension level and their MOS PPT certification scores was significant at a 5% significance level. This implies that an increase in reading comprehension scores also causes an increase in MOS PowerPoint exams scores. Conversely, a decrease in reading comprehension scores causes a decrease in MOS PowerPoint scores. In practice, this suggests that high proficiency in reading comprehension also indicates higher performance in MOS PowerPoint exam scores. That is, students who perform better in reading comprehension also perform better in MOS PowerPoint exams.

Table 27

Pearson's Correlation between Reading Comprehension Level and MOS PPT Certification Scores

	Lexile	PPT MOS
Lexile	1.000	.590**
		0.000
		52

Note. ** Correlation is significant at the 0.01 level (2-tailed), Exam = PPT

Findings Related to Research Question 3

To answer the third research question, *"How does motivation and reading comprehension of students predict MOS scores?"* a multiple linear regression model was conducted. A multiple linear regression model with four predictors was conducted to investigate whether the subscales of motivation (expectancy, Value, and Cost), reading comprehension (measured in terms of Lexile scores), the interaction between motivation and comprehension, and demographic variables significantly predict MOS scores. The backward method of linear regression was used. In this case, ten models were fitted in SPSS, where the tenth model was the parsimonious model. When the model with all the predictors was performed, an R-square of 0.403 was yielded. This implies that 40.3% of the total variability in MOS scores was contributed by motivation and reading comprehension. In contrast, the remaining variability was due to other factors not included in the model. A regression model with value, cost, grade, the interaction of motivation and comprehension, ethnicity, and school was significant, F (7, 250) = 24.135, $p < 0.01$, $f^2 = 0.675$. This implies that the above-outlined predictors significantly predict MOS scores (See Table 28).

Table 28

ANOVA Table for the Regression Model

Model		Sum of Squares	Df	Mean Square	F	Sig.
10	Regression	5300262	7	757180.30	24.135	.000k
	Residual	7843280	250	31373.12		
	Total	13143542	257			

Note. k Predictors: (Constant), School, Grade, Motivations and Comprehension, Cost, Value, Ethnicity. R-square = 0.403.

The regression coefficient table also supported that WMS School, Grade, Motivations and Comprehension, Cost, WHS School, Value, and Ethnicity significantly predict MOS score. WMS School had significant impact in predicting MOS score (b = -151.18, t (250) = -4.529, $p < .01$). The baseline variable for the schools was DHS schools. This implies that WMS School contributes 151.18 units less than DHS School in predicting the MOS score. School also had significant impact in predicting MOS scores (b = -67.959, t (250) = -2.759, $p < .01$). This further posits that school is a significant predictor for the overall MOS scores. The tenth grade was considered the baseline variable in the effects of grades in predicting MOS scores. The school grade was significant in predicting MOS scores (b = -78.937, t (250) = -2.591, $p < .01$). This implies that the ninth grade contributed 78.937 units less than the tenth grade in predicting MOS scores. Based on the ethnicity of the participants, Asian ethnicity was considered as the baseline variable. The results showed that Black ethnicity was the only race that significantly predicted the MOS scores (b = -79.444, t (250) = -3.21, $p < .01$). This implies that the ethnicity significantly contributed in the prediction of the students' MOS scores. Moreover, the interactions between motivation and comprehension were also found to have significant effects in predicting students' MOS score (b = 0.023, t

(250) = 5.289, $p < .01$). This implies that for a unit increase in the interaction between motivation and comprehension, there was a corresponding 2.3% increase in MOS scores, other factors held constant. Additionally, value and costs as sub-scales of motivation were significant in predicting MOS scores (See Table 29).

Table 29

Coefficients of the Model and their Significance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
10	(Constant)	657.768	87.398		7.526	0.000
	Value	-34.605	14.959	-0.147	-2.313	0.022
	Cost	-72.490	10.847	-0.384	-6.683	0.000
	Motivations &Comprehension	0.023	0.004	0.336	5.289	0.000
	Black	-79.444	24.747	-0.173	-3.210	0.001
	Ninth Grade	-78.937	30.467	-0.130	-2.591	0.010
	WHS school	-67.959	24.632	-0.145	-2.759	0.006
	WMS school	-151.180	33.384	-0.250	-4.529	0.000

a Dependent Variable: MOS

Chapter V

CONCLUSIONS & DISCUSSION

This chapter presents the conclusion of the study based on the findings. The chapter is organized into seven sections. The first section provides an explanation of the problem under investigation. The next section presents a highlight of the research questions that this study aimed to answer. The following section provides an outline of the participant group describing the major characteristics of the participants. The chapter then summarizes the study findings. The last two sections present recommendations for teachers and future researchers, respectively.

Explanation of the Problem

According to Certiport (2018), Microsoft Office Specialist (MOS) certification equips the students with the skills and knowledge necessary to be productive in all types of jobs. A productivity study by Microsoft Office Specialist found that students and employees are both more productive as they increase their skills in the Microsoft Office programs (Certiport, 2013). This is because the MOS certification helps students to presents themselves as truly knowledgeable individuals and, at the same time, differentiate them in competitive job markets (Certiport, 2018). Generally, acquiring MOS certification help students be more productive, proficient, and effective; and consequently, increases their confidence in their ability to perform better in any given task.

Özcan, Bicen, and Aydar (2011) argued that students' motivation is essential in enhancing students' performance in exams. Özcan et al. (2011) argued that low motivation of students is associated with underperformance, whereas high students' motivation leads to better performance in exams. Cimmiyotti (2013) also argued that the reading comprehension level of students also influences students' performance in exams. The author argued that low students' reading comprehension levels affect students' overall performance because they do not understand the requirement of the questions and thus give wrong answers. Having outlined the significance of motivation, reading comprehension, and MOS certification scores, I sought to examine the predictive role of reading comprehension level and motivation on students' performance in MOS certification exams.

Research Questions

To determine the predictive role of reading comprehension and motivation on students' performance in MOS certification exams, the following research questions were examined:

1. What is the correlation, if any, between the motivation of middle and high school students and their scores on MOS certification exams?
2. What is the correlation, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams?
3. How do students' motivation and reading comprehension predict their performance in MOS exams?

Highlights of Literature Review

Motivation and Academic Performance

According to Singh (2011), motivation drives people to reach their goals, enhances students' academic careers, and directly affects their achievement. Although there are different types of motivation, motivation generally pushes individuals to greater heights. It also makes them yearn to achieve more by activating a drive in them that give them direction (Singh, 2011).

Solak (2012) further argued that motivation boosts individual efforts to become successful. In addition, motivation helps in determining what to do, the amount of time to dedicate to a task, and the effort they will put on the task to achieve better performance. Rowell and Hong (2013) also argued academic motivation is detrimental to learning and development in people. When students are academically motivated, they see the importance of education and enjoy learning (Rowell & Hong, 2013). Moreover, Sharma and Sharma (2018) outlined that students are more intrinsically motivated when they are self-determined and confident in challenging situations. This consequently improves the academic performance of students.

Reading Comprehension and Performance

According to Cimmiyotti (2013), reading ability is a fundamental skill for students' higher academic performance. Cimmiyotti (2013) also argued that the higher the grade a student is, the better the performance. This implies that high-grade students have improved comprehension ability than low-grade students. Woolley (2010) revealed that reading comprehension is a major ingredient for academic success. The author posited that increased reading comprehension skills and abilities among students assist

them in preparing for high-stakes testing and academic success. Thus, Woolley (2010) argued that improving students' reading comprehension should also involve the understanding of vocabulary in different fields.

Furthermore, Urquhart and Frazee (2012) outlined that students with insufficient reading and understanding abilities are associated with minimized academic success relative to those with higher reading abilities. This inability to read and comprehend the material can also impair success on the jobs and has been identified to be a major deficiency in newly hired employees (Urquhart & Frazee, 2012).

Participant Group

The participants in this study were students from the middle and high school levels. The participants were also from three different school systems. These school systems were D School, M school, and W school. Although these schools were of different sizes, the demographic variables in each school were similar. The sample for the study included students enrolled in courses in the Business and Technology pathway. The students who qualified to participate in the MOS certification exams were the students enrolled in one of the three courses; Introduction to Business and Technology, Business and Technology, and Business Communications.

Findings

This section was organized based on the research questions. The first sub-section presents findings from the demographic variables. The next sub-section presents findings of the relationship between motivation and students' performance in MOS certification exams. The third sub-section presents the findings on the impacts of reading comprehension on students' performance in MOS certification exams. The last sub-

section presented the findings on the third research question, which examined whether motivation and reading comprehension predicts MOS certification scores.

Performance by Gender

The demographic variables that were analyzed include gender, ethnicity, school, and the students' Grade. To examine whether there was a significant mean difference in reading comprehension and MOS performance between male and female students, the results revealed that there was no significant difference in their reading comprehension between males and females, t (256) = 0.907, p = 0.37, d = 0.1143. The results also revealed no significant difference in aggregate MOS certification scores between males and females, t (256) = -1.59, p = 0.11, d = 0.19875. Using a post hoc analysis, the findings revealed that students performed significantly better in PPT exams than in MS Excel and MS Word exams.

Performance by Ethnicity

Regarding the students' performance based on the five ethnic groups (Asian, Black, Hispanic, White, and Multi-race), the results showed that there was a significant difference in reading comprehension among the five ethnic groups, F (4, 253) = 16.801, p < 0.01, f = 0.5154. The results from post hoc analysis disclosed that Asians performed better than the Hispanic and the Multi-race ethnic groups. Hispanic performed better than the Black. White performed better than the Black, Hispanic, and the Multi-race.

Based on overall MOS scores, one-way ANOVA was performed to assess whether there was a significant difference in overall MOS scores between the five ethnic groups. The findings revealed that there were significant differences in certification exams among the five ethnic groups, F (4, 253) = 9.987, p < 0.01, f = 0.3974.

Additionally, findings from the post hoc analysis showed that Asian, Hispanic, and White performed better than the Black, whereas White performed better than the Hispanic, Black, and Multi-race.

The results from a one-way ANOVA on the individual MOS exam score showed a significant mean difference in MS Excel exam scores between the different ethnic groups, F (4, 96) = 3.071, p = 0.02, f = 0.3577. The results from post hoc analysis revealed that the White ethnic group performed significantly better in MS Excel exams as compared to those from the Black ethnic group. Based on MS Word exams, the results from one-way ANOVA revealed that students from various ethnic groups performed significantly different in MS Word exams, F (4, 100) = 3.757, p = 0.007, f = 0.3877. The results from the post hoc analysis test showed that only the White students performed significantly better in MS Word exams than the Black students. With regards to their performance in MS PowerPoint exams, the results from one-way ANOVA revealed that students from these ethnic groups performed significantly different in MS PowerPoint exams, F (4, 47) = 6.085, $p < 0.01$, f = 0.7196. The results from post hoc analysis revealed that Asian students performed significantly better than the Black students, and students from Multi-race ethnic group. In addition, the Hispanic students performed significantly better in MS PowerPoint exams as compared to the Black and Multi-race students. Furthermore, students from the White ethnic group performed significantly better in these exams as compared to the Black students.

Performance by Schools

Four different schools were examined to determine whether there was a significant difference in reading comprehension and MOS certification performance. The

results from a one-way ANOVA indicated that there was a significant difference in reading comprehension scores between the schools, F (3, 254) = 9.775, $p < 0.01$, f = 0.3398. Post hoc results revealed that MHS School performed better than DHS. DHS School performed significantly better than WMS School, and MHS performed better than WMS School.

To determine the schools' performance in overall MOS exams, the results showed that there was a significant difference in overall MOS exam performance between the schools, F (3, 254) = 15.946, $p < 0.01$, f = 0.4340. The results from post hoc analysis revealed that MHS schools performed better than DHS schools, DHS also performed better than WMS schools, and MHS performed better than WMS schools. Additionally, WHS outperformed WMS schools.

Regarding the schools' performance based on individual MOS certification exams, the results indicated no significant difference in MS Excel performance between different schools, F (2, 98) = 1.796, p = 0.171, f = 0.1915. However, there was a significant mean difference in MS Word performance between the four schools, F (2, 101) = 13.843, $p < 0.01$, f = 0.6412. Post hoc analysis results showed that DHS School performed significantly better in MS Word exam than WMS, MHS School performed significantly better than WMS and WHS School performed significantly better than WMS. Moreover, for the MS PowerPoint exams, the results showed that there was a significant difference in school performance in these exams, F (2, 49) = 6.87, p = 0.002, f = 0.5334. Results from post hoc analysis indicated that DHS School performed significantly better than WHS School, and MHS performed better than WHS School.

Performance in Different Grades

Five different schools Grades (Grade 8, 9, 10, 11, and 12) were examined to determine whether there was a significant difference in reading comprehension and MOS certification exam performance. The results showed that there were significant differences in reading comprehension among the five-grade reading comprehension, F (4, 253) = 6.520, $p < 0.01$, $f = 0.3211$. The post hoc results revealed that Grade 10 students performed better than Grade 8, Grade 12 performed better than Grade 11, Grade 11 performed better than Grade 8. In addition, students from Grade 12 performed better than Grade 8, and Grade 9 performed better than Grade 8 students.

Regarding the Grades performance in the overall MOS certification exams, the results from one-way ANOVA showed that there were significant differences in MOS scores among the five grades, F (4, 253) = 6.520, $p < 0.01$, $f = 0.3389$. The results from post hoc analysis also revealed that 10th-grade students outperformed the 8th Grade, 11th outperformed the 8th Grade, 12th outperformed the 8th, and 9th outperformed the 8th Grade students. This implies that the 9th, 10th, 11th, and 12th-grade students outperformed the 8th-grade students in the MOS certification scores.

Based on the individual MOS exams, the results showed no significant difference in MS Excel scores between the five Grades, F (3, 97) = 0.312, $p = 0.816$, $f = 0.0983$. However, there was a significant difference in MS Word performance between the four grades, F (4, 100) = 9.108, $p < 0.01$, $f = 0.6036$. The results from the post hoc analysis revealed that Grade 10 performed significantly better than Grade 8 students. Grade 11 students performed significantly better than Grade 8 and Grade 9 students. In addition, Grade 12 students performed significantly better than Grade 8 students. Regarding Grade

performance in MS PowerPoint exams, the results showed no significant mean difference in MS PowerPoint Scores between the different grades, F (3, 48) = 0.944, p = 0.427, f =0.2429.

Research Question 1: What is the Correlation, if any, Between the Motivation of Middle and High School Students and Their Scores on MOS Certification Exams?

The student's motivation was measured using three aspects (expectancy, value, and cost), as described in the expectancy-value-cost survey. To assess the relationship between motivation and MOS Word Certification scores, Pearson's correlation was performed. The results showed that there was a significant positive correlation between expectancy motivation level of students and their MOS Word certification scores, r (105) = 0.461, $p < 0.01$, $r^2 = 0.2125$. This suggests that students with strong positive expectations about their ability to perform in MOS Word exams were associated with better performance than those with negative expectations. Also, there was a correlation between the value motivation level of students and their MOS Word certification scores, r (105) = 0.319, p = 0.001, $r^2 = 0.102$. This suggests that students who are more willing to participate in MOS Word exams are associated with better performance than the less willing students. However, there was a significant negative correlation between the cost motivation level of students and their MOS Word certification scores, r (105) = -0.408, $p < 0.01$, $r^2 = 0.166$. This further posits that when the costs of acquiring resources for practicing the program features is high, students are less likely to do the practice.

In addition, the results revealed that there was a weak and significant relationship between expectancy motivation level of students and MOS Excel certification scores. This suggests that students with positive expectations about the performance in MOS

Excel exams are associated with better performance than those with negative expectations. In addition, there was a significant negative correlation between the cost motivation level of students and their MOS Excel certification scores, r (101) = -0.34, p < .01, r^2= 0.116. This suggests that if the costs for acquiring the resources necessary for practicing MS Excel exercises are high, students are less likely to do thorough practices. This consequently leads to poor performance.

Furthermore, the results showed that there was a significant positive correlation between expectancy motivation level of students and their MOS PowerPoint certification scores, r (52) = 0.596, p < 0.01, r^2= 0.355. This implies that students with a higher expectation of performing in MOS PowerPoint exams tend to score better than those with low expectations. Besides, there was a significant positive relationship between value motivation level of students and their MOS PowerPoint certification scores, r (52) = 0.485, p < 0.01, r^2= 0.235. This implies that students with higher willingness to participate in MOS PowerPoint Exams perform better than those who do not value PowerPoint exams. Moreover, there was a significant negative correlation between the cost motivation level of students and their MOS PowerPoint certification scores, , r (52) = -0.439, p < 0.01, r^2= 0.193. In practice, when the costs associated with practicing and doing a presentation is high, students do not get enough practice, which results in poor performance. Also, if the time required to train presentations is high, teachers tend to be more reluctant and may perceive the process as wastage of time. This is, in turn, reflected in the poor performance of students.

Research Question 2: What is the Correlation, if any, Between the Reading Comprehension Levels of Middle and High School Students and Their Scores on MOS Certification Exams?

Reading comprehension scores were analyzed to examine whether there were significantly related to MOS Word certification scores. The results showed a positive correlation between reading comprehension level and their MOS Word certification scores, r (105) = 0.547, $p < 0.01$, $r^2 = 0.299$. This implies that students with high reading comprehension abilities were also associated with high performance in MS Word exams. The results also showed a positive correlation between reading comprehension level and their MOS Excel certification scores, r (101) = 0.344, $p < 0.01$, $r^2 = 0.118$. This implies that students with proficient reading comprehension abilities are also associated with better performance in MOS Excel exams. The results from Pearson's correlation also revealed that there was a positive correlation between reading comprehension level and their MOS PPT certification scores, r (52) = 0.590, $p < 0.01$, $r^2 = 0.348$. This suggests that high proficiency in reading comprehension correlates with higher performance in MOS PowerPoint exam scores.

Research Question 3: How Does Motivation and Reading Comprehension of a Student Predict MOS Scores?

Multiple linear regression with interaction was performed to answer this research question. The predictor variables were the three aspects of motivation (expectancy, value, and cost) and reading comprehension as measured using Lexile scores, and the demographic variables. The findings from the parsimonious model revealed that

performance WMS School, Ninth Grade, Motivations, and Comprehension (interactions), Cost, WHS School, Value, and Black ethnicity significantly predict MOS score.

WMS School had significant impact in predicting MOS score (b = -151.18, t (250) = -4.529, $p < .01$). Using DHS school as the reference variables, then WMS School contributes 151.18 units less than DHS School in predicting the MOS score. WHS school also had significant impact in predicting MOS score (b = -67.959, t (250) = -2.759, $p < .01$). This implies that WHS school contributes 67.959 less than DHS school. While assessing Grade as a predictor of MOS performance and considering Grade 10 to be the reference variable, the result revealed that ninth Grade was significant in predicting MOS score (b = -78.937, t (250) = -2.591, $p < .01$). This implies that the ninth grade contributed 78.937 units less than the tenth grade in predicting MOS scores. Based on the ethnicity of the participants and considering the Asian ethnic group as the reference variable, the results showed that the Black ethnic group significantly predicted the MOS scores (b = -79.444, t (250) = -3.21, $p < .01$). This implies that ethnicity significantly predicts the students' MOS scores.

Discussion of Findings

Özcan et al. (2011) argued that student's motivation is essential in enhancing students' performance in exams in that low motivation among students is associated with underperformance, whereas high students' motivation leads to better performance in exams. Similarly, Cimmiyotti (2013) also argued that students' reading comprehension level also influences students' performance in exams in that students with low reading comprehension levels don't perform as well because they do not understand the requirement of the questions and thus give wrong answers. Having outlined the

significance of motivation, reading comprehension, and MOS certification scores, this study sought to examine the predictive role of reading comprehension level and motivation on students' performance in MOS certification exams.

The findings from this study showed that students' motivation level is significantly associated with their performance both in their reading comprehension ability and MOS exams. These findings were consistent with Singh's (2011) and Solak's (2012) findings that motivation drives people to reach their goals, enhances students' academic careers, and directly affects their achievement. This implies that teachers should understand the significance of motivation in all academic activities as it is associated with better achievements and academic performance. Teachers should also embrace both expectancy and value motivation because it general1y makes students yearn to achieve more by activating a drive that gives them direction.

The findings from the present study revealed that when the cost of academic resources is high, students are less likely to be motivated to practice their knowledge, which will be reflected in poor academic performance. This was in line with Rowell and Hong's (2013) findings that motivation helps people determine what to do, the amount of time to dedicate to a task, and the effort they will put on the task to achieve better performance. The findings also revealed that when the students have a higher expectation of passing the exams, they are more likely to work harder to achieve their goals. As a result, they will perform significantly better in their exams. These findings were consistent with Rowell and Hong's (2013) findings that when students are academically motivated, they see the importance of education and enjoy learning. The motivation level of students in this study was comprised of expectancy, value, and cost.

The findings showed that value is positively and significantly associated with performance in reading comprehension and MOS certification exams. These findings were consistent with Rollins (2014) findings. Rollins (2014) found that student's motivation is impacted by the values the students place on tasks. This implies that when students place a high value on a task, and when students have the confidence in themselves in completing the task, they are more likely to be engaged in the task and are more likely to stay motivated in the task. However, when students place a low value on a task and lack the confidence in themselves in completing the task successfully, the students become less motivated in the task and try to avoid the task (Rollins, 2014).

Other findings in this study showed that students' motivation level influences their performance both in reading comprehension and sit-in exams such as MOS exams. This implies that motivation level influences students' performance in different areas of achievement. These findings agree with Mucherah and Yoder's (2008) findings that students' motivation level can affect how well they perform academically in different areas of achievement.

Furthermore, the findings showed that students with higher reading comprehension abilities are also associated with increased MOS performance. These findings agreed with Cimmiyotti's (2013) findings that reading ability is a fundamental skill for students' higher academic performance. This implies that increased reading comprehension skills and abilities among students assist them in preparing for high-stakes testing and academic success. Cimmiyotti (2013) further acknowledged that students from higher school grade a student are associated with better the performance because they tend to have improved comprehension ability than students from low

Grades. These findings were consistent with the present study findings that Grade 12 students scored higher in reading comprehension exams than Grade 8 students. Woolley (2010) posited that improving student's reading comprehension should also involve understanding vocabulary in different fields. Urquhart and Frazee (2012) also supported that students with insufficient reading and understanding abilities are associated with minimized academic success relative to those with higher reading abilities. They further acknowledged that students' inability to read and comprehend the material could also impair success on the jobs and has been found to be a major deficiency in newly hired employees. This suggests that teachers should be more inclined to improve students' reading comprehension levels to indirectly enhance their job successfulness.

Neuhoff et al. (2016) focused on calculating the readability on certification exams. Neuhoff et al. (2016) argued that high-stakes tests require students to have a knowledge of the content being tested as well as the ability to comprehend the questions on the tests to know what they are required to do. This was in line with the present study findings that reading comprehension significantly predicts students' performance in MOS exams. In addition, Neuhoff et al. (2016) noted that test-takers' ability to read and comprehend a test determines how useful an assessment tool or a test is. This implies that improving the reading comprehension level of students provides them with a comprehensive understanding of the significance of the test, thus increasing their academic achievements.

In conclusion, it is clear that different forms of motivation (e.g., value, cost) have different effects on students' academic achievements on MOS exams, especially the Excel exam. It also is clear that the reading ability of a student is significantly associated

with performance in other exams, as it allows them to understand each question's requirement. Other confounding factors (e.g., ethnicity and grade level) also are related to students' performance levels on MOS exams.

Recommendations for Teachers

The findings from this study revealed that students perform better in MS PowerPoint exams compared to MS Word and MS Excel. This implies that teachers should implement strategies to enhance students' improved performance in MS Word and MS Excel exams. The findings from the first research question revealed that there was a significant negative relationship between the cost motivation level of students and their MOS certification scores. This suggests that when the costs of acquiring resources for practice are high, students are less likely to do the practice required. As a result, they are likely to perform poorly in MOS Word exams. As such, teachers and relevant education authorities should develop strategies to ensure that students acquire the necessary resources to enhance their performance. Some of the findings also showed that reading comprehension was positively and significantly associated with improved performance in MOS certification exams. Thus, teachers should employ the most effective teaching methods that can improve the students' reading comprehension as it is a fundamental element to improve academic performance in other sit-in exams.

With regard to student's performance in reading comprehension by ethnicity, the results revealed that Asians performed better than the Hispanic and Multi-race ethnic groups. Hispanic performed better than the Black. White performed better than the Black, Hispanic, and the Multi-race. In addition, the reading comprehension scores correlated highly with students' performance in MOS exams. This posits that teachers

should implement strategies to improve the reading comprehension levels of students, especially Hispanic and the multi-race who recorded low relatively poor performance compared to the Black, White, and the Asians.

Recommendations for Future Researchers

This study revealed that reading comprehension scores were highly correlated with performance in MOS scores. This suggested that students with high reading comprehension ability were associated with high scores in other sit-in exams. However, this study did not examine the factors that enhance the reading comprehension level of students. Future research, therefore, should investigate the factors that enhance the reading comprehension level of students. In addition, the participants in this study were students from Grade 8 to Grade 12. However, further studies need to be conducted considering students from grades 6 to 12 or with students from higher education. The grade suggestion is limited to 6 through 12 or from higher education because these are the only students that take the MOS certification exams. This study also assessed the effects of reading comprehension level on students' performance MOS certification exams. There is a possibility that reading comprehension ability might have different effects on performance in different subjects. Thus, future research should examine the effects of motivation, reading comprehension ability on performance in such subjects as mathematics. How students perceive math could help explain the lack of value students place on Excel certification, since so much in Excel is math related. In addition, this study found that motivation and reading comprehension level increases students' performance in MOS. However, performance in MOS exams could be attributed to

teaching methods and their effectiveness. This posits that future researchers should focus on such factors and their impacts on the students' performance in MOS scores.

With regard to student's performance in MOS certification exams, the findings showed that students performed relatively better in MS PowerPoint than Excel. This low performance could be attributed to a lack of presentation classes and different teaching methods. Thus, future studies should consider exposing the students to similar teaching methods to examine whether they would perform significantly differently in these exams.

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APPENDIX A:

Motivational Surveys

Motivational Survey
MOS (Microsoft Office Specialist) Certification Exams- Word

Directions: The following questions ask about your motivation for and attitudes about Microsoft Word. There are no right or wrong answers. Answer each question as accurately as possible based on your feelings. Using the 1 to 6 scale below, please indicate your response to each of the items listed.

1 – Strongly Disagree **2** – Disagree **3** – Slightly Disagree **4** - Slightly Agree **5** – Agree **6** – Strongly Agree

		1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
E1	I know I can learn the material in Microsoft Word.						
E2	I believe I can be successful in Microsoft Word.						
E3	I am confident that I can understand the material in Microsoft Word.						
V1	I think Microsoft Word is important.						
V2	I value Microsoft Word.						
V3	I think Microsoft Word is useful.						
C1	My Microsoft Word classwork requires too much time.						
C2	Because of other things that I do, I don't have time to put into Microsoft Word.						
C3	I'm unable to put in the time needed to do well in Microsoft Word.						
C4	I have to give up too much to do well in Microsoft Word.						

Please indicate the following:

Grade: ____ 9th ____ 10th ____ 11th ____ 12th **Gender:** ____ male ____ female

Ethnicity: ____ American Indian/Alaskan ____ Asian/Pacific Islander

____ Black ____ Hispanic ____ Multi-Racial ____ Caucasian/White

DO NOT WRITE BELOW THIS LINE. TEACHER USE ONLY.

Student # (as assigned by individual teacher): _____ Student's Lexile Level: _____

MOS Exam Taken: _____ Student's Score on MOS Exam: _____

Motivational Survey
MOS (Microsoft Office Specialist) Certification Exams- Excel

Directions: The following questions ask about your motivation for and attitudes about Microsoft Excel. There are no right or wrong answers. Answer each question as accurately as possible based on your feelings. Using the 1 to 6 scale below, please indicate your response to each of the items listed.

1 – Strongly Disagree **2** – Disagree **3** – Slightly Disagree **4** - Slightly Agree 5 – Agree **6** – Strongly Agree

		1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
E1	I know I can learn the material in Microsoft Excel.						
E2	I believe I can be successful in Microsoft Excel.						
E3	I am confident that I can understand the material in Microsoft Excel.						
V1	I think Microsoft Excel is important.						
V2	I value Microsoft Excel.						
V3	I think Microsoft Excel is useful.						
C1	My Microsoft Excel classwork requires too much time.						
C2	Because of other things that I do, I don't have time to put into Microsoft Excel.						
C3	I'm unable to put in the time needed to do well in Microsoft Excel.						
C4	I have to give up too much to do well in Microsoft Excel.						

Please indicate the following:

Grade: ____ 9th ____ 10th ____ 11th ____ 12th **Gender:** ____ male ____ female

Ethnicity: ____ American Indian/Alaskan ____ Asian/Pacific Islander

____ Black ____ Hispanic ____ Multi-Racial ____ Caucasian/White

DO NOT WRITE BELOW THIS LINE. TEACHER USE ONLY.

Student # (as assigned by individual teacher): _____ Student's Lexile Level: _____

MOS Exam Taken: _____ Student's Score on MOS Exam: _____

Motivational Survey
MOS (Microsoft Office Specialist) Certification Exams- PowerPoint

Directions: The following questions ask about your motivation for and attitudes about Microsoft PowerPoint. There are no right or wrong answers. Answer each question as accurately as possible based on your feelings. Using the 1 to 6 scale below, please indicate your response to each of the items listed.

1 – Strongly Disagree **2** – Disagree **3** – Slightly Disagree **4** - Slightly Agree 5 – Agree **6** – Strongly Agree

		1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
E1	I know I can learn the material in Microsoft PowerPoint.						
E2	I believe I can be successful in Microsoft PowerPoint.						
E3	I am confident that I can understand the material in Microsoft PowerPoint.						
V1	I think Microsoft PowerPoint is important.						
V2	I value Microsoft PowerPoint.						
V3	I think Microsoft PowerPoint is useful.						
C1	My Microsoft PowerPoint classwork requires too much time.						
C2	Because of other things that I do, I don't have time to put into Microsoft PowerPoint.						
C3	I'm unable to put in the time needed to do well in Microsoft PowerPoint.						
C4	I have to give up too much to do well in Microsoft PowerPoint.						

Please indicate the following:

Grade: ____ 9th ____ 10th ____ 11th ____ 12th **Gender:** ____ male ____ female

Ethnicity:____ American Indian/Alaskan ____ Asian/Pacific Islander

____ Black ____ Hispanic ____ Multi-Racial ____ Caucasian/White

DO NOT WRITE BELOW THIS LINE. TEACHER USE ONLY.

Student # (as assigned by individual teacher): _____ Student's Lexile Level: _____

MOS Exam Taken: _____ Student's Score on MOS Exam: _____

APPENDIX B:

Parental Consent Form

VALDOSTA STATE UNIVERSITY

Parent/Guardian Permission for Child's/Ward's Participation in Research

You are being asked to allow your child (or ward) to participate in a research study entitled "FACTORS AFFECTING MOS CERTIFICATION IN MIDDLE AND HIGH SCHOOL STUDENTS." This research study is being conducted by Amy Harkins, a student in Leadership in the Department of Curriculum, Leadership, & Technology at Valdosta State University. The purpose of this research is to determine if there is a relationship between the motivation level of students and their performance on the MOS certification exams, and to determine if there is a relationship between the reading comprehension levels of students and their performance on the MOS certification exams, focusing on the MOS Word, MOS Excel, and MOS PowerPoint certification exams. Your child's participation in this study is entirely voluntary. From this point on in this form, the term "child" is used for either a child or a ward.

As described in more detail below, we will ask your child to complete a 10-item motivational survey in their Introduction to Business and Technology (IBT), Business and Technology (BT), or Business Communications (BC) classroom prior to taking the MOS Certification Exam. Your child's participation will last for approximately 15 minutes. Someone in your position might be interested in allowing your child to participate because it may help your child's teacher better prepare students for the certification exams. Although there are no known risks associated with these research procedures, it is not always possible to identify all potential risks of participating in a research study. In this case, you may not wish to allow your child to participate. It is important for you to know that you or your child may discontinue participation at any time during this study.

This form includes detailed information to help you decide whether to participate in this study. Please read it carefully and ask any questions that you have before you agree to participate. Please be sure to retain a copy of this form for your records.

Procedures:

Your child's participation will involve completing a 10-item motivational survey in their Introduction to Business and Technology (IBT), Business and Technology (BT), or Business Communications (BC) classroom prior to taking the MOS Certification Exam. The amount of time required for your child's participation will be approximately 5 – 10 minutes. If you agree to participate, the researchers will also collect your child's Lexile score from the previous year's EOG/EOC as well as scores from the MOS certification exam. You or your child may discontinue participation at any time during this study regardless of the reason.

All direct interaction with your child will occur with your child's teacher in the classroom.

This study involves research. There are no alternatives to the experimental procedures in this study. The only alternative is for you to choose not to allow your child to participate.

Possible Risks or Discomfort:

This is a minimal risk research study. That means that the risks of participating are no more likely or serious than those you encounter in everyday activities. Although there are no known risks to your child associated with the research procedures, it is not always possible to identify all potential risks of participating in a research study. However, the University has taken reasonable safeguards to minimize potential but unknown risks.

By agreeing to participate in this research project, you are not waiving any rights that you or your child may have against Valdosta State University for injury resulting from negligence of the University or its researchers. Although there are no known risks associated with these research procedures, it is not always possible to identify all potential risks of participating in a research study. However, the University has taken reasonable safeguards to minimize potential but unknown risks.

Potential Benefits:
Although you may not benefit directly from this research, your participation will help the researcher gain additional understanding of how motivation and reading comprehension affects performance on the MOS certification exams.

Costs and Compensation:
There are no costs to you and there is no compensation (no money, gifts, or services) for your participation in this research project.

Assurance of Confidentiality:
Valdosta State University and the researcher will keep your child's information confidential to the extent allowed by law. Members of the Institutional Review Board (IRB), a university committee charged with reviewing research to ensure the rights and welfare of research participants, may be given access to your child's confidential information.

Your child will be assigned a code number as a way to identify and keep track of data. Numbers assigned to your child with not be associated with his/her name or any other identifying information. This is to ensure that individuals remain unidentifiable. All information obtained from testing will be kept in the researcher's office secured by lock and key. Only those individuals that YOU choose to share the results with will have access to the results.

Data from this study will be reported in combination with testing information obtained from other participants. None of the participants will be identified in this study by name.

Voluntary Participation:
Your decision to allow your child to participate in this research project is entirely voluntary. If you agree now to allow your child to participate and you change your mind later, you are free to withdraw your child from the study at that time. By not allowing your child to participate in this study or by withdrawing him/her from the study before the research is complete, you are not giving up any rights that you or your child have or any services to which you or your child are otherwise entitled to from Valdosta State University. If you decide to withdraw your child from the study after data collection is complete, your child's information will be deleted from the database and will not be included in research results.

You may skip any questions that you do not want to answer.

Information Contacts:
Questions regarding the purpose or procedures of the research should be directed to Amy Harkins at acharkin@valdosta.edu. This study has been approved by the Valdosta State University Institutional Review Board (IRB) for the Protection of Human Research Participants. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

Agreement to Participate:

The research project and my child's (or ward's) role in it have been explained to me, and my questions have been answered to my satisfaction. I grant permission for my child to participate in this study. By signing this form, I am indicating that I am either the custodial parent or legal guardian of the child. I have received a copy of this permission form.

I would like to receive a copy of the results of this study: _____ Yes _____ No

Mailing Address: _____

E-mail Address: _____

This research project has been approved by the Valdosta State University Institutional Review Board for the Protection of Human Research Participants through the date noted below:

_____
Printed Name of Child/Ward

_____
Printed Name of Parent/Guardian

_____
Signature of Parent/Guardian Date

_____
Signature of Person Obtaining Consent Date

APPENDIX C:

Child Consent Form

Hi. My name is Amy Harkins. I'm a doctoral student at Valdosta State University. Right now, I'm doing a research study about Factors Affecting MOS Certification in Middle and High School Students. I would like to ask you to help me by being in a study, but before I do, I want to explain what will happen if you decide to help me.

I will ask you to complete a 10-item motivational survey in your Introduction to Business and Technology (IBT), Business and Technology (BT), or Business Communications (BC) classroom prior to taking the MOS Certification Exam. The amount of time required for your participation will be approximately 5 – 10 minutes. Participation will also include the release of your Lexile score from the previous year's EOG/EOC as well as scores from the MOS certification exam.
By being in the study, you will help me understand the relationship, if any, between the motivation of middle and high school students and their scores on MOS certification exams, the relationship, if any, between the reading comprehension levels of middle and high school students and their scores on MOS certification exams, and the interactions, if any, between motivation, reading comprehension, and MOS scores.

Your parents and classmates will not know what you have said on your survey. When I tell other people about my study, I will not use your name, and no one will be able to tell who I'm talking about.

Your mom/dad have said that it is okay for you to be in my study. However, if you don't want to be in the study, you don't have to be. What you decide won't make any difference with your grades or scores on your MOS exam. I won't be upset, and no one else will be upset, if you don't want to be in the study. If you want to be in the study now but change your mind later, that's okay. You can stop at any time. If there is anything you don't understand you should tell me so I can explain it to you

You can ask me questions about the study. If you have a question later that you don't think of now, you can call me or ask parents or teacher to call me or send me an email.

Do you have any questions for me now?

Would you like to be in my study and complete a survey on motivation as it relates to the MOS certification exam?

NOTES TO RESEARCHER: The child (under age 18) must answer **"Yes"** or **"No."** Only a definite **"Yes"** may be taken as assent to participate.

Name of Student: _____ **Parental Permission on File:** ☐ Yes ☐ No
(If "No," do not proceed with assent or research procedures.)

Student's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

APPENDIX D:

IRB Approval Form

Institutional Review Board (IRB) for the Protection of Human Research Participants

EXPEDITED PROTOCOL APPROVAL

Protocol Number: IRB-03804-2019 **Responsible Researcher:** Amy Harkins

Supervising Faculty: Dr. Sakhavat Mammadov

Project Title: *Examination of the Relationships Pertaining to the MOS Certification Exams in Georgia Students.*

Level of Risk: ☒ Minimal ☐ More than Minimal

Type of Review: ☒ Expedited ☐ Convened (Full Board)

Approval Category: **7**

Approval Date: **06.04.2019**

Expiration Date: **06.04.2022**

Consent Requirements:

- ☐ Adult Participants – Written informed consent with documentation (signature)
- ☐ Adult Participants – Written informed consent with waiver of documentation (signature)
- ☐ Adult Participants – Verbal informed consent
- ☐ Adult Participants – Waiver of informed consent
- ☒ Minor Participants – Written parent/guardian permission with documentation (signature)
- ☐ Minor Participants – Written parent/guardian permission with waiver of documentation (signature)
- ☐ Minor Participants – Verbal parent/guardian permission
- ☐ Minor Participants – Waiver of parent/guardian permission
- ☐ Minor Participants – Written assent with documentation (signature)
- ☒ Minor Participants – Written assent with waiver of documentation (signature)
- ☐ Minor Participants – Verbal assent
- ☐ Minor Participants – Waiver of assent
- ☐ Waiver of some elements of consent/permission/assent

Approval: This research protocol is **approved as presented**. Your approved consent form(s), with IRB approval stamp are attached. If you prefer the original stamped consent, please email tmwright@valdosta.edu and the form will be sent via inter-office mail, or you may come by the OSPRA office to obtain the original. Please see page 2 for additional important information for researchers.

Comments:

APPENDIX E:

Appendix Tables

Table A1

Testing for Multicollinearity Using VIF

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-100.886	127.362		-0.792	0.429		
	Lexile	0.364	0.059	0.335	6.126	0.00	0.887	1.127
	Expectancy	72.277	17.066	0.263	4.235	0.00	0.69	1.449
	Value	-10.937	14.39	-0.046	-0.76	0.448	0.71	1.408
	Cost	-38.304	11.29	-0.203	-3.393	0.001	0.74	1.35

Table A2

Post-hoc Analysis for Students' Performance in Reading Comprehension and MOS Exam for the five Ethnic groups (LSD)

Dependent Variable	(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Lexile	Asian/Pacific	Black	255.329*	59.116	0.000	138.91	371.75
		Hispanic	167.662*	64.478	0.010	40.68	294.64
		Multi-Racial	268.674*	77.865	0.001	115.33	422.02
		White	59.522	59.410	0.317	-57.48	176.52
	Black	Asian/Pacific	-255.329*	59.116	0.000	-371.75	-138.91
		Hispanic	-87.667*	36.408	0.017	-159.37	-15.96
		Multi-Racial	13.345	56.842	0.815	-98.60	125.29
		White	-195.807*	26.413	0.000	-247.82	-143.79
	Hispanic	Asian/Pacific	-167.662*	64.478	0.010	-294.64	-40.68
		Black	87.667*	36.408	0.017	15.96	159.37
		Multi-Racial	101.012	62.401	0.107	-21.88	223.90
		White	-108.140*	36.884	0.004	-180.78	-35.50
	Multi-Racial	Asian/Pacific	-268.674*	77.865	0.001	-422.02	-115.33
		Black	-13.345	56.842	0.815	-125.29	98.60
		Hispanic	-101.012	62.401	0.107	-223.90	21.88
		White	-209.152*	57.148	0.000	-321.70	-96.60
	White	Asian/Pacific	-59.522	59.410	0.317	-176.52	57.48
		Black	195.807*	26.413	0.000	143.79	247.82
		Hispanic	108.140*	36.884	0.004	35.50	180.78
		Multi-Racial	209.152*	57.148	0.000	96.60	321.70

MOS	Asian/Pa	Black	197.767*	67.127	0.004	65.57	329.97
		Hispanic	104.491	73.216	0.155	-39.70	248.68
		Multi-Racial	137.424	88.417	0.121	-36.70	311.55
		White	15.807	67.461	0.815	-117.05	148.66
	Black	Asian/Pacific	-197.767*	67.127	0.004	-329.97	-65.57
		Hispanic	-93.276*	41.342	0.025	-174.70	-11.86
		Multi-Racial	-60.343	64.546	0.351	-187.46	66.77
		White	-181.960*	29.993	0.000	-241.03	-122.89
	Hispanic	Asian/Pacific	-104.491	73.216	0.155	-248.68	39.70
		Black	93.276*	41.342	0.025	11.86	174.70
		Multi-Racial	32.933	70.857	0.642	-106.61	172.48
		White	-88.684*	41.883	0.035	-171.17	-6.20
	Multi-Racial	Asian/Pacific	-137.424	88.417	0.121	-311.55	36.70
		Black	60.343	64.546	0.351	-66.77	187.46
		Hispanic	-32.933	70.857	0.642	-172.48	106.61
		White	-121.618	64.893	0.062	-249.42	6.18
	White	Asian/Pacific	-15.807	67.461	0.815	-148.66	117.05
		Black	181.960*	29.993	0.000	122.89	241.03
		Hispanic	88.684*	41.883	0.035	6.20	171.17
		Multi-Racial	121.618	64.893	0.062	-6.18	249.42

Table A3

Post hoc analysis for students' performance in the five schools' grades (LSD)

Dependent Variable	(I) Grade1	(J) Grade1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Lexile	10	11	32.614	34.927	0.351	-36.17	101.40
		12	-67.653	39.403	0.087	-145.25	9.95
		8	139.214*	38.509	0.000	63.37	215.05
		9	-25.321	38.509	0.511	-101.16	50.52
	11	10	-32.614	34.927	0.351	-101.40	36.17
		12	-100.267*	40.786	0.015	-180.59	-19.94
		8	106.600*	39.923	0.008	27.98	185.22
		9	-57.935	39.923	0.148	-136.56	20.69
	12	10	67.653	39.403	0.087	-9.95	145.25
		11	100.267*	40.786	0.015	19.94	180.59
		8	206.866*	43.892	0.000	120.43	293.31
		9	42.331	43.892	0.336	-44.11	128.77
	8	10	-139.214*	38.509	0.000	-215.05	-63.37
		11	-106.600*	39.923	0.008	-185.22	-27.98
		12	-206.866*	43.892	0.000	-293.31	-120.43
		9	-164.535*	43.092	0.000	-249.40	-79.67
	9	10	25.321	38.509	0.511	-50.52	101.16
		11	57.935	39.923	0.148	-20.69	136.56
		12	-42.331	43.892	0.336	-128.77	44.11
		8	164.535*	43.092	0.000	79.67	249.40
MOS	10	11	-36.914	37.733	0.329	-111.23	37.40

Dependent Variable	(I) Grade1	(J) Grade1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
		12	-13.222	42.569	0.756	-97.06	70.61
		8	178.414*	41.603	0.000	96.48	260.35
		9	39.507	41.603	0.343	-42.43	121.44
	11	10	36.914	37.733	0.329	-37.40	111.23
		12	23.692	44.063	0.591	-63.09	110.47
		8	215.328*	43.131	0.000	130.39	300.27
		9	76.421	43.131	0.078	-8.52	161.36
	12	10	13.222	42.569	0.756	-70.61	97.06
		11	-23.692	44.063	0.591	-110.47	63.09
		8	191.637*	47.419	0.000	98.25	285.02
		9	52.730	47.419	0.267	-40.66	146.12
	8	10	-178.414*	41.603	0.000	-260.35	-96.48
		11	-215.328*	43.131	0.000	-300.27	-130.39
		12	-191.637*	47.419	0.000	-285.02	-98.25
		9	-138.907*	46.554	0.003	-230.59	-47.22
	9	10	-39.507	41.603	0.343	-121.44	42.43
		11	-76.421	43.131	0.078	-161.36	8.52
		12	-52.730	47.419	0.267	-146.12	40.66
		8	138.907*	46.554	0.003	47.22	230.59

* The mean difference is significant at the 0.05 level.