THE DIFFERENCE IN FOUR-YEAR GRADUATION RATES OF MISSOURI PUBLIC HIGH SCHOOLS UTILIZING AT-RISK ALTERNATIVE HIGH SCHOOLS OR VOCATIONAL PROGRAMS

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THE DIFFERENCE IN FOUR-YEAR GRADUATION RATES OF MISSOURI PUBLIC HIGH SCHOOLS UTILIZING AT-RISK ALTERNATIVE HIGH SCHOOLS OR VOCATIONAL PROGRAMS

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THE DIFFERENCE IN FOUR-YEAR GRADUATION RATES OF MISSOURI PUBLIC HIGH SCHOOLS UTILIZING AT-RISK ALTERNATIVE HIGH SCHOOLS OR VOCATIONAL PROGRAMS

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By

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ABSTRACT

There are negative results that come from students not earning a high school diploma. Individuals can suffer from poor health, low wages, and a higher likelihood of going to prison. Society also experiences negative economic consequences through a higher public cost of social expenses, lower tax revenue, and increased health care costs. Due to these undesirable effects of dropping out, educators seek to find a variety of ways to help students graduate from high school. Two of those methods are an at-risk alternative high school and a vocational/ technical program. These interventions target students considered at-risk due to many factors including socioeconomic status, retention in school, attendance, behavior, and academic achievement.

This causal-comparative study examined the difference in four-year cohort graduation rates for Missouri public high schools that do and do not utilize an at-risk alternative high school or a vocational/technical program for the years 2016, 2017, and 2018 as well as the 3-year average over this timeframe. The research conducted will provide data and recommendations to educators to assist them as they try to place students in the best program possible to help them graduate. Statistically significant differences were revealed between schools that did and did not offer an at-risk alternative high school, with a higher mean four-year cohort graduation rate for those that did not utilize this intervention. There were no statistically significant differences between schools that did and did not offer a vocational/technical program, with a higher mean four-year cohort graduation rate for those that did utilize this intervention. This research will not only provide schools with insight into evaluating existing systems, it will present opportunities to create new systems to guide students towards completing high school.

CHAPTER ONE

INTRODUCTION TO THE STUDY

Dropout deterrence programs regularly provide concentrated services to students who are considered at-risk for dropping out of school. If programs are going to be effective, it is critical to properly identify students who, without appropriate intervention, would likely not graduate with a high school diploma (Balfanz, Bridgeland, Fox, DePaoli, Ingram, & Maushard, 2014). Identifying intervention, prevention and dropout recovery programs that effectively work to reduce the dropout rates and increase the graduation rates is vital to GradNation's campaign goal of achieving a national 90% graduation rate by the time the class of 2020 graduates (Sparks, 2013).

Issues related to dropout rates will likely continue to those who drop out of school and the rest of the American population. Balfanz et al. (2014) stated American taxpayers are paying ninety-three billion dollars a year because of dropouts' lost revenues and their increased dependency of social services. Their studies showed that at-risk students and dropouts who do not graduate before the age 25 tend to get into legal troubles and earn significantly less money than their classmates who graduated from high school before age 25.

In March of 2010, the dropout dilemma in the United States propelled President Obama to infuse an additional $900 million in federal dollars into the American school system to increase the percentage of graduates, but the extent to which states have tackled this issue varies greatly (Cline, 2016). The success of intervention and prevention programs in high schools is an important task in curbing the dropout rate and increasing

the graduation rate in school districts. Therefore, knowing which strategies and programs are effective is vital (Briones, Jones, & Challoo 2015).

Problem Statement

Finishing high school is an important step to a productive and meaningful life; it is a requirement to higher education, and it is a supplement to a successful career (Featherston, 2010). It is imperative to create a system or plan that will effectively keep students throughout the nation in school (Wallace, 2016). Research describing dropouts is plentiful, but research on strategies to prevent their exit from school early is not so abundant (Knesting-Lund, Reese, & Boody, 2013). Only recently has the research begun to shift toward moving past identifying students at risk for dropping out and truly advancing early-warning systems and interventions for these students (Hoff, Olson & Peterson, 2015).

Zajacova (2012) indicated those who earn a GED traditionally make less in income than high school graduates, and their potential for employability is considerably less for those who possess a GED instead of those that earn a high school diploma. The average earnings difference was estimated to be $9,200 per year and approximately $267,000 over the course of a lifetime (U.S. Bureau of Labor Statistics, 2018). GED certificate holders earned less than high school diploma recipients even when they did achieve higher education.

Statistics from the United States Department of Labor (2018) illustrated that students who earned a GED were far more likely to be unemployed. The unemployment rate for individuals 25 years and older with a GED or no high school diploma was 6.5% in 2017. The unemployment rate for individuals 25 years and older with no post-

secondary education, but did have a high school diploma, was 4.6% in 2017. While a GED may be beneficial in obtaining a job, the likelihood of finding employment is increased with a high school diploma (Young, 2013).

The state of Missouri uses a variety of data to grade school districts on a "report card" to gauge the effectiveness for an elementary, middle or high school, or for the district as a whole. One of those data points is known as the four-year adjusted cohort graduation rate. A considerable change to the calculation of graduation rates took place in 2008, when the United States Department of Education mandated all states accepting Title I federal funding must adopt the four-year adjusted cohort model for measuring graduation rates by 2010-2011 (United States Department of Education, 2008).

The Missouri Department of Elementary and Secondary Education (DESE) has defined the four-year adjusted cohort graduation rate as the number of students who graduate in four years with a regular high school diploma divided by the number of students who form the adjusted cohort for the graduating class rounded to the tenth (Missouri DESE, 2011). From the beginning of 9th grade, students who are entering that grade for the first time form a cohort that is subsequently adjusted by adding any students who transfer into the cohort later during the 9th grade and the next three years and subtracting any students who transfer out, emigrate to another country, or die during that same period (Missouri DESE, 2011). In 2014, the state of Missouri established the Graduation Matters Initiative. The focus of this campaign was to increase graduation rates for all students using evidence-based practices. There were six essential areas targeted by DESE: school climate, attendance, pro-social behavior, effective discipline, academic competence and success, and engagement of students and parents/families

(Smith & Gilpin, 2014). Its goal was to create a harmonious system across all grade levels that would concentrate on and ensure students' academic, behavioral, and social/emotional success.

According to data released by DESE, the state's annual dropout rate has remained steady since 2016. In 2016 the dropout rate was 2.0%, and decreased slightly to 1.9% in 2018 (Missouri Annual Dropout Rate, 2019). The graduation rate in the state of Missouri has seen an increase since 2016. In 2016, the four-year adjusted cohort graduation rate was 88.98%. In 2017, the graduation rate dropped to 88.95% but rose to 89.23% in 2018 (Missouri Annual Graduation Rate, 2019).

From 2016 to 2018, an average of 106 public high schools were above the state average dropout rate. Of these 106 schools, 58 were above the state average all three years (Building Dropout Rates, 2019). From 2016 to 2018, an average of 98 public high schools were below the state average four-year adjusted cohort graduation rate. Of these 98 schools, 36 were below the state average all three years (Building Adjusted Cohort Graduation Rates, 2019).

With the number of schools falling below the state average in graduation rate and above the state average in dropout rate, further research is needed to examine potential solutions to helping more students achieve the goal of earning a high school diploma. Studies that considered students who failed to graduate from high school often found that students who dropped out of high school had fewer opportunities to gain further education and advance their potential skills and abilities (Kim, Joo, & Lee, 2018). Students who dropped out of high school are more likely to be unemployed, involved in criminal activities, and suffer serious economic and social problems (Rumberger, 2013).

Teachers, administrators, retired education professionals, government officials, and private enterprises have taken an interest in the dropout predicament in the United States. These entities have developed a number of dropout prevention and intervention programs to address the problem. Minimal research, however, exists on the effectiveness of dropout prevention programs (Briones et al., 2015).

Purpose of the Study

The purpose of this causal-comparative study was to test the organization and contingency theories of Max Weber and Joan Woodward (Colgan, 2018) that differences exist in four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. The first independent variable of interest of alternative high schools was generally defined as the use of an at-risk alternative high school as a dropout intervention. The second independent variable of interest of vocational/technical programs was generally defined as the use of a vocational/technical program as a dropout intervention program. The dependent variable was the graduation rate, which was defined as the four-year adjusted cohort graduation rate for a Missouri public high school.

The researcher's study focused on the effectiveness of schoolwide intervention dropout strategies on the four-year graduation rate in the state of Missouri. More specifically, this research concentrated on at-risk alternative high schools and vocational/technical programs utilized within high schools in in the state of Missouri. The key focus of the data analysis was the differences in adjusted four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools and vocational/technical programs.

A variety of perspectives relative to the dropout issue were recognized and an assortment of intervention strategies used to combat this trend in high school dropouts were characterized throughout this research. Characteristics of dropouts were also defined as part of this research. While there is substantial literature regarding programs and attributes of dropouts, the recognition of effective practices that would have a significant impact within our nation's education system as a model to prevent students from dropping out was not readily available.

The National Dropout Prevention Center/Network (Hammond, Linton, Smink & Drew, 2007) has listed hundreds of model programs for student intervention. Many of these programs targeted academic performance, absences, discipline or other risk factors for dropout. Seldom do these programs include dropout reduction as an aim of the intervention (Wilson & Tanner-Smith, 2013a).

Research Questions

1. What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1a. What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1b. What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1c. What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

2. What is the difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2a. What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2b. What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2c. What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null Hypotheses

$H_0$1: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting.

$H_0$1a: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016.

$H_0$1b: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017.

$H_0$1c: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018.

$H_0$2: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program.

$H_0$2a: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2016.

$H_0$2b: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2017.

$H_0$2c: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2018.

Significance of the Study

The researcher in this study explored alternative programs and intervention strategies utilized to address the needs of at-risk students and whether students experienced an increase in the likelihood of obtaining a high school diploma within four years of beginning their high school careers. This study focused on high schools in the

state of Missouri. Administrators in public high schools throughout the country may find the research helpful when collecting information necessary to making decisions related to funding such programs and strategies.

Research classified dropout prevention programs implemented in high schools as either a targeted intervention or schoolwide intervention (Dropout Prevention, 2008). This research examined Missouri programs that fell into the schoolwide intervention category and studied the differences in four-year adjusted cohort graduation rates of high schools with and without at-risk alternative high schools and vocational/technical programs. This examination of high schools in Missouri, with its explicit spotlight on the presence of dropout prevention programs, is important in that it presented data as to where differences in graduation rates exist in schools that do or do not offer at-risk alternative high schools and vocational/technical programs.

Economists contend that persons who are 16-24 years old and not involved in the workforce or in education have short-term and long-term costs for themselves and society, as these persons fail to gain knowledge and skills that will prepare them to become valuable members of society (Belfield, Levin, & Rosen, 2012). The encumbrances for society include lower tax revenues, higher government expenditures, lost earnings, and lower economic growth for each person who did not earn a high school diploma (Belfield et al., 2012). With so many individual and societal problems that stem from students dropping out of school, this research is important to conduct in order to examine potential gains on the graduation rate that can be made from the use of specific intervention programs.

Theoretical Framework

The framework for this study is organization theory. Organization theory, originally developed in the early 1900s by Max Weber, is the study of organizational systems and forms, the relationship of organizations with their external environment, and the actions of supervisors and other personnel within organizations (Colgan, 2018). Organization theory considers how organizations behave and how they impact and are impacted by the environment in which they function (Buzzelli & Allison, 2017). The organization theory lens helps simplify complex variables, interactions, and processes occurring within an organization and gives some context for specific experiences and circumstances. This theory can apply to business, politics, schools and cultural institutions (Ylamiki & Uljens, 2017).

Theorists come from a variety of fields and include thinkers such as Smith, Marx, Weber, Emery, Thompson, and Rorty among others (Hatch, 2006). These theorists developed the early underpinnings of organization theory, but the discipline was not recognized as a concept of thought until the 1960s (Hatch, 2006). It is important to note that there is not one overarching organization theory, but a series of, at times, competing theories that attempt to explain and justify how organizations work and operate (Shafritz, Ott, & Jang, 2011).

Of the many branches of organization theory, Joan Woodward's contingency theory is most applicable to schools trying to determine the best dropout interventions for their students. Developed in the 1950s, contingency theory maintains there is no best way to arrange and lead an organization, or to make decisions within the establishment (Ven, Ganco, & Hinings, 2013). The optimal organization, leadership, or decision-making style

depends upon various internal and external constraints, and the relationship between the organization and the environment determines survival and success (Sayilar, 2016).

Research conducted by Conley and Enomoto (2005) focused on routines, programs, and transformational change within educational settings. Their findings showed that educators need to respond to the students and their given circumstances on an individual basis, and that simply repeating the same intervention for various students is not effective. A student's academic success is contingent on the thoroughness shown in the development of dropout intervention programs and the proper placement of at-risk students within them (Bush, 2015).

The contingent model of organization theory offers an alternative methodology to school management outside of the "one size fits all" belief (Bush, 2015). Creating new systems, based in progressive practices from that of traditional schools, provide wide-ranging opportunities to learn for all students, and students from disadvantaged populations in particular (Ogawa, 2014). Murnane (2013) added that the job of an educator is too multifaceted and unpredictable, and the needs of students are too numerous and diverse to rely on a set of homogeneous responses to events and conditions.

The reflexive approach of contingency theory's value for this specific study lied in the examination of organizational structures and its programs' impact on student performance and decision making relating to the drop-out issue. At-risk students make the decision to drop-out or work toward the goal of graduation in the organizational context of the school (Knesting & Waldron, 2006). An important question to study is how

the school's programs and interventions impact the progress towards graduation of at-risk students.

The application of organization and contingency theories was particularly valuable for this study by focusing on a school's services, programs and policies and how they corresponded with a reduction in the dropout rate of at-risk high school students. Specifically, these theories help address the question of how a school's programs and policies coincide with at-risk students and school completion. Focusing through the lens of this framework, the researcher attempted to answer how a school's programs and policies impact an at-risk student's likelihood to earn a high school diploma.

School systems have an organizational interest in student retention and graduation. Schools and school personnel strive to ensure that a high percentage of students graduate. Organization and contingency theory look at the complex interaction of an organization with a large number of variables that can impact graduation outcomes (Walonick, 1993). Organization and contingency theory is a valuable lens to view the impact of school-based variables on the dropout rate.

Definition of Terms

The definitions below are given to clarify terms used in this study.

At-risk student. In a state or condition marked by a high level of risk or susceptibility to failing academically or dropping out of school (Glossary of Education Reform, 2013).

Dropout rate. For grades 9-12, the number of dropouts divided by the total of September enrollment, plus transfers in, minus transfers out, minus dropouts, added to

September enrollment, then divided by two equals the dropout rate for Missouri public schools (Missouri DESE, 2011).

High school dropout. A student who is enrolled in the current school year but did not return to high school within the school start window, was not expelled, did not graduate, begin college, or begin school in another school district (Verdugo, 2011). A high school dropout is a student who failed to graduate from high school in Missouri public schools. GED recipients are not counted as graduates and are therefore considered a high school dropout in the state of Missouri (Missouri DESE, 2011).

High school graduate. Only those students who earned a regular diploma are calculated into the graduation rate (Gregg, 2010). This excludes students who earn a Graduate Equivalency Diploma (GED).

Off-site alternative high school. A school or separate class group designed to best serve the educational needs of students and helps in realizing the academic criteria of the school district and the state. The school offers flexible scheduling, low student/teacher ratios, individualized instruction, and diverse instructional methods to meet students' learning needs. Most alternative high school students are enrolled in grades 9-12 (Hinds, 2013).

Special education. Specially designed instruction, at no cost to parents, to meet the unique needs of a child with a disability, including instruction conducted in the classroom, in the home, in hospitals and institutions, and in other settings (and instruction in physical education) as defined by the Individuals with Disabilities Education Act (Section 300.39 Special Education, 2018).

Student retained. A student retained is as a student who fails to be promoted and is expected to repeat a grade the following year in Missouri public schools (Missouri DESE, 2011).

Successful dropout prevention program. Any dropout prevention program that may serve as a model and is desirable to replicate, based upon data collected about successful practices (Storm, 1989). The intervention components employed in the program significantly reduce the dropout rate.

Suspension. Removal from the educational setting for a defined period of time while enrolled for the purposes of attendance. Suspensions are typically either in-school or out-of-school (Scott & Barrett, 2004).

Research-Design Overview

The importance of this study was to focus on the matter of increasing the four-year graduation rate by evaluating the effectiveness of specific dropout intervention programs. The study design was quantitative and utilized a non-experimental causal-comparative construct where secondary data were analyzed. A causal-comparative study involves the analysis and understanding of the patterns, differences and similarities across two or more cases that share a common focus or goal (Goodrick, 2014). A study of this nature shows relationships between independent and dependent variables after an event has already occurred. The research conducted in this study reflects happenings from the previous school years of 2016, 2017, and 2018.

Secondary data were previously collected and available for further examination. Quantitative methodology was applied to compare high schools that housed students in an at-risk alternative high school aor a vocational/technical program and their four-year

cohort adjusted graduation rate. An assessment of a program's effectiveness concluded if specific dropout intervention programs had an effect of a school district's goal of increasing the number of four-year graduates from the high schools. The study included the graduating classes of 2016-2018 and was ex-post facto in nature. An ex-post facto study is after-the-fact research in which the examination begins after the fact has occurred without interference from the researcher (Salkind, 2010).

Limitations

Limitations of a study are external factors to the study that cannot be controlled by the researcher (Creswell, 2003; McMillan & Schumacher, 2005). This study is based on the practice that certain student intervention programs, student assistance systems, and precautionary procedures are effective at reducing the number of students who drop out of school before earning a high school diploma. The numerous physical, emotional and social transformations faced by teenagers offer not only challenges but also prospects for intercessions and prevention (Hernandez Jozefowicz-Simbeni, 2008).

Special care has been taken to produce valid results in this study. However, the following limitations should be noted:

1. The findings were a result of data compiled from public high schools from the state of Missouri. Care must be exercised in generalizing the findings of this study.

2. A quantitative study, chosen over a qualitative study, allowed the researcher to analyze data that are accessible to a high school administrator.

3. In the study, analysis was only done based on data on Missouri public high schools and the existence of either an at-risk alternative high school setting or an

alternative/technical program to determine if a potential difference existed between program existence and a four-year graduation from high school.

4. This study design did not have a control group and analyzed multiple school districts.

5. The graduation rate may be due to other school district factors such as better record keeping by personnel, addition or removal of other intervention programs, curriculum changes, or personnel turnover.

6. Besides the selected dropout prevention programs, other variables such as socioeconomic status of students or the high school's student population were not factored. A school administrator cannot control or change the home and community environment of individual students.

Delimitations

Delimitations are conditions placed on the study by the researcher (Creswell, 2003; McMillan & Schumaker, 2005). For this study the delimitations were:

1. Only public high schools were considered and not any private schools or charter schools.

2. The data for this study were secured in 2019 from graduation rate data collected between 2016 and 2018.

3. Analysis was done only on current at-risk alternative high schools and vocational/technical programs within the state of Missouri to determine their effect on the four-year graduation rate.

4. Schools that have had programs at least six years were considered for this study.

5. No consideration was given to changes made within programs within the last six years.

6. The researcher cannot control for the non-response of school districts. Those who did not respond were excluded from the study altogether.

This study's delimitations were chosen by the researcher and therefore did not contradict the research. Rather, these conditions gave clear direction during each phase of the research process. Conversely, the researcher could not control the limitations during the research process. As there are various definitions of graduation rate, the researcher used a clearly defined graduation rate as determined by the state of Missouri during this study.

Assumptions

The importance of this research was to address the issue of increasing the high school graduation rate by evaluating the effectiveness of a specific dropout-intervention program. The location of this study was public high schools throughout the state of Missouri. The following assumptions were made for this study.

1. All data were reported accurately by school districts through DESE's open access database.

2. It is assumed the students participating in an at-risk alternative high school or a vocational/technical program were students who were vulnerable to dropping out of high school as determined by low academic achievement, elevated absence rate, or higher rate of suspension.

3. The at-risk alternative high schools and vocational/technical programs were implemented with fidelity and consistency.

4. Data for the graduating cohort classes of 2016-2018 would be available from the DESE open access database.

5. Honest answers were given by school officials in response to the researcher's survey questions.

Design Control

Through the use of quantitative data related to students in all public Missouri high schools, the researcher attempted to determine if there were differences in the adjusted four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. The research design was causal-comparative and was completed ex-post facto. All data downloaded from the DESE website was previously reported by individual school districts without bias or influence of the researcher. To protect against researcher bias, the researcher did not include survey data from the researcher's current high school of employment.

The researcher created an informational survey to send to principals at all public Missouri high schools to determine the utilization of at-risk alternative high schools or vocational/technical programs during the time period of 2013-2018. The survey was emailed to these school personnel and contained assurance that there would be confidentiality in their responses. A timeline was established as to when surveys should be returned. A follow up email was sent after the initial deadline, to encourage a greater response.

The survey sent to Missouri public high schools contained four questions. In order to maintain consistency with how long the at-risk alternative high schools or vocational/technical programs had been in place, two survey questions addressed this

issue. If schools respond “yes” to utilizing either intervention, they were then prompted to answer if those programs had been in place since the 2012-2013 school year. These responses ensured that all data collected from schools was consistent, and that there were no variations in the length of time some of these methods had been used to help students progress towards graduation.

Summary

This chapter outlined the problem statement which details the issues associated with a large population of high school dropouts in the United States. The purpose of this study was to examine differences in four-year adjusted cohort graduation rates in Missouri public high schools between schools that do or do not utilize an at-risk alternative high school or a vocational/technical program. While there is ample research describing dropouts, research on strategies to preclude their exit from school early is scarce.

The impact of intervention programs is a critical task in reducing the dropout rate and increasing the graduation rate throughout public high schools in the state of Missouri. This study concentrated on determining what interventions are successful at helping students stay in school and earn a high school diploma. Knowing which strategies and programs are effective is vital to effective student intervention application in schools.

The framework around which this study was based holds schools accountable to develop strategies and solutions to address the dropout problem. Organization and contingency theory can be applied to examine how schools and their structures impact student success, and how educational organizations respond to students and

environmental factors that impact their learning. These theories formed the basis for this study.

Research questions surrounding intervention programs and strategies utilized by Missouri public high schools aim to measure whether a greater percentage of students are earning a high school diploma within four years of beginning their high school careers with select offerings of intervention programs. This study was a significant one to undertake. School districts across the state of Missouri are targeting at-risk students and attempting to increase their graduation rates, and are looking for programs which will effectively assist in helping students achieve the goal of a high school diploma.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

In 1983, the National Commission on Excellence in Education published their *A Nation at Risk* report on the current state of affairs in the American education system. One of their chief concerns was for those individuals who did not exhibit a level of reading skills, expertise, or training vital to individual success in the information age. People who were deemed not up to par would lead lives deprived of material benefits, and would be unable to wholly partake in the American life. Those who were destined to lead unfulfilled lives would do so because of an inability to competently perform in different aspects of life (United States Department of Education, 1983). In essence, people without a proper education would be unable to compete and thrive in society, and would be more likely to have a low standard of living compared to better educated Americans.

Chapter Two reviews the theoretical and research literature related to five areas concerning high school dropout: (a) the history of dropouts in the United States and the current state of dropouts in Missouri (b) the consequences of the dropout problem nationwide (c) some of the identifying characteristics of at-risk students and dropouts (d) the types of dropout strategies and (e) dropout intervention programs intended to reduce the dropout rate in Missouri high schools.

An at-risk student is one who is prone to drop out of high school based on characteristics illustrated in research (Logan, 2010). Literature has defined key characteristics that help identify at-risk students. These include: substandard academic

achievement (Williams & Seibert, 2018); low socioeconomic status (Morales, 2016); poor school attendance (Huffman, 2013); grade retention (Rhodes, Thomas, & Liles, 2018); and high levels of discipline (Huffman, 2013). Students with one or more of these attributes may be identified as needing short-term or long-term interventions to reduce their chance of dropping out of school.

In an attempt to lower the dropout rate in high schools, two main strategies have emerged that have yielded a myriad of intervention programs (Rumberger et al., 2017). The first category of strategies is targeted interventions. These methods concentrate on programs that are applied at the individual level, emphasizing work that focuses on academic support and enrichment. Examples of these types of programs include mathematics and reading programs, and credit recovery and online programs.

The second method being utilized in high schools, and the approach this research will emphasize as part of the study, is the schoolwide intervention strategy. Within the schoolwide strategy there are two categories which this study will focus on: personalized learning and rigorous and relevant instruction. Two programs fall underneath these areas. Career and technical programs fall in the area of rigorous and relevant instruction, while at-risk alternative school settings are implemented as part of personalized learning in high schools. Data were collected and analyzed from Missouri public high schools to determine if there was a difference in the four-year adjusted graduation rate for those schools that do and do not offer an at-risk alternative high school or a career/technical program.

Organization and Contingency Theories

Organization theory is the study of organizational systems and forms, the relationship of organizations and its personnel, and how they affect and are affected by their external environment (Jones, 2012). Within an educational institution, more consideration is being given for completion of high school instead of preventing a student from dropping out. This shift lends itself to a deeper understanding of the complicated connections between student, school, family, and community variables as well as risk and protective factors in forming students' journey towards school dropout or completion (Hess & Copeland, 2001). Of the many branches of organization theory, Joan Woodward's contingency theory is most applicable to schools trying to determine the best dropout interventions for their students.

Contingency theory functions under the guise of uncertainty, where informed educators analyze students in the social, cultural, and academic context. This examination can support students and the particular mix of resources and learning activities that will enable them to learn (West, 2012). The risk of dropout is predicted by both in-school and out-of-school influences; the variety of issues affecting student success suggests that effective dropout intervention should focus on at-risk factors both in the school and in the larger family and community context (Freeman & Simonsen, 2015). The shifting external conditions of a student, paired with the internal environments of a school and its intervention programs, yield a unique situation for each at-risk student who is struggling to earn a high school diploma. The contingent model of organization theory offers a different approach school decision-making where each individual student's program for success looks different (Bush, 2015).

The contingent method supposes that the response of educational leaders to the distinctive difficulties and external conditions of students is significant, and that schools must differ their reactions to each unique situation for students to be successful (Leithwood, Jantzi, & Steinbach, 1999). Among the barriers to research in this area is the fact that many interventions that can be rigorously evaluated are narrow in focus and modest in scope; complex interventions that address multifaceted needs of students at risk of dropout can be difficult to study (Murnane, 2013). This theory is suitable to use for this study in that it focuses on decisions that have to be made in a school environment for students in need of an intervention to be successful in obtaining a high school diploma. Educators must know every child and every child's story, their circumstances and their families (Bui, 2013). Participation in either an at-risk alternative high school or a vocational/technical program can sometimes make the difference in a student graduating or dropping out of school.

Dropouts and Their History

Initial worries about decreases in the number of students graduating from high school occurred throughout the first half of the twentieth century (Gonzalez, Kennedy, & St. Julien, 2009). Before dropping out of school could be considered a social concern, graduating with a high school diploma had to be thought of as the standard in the American society. The belief of high school graduation as the American standard was prompted by two key elements: the increased registration of students in school during the middle part of the twentieth century, and the growing job market during the same time frame (Kamenetz, 2015).

Research conducted by Hodgkinson (1985) found that during the early 1900s, only six percent of students graduated from school. Woodring (1989) stated that in the 1920s approximately 50% of the school-aged youth attended high school and only half of them completed all four years. Child labor laws were implemented in the 1930s and 1940s. These policies altered how society viewed education as schools became the proper and established place where youth spent their teenage years. Educators had expanded the mission of high schools by the end of World War II to include the goal that schools should assist students in their adjustment to adult life (Dorn, 1996).

As the job market expanded during the 1940s, the technical expertise needed to gain employment also made it more difficult for teenagers to find work. American enterprise saw an increased use of technology in the workplace, tighter administration of child-labor laws, and growth in the number of immigrant adult workers (Dorn, 1996). These factors kept more teenagers in school for extended periods of time, which yielded increases in the graduation rate. Completing high school became the American standard in the postwar United States during the 1940s, and the rate of graduation steadily increased throughout the 1950s and 1960s (Swanson, 2010).

During the 1950s, keeping adolescents in school became a priority for educators. From 1940 to 1975, the percentage of 25 to 29-year-old adults who completed 12 years of education gradually increased from 37.8 to 83.2% (Roderick, 1993). “Dropouts” were first considered an issue in the 1960s when the term, which originally referred to students who were “eliminated from school,” was coined to describe students who did not graduate with a high school diploma. For the first time, students not completing high school were considered a failure of the education system, whose essential objective was

to provide an education for every child (Dorn, 1996). Many at-risk students were categorized as underprivileged or minority in the 1960s (Cooper, 1988).

The National Center for Education Statistics began tracking dropout rates in the 1970s. In 1979 the *Critical Issue Report* was issued by the American Association of School Administrators. This summary on the current state of education asserted that retaining students was a considerable problem on a national level for school administrators (Lam-Yip & Lewis-Zavala, 1998). Even with a growing concern over students not earning a high school diploma, government concern over policies to address the dropout dilemma did not take shape until the 1980s.

Due to the growing concern over the quality and conditions of our nation's schools, a detailed study entitled *A Nation at Risk* was conducted by the National Commission on Excellence in Education in the early 1980s. This report outlined the deteriorating state of America's education system as compared to other countries. This report proposed recommendations for improvement. Among these recommendations were increased expectations for academic outcomes and student behavior (United States Department of Education, 1983).

In Missouri, the "Excellence in Education Act" passed in 1985 specifically required school districts to establish standards of discipline and a detailed standard of conduct to be followed by all students, and also to identify fundamental skills and develop testing programs to measure competencies in these areas (Bliss & Honeyman, 1986). These subjects included science, mathematics, social studies, civics, English, reading and language arts. By the end of the decade almost every major school system in

the United States had established policies and programs aimed to increase their graduation rate (Roderick, 1993).

During the 1990s a variety of studies investigated the dropout problem in the United States. Hyde (1991) examined perceptions of school leaders on the roots of student dropout and contended if school leaders understood their part in curtailing dropout rates, more students would desire to earn their high school diploma. Smith (1992) ascertained education experts believed change is best implemented at the school level, while theorists and academics are concerned with how the change is communicated to and accepted by the community. Smith believed that unreasonable amounts of change in a school system lead to students dropping out, and too many programs may lead to a lack of fidelity in implementation of programs that are intended to target at-risk students. In addition to Smith's research on the school system research, Byrk, Gomez, Grunow, and LeMahieu (2015) studied large-scale transformations of hundreds of high schools into smaller schools. Their research showed that structural changes implemented in many of these buildings failed to bring about the instructional and idyllic changes necessary to advance the academic achievement and well-being of high school students.

The connection between the dropout rate and school suspensions was studied by Henderson and Friedland (1996). They concluded that students with a higher number of discipline incidents that result in suspension drop out of school more frequently than compared to students with fewer suspensions. Henderson and Friedland also found that principals must make impartial decisions and implement school policy equally to all students.

In 2002 the No Child Left Behind Act was signed into law. This legislation required measures of accountability for school districts to ensure a steady advancement of achievement for all students who attend public schools (United States Department of Education, 2008). A fundamental principle of the Act was to set success standards for the legislation by requiring all students read and apply mathematical concepts at grade-level or above by 2014. Additionally, all states were expected to recognize and report high school graduation rates as a means of determining academic accountability (United States Department of Education, 2006), leading to a revived interest in high school transformation as well as increased accountability standards for public schools (National Association of Secondary School Principals, 2005).

In 2011, the Missouri Department of Elementary and Secondary Education (DESE) developed a strategic plan entitled "Top 10 by 20" for the state's education system. The proposal was that as a whole, all Missouri schools would be in the top 10 of 50 states in the nation by the year 2020. The goals included in this plan targeted graduating students being prepared for college or a career, success for students entering kindergarten, developing and supporting effective educators, and improving departmental efficiency and operational effectiveness within DESE (Missouri Department of Elementary and Secondary Education, 2011). In the 2011-2012 school year, the United States reported a four-year graduation rate of 80%, although minorities were still lower at approximately 67% (Stetser & Stilwell, 2014).

It is imperative that school districts prioritize its at-risk students and actively engage with assisting them in obtaining a high school diploma. Not only is graduating from high school beneficial to their own well-being, but to the overall health of the

United States economy and its society as a whole. Earning a high school diploma yields further education opportunities, and generates additional employment prospects at higher wages.

Consequences of High School Dropouts

In the twenty-first century workplace, where the competition for employment worldwide is fierce, employers are consistently requiring a minimum educational attainment of a high school diploma for their workers (Pharris-Ciurej, Hirschman, & Willhoft, 2012). Those who do not graduate from high school are more likely than their contemporaries who graduate to live in poverty, be unemployed, receive assistance from a social program, commit a crime that results in prison incarceration, divorced, and in the end become single parents with offspring who also become high school dropouts (Low & Weiler, 2012). When wages are compared, high school dropouts are paid an average of $9,200 less per year than those with a high school diploma, and earn approximately $1 million less during a lifetime than college graduates (U.S. Bureau of Labor Statistics, 2018). Dropouts who are employed "earn an average of only $12.75 per hour, with the most common jobs found in the construction, food-service and landscaping industries" (Messacar & Oreopoulos, 2013, p. 55).

The lack of a high school diploma can have an impact on an individual's health. Compared with high school graduates, adults who received a GED were considerably worse off in twenty-five health indicators, from ongoing conditions to serious illness and numerous universal health factors (Zajacova, 2012). Failure in school has also been linked to being less effective in adult responsibilities tied to family and job, a greater

chance of suicide and early death, and a higher risk for admittance to mental hospitals (Rumberger, 1987).

Dropping out of high school not only has an impact on individuals, it has a significant effect on the United States' economy (Burrus & Roberts, 2012). A 2016 study from the Center for Civil Rights Remedies at UCLA estimated that each high school dropout costs the nation more than $163,000 in lost tax revenue in their lifetime, totaling an $11 billion fiscal loss throughout the United States. Each dropout incurs more than $364,000 in social expenses as well, such as increased health care expenses that cost society a total of more than $24 billion. The United States profits from higher amounts of tax revenue, improved worker output, and increased purchasing power from those who possess high school diplomas (Zajacova, 2012). Students will have the opportunity to graduate, enter college, get a better job, and live a more productive life with a high school education (Messacar & Oreopoulos, 2013).

High school dropouts not only cause harm to the individual, but are also a detriment to society as a whole (Burrus & Roberts, 2012). Taking a closer look at the consequences of dropouts gives credence to developing solutions to reduce the number of students who do not graduate with a high school diploma. Researching the effect of high school intervention strategies and dropout programs on the graduation rate will allow school districts to more accurately categorize what is making a positive difference at reducing the dropout rate in their high schools and positively impacting the socioeconomic status of American citizens and the entirety of society.

At-risk Students

Educators have long been mindful of the term “at-risk,” and for decades have sought remedies for those who are less likely to be successful in school. Within the system of education, teachers and administrators come across students in each school who can be deemed "at-risk" for educational success in one way or another (Washington, 2015). The search for an answer to a student’s school struggles falls right in line with contingency theory and its emphasis on differing internal and external factors.

Being at-risk suggests a troublesome possibility that a student may achieve at a low scholastic level with a higher probability of dropping out of school (Bowers, Sprott, & Taff, 2013). An at-risk student with a greater chance of dropping out of school is any student who needs short-term or long-term intervention in order to succeed in school and to earn a high school diploma with significant opportunities for their future (Education and Economic Development Coordinating Council, 2007).

Students who are considered at-risk are categorized as such because they have a greater possibility of not earning a high school diploma when compared to non-at-risk students. There are several factors that are considered to be contributors to students being classified as at-risk. These include a substandard level of academic achievement, low socioeconomic status, below average attendance and a high number of truancies, grade retention, and high rates of discipline and suspension (McIntyre, 2013). In many instances, multiple risk factors can combine to increase students’ risk of dropping out in high school (Bowers & Sprout, 2012).

Academic achievement. The first factor that increases the likelihood of a student to be classified as an at-risk is poor academic achievement. Academic achievement is a

measurement of student success determined by aptitude in academic areas, usually stated using a GPA (Gard, 2014). Poor academic achievement is associated with dropping out of school and has earned extensive attention over the last few decades (Pyle & Wexler, 2012). Factors connected to poor academic achievement include low test scores and grades, placement on nonacademic path, disciplinary problems and grade retention (Gard, 2014). The pressure to achieve academic benchmarks that seem out of reach may lead some students to detach from school and dropout (Cornell, Gregory, & Huang, 2013).

Research conducted found that grades and course failures in core academic classes tended to be better indicators of dropout than test scores (Allensworth, Gwynne, Moore, & De la Torre, 2014). McKee and Caldarella (2016) studied 416 middle school students from three large suburban middle schools. These researchers concluded that middle school GPA, D grades, and standardized math test scores were the strongest predictors of high school performance and were ultimately linked to high school completion. The academic difficulties of high school are typically greater than that of middle school, which can lead to substantial amounts of course failure in the freshman year (Pharris-Ciurej et al., 2012). Poor academic performance that continued through ninth grade typically led to academic difficulties throughout high school and increased the risk of dropping out (Hemelt & Marcotte, 2013).

Eighth graders who failed math or English class were 77% more likely to become dropouts (Neild & Balfanz, 2006). The researchers also found that high school students who failed to earn ample credits to advance from ninth to tenth grade was the most significant risk factor for dropping out. In addition, the inability to pass exit exams plays

a growing role in the decision to drop out of high school for many students with academic struggles (Hemelt & Marcotte, 2013).

The research discussed in this section indicates that there is a strong correlation between a student's academic success and graduating from high school. The likelihood of not graduating is increased by the failing of core subjects and the inability to earn credits in school. Students with poor academic achievement often have low test scores and course grades which are a predictor of dropping out of school.

Socioeconomic status. Another factor contributing to lower grades and the dropout rate is socioeconomic status. The poverty level of students is a significant forecaster of success in high school and earning a high school diploma. While poverty alone does not determine if a student will leave high school, it is a risk factor that influences the decision (Bowers, 2017). Impoverished students can be found in populations that are categorized by shortcomings that may impact underachievement in school, such as susceptibility to downturns in the economy, diminishing populations, and deficiency of health services and cultural resources (Rumberger, 2013). Students with a low socioeconomic status are frequently alienated from their peers because they belong to a different social class than the rest of their contemporaries.

Numerous students from low socioeconomic conditions leave school without degrees (Leech, 2012). Whether caring for younger siblings while parents work or taking jobs themselves, many teens in lower socioeconomic situations find themselves in the position of taking on adult roles within the family (Bowers, 2017). These students face burdens that contribute to the decision to drop out of high school without considering the implications this decision will have on future earning potential. An extensive analysis of

dropouts was done by Hammond, Linton, Smink, and Drew (2007) to determine the risk elements and situations under which students drop out of high school. These researchers reviewed 3,400 studies on high school students who failed to earn a high school diploma and determined that 83.3% of the studies attributed low socioeconomic status as a considerable predictor of dropout status.

Research by Jiang, Ekono, and Skinner (2016) showed the percentage of children living in low-income families increased from 39% in 2008 to 44% in 2014. Their study concluded that a student's socioeconomic situation is a crucial influence in establishing whether they will have positive academic outcomes. Amid impoverished youth, academic failure is commonplace, especially with disadvantaged children from racial-ethnic minority groups (Hokayem & Heggeness, 2013).

Rumberger (2013) states that underprivileged communities affect child and adolescent development because of harmful peer influences and a minimum amount of resources. The researcher also observed that students living in poverty are more likely to socialize with other youths who are dropouts, which increases the chances that they will not graduate from high school. Students living in impoverished homes struggle to adapt to the rules and social norms of schools that function in a middle-class living standard (Payne, 2005). There are complex and hidden principles of behavior in middle-class schools that prompt kids of poverty to be distressed or ashamed which can cause discouragement in the classroom (Shonkoff & Garner, 2012).

A study by Coley and Baker (2013) observed that 64% of children from the middle- and upper-class income groups were read to daily by a family member, while only 40% of youth in disadvantaged families were read to by a family member. Their

research revealed that children whose families live in poverty repeatedly start school with a learning shortfall because of the lack of educational stimulation in the home. This is symbolic of the absence of resources and time families living in poverty can devote to the early educational growth of their children.

As evidenced, research indicates these students struggle with social issues and have a difficult time connecting with classmates. Impoverished students also tend to have lower test scores and higher course failures than their peers. A low socioeconomic status is especially predictive of dropping out of school for students from minority ethnic groups.

Attendance. Another factor that increases the possibility of a student being categorized as at-risk is attendance. Educators measure student attendance by comparing the number of days a student attends school in a given school year with the total number of days in that school year (Benner & Wang, 2014). Research indicates that students who miss 10% or more in a given school year are at a greater risk for academic failure than students who attend school on a regular basis (Chang, 2012). Once a student falls behind in school their attendance declines, which has been shown to have a substantial influence on a student's decision to drop out of school (Marvul, 2012).

A poor rate of attendance in school can be affected by truancy, illnesses, and discipline incidents that lead to suspension (Balfanz & Byrnes, 2012). Children living in a low socioeconomic status household are more susceptible to sickness. This is linked to their inability to access preventative health care and health insurance. The children's ailments yield more school absences, which cause the child to fall behind in their academic work (Hazel, Vazirabadi, & Gallagher, 2013).

Even somewhat poor attendance in ninth grade can be linked to eventual dropout (Gasper, Deluca, & Estacion, 2012). In a study by Allensworth and Easton (2007), only 63% of ninth grade students who missed approximately one week of school during their freshmen year earned a high school diploma within four years, compared to 87% of students who missed less than one week of school. Furthermore, in research conducted by Young (2013), most of the high school dropouts that participated in her study experienced a high level of absenteeism during an extended period of time, which led to them dropping out of school more than one time.

Truancy is an issue that many schools must deal with on a daily basis. Truancy refers to an unexcused absence in which the parents have not notified the school of their student's absence (Benner & Wang, 2014). It is a district-wide problem that occurs as early as second grade (Conner & Pope, 2013). According to Schoeneberger (2012), student attendance reflects student engagement, as students with low attendance may feel disconnected from the school environment. The National Center for School Engagement (NCSE, n.d.) reported that students who lose interest in school are at a higher risk for substance abuse and participating in delinquent activities. NCSE also stated that students who are chronically truant undergo greater rejection and have low self-esteem.

Chronic truancy is defined as absences from school by a student who is subject to compulsory education without a valid excuse for 10% or more of the school days in one school year (Truancy, n.d.). A study by Heppen (2013) revealed that a student who misses more than 10% of instruction time is at greater risk of dropping out of school and should be considered for intervention. Approximately 45% of students began missing

classes one year prior to dropping out of school, and almost 65% of those students often dropped out that same year (Rumberger & Rotermund, 2012).

Students who have a low rate of attendance and a high number of truancies are categorized as at-risk. These absences can be linked to illness, discipline, lack of student engagement, and socioeconomic status. Absences from school can lead to low academic achievement and ultimately not earning a high school diploma, and is a problem that can start as early as elementary school.

Retention. Being held back in school, which is also known as being retained and repeating the same grade, is a significant factor that can cause students to be considered at-risk. The consequence of grade retention on students potentially dropping out of school was studied by Roderick (1994). No matter the age of retention, students who were held back at least one grade were three times more likely to drop out of school than students who had not been retained. Roderick observed that students who were over age in relation to their peers either due to starting school at an older age or being retained were more apt to disengage from school and have higher rates of absenteeism or drop out of school.

Retention is a strategy used to give academically struggling students a chance to fortify their learning, and for some districts is a requirement of students who unsuccessfully complete a grade to repeat the grade the following year (LeBlanc, 2016). Retained students repeatedly have poorer achievement (predominantly in language arts and reading) compared to the majority of students who were not retained (Smith & Herzog, 2014). In addition, many students who are held back a grade display behavior

problems and are socially and emotionally deficient when compared to peers (Dupéré, Leventhal, Dion, Crosnoe, Archambault, & Janosz, 2015).

Using the strategy of retention to support students that struggle with academics has been correlated with a negative cost-benefit (Dombek & Connor, 2012). Grade retention is often replaced with social promotion. Social promotion is the process of advancing a student to the next grade level despite limited mastery of skills and knowledge. It is the belief that this promotion will boost self-esteem and improve a child's likelihood of academic success (Lynch, 2013). Social promotion is a common practice in many states and school districts and despite failing grades, students move on to the next grade level (Smith & Herzog, 2014). After being socially promoted more than once, children fall further behind in their academics. The probability of dropping out of school or not graduating on time becomes a greater possibility with continued social promotion (Im, Hughes, Kwok, Puckett, & Cerda, 2013).

Alexander, Entwisle, and Horsey (1997) researched high school dropouts. The researchers determined that 64% of elementary school students that repeated a grade, and 63% of the middle school students held back failed to earn a diploma. Failure to be promoted in high school is directly related to the earning of course credit. This creates a circumstance where a student who has academic deficits may be recognized by age in a lower grade than their peers (Range, Holt, Pijanowski, & Young, 2012). Lynch (2013) conducted a survey on the negative effects of retention. His findings concluded that graduating without required skills is more damaging to students than the short-term pain caused by retention.

The advantages of grade retention as a method of dissuading students from dropping out continues to be scrutinized. Researchers identify grade retention as a singular event, while dropping out of school is a process that takes place over several years. While grade retention is closely examined and its positive impact on graduation rates remains in doubt, it continues to be a widely used intervention and is an important indicator for potential dropouts (West, 2012).

Repeating a grade is an at-risk factor for students and increases the likelihood of dropping out of school (Smith & Herzog, 2014). Research does not provide any significant support for retention increasing the chances of a student graduating. Social promotion also complicates a student's ability to be successful in school as it allows students to move on to the next grade level, even though they have not earned high enough grades to be promoted (Im et al., 2013).

Discipline. Poor behavior which leads to discipline in school make it more likely that students will be recognized as at-risk. In a 2007 study by Suh and Suh, research showed that if a student had previous instances of suspension from school, the chances of the student not earning a high school diploma increased by 78%. Research conducted by Lee, Cornell, Gregory, and Fan determined that suspension does have a correlation with dropout rates, regardless of ethnicity (2011). Students who struggled academically and were retained early in their education continued to struggle academically and exhibit poor behaviors in middle and high school (Im et al., 2013).

Students who have poor relationships with teachers or peers, dislike school, do not respect authority, abuse drugs or alcohol, or come to school for the purpose of creating violence are at risk for dropping out of school (Ehrenreich, Reeves, Corley, &

Orpinas, 2012). These behaviors which disrupt student learning and instruction may include spontaneous actions, quarrelling with peers, defiance of authority, and an inability to follow school rules (Henry, Knight, & Thornberry, 2012). Students displaying disruptive behaviors in the classroom encounter social, psychological, and academic problems, and may strain finite school services and resources (Wilkerson, Perzigian, Justin, & Lequia, 2016).

Inappropriate behaviors in school, notably behaviors that result in recurring suspensions or an expulsion, can intensify a student's disengagement from school (Mooney, 2017). Wang and Fredericks (2014) reported that involvement in delinquent behaviors, including substance use was predicted by early disengagement in school through behavioral and emotional issues. Research conducted by America's Promise Alliance (2014) showed that the typical classroom referral for discipline lead to a loss of 45 minutes of instructional time for students. This loss of time in the classroom for students who more frequently receive discipline referrals can lead to them falling behind in academic achievement (Boyd, 2014).

As schools continue to focus extensively on zero tolerance policies for behavior offense and on school-wide safety programs, it can be discerned that these developments have occurred without establishing adequate programs to preclude negative behaviors (Hawkins, Jaccard, & Needle, 2013). Students who are at risk of academic failure usually display inappropriate behavior to cover up their inability to learn the needed skills, thus creating discipline problems (Giridhar, 2013). While educators often use suspensions as disciplinary consequences, Flannery, Frank, and Kato (2012) note that these

consequences are not an effective means of preventing truancy among high school students.

It has been concluded that disruptive behaviors in school can classify students as being at-risk and can lead to suspensions, a loss of instructional time, a disruption in learning, and ultimately a loss of earned credit and a higher chance of dropping out of school. Discipline referrals at a high rate, even in elementary and middle school, indicate an increased likelihood of not earning a high school diploma. As zero tolerance policies and school safety continue to be a priority in schools, students facing multiple suspensions become more disengaged from school and need numerous supports to help them be successful in the classroom.

Dropout Prevention Strategies and Intervention Programs

With more than 7,000 students dropping out of high school every day and over one million students dropping out of high school each year across the United States, dropout prevention remains a crucial connecting point between educational research, policy, and practice (Freeman & Simonsen, 2015). Students considered at-risk fall into different categories depending on the factor, or factors that have placed them at a higher risk for not earning a high school diploma. There are several interventions that can be utilized to help decrease the chance of a student dropping out of school. These strategies typically range from broad, school-wide approaches to intense, student-focused methods. The end goal for both intervention types is to keep students in school and graduate with a high school diploma.

In researching contingency theory, Hanson and Brown (1977) found that problems emerging from a school's unpredictable environment must proceed through a

series of stages and can be pointed in any number of directions depending on the set of circumstances surrounding each step. Similar types of problems such as discipline, academic weaknesses, or resource shortages tend to produce comparable types of contingencies. Some level of predictability of which intervention type is most appropriate for each student tends to materialize once the type of problems and the makeup of the contingencies facing them have been identified.

No Child Left Behind created a sense of urgency among policymakers and educators to consider the many social and academic challenges that come with educating today's youth (Frazier, 2018). In 2017, the *What Works Clearinghouse* published a best practice guide for the Institute of Education Sciences (IES) to identify the most important research in relation to the difficulties of implementing and sustaining school intervention programs (Rumberger et al., 2017). Their goal was to produce evidence-based recommendations for educators that would address the challenge of reducing the dropout rate in the United States. The guide provided by the IES presented a set of four proposals for reducing dropout rates. These endorsements, fell into two categories: targeted and schoolwide interventions.

Targeted interventions include those that involve academic support and enrichment, and improvement of behavior and social skills. Schoolwide interventions include those that focus on personalized learning as well as rigorous and relevant instruction. The primary focus of this research is on broader, schoolwide interventions aimed at providing support to multiple students in a learning environment. Within the schoolwide approach an emphasis will be placed on programs that are concentrated on the areas of personalized learning and rigorous and relevant instruction.

Personalized learning centers on students who are the most at risk of not earning a high school diploma by comprehensively intervening in their academic, social, and personal lives (Rumberger et al., 2017). These strategies are aimed at specific students who have been identified as more likely to drop out of school. These schoolwide interventions create small, personalized learning communities to facilitate monitoring of academic progress and flexible support to facilitate graduation for all students in school (Rumberger et al., 2017).

Strategies that fall into this category are more likely to be implemented in schools with a large population of at-risk students, and recognize that internal factors within a school can encourage a student to dropout (Nelson, Smith, Fien, Crone, Baker, & Kame'enui, 2016). Schools who implement programs of this nature often times acknowledge they have flawed systems within their own building. Their focus shifts away from the external environment of their students (Rumberger et al., 2017).

Rigorous and relevant instruction concentrates on the engagement of students by providing a curriculum and programs that connect schoolwork with success in college and careers (Rumberger et al., 2017). Courses and instruction focused on increasing the applicability of school to work, building helpful relationships, and aiding students in managing social and emotional challenges can help prevent disengagement in school (National Center on Safe Supportive Learning Environments, 2016). These programs help prepare students for life after high school by providing courses of study that students find personally relevant, as well as academically challenging in nature (Laing & Villavicencio, 2016).

Schools who utilize programs such as these hope to engage students in school in an area where they are interested in their classes and see their education as vital to their future, coupled with a sense of belonging in their school setting (Rumberger et al., 2017). Positive relationships between teachers and students are critical to keeping at-risk students engaged, especially for students who suffer from low attendance rates and declining grades (Johnson, Simon, & Mun, 2014). Through classroom instruction and hands-on internships, students hone their social and emotional skills while reinforcing skills that can be utilized in college or a career (Bryson & Opitz, 2008).

Schools, in an effort to reduce the dropout rate in their districts, have constructed an all-inclusive approach to dropout prevention that integrates various suggestions and brings together both schoolwide and targeted interventions such as those discussed above (Rumberger et al., 2017). When high school students fall behind their peers, schools must employ intervention strategies to meet the varied needs of their students to reengage them in their education (Wilson & Tanner-Smith, 2013b). There are many practices that revolve around the two intervention strategies outlined in this research, which in recent years has been framed around a more flexible school-level perspective (Fall & Roberts, 2012).

Successful interventions depend on precise identification of student performance and data about what is and what is not effective for students and what adjustments need to be made, such as whether or not to move a student in or out of a more rigorous level of support (Duffy, 2007). Some students need alternate ways to complete tasks, alternative timelines and paths to complete school, and the meticulous evaluation of current school programs is critical (Woosley, 2015). Utilizing the contingency branch of the

organization theory model, schools make choices which are essential in establishing the desired close match between the organization, the student, and the various conditions affecting the external and internal environments. For this study, these choices consist of placement in an at-risk alternative high school or a vocational/technical program. These particular schoolwide interventions fall into the categories of rigorous and relevant instruction and personalized learning as detailed by the *2017 Secondary Schools Dropout Prevention* report produced by the IES.

Intervention strategy one - personalized learning. The first schoolwide intervention involves the personalization of instruction and the learning environment. This strategy targets multiple students in its approach to helping at-risk students achieve a high school diploma. Lucio, Hunt, and Bornovalova (2012) identified students that have a history of low academic achievement and a high absentee rate as those who would benefit most from specialized support at school. A personalized learning environment brings about a sense of togetherness and develops circumstances where students and teachers can strengthen relationships, and backing is provided for academic success as well as improved social and behavioral skills (Ellerbrock & Kiefer, 2014).

The achievement and performance of at-risk students have become a primary goal of many schools' missions and objectives (Hemmer & Uribe, 2012). To achieve this objective, schools have developed specialized programs that target the needs of individual students in order to help them progress towards graduation. A personalized learning environment produces a sense of attachment to school and encourages a feeling of community, and promotes a school culture where teachers and students build relationships with each other (Kemple, Connell, Klem, Letgers, & Eccles, 2005).

Students can become apathetic towards school to the point where they feel little connection to school and never earn a high school diploma. Research by Hoffman (2015) acknowledged that many of the traditional setting impediments such as large schools and class sizes made it difficult to give some students the personal attention needed for academic success, and led to minimal connections to school personnel. These issues can be directly addressed in many alternative settings which can provide smaller class sizes, a lower teacher-student ratio and a focus on counseling and academics (Hoffman, 2015).

Alternative environments that have reduced class sizes give students more opportunities to have academic success (Hoffman, 2015). Personalization is especially critical at the middle school and high school levels as class sizes are frequently larger than those at the elementary level (Mooney, 2017). In small classes, instruction can be personalized, adaptable, and self-paced, which may create a more relaxed atmosphere and can lead to increased academic success, school attendance, school culture, and decreased dropout rates (Washington, 2015). Student results were most improved when a nurturing and responsive environment was paired with a concentrated effort on learning and high expectations (Rumberger et al., 2017).

Students who obtain specialized instruction from teachers may be more focused on learning because the teachers are able to better motivate individual students (Washington, 2015). One approach, an alternative high school prototype, advises that schools enroll a maximum 500 students in order to develop a sense of community (Dropout Intervention, 2008). Alternative education for at-risk youths in public schools includes at-risk alternative schools, charter schools, district funded community-based

schools or programs, and schools and programs that have evening and weekend sessions (Messacar & Oreopolos, 2013).

At-risk alternative high school settings. One option to help at-risk students progress towards graduation is an alternative high school setting. Dropping out of school is the leading choice for those at-risk students who find a traditional school setting too unyielding to accommodate for a high school diploma (Tuck, 2013). The curriculum implemented in traditional educational systems lacks the emotional connection that needed to support all students (DeAngelis, 2012).

To provide support and to ensure success for all students, alternative education programs are implemented in many school districts. Alternative education programs are frequently seen as customized opportunities intended to meet the educational needs for students recognized as at-risk for school dropout (Porowski, O'Conner, & Luo, 2014). Teachers, administrators, and other educators perform vital roles in alternative schools, as they present inventive instructional practices and motivate students to exhibit fresh behaviors in order to achieve individual, academic, and societal goals (Leu, 2005).

At-risk alternative education can be defined as a public elementary or secondary school that targets needs of students that generally cannot be met in a regular school or does not fit into the categories of regular, special, or vocational/technical education (Lehr & Lange, 2003). At-risk alternative schools allow publicly funded schools to not only meet the educational needs of students, but also the emotional, physical, and social obstacles of youth that are not addressed by mainstream school systems (Bascia & Fine, 2012). Students must choose this educational setting or be placed in the school by the district, and it must be at no additional cost to the student (Garrett, 2018).

The students who are part of these programs are generally underachieving and typically are lacking graduation credits or are at least one grade level behind their cohort group (Jossell, 2012). The students who have negative experiences in school are inclined to respond poorly in a traditional school that is not fitted to sufficiently respond to student needs and need an alternative setting (McGee & Lin, 2017). Research conducted in 2012 revealed that when at-risk students are removed from their unproductive environment of a traditional education setting and situated into more accommodating and targeted programs of an at-risk alternative school, the students started to show gains in their academic achievement (Aud et al., 2012).

The large size of a class and the minimal amount of time teachers have for individualized attention to each student may hamper the success of students who need more assistance to flourish in school (Jolivette, McDaniel, Sprague, Swain-Bradway, & Ennis, 2012). A 2013 study by Hutchinson and Henry found that at-risk students in an alternative school setting showed statistically significant increases in grades, attendance, and good behavior. Students that transitioned back to a traditional high school setting found themselves with decreased behavior suspensions, but with an increased rate of failing grades and poor attendance.

In a study of alternative schools, Turpin and Hinton (2000) discovered that 91% of students surveyed indicated there was an improvement in grades for those who were placed in an alternative school setting for academic deficiencies. When alternative high school graduates are successful in furthering their academic, social and behavioral skills, they become more sought-after within the workforce (Messacar & Oreopoulos, 2013). According to Petty and Thomas (2014), implementing programs that advance the career

development skills for at-risk students, such as the alternative high school, have a direct positive effect on the graduates, the community and society.

Research conducted on alternative high school settings found that those schools whose focus was on academic support and enrichment as opposed to discipline or correction were effective at dropout prevention (Franklin, Kim, Streeter, & Tripodi, 2007). In comparison to a cohort of high school students, Hutchinson and Henry (2013) observed that students who attended the alternative school exhibited a higher dropout rate when compared to a cohort of high school students in a traditional setting in the district. Policymakers, researchers and educators have been working to recognize how to better serve at-risk student populations and further effective policies and best practices for alternative education settings (Deeds & DePaoli, 2017).

In a study conducted in 2013, Hinds recognized alternative schools as being able to introduce new and innovative ways of working with learners and provide an opportunity for educational experimentation on a small scale. Hinds also identified the difficulty in evaluating at-risk alternative schools using methods designed for a traditional setting and holding them to the same level of accountability. Further research is needed to help determine the impact of alternative high school settings on the graduation rate.

At-risk alternative high schools help meet the educational, emotional, social and physical needs of students who have not been successful in a traditional school setting. This intervention serves as an expansion of the conventional high school. Students considered at-risk for dropping out and not on track to graduate may find an alternative placement beneficial to their academic success.

Intervention strategy two - rigorous and relevant instruction. The second schoolwide strategy is to implement engaging and relevant lessons to better involve students in their education and prepare students for success after graduation. Classrooms showing rigor are student-centered, giving responsibility of learning to the student instead of the teacher (Gentry, 2018). Students develop meaning from teacher-led instruction that emphasizes experiential learning in a project-based classroom to further develop their subject knowledge and skills (Quint & Condiffe, 2018). Engagement can be increased by giving students the proper abilities to earn a high school diploma, and by showing students what opportunities they may have beyond high school.

Students must be ready for educational opportunities and jobs after high school, but according to according to Rothman (2012) "a large proportion of U.S. high school graduates are ill-prepared to meet the challenges of college or career" (p. 10). Schools can employ changes directed at advancing instruction to provide students the essential skills to earn a high school diploma as well as the expertise to succeed in postsecondary education and on the job (Rumberger et al., 2017). Students often are not challenged to do critical thinking, explain their reasoning, or debate with their peers. These are very important steps in allowing children to gain a deeper depth of understanding of their learning, which in turn helps prepare students for real life scenarios (Maye, 2013). Students need to have a purpose for earning a high school diploma. This has led to integrating career-related programs, challenging academic curriculum and instruction, and components of career advisement into the school standard (Constantine, Seftor, Martin, Silva, & Myers, 2006).

Secondary education has mostly been made up of two tracks; the academic and the technical track. These pathways replicate the focus of education, which has been typically tied to meeting the labor needs of society, giving purpose to education, and assisting all social groups in becoming assimilated in the economy (Van Scyoc, 2016). Career and Technical Education (CTE) proponents contend that non-college bound students should strive towards developing applicable workplace skills. CTE programs should create global awareness, collaborative skills, and competence necessary for student success in the 21st century workplace (Scardamalia, Bransford, Kozma, & Quellmalz, 2012).

The various pathways system includes a push to improve instruction in essential academic courses as well as CTE courses, aligning lessons and academic standards, and showing the importance of the academic courses to students (Rumberger et al., 2017). One method focuses on students in upper grades (10-12). These students choose a career-aligned set of courses. Students enroll in career-specific courses to develop work-related knowledge and developmental activities while also taking core academic courses (Kemple et al., 2005).

Another approach similar to career-focused themes in multiple pathways includes hands-on training in the workplace. This method shows students how core subjects like math, science, and writing are utilized in real-life applications. In addition to taking a set of career-aligned and core academic courses, students learn employability competencies in core and vocational courses, and are given work-supported educational experiences through internships at local business partners (Kemple et al., 2005). The partnership between schools and businesses is essential to evaluate and improve curriculum programs

that will aid students in finding employment after they finish these courses (Burrowes, Young, Restuccia, Fuller, & Raman, 2014).

Career and technical training and programs. Career and technical training and programs are common education interventions to help reduce the number of high school dropouts. Formal high school courses that are typically categorized as CTE include those in ten specific market labor preparation areas (SMLP) (NCES, 1999). The 10 SMLP areas are agriculture and renewable resources, business, marketing and distribution, health care, public and protective services, trade and industry, technology and communications, personal and other services, food service and hospitality, and child care and education. SMLP courses are a combination of classroom-based learning experiences, cooperative education, and other workplace learning (Plank, DeLuca, & Estacion, 2008).

Some researchers have depicted CTE as a learning environment in which apathetic students face low expectations and antiquated training. Kogan, Gebel, and Noelke (2012) determined that most students enrolled in the vocational education track came from a background of poverty, and had parents who did not graduate from high school. A stigma exists that vocational education is a last resort for students who do not have the right skills to go the traditional route in high school. This negative opinion has created constant barriers regarding high-level curriculum and proper staffing (Minhau, 2015).

There is contradiction in the impact CTE has on the academic success of students that ultimately leads to them graduating from high school. A study by Gordon (2014) showed that CTE programs have reformed to offer their students integrated programs of

study that allow both academic and career-oriented growth. High school CTE programs include a rigorous curriculum that is relevant to a student's career ambitions by teaching them how to apply their learning to their workplace or further academics (Frazier, 2018). Researchers found that students in Chicago public schools who transferred to a career academy (high schools which contained smaller concentrated schools) because of school district attendance boundaries, or declined to attend their neighborhood high school to attend a career secondary school, had increased odds of completing grades beyond ninth grade and graduating from high school (Cullen, Jacob, & Levitt, 2000).

Miller and Mittleman (2012) performed a comparative analysis of 18 rural CTE schools over a ten-year span. They discovered no effect on the academic success of students, and increased inequality between disadvantaged and advantaged students in the rigor of courses taken. The researchers concluded that either the CTE programs were not properly implementing CTE principles, or the districts were failing in their stated mission.

Noddings (2013) expressed a more alarming condemnation. This study showed that modern CTE programs are deserting the population of students that they were originally designed to reach. The researcher explained that the most popular modern CTE programs are actually influential academies for the elite, organized around classifications of professional interest, and leaves out students who would benefit most from CTE education.

Many people feel as though vocational/technical schools are not operating as originally intended (Connors, 2019). A 2013 study, however, observed these schools have revamped and improved themselves (Harrity, Unger, Reiss Medwed, & Reville,

2013). Inconsistencies such as these in previous research demonstrate a further need to investigate the effect of enrollment in CTE programs on the graduation rate.

CTE programs should provide a rigorous and relevant instruction for a group of students that are preparing to enter the workforce after high school. These vocational courses are taken in varied levels of concentration, and can be taken in conjunction with traditional high school classes. In a 2012 study, Halpren discussed the inadequacies of vocational instruction in secondary education, which, according to his research, provide little vocational knowledge to students who enter the labor force after graduation. While there has been some criticism of CTE programs providing students a less than challenging academic rigor, CTE is a valued program for students who are not pursuing post-secondary education by connecting school with what they can do in the workplace after high school (Neild, Boccanfuso, & Byrnes, 2015).

Summary

The literature review described the history of school dropouts and the consequences of not graduating from high school. Not earning a high school diploma can impact a person's health (Zajacova, 2012), may lead to a higher chance for unemployment and lower wages (Dolan, 2001), and has a great impact on society through an increase in social program expenses and lower worker output (Thorstensen, 2004). Research suggests that school intervention programs should focus on increasing academic success, appropriate behaviors, attendance, and reducing retention coupled with programs that address the socioeconomic status that put students at risk. Focusing on these areas may be the key to keeping students in school as well as preparing them for life after school.

The organization model provides the framework for this study. The recognition of changing conditions, both in the student's external and the school's internal environments, establishes the unique situation that the contingency theory can be applied. These intertwining relationships yield different scenarios in which education professionals must identify an appropriate academic intervention for at-risk students to be successful in pursuit of a high school diploma.

This literature review has explored intervention strategies that aimed to increase the chances for all students to graduate. Personalized learning through at-risk alternative high schools were discussed as a specialized approach meant to target individual students on a larger scale. Rigorous and relevant instruction implemented in vocational/technical programs have been established over time to focus on students who are in need of skills that will transcend beyond the classroom and into the everyday lives of workers upon graduation from high school.

The review of literature also identified the lack of available research studies and widespread inconsistency on the effectiveness of alternative education programs for at-risk youth, which demonstrates the necessity for this study. A current gap in the literature exists in that most of the studies look only at school dropout and concentrate on dropout characteristics of students instead of strategies and programs to keep them in school. This study focused on determining what interventions were having success at helping students stay in school and graduate.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

Dropping out of high school produces social and economic difficulties for the student as well as for society. Dropouts are less likely to be able to earn enough income to cover their basic needs like food, health care, and rent (Low & Weiler, 2012). Those without a high school diploma are also more likely to suffer from physical and mental health issues, and have a higher rate of premature death than those who graduate from high school (Zajacova, 2012). Dropouts are more likely to commit crimes, need assistance from a social assistance program, and contribute far less tax revenue to the country's economy (Burrus & Roberts, 2012). High school dropouts not only cause harm to the individual, but are also a detriment to society as a whole. A school district's failure to identify and employ effective dropout intervention strategies for at-risk students can have a negative impact on all stakeholders (McCallumore & Sparapani, 2010).

Students identified as "at-risk" are categorized this way because they have a higher likelihood of dropping out of high school when compared to non-at-risk students. Being classified as at-risk submits a troubling likelihood that a student may reach a low academic level of achievement with an elevated prospect of dropping out of school (Bowers et al., 2013). An at-risk student with an increased probability of dropping out of school is any student who requires short-term or long-term intervention to be scholastically successful in school and to earn a high school diploma with substantial prospects for their future (Education and Economic Development Coordinating Council, 2007). A variety of programs have been developed to address the dropout problem and to

help at-risk students earn a high school diploma, but nominal research has been conducted on the effectiveness of dropout prevention and intervention programs (Briones et al., 2015).

This study is quantitative in nature and analyzed secondary data through descriptive statistics to conclude if there were differences in the adjusted four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. The design of this study was to recognize if the use (or lack thereof) of an at-risk alternative high school or a vocational/technical program had an influence on a high school's adjusted four-year graduation rate. An independent samples *t*-test was utilized to determine whether there was a statistically significant difference between the means in two unrelated groups. For this study it was groups with or without an at-risk alternative high school or a vocational/technical program.

Secondary data analyzed consisted of a school's participation in utilizing an at-risk alternative high school or a vocational technical program to target students that need a different path to high school graduation other than the traditional setting. Differences were then analyzed in a high school's four-year adjusted cohort graduation rate for those schools that do or do not have these programs. This chapter includes an overview of the study design and methodology, the research questions utilized as well as alternative hypotheses, the population and selection of the sample, research and data collection procedures, procedures for data analysis, and the validity and reliability of data used.

Research Design

The research design was quantitative and utilized a causal-comparative design where secondary data were analyzed. A causal-comparative study involves the analysis and understanding of the patterns, differences and similarities across two or more cases that share a common focus or goal (Goodrick, 2014). A causal-comparative research design was appropriate for a study of this nature.

Lodico, Spaulding, and Voegtle (2010) stated that when researchers examine whether independent variables produce differences in the dependent variables to establish cause and effect relationships, it is suitable to use a causal-comparative research design. The study included the graduating classes of 2016-2018 and was ex-post facto in nature. An ex-post facto study is after-the-fact research in which the examination begins after the fact has occurred without interference from the researcher.

In this study, the common focus of high schools was to help students earn a high school diploma within four years of beginning their freshman year. Secondary data were previously collected and available for further examination. The study included the graduating classes of 2016-2018. Inferential statistics, as well as descriptive statistics were analyzed by the researcher for the various comparison groups. Two comparison groups, including high schools that did/did not utilize an at-risk alternative high school and those that did/did not utilize a vocational/technical program, were analyzed to establish if a difference subsisted in their four-year adjusted cohort graduation rates for the years 2016, 2017, and 2018.

The quantitative analysis methods used in this study included an independent samples *t*-test, which is an inferential statistical test that determines whether there is a

statistically significant difference between the means in two unrelated groups. The calculations used graduation rates as the dependent variable and indicators of existence of at-risk alternative high schools and vocational/technical programs as the independent variables.

Research Questions

1. What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1a. What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1b. What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1c. What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

2. What is the difference in the four-year graduation rate between high schools that offer vocational/technical program and those that do not offer a vocational/technical program?

    2a. What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2b. What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2c. What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null Hypotheses

$H_0$1: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting.

$H_0$1a: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016.

$H_0$1b: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017.

$H_0$1c: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018.

$H_0$2: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer vocational/technical program.

$H_0$2a: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer vocational/technical program in 2016.

$H_0$2b: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer vocational/technical program in 2017.

$H_0$2c: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer vocational/technical program in 2018.

Participants

The researcher was able to determine the effect that specific intervention programs had on the longitudinal graduation rate of high schools throughout the state of Missouri. Quantitative data were downloaded from reports on Missouri school district's four-year graduation rates for the classes of 2016, 2017 and 2018. The quantitative components of the study examined the graduation rate of high school students enrolled in Missouri public high schools during a three-year period to determine if intervention prevention programs had an effect on the longitudinal graduation rate.

Missouri public school districts report information to DESE on behalf of the high schools within their district concerning graduation rates. This data were examined as part of this research and functioned as independent variables as part of the independent samples *t*-test. This data were important to include in the study as it detailed the district's most important student population and achievement data in order to outline the student population studied and the effect of dropout interventions on the graduation rate.

Public school districts in the state of Missouri report information to DESE on behalf of the high schools within their district concerning enrollment, graduation rates, dropout rates, attendance rates, discipline incidents, and performance on English and Mathematics standardized exams as part of the Missouri Assessment Program. This data was important to include in the study as it detailed the state of Missouri's most important student population and achievement data in order to outline the at-risk population studied and a need for dropout interventions.

In 2016, Missouri passed *Revised Statute 167.905* into law. This legislation required all school districts to develop a board policy and employ a measurable system for identifying at-risk students prior to their ninth-grade year of school. Districts shall include, but are not limited to, utilizing these sources of information when identifying at-risk students: 1) a student's performance on the Missouri assessment program test in eighth grade in English language arts and mathematics, or a comparable assessment from another state; 2) a district's reported rate of students taking remediated courses; 3) a student's rate of attendance; 4) a student's behavior or discipline. The descriptive data provided in Chapter Three outlines student data for the state of Missouri in order to highlight demographics throughout Missouri schools, and to provide insight into student information in at-risk categories.

Data on Enrollment Numbers from 2013 through 2018 from the state of Missouri are shown in Table 1. DESE defines enrollment as the student count obtained the last Wednesday of September of all resident and non-resident students in grades K through 12 enrolled in the attendance center (Missouri DESE, 2011). Each student (part-time, full-time or kindergarten) is counted as one. Desegregation transfer students are stated as

residents of the district in which they attend school. Enrollment for students attending at-risk alternative high schools and area vocational/technical schools are reported at the student's regular school in their home district.

Table 1

Descriptive Data on Enrollment Numbers

School District	2013	2014	2015	2016	2017	2018
Missouri K-12	888,168	887,348	886,465	885,131	883,892	883,631
Missouri 9-12	270,145	268,794	268,692	268,972	267,771	267,411

Note. For graduation years 2013 through 2018.

As illustrated in Table 1, the state of Missouri had a 2018 total K-12 enrollment of 883,631 students which is 4,537 students lower than it was in 2013. The average Missouri total K-12 enrollment over the six-year period was 885,773 students. In high school grades 9-12, enrollment decreased 2,734 students from 270,145 in 2013 to 267,411 in 2018. The average Missouri 9-12 enrollment over the six-year period was 268,631 students.

The data in Table 1 shows the number of public school students in Missouri, and more importantly, the population enrolled in high school (9-12). This study focused on students in grades 9-12 during the time period of 2013 to 2018. It is important to consider this information as this is the group of students who are directly impacted by school and family decisions to place them in either an at-risk alternative high school or a vocational/technical program in order to achieve a high school diploma.

Table 2 outlines the Four-Year Graduation Rate in percent for the state of Missouri from the years 2013 to 2018. DESE defines the four-year adjusted cohort graduation rate as the number of students who graduate in four years with a regular high

school diploma divided by the number of students who make up the modified cohort for the graduating class rounded to the tenth (Missouri DESE, 2011). From the beginning of 9th grade, students who are entering that grade for the first time form a cohort that is afterwards modified by adding any students who transfer into the cohort later during the 9th grade and the next three years and subtracting any students who transfer out, emigrate to another country, or die during that same period (Missouri DESE, 2011).

Table 2

Descriptive Data on Four-Year Graduation Rate

School District	2013	2014	2015	2016	2017	2018
Missouri	85.93	87.62	87.94	88.98	88.95	89.23

Note. Measured in percent. For graduation years 2013 through 2018.

As illustrated in Table 2, the Missouri graduation rate percent had an increase of 3.3% in its graduation rate from 2013 to 2018. Gains were made every year except for in 2017 when the graduation rate decreased (District Annual Dropout Rate, 2018). While these numbers indicate gains made in improving the graduation rate as a whole in the state of Missouri, data discussed in Chapter One shows 36 high schools consistently falling below the state average in four-year graduation rate from 2016 to 2018. These discrepancies led the researcher to study at-risk alternative high schools and vocational/technical programs within high schools to determine the differences in graduation rates between those schools who do and do not utilize these interventions.

Table 3 outlines the District Attendance Rate in percent for the state of Missouri. Hours of attendance and hours of absence for each student is reported in the June Student Core Enrollment and Attendance file. A student's hours of attendance plus hours of absence equal the number of hours possible for attendance in a school year. An

Individual Student Attendance Rate is then calculated by dividing the hours of attendance by the hours possible and multiplying that result by 100. Attendance rate is then determined for all K-12 students throughout the district (Missouri DESE, 2011).

Table 3

Descriptive Data on District Attendance Rate

School District	2013	2014	2015	2016	2017	2018
Missouri K-12	87.8	89.3	88.7	89.7	88.7	87.7

Note. Measured in percent. For graduation years 2013 through 2018.

Table 3 outlines the Attendance Rate percentage for the state of Missouri. Public schools saw a small decline in its attendance rate, with a decrease of 0.1 percent from 2013 to 2018. An increase of 1.9 percent was seen from 2013 to 2016, but then dropped 2.0 percent from 2016 to 2018. This data was important to review as it showed the fluctuation in attendance rates throughout the state, and showed a decline in overall percentage over the last three years. As discussed in the literature review, attendance is an at-risk factor for students. A decrease in these numbers gave the researcher concern for the well-being of students and their academic preparedness.

Table 4 outlines Dropout Rate data in grades 9-12 for public high schools in the state of Missouri. For grades 9-12 the dropout rate is calculated by dividing by the total of September enrollment, plus transfers in, minus transfers out, minus dropouts, added to September enrollment, then divided by two (Missouri DESE, 2011).

Table 4

Descriptive Data on Annual Dropout Rate Grades 9-12

School District	2013	2014	2015	2016	2017	2018
Missouri	2.3	2.3	2.0	2.0	2.0	1.9

Note. Measured in percent. For graduation years 2013 through 2018.

As illustrated in Table 4, the annual 9-12 dropout rate for the state of Missouri decreased from 2.3 to 1.9 from 2013 to 2018. The average dropout rate over the six-year period was 2.1. While these numbers show small decreases in the dropout rate throughout Missouri, data considered in Chapter One shows 58 high schools were consistently above the state average in dropout rate for each of the years between 2016 and 2018. Dropout statistics are important to consider as it shows the percentage of students that fail to earn a high school diploma. As outlined in Chapter Two, being a dropout causes harm to not only the individual but to society as a whole. These figures gave the researcher cause for concern as it is clear that schools still deal with the problem of student dropouts, which led to the exploration into this issue.

Table 5 summarizes Discipline Incident data for the state of Missouri. The types of offenses included in this data include those involving alcohol, drugs, tobacco, violent acts, weapons, and other offenses where a student is removed from the traditional classroom setting for ten or more consecutive days (Missouri DESE, 2011).

Table 5

Descriptive Data on Discipline Incidents

School District	2013	2014	2015	2016	2017	2018
Missouri (rate per 100 students)	1.3	1.2	1.2	1.1	1.0	1.2
Missouri (suspensions of 10 or more consecutive days)	11,703	10,783	10,650	9,962	9,193	11,023

Note. For graduation years 2013 through 2018.

As illustrated in Table 5, the number of discipline incidents per 100 students for all grades K-12 dropped 0.1 percent from 2013 to 2018. The average discipline incident rate in grades K-12 for the six-year period was 1.2. The number of discipline incidents that yielded a suspension of 10 or more consecutive days was 11,703 in 2013. This was

the highest rate over the six-year period between 2013 and 2018, when the number dropped to 11,023. The average discipline in grades K-12 for incidents that yielded a suspension of 10 or more consecutive days was 10,552 for the six-year period.

This data were significant to evaluate as it revealed the number of students involved in major discipline incidents throughout the state of Missouri. This data has fluctuated in recent years, with the most recent period showing a sharp increase from 2017 to 2018. The literature review outlined why discipline and behaviors can cause students to fall behind in school and ultimately dropout without a high school diploma. An increase in these numbers revealed a demographic of students that are at-risk of not graduating, and lends credence to the necessity of this research.

The Missouri School Improvement Program Cycle 5 consists of a series of performance standards and indicators and has the responsibility of reviewing and giving accreditation to all 518 school districts in Missouri. One of the categories is in the area of academic achievement. Public school districts are to administer assessments required by the Missouri Assessment Program (MAP) to measure academic achievement and demonstrate improvement in the performance of its students over time. Student performance on assessments required by the MAP are to meet or exceed the state standard or demonstrate improvement in performance over time (Missouri DESE, 2011).

Table 6 summarizes test scores for students in the area of English 2. The English 2 exam is a mandatory exam that is required for all students to take before graduating high school. Test scores were not released by the state of Missouri for the years 2013, 2014, and 2017.

Table 6

Descriptive Data on English 2 Missouri Assessment Program Exam

Year	Below Basic	Basic	Proficient	Advanced
2018	12.0	30.6	47.1	10.3
2017	n/a	n/a	n/a	n/a
2016	4.1	16.7	61.9	17.3
2015	5.4	21.0	55.6	18.1
2014	n/a	n/a	n/a	n/a
2013	n/a	n/a	n/a	n/a

Note. Measured in percent. For graduation years 2013 through 2018.

Table 6 shows movement in all levels of testing. In 2015, 26.4% of students tested at the Basic or Below Basic level in English 2. This percentage increased to 42.6 in 2018. In 2015, 73.7% of students tested at the Advanced or Proficient level. This percentage dropped to 57.4% in 2018. Academic achievement in the area of English, as reviewed in Chapter Two, is connected to dropping out of school. The decrease in test scores in this area gave the researcher great concern as it may lead to continued academic failures and students potentially not graduating from high school. This data gives credibility to the necessity of conducting this study by revealing a decline in a critical area of learning that can affect a student's ability towards graduation.

Table 7 summarizes test scores for students in the area of Algebra 1. The Algebra 1 exam is a mandatory exam that is required for all students to take before graduating high school. Test scores were not released by the state of Missouri for the years 2013, 2014, and 2017.

Table 7

Descriptive Data on Algebra 1 Missouri Assessment Program Exam

Year	Below Basic	Basic	Proficient	Advanced
2018	23.4	29.7	22.1	24.8
2017	n/a	n/a	n/a	n/a
2016	14.5	19.7	47.6	18.2
2015	18.5	19.6	43.3	18.5
2014	n/a	n/a	n/a	n/a
2013	n/a	n/a	n/a	n/a

Note. Measured in percent. For graduation years 2013 through 2018.

Table 7 shows a lot of movement in test scores at all levels of testing. In 2015, scores that were Basic and Below Basic combined were 38.1%, while Proficient and Advanced combined were 61.8%. In 2018, scores that were Basic and Below Basic combined increased to 53.1%, while Proficient and Advanced combined fell to 46.9%. The literature review considered the educational ramifications of poor academic achievement in the area of mathematics. The state of Missouri's test scores in this area show an increase in the percentage of students achieving at a Basic or Below Basic level over time. This information is of great concern to the researcher and shows a need to further examine ways in which to help students be successful in school and progress towards graduation.

Data on student participants in the state of Missouri is important to inspect as part of this study. Examining student enrollment, rates of graduation, dropout and attendance, discipline numbers and test scores shows the demographics of students attending public high schools from 2013 to 2018 that may have been a part of this research. Focusing on discipline, attendance and test scores shows the student data on categories that are

considered to be factors for youth being considered at-risk in school and in need of an intervention such as an at-risk alternative high school or a vocational/technical program.

Research Setting

All participants in this study were from public school districts in the state of Missouri. More specifically, these students attended a public high school and did or did not earn a high school diploma. As of July 1, 2018, there are 518 public school districts in the state of Missouri, 448 of those maintain a high school. There are 566 high schools within these 448 districts. As referenced in Table 1, 267,411 students were enrolled in Missouri public high schools during the fall of the 2017-2018 school year (Statistics of Missouri Public Schools, 2018).

The participants in this study encompassed high school students from public high schools in Missouri who were enrolled as active students at some point in time between the 2012-2013 school year and the 2017-2018 school year. Only those public high schools in Missouri that met these criteria for the entire six-year period were considered for this study. Specifically, participants in this study were students from public high schools in Missouri who chose to respond to the research survey.

Using high schools and students from the state of Missouri was appropriate for this study based on recent data from the DESE open access database. Data discussed earlier in this paper confirmed more than 100 high schools were above the state average in dropout rate for each of the years between 2016 and 2018. Additionally, an average of 98 Missouri public high schools fell below the state average in four-year graduation rate between the years of 2016 and 2018. These shortcomings in high school students earning their high school diploma in Missouri prompted the researcher to conduct this study.

Sample Selection

The selection of samples for this study was purposive in nature. Purposive sampling is utilized by researchers because they believe that subjects in their study fit the profile of the people that they need to reach (Etikan, Musa & Alkissim, 2016). For this research, the alternative high school or the vocational/technical program had to be in place for students to participate in since the start of their freshman year. In addition, these interventions had to be in existence for the entirety of their high school career. If either of these elements were not met, the high school was determined to be a "no" as having an at-risk alternative high school or a vocational/technical program.

A minimum sample size of 128 participating schools was required for this study. This included at least 64 schools in the at-risk alternative high school group, and a minimum of 64 schools in the alternative/technical program group. These numbers were needed to achieve a medium effect size of 0.5 and a power of 0.8 (Faul, Erdfelder, Buchner, & Lang, 2009).

Missouri public high schools were identified as respondents to the survey, and principals from each school received emails asking for their participation. Out of the 566 educators to receive communication, 197 respondents took part in the survey request, and the data gathered was paired with their school's four-year adjusted cohort graduation rates for the years 2016, 2017 and 2018. If there were multiple replies from the same high school, only one response was used per school.

The cohort graduation rate data was retrieved from the DESE online data portal for the school districts that responded to the survey. Each school was assigned a unique code to allow for anonymity. The information collected was held and used in

confidentiality. Participants were notified data would be safeguarded online in a secure cloud drive for the duration of time the researcher retains the data.

The researcher completed an ethics class, and applied ethical standards learned throughout the course. Proposal for research was made to the Institutional Review Board (IRB) at Southwest Baptist University (SBU) to ensure rights and welfare of human research subjects involved in the study were protected. The IRB evaluated the request for a) selection of human research participants; b) welfare of human research participants; c) special protection of participants; d) minimizing risk of subject harm; e) informed consent of participants; and f) confidentiality of data and records. Once reviewed and approved by the IRB committee, the researcher proceeded with the gathering of data.

Data was obtained from the DESE open access database and from school surveys, entered into Statistical Package for Social Sciences (SPSS), then analyzed the information looking for differences in four-year adjusted graduation rates between public high schools that do and do not offer an at-risk alternative high school or a vocational/technical program. Outcomes were uploaded into SPSS. Names of high schools used in the data were removed from the spreadsheet copy of the survey report. Once the study was completed, the researcher preserved the information on a secured cloud drive for the time period that the researcher retains the data.

Research Procedures

Approval was granted by the IRB of SBU in order to conduct research for this study. Once SBU approved the research, each of Missouri's 566 public high schools received two emails from the researcher. After the initial email was sent to schools in late September of 2019, a follow-up email was remitted a week later in early October of 2019

to encourage participation in the survey and to garner a greater rate of response. Two weeks total was given to collect survey data. Four questions were asked of each school:

1. Does your school utilize an at-risk alternative high school for your students? For the purposes of this study, the following definition is being used: At-Risk Alternative High School - An offsite program (not housed within the main school building) that utilizes programming for at-risk students who are likely to not finish high school.

2. If you answered "yes" to question 1, has your school utilized an at-risk alternative high school for your students since the beginning of the 2012-2013 school year?

3. Does your school district utilize a high school vocational/technical program for your students? For the purposes of this study, the following definition is being used: Vocational/Technical Program - An offsite program that operates as a stand-alone facility where students study a skill or trade in addition to completing academic core requirements.

4. If you answered "yes" to question 3, has your school utilized a vocational/technical program for your students since the beginning of the 2012-2013 school year?

After survey results were collected, data were pulled from the DESE website on public high schools in the state of Missouri. Only information from schools which participated in the study were taken from the DESE site. The archived data downloaded from the DESE website was open access data and did not require any permission from DESE. The study attempted to identify the differences on the four-year graduation rate of Missouri public high schools with an at-risk alternative high school or a vocational/technical program as compared to one without such programs. This data was

reported by each district and for their high schools for the graduation years of 2016, 2017, and 2018.

The researcher used SPSS to analyze the data and explore the outcome of the study using an independent samples *t*-test. The researcher recorded a "yes" or "no" indicator in the SPSS program for the independent variables. The dependent variable indicated the graduation rate of each high school in the years 2016, 2017 and 2018. The independent variable indicated if a school utilized an at-risk alternative high school or a vocational/technical program.

Validity and Reliability

The Core Data System and MOSIS (Missouri Student Information System) are data collection systems managed by the Office of Data System Management at DESE. Since 1989, the Core Data System has been used to directly enter and collect data or to update school district information. Missouri's public school districts use the collection of data to measure student achievement. Data in several Core Data areas are directly populated from electronic files submitted in the MOSIS data collection system.

MOSIS consists of two parts: the data collection piece and the ID assignment component. The data collection system collects information at the individual level and develops aggregate reports from this data. The ID assignment system supports a distinctive identification number for every Missouri public school student that receives educational services. Data items are reported every other month beginning in August by school districts through the Core Data and MOSIS systems.

School districts are responsible for the wholeness, accuracy, and timely submission of the data. Districts are obligated to follow DESE's reporting guidelines and

should instruct their schools on how data is recorded and submitted. The timeliness and accuracy of a school's data should be monitored by the district. Corrections to data can be made by districts through the MOSIS system by following the steps outlined by DESE. Once data is edited and exact, districts have the information certified by DESE to fulfill the collections requirements of the state.

Data were verified for validity and reliability by DESE via the MSIP evaluation process. Reliability is the consistency of your measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects (Cooper & Schindler, 2006). In short, it is the repeatability of the measurement accurately measuring something each time. Validity is the extent to which a concept is accurately measured in a study (Burns & Grove, 2003). In essence, the data actually measures what it is intended to measure.

Data Analysis

Once the information was collected, data were entered into a spreadsheet. Data were cross-referenced with original graduation records downloaded from the DESE open access database and the original survey email results from schools. Schools with incomplete data between 2013 and 2018, or did not meet the parameters of the research study were examined and removed from the spreadsheet. After the necessary amendments for unusable information were made, a response rate of 34.81% was calculated.

Once the data were determined to be accurate, information was exported to SPSS and an analysis of data was conducted. Demographic information was included and compared to those of the overall state of Missouri to ensure the data was valid. Data

analysis was performed to determine if there were differences in a high school's four-year adjusted cohort graduation rate for those schools that do or do not have an at-risk alternative high school or a vocational/technical program.

A quantitative analysis method was used in this study which included an independent samples *t*-test. An independent samples *t*-test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups (Salklind, 2010). The groups either use a schoolwide approach to dropout intervention or they do not utilize this method. The independent samples *t*-test was appropriate for this study because no controls were applied to the samples. The samples were not matched based on any criteria. The calculations used graduation rates as the dependent variable and indicators of existence of at-risk alternative high schools or vocational/technical programs was the independent variable. samp

The spreadsheet was formatted by the researcher by changing all "yes" responses to a "1" and all "no" responses to a "0" and double checked for accuracy. Table 8 references a sample coded Excel spreadsheet for the dependent and independent variables.

Table 8

Sample Coded Excel Spreadsheet

High School Code	Graduation Year	Four-Year Graduation Rate	Alt. School	Vocational/ Technical
A1	2016	89.43	1	0
A1	2017	91.20	1	0
A1	2018	88.67	1	0
D4	2016	94.56	1	1
D4	2017	97.63	1	1
D4	2018	95.11	1	1
F7	2016	86.72	0	1
F7	2017	88.30	0	1
F7	2018	85.93	0	1

Note. Four-year graduation rate measured in percent.

Data were binary in nature and entered into variables. The columns were labeled, and responses were coded with a value of "1" for "yes" and a "0" for "no", and confirmed no duplicate identification numbers or errors were included. These conversions were done by the researcher.

The basic assumptions when utilizing an independent samples *t*-test are independence of observations, normality with no significant outliers, and homogeneity of variances. Independent observations hold if each case represents a different statistical unit (Salklind, 2010). This seemed to hold for the data in this research as each high school in the study operated independent of each other, and their actions were not predictive of observations of other schools.

The dependent variable should follow a normal distribution in the statistical population. Normality is typically only needed for samples smaller than 25 statistical units, but can be violated as long as the sample size is reasonably large (Salklind, 2010). This assumption is not needed at all as the central limit theorem ensured that the distribution of disturbance term would approximate normality. This study had a total

sample size of 161 high schools for at-risk alternative high schools, and 171 high schools for vocational/technical programs. Normality can be tested in SPSS using the Shapiro-Wilk test of normality.

The standard deviation of the dependent variable must be equal in both statistical populations for homogeneity to exist. This assumption is always needed when conducting an independent samples *t*-test (Independent *t*-test using SPSS Statistics, n.d.). This assumption can be tested in SPSS using Levene's test for homogeneity of variances.

The mean and standard deviation was calculated for the variables for each research question and sub-question considered as part of this study. The accepted probability value for the alpha level was set at .05. The null hypothesis would have been rejected had the data displayed significance at the .05 level. According to Pelham (2013), the researcher may reject the null hypothesis and conclude the hypothesis is correct only when findings occurred by chance less than five percent of the time.

Cohen's *d* is a measurement that evaluates the degree that the mean scores on the two test variables differ, and represents the extent to which a null hypothesis is false. This is a calculation of effect size and is an appropriate measure if two groups have similar standard deviations and are of the same size (Abbott, 2011). It is a measure of the practical importance of a significant finding, and was calculated after the *t*-test was ran. Statistically it means that the difference between two samples means standard deviation units from zero. If the calculated *d* equals zero, it is an indication that there are no differences in the means (Kent State University, n.d.). However, as *d* deviates from zero, the effect size becomes bigger.

The answers to the research questions were determined through data gathered from the DESE website. Responses to survey questions answered by Missouri public schools were also utilized to resolve the questions asked by the researcher. Schools were coded in order to ensure anonymity of the schools used in the study.

Summary

The purpose of this causal-comparative study was to test the organization and contingency theories of Max Weber and Joan Woodward (Colgan, 2018) that differences exist in four-year cohort graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. This chapter outlined the methodology for this study. This included the research questions and hypothesis, procedures, design, sampling, instrument, participants, and data analysis. In Chapter Four the researcher will highlight the research questions and null hypotheses associated with this study, data cleaning process, samples and demographics of participants, data analysis, and findings of the statistical computations.

CHAPTER FOUR
ANALYSIS OF THE DATA

Introduction

Utilizing the theories of organization and contingency for this study, the purpose of this research was to examine if there are differences in four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. From 2016 to 2018, an average of 58 public high schools in the state of Missouri were above the state average dropout rate in each of these three years (Building Dropout Rates, 2019). During the same timeframe, 36 Missouri public high schools were below the state average four-year adjusted cohort graduation rate (Building Adjusted Cohort Graduation Rates, 2019). Those who do not graduate from high school are more likely than their peers with a high school diploma to suffer from lower wages, poorer health, and to have a negative impact on the economic health of the country (Low & Weiler, 2012). With undesirable high school completion numbers in Missouri and detrimental effects of dropouts on individuals and society, it is important to inspect possible solutions to help more students achieve the goal of earning a high school diploma.

Chapter Four will highlight the research questions and null hypotheses associated with this study, data cleaning process, samples and demographics of participants, data analysis, and findings of the statistical computations. Data were downloaded from DESE's open access database and collected from surveys from public high school principals, then uploaded in SPSS for analysis. Inferential and descriptive statistics were

utilized to present quantitative data in a convenient manner. Data will be presented in this chapter giving insight into the following research questions:

1. What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1a. What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1b. What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1c. What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

2. What is the difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2a. What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2b. What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2c. What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Based on the data collected during the research investigation, the following null hypotheses were tested:

$H_0$1: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting.

$H_0$1a: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016.

$H_0$1b: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017.

$H_0$1c: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018.

$H_0$2: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program.

$H_0$2a: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2016.

$H_0$2b: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2017.

$H_0$2c: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2018.

Each question and related hypothesis were investigated through quantitative analysis, with the researcher conducting independent sample *t*-tests to determine whether there was a statistically significant difference between the means in two unrelated groups. For this study it was groups with or without an at-risk alternative high school or a vocational/technical program. The data from these groups were paired with four-year cohort graduation rates for the years 2016 through 2018.

After survey results were collected, data were pulled from the DESE website on public high schools in the state of Missouri. Only information from schools which participated in the study were taken from the DESE website. Data was then inputted into SPSS in order to make comparisons between the variables. The first independent variable of interest of alternative high schools was generally defined as the use of an at-risk alternative high school as a dropout intervention. The second independent variable of interest of vocational/technical programs was generally defined as the use of a vocational/technical program as a dropout intervention program. The dependent variable was the graduation rate, which was defined as the four-year adjusted cohort graduation rate for a Missouri public high school.

Data Cleaning

The building administrator survey results were downloaded from the Zoho survey delivery website and saved in the Microsoft Excel format. Responses were categorized into four groups: “yes” and “no” values for those that responded to questions about use of at-risk alternative high schools and vocational/technical programs. “No” responses were identified as having a “0” value, and “yes” responses were identified as having a “1” value. Four item responses for 197 Missouri public high school building administrators were entered into a Microsoft Excel spreadsheet.

Once the survey item responses were entered, data were tabulated for the “yes” and “no” answers given. Of the 566 public high schools throughout Missouri that were invited to participate in this research through survey email, 177 schools replied and gave responses. This yielded a response rate of 31.27%. An additional eight responses were collected via emails to high school principals, and 12 additional responses were gathered through phone calls to district level personnel. These supplementary responses elevated the overall survey rate of response to 34.81%.

Once all responses were received, the survey data were cleaned. Of the 197 replies to the questions about at-risk alternative high schools, four were removed for a lack of graduation rate data, six were duplicate responses, 18 answers were incomplete, and eight had inconsistent responses to the survey questions. Removing these 36 responses yielded a data set in this category of 161 Missouri public high schools. Of the 197 replies to the questions about vocational/technical programs, four were removed for a lack of graduation rate data, six were duplicate responses, 12 answers were incomplete,

and four had inconsistent responses to the survey questions. Removing these 26 responses yielded a data set in this category of 171 Missouri public high schools.

Once all survey information was accumulated, organized and cleaned, data were entered into a spreadsheet. Survey data were checked and matched with original graduation rate data files downloaded from the DESE open access database and the original survey email results from schools. Schools with inadequate data between 2016 and 2018, or that did not meet the limitations of the research study were examined and removed from the spreadsheet before being uploaded to SPSS.

Samples

This study utilized data from public high schools in the state of Missouri that responded to the researcher's survey. Schools that were identified as K-8 districts, parochial, private, and the researcher's own school were not used in this study. For this research, the alternative high school or the vocational/technical program had to be in place for students to participate in since the start of their freshman year. In addition, these interventions had to be in existence for the entirety of their high school career. If either of these elements were not met, the high school was determined to be a "no" as having an at-risk alternative high school or a vocational/technical program.

Data were directly downloaded from DESE's open access database and coupled with survey results, inputted into an Excel spreadsheet, and then analyzed seeking differences in four-year cohort graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. An ethics course was completed by the researcher and ethical guidelines were employed. All cleaned data was uploaded into SPSS, and school names were removed from the final

output. Once the study was completed, information was preserved on a secured cloud drive for the time period that the researcher retains the data.

The participants in this study encompassed public high schools in Missouri who were fully accredited by DESE for the period of time between the 2012-2013 school year and the 2017-2018 school year. After the survey data were cleaned, a sample size of 161 Missouri public high schools was determined for the questions that targeted at-risk alternative high schools. The sample size for questions that targeted vocational/technical programs was 171 Missouri public high schools.

Demographics

Survey data were obtained from Missouri public high school principals on their school's use of at-risk alternative high schools and vocational/technical programs. The graduation rate cohort data was then retrieved from the DESE online data portal for the schools that responded to the survey. The database was available to the public and no permission was needed to download information. DESE verified all data for reliability and validity through the MSIP evaluation process.

Tables 9 and 10 break down the demographic and enrollment information of students from public high schools considered for the at-risk alternative high school part of the study. Sample size for this group was 161 schools.

Table 9

Descriptive Data on Student Demographics of At-Risk Alternative High School Research Participants for the Graduation Years 2016-2018

Demographic	2016	2017	2018
Free/Reduced	29.46	28.02	27.55
IEP	10.99	10.92	11.06
ELL	1.68	1.91	2.34
White	77.74	76.98	76.57
Black	12.15	11.85	11.78
Asian	2.28	2.33	2.45
Hispanic	4.75	5.27	5.49
Multi-Race	1.99	2.40	2.66

Note. Measured in percent.

Table 10

Descriptive Data on Grades 9-12 Student Enrollment of At-Risk Alternative High School Research Participants for the Graduation Years 2016-2018

Enrollment	2016	2017	2018
Total	98,846	98,469	97,801
Smallest	65	64	68
Largest	2,548	2,494	2,499
Average	614	612	607
Rural Schools	129	129	129
Urban Schools	32	32	32

Tables 11 and 12 break down the demographic and enrollment information of students from public high schools considered for the vocational/technical program part of the study. Sample size for this group was 171 schools.

Table 11

Descriptive Data on Student Demographics of Vocational/Technical Program Research Participants for the Graduation Years 2016-2018

Demographic	2016	2017	2018
Free/Reduced	30.31	29.08	28.69
IEP	11.08	10.98	11.18
ELL	1.79	2.04	2.48
White	77.00	76.14	75.68
Black	12.35	12.13	12.01
Asian	2.32	2.38	2.54
Hispanic	5.11	5.68	5.93
Multi-Race	2.12	2.47	2.77

Note. Measured in percent.

Table 12

Descriptive Data on Grades 9-12 Student Enrollment of Vocational/Technical Program Research Participants for the Graduation Years 2016-2018

Enrollment	2016	2017	2018
Total	110,734	110,323	109,546
Smallest	65	64	68
Largest	2,548	2,494	2,499
Average	648	645	641
Rural Schools	140	140	140
Urban Schools	31	31	31

The high schools analyzed in this study were public high schools in the state of Missouri. After cleaning the data from survey results, 161 schools were used in the analysis for at-risk alternative high schools, and 171 schools were used in the analysis for vocational/technical programs. For this research, the alternative high school or the vocational/technical program had to be in place for students to participate in since the start of their freshman year. In addition, these interventions had to be in existence for the entirety of their high school career.

Research Question 1

What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting.*

Table 13 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 13

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Years 2016-2018

Dependent Variable	*N*	Mean	*SD*
No	95	93.96	6.78
Yes	66	90.93	9.41

Note. Mean measured as a percent.

For the combined years of 2016-2018, the group that did not use an at-risk alternative high school ($N = 95$) was associated with a four-year cohort graduation rate mean of 93.96% ($SD = 6.78$). By comparison, the group that did use an at-risk alternative high school ($N = 66$) was associated with a four-year cohort graduation rate mean of 90.93% ($SD = 9.41$). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(110.33)$, $p = .025$. Given that $p < .05$, it was concluded that the variances were not equal. The *t*-test was read from the bottom line of data, which considered an adjustment for the standard error of the estimate and adjustment for the degrees of freedom for equality of means results (Kent State University, n.d.). The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 3-year average graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 14.

Table 14

Shapiro-Wilk Test of Normality for Missouri Public High Schools that Do and Do Not Use an At-Risk Alternative High School for Years 2016-2018

Statistic	*df*	Sig.
.64	161	< .001

This suggests that the graduation rates for 2016-2018 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 161 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 15.

Table 15

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use an At-Risk Alternative High School for Years 2016-2018

				95% Confidence Interval	
t	*df*	Sig.	Mean Difference	Lower	Upper
2.24	110.33	.027	3.03	.35	5.71

There were 95 “yes” participants and 66 “no” participants. An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use an at-risk alternative high school for the years 2016-2018. There were eight outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk’s test ($p < .05$). There was no homogeneity of variance ($p = .025$) as evaluated by Levene’s test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did not utilize an at-risk alternative high school ($M = 93.96\%$, $SD = 6.78$) when compared to those that did utilize an at-risk alternative high school ($M = 90.93\%$, $SD = 9.41$). A statistically significant difference of 3.03% (95% CI, .35 to 5.71), $t(110.33) = 2.24$, $p = .027$ was associated with the independent samples *t*-test. With $p < .05$, the schools without an at-risk alternative high school were associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen’s *d* was estimated at 0.37, which is a small effect size. In education research, the average effect size is considered $d = 0.4$, with 0.2, 0.4 and 0.6 considered

small, medium and large effects (Cumming & Calin-Jageman, 2018). A boxplot graphical representation displaying the distribution of data is displayed in Figure 1.

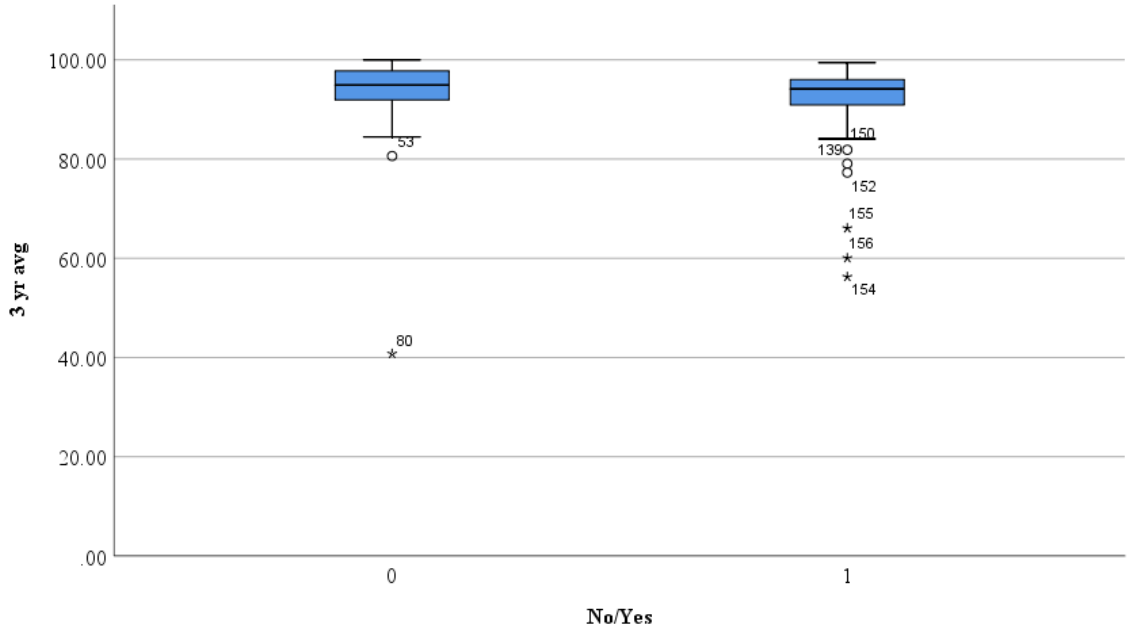

Figure 1. Distribution of data for the use of an at-risk alternative high school for years 2016-2018 (four-year cohort graduation rate)

For schools that did not utilize an at-risk alternative high school, the median four-year cohort graduation rate was 94.93%. Q3 (75th percentile) graduation rate was 97.76%, Q1 (25th percentile) was 91.92%, and the IQR (range between Q3 and Q1) was 5.84%. Two outliers existed for this set of data. For schools that did utilize an at-risk alternative high school, the median four-year cohort graduation rate was 94.15%. Q3 (75th percentile) four-year cohort graduation rate was 96.03%, Q1 (25th percentile) four-year cohort graduation rate was 90.92%, and the IQR (range between Q3 and Q1) was 5.11%. Six outliers existed for this set of data. Table 16 displays the distribution of four-year graduation cohort data and the use of an at-risk alternative high school for the years 2016-2018.

Table 16

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Years 2016-2018

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	95	94.93	91.92	97.76	5.84	2
Yes	66	94.15	90.92	96.03	5.11	6

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2016 Data

What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016.*

Table 17 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 17

Descriptive Statistics: four-year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2016

Dependent Variable	*N*	Mean	*SD*
No	95	94.59	8.09
Yes	66	91.16	9.54

Note. Mean measured as a percent.

For the year 2016, the group that did not use an at-risk alternative high school (*N* = 95) was associated with a four-year cohort graduation rate mean of 94.59% (*SD* =

8.09). By comparison, the group that did use an at-risk alternative high school ($N = 66$) was associated with a four-year cohort graduation rate mean of 91.16% ($SD = 9.54$). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(159)$, $p = 0.079$. Given that $p > 0.05$, it was concluded that the variances were equal. The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2016 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 18.

Table 18

Shapiro-Wilk Test of Normality for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2016

Statistic	*Df*	Sig.
.62	161	< .001

This suggests that the graduation rates for 2016 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 161 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 19.

Table 19

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2016

				95% Confidence Interval	
T	*Df*	Sig.	Mean Difference	Lower	Upper
2.45	159	.015	3.42	.67	6.18

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use an at-risk alternative high school for the year 2016. There were eight outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$). There was homogeneity of variance ($p = .079$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belong in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did not utilize an at-risk alternative high school ($M = 94.59\%$, $SD = 8.09$) when compared to those that did utilize an at-risk alternative high school ($M = 91.16\%$, $SD = 9.54$). A statistically significant difference of 3.42% (95% CI, .67 to 6.18), $t(159) = 2.45$, $p = 0.015$ was associated with the independent samples *t*-test. With $p < .05$, the schools without an at-risk alternative high school were associated with a significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen's *d* was estimated at 0.39, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 2.

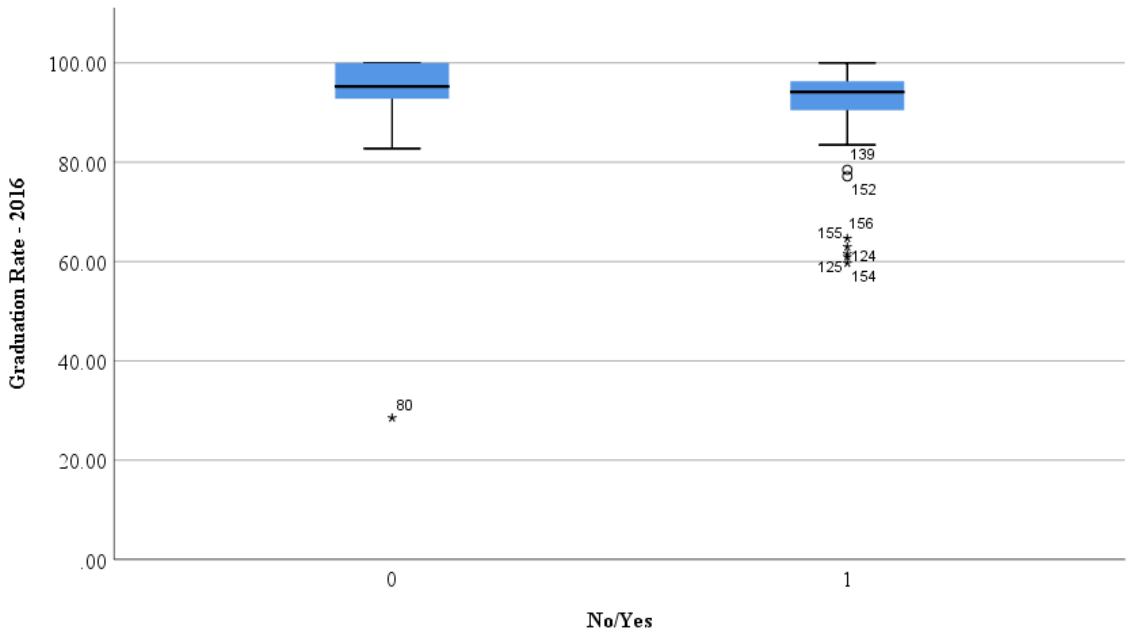

Figure 2. Distribution of data for the use of an at-risk alternative high school for year 2016 (four-year cohort graduation rate)

For schools that did not utilize an at-risk alternative high school, the median four-year cohort graduation rate was 95.24%. Q3 (75th percentile) graduation rate was 100%, Q1 (25th percentile) was 92.79%, and the IQR (range between Q3 and Q1) was 7.21%. One outlier existed for this set of data. For schools that did utilize an at-risk alternative high school, the median four-year cohort graduation rate was 94.14%. Q3 (75th percentile) four-year cohort graduation rate was 96.31%, Q1 (25th percentile) four-year cohort graduation rate was 90.46%, and the IQR (range between Q3 and Q1) was 5.85%. Seven outliers existed for this set of data. Table 20 displays the distribution of four-year graduation cohort data and the use of an at-risk alternative high school for the year 2016.

Table 20

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2016

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	95	95.24	92.79	100	7.21	1
Yes	66	94.14	90.46	96.31	5.8	7

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2017 Data

What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017.*

Table 21 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 21

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2017

Dependent Variable	*N*	Mean	*SD*
No	95	93.59	7.67
Yes	66	91.01	10.12

Note. Mean measured as a percent.

For the year 2017, the group that did not use an at-risk alternative high school (*N* = 95) was associated with a four-year cohort graduation rate mean of 93.59% (*SD* = 7.67). By comparison, the group that did use an at-risk alternative high school (*N* = 66)

was associated with a four-year cohort graduation rate mean of 91.01% (*SD* = 10.12). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(159)$, $p = 0.111$. Given that $p > 0.05$, it was concluded that the variances were equal. The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2017 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 22.

Table 22

Shapiro-Wilk Test of Normality for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2017

Statistic	*Df*	Sig.
.68	161	< .001

This suggests that the graduation rates for 2017 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test is robust against the assumption of normality with a sample size of 161 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 23.

Table 23

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use an At-Risk Alternative High School for Years 2017

				95% Confidence Interval	
t	*Df*	Sig.	Mean Difference	Lower	Upper
1.84	159	.067	2.59	-.19	5.36

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use an at-risk alternative high school for the year 2017. There were eight outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$). There was homogeneity of variance ($p = .111$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belong in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did not utilize an at-risk alternative high school ($M = 93.59\%$, $SD = 7.67$) when compared to those that did utilize an at-risk alternative high school ($M = 91.01\%$, $SD = 10.12$). An effect that was not statistically significantly different of 2.59% (95% CI, -.19 to 5.36), $t(159) = 1.84$, $p = .067$ was associated with the independent samples *t*-test. With $p > .05$, the schools without an at-risk alternative high school were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at 0.29, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 3.

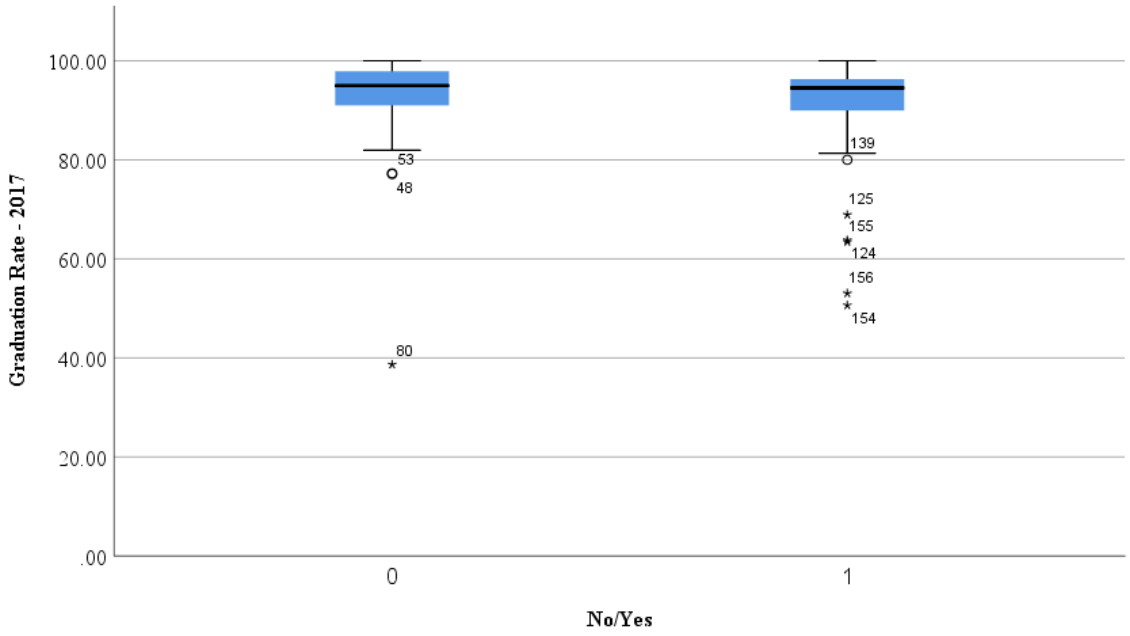

Figure 3. Distribution of data for the use of an at-risk alternative high school for year 2017 (four-year cohort graduation rate)

For schools that did not utilize an at-risk alternative high school, the median four-year cohort graduation rate was 95%. Q3 (75th percentile) graduation rate was 97.87%, Q1 (25th percentile) was 91%, and the IQR (range between Q3 and Q1) was 6.87%. Three outliers existed for this set of data. For schools that did utilize an at-risk alternative high school, the median four-year cohort graduation rate was 94.52%. Q3 (75th percentile) four-year cohort graduation rate was 96.3%, Q1 (25th percentile) four-year cohort graduation rate was 89.97%, and the IQR (range between Q3 and Q1) was 6.33%. Six outliers existed for this set of data.

Table 24 displays the distribution of four-year graduation cohort data and the use of an at-risk alternative high school for the year 2017.

Table 24

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2018

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	95	95	91	97.87	6.87	3
Yes	66	94.52	89.97	96.3	6.33	6

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2018 Data

What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018.*

Table 25 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 25

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2018

Dependent Variable	*N*	Mean	*SD*
No	95	93.69	7.24
Yes	66	90.61	9.16

Note. Mean measured as a percent.

For the year 2018, the group that did not use an at-risk alternative high school (*N* = 95) was associated with a four-year cohort graduation rate mean of 93.69% (*SD* = 7.24). By comparison, the group that did use an at-risk alternative high school (*N* = 66)

was associated with a four-year cohort graduation rate mean of 90.61% (*SD* = 9.16). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(159)$, $p = .177$. Given that $p > .05$, it was concluded that the variances were equal. The independent observation assumption was met, as no results belong in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2018 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 26.

Table 26

Shapiro-Wilk Test of Normality for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2018

Statistic	*df*	Sig.
.74	161	< .001

This suggests that the graduation rates for 2018 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 161 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 27.

Table 27

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2018

				95% Confidence Interval	
t	*df*	Sig.	Mean Difference	Lower	Upper
2.38	159	.019	3.08	.52	5.63

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use an at-risk alternative high school for the year 2018. There were 12 outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p > .05$). There was homogeneity of variance ($p = .177$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did not utilize an at-risk alternative high school ($M = 93.69\%$, $SD = 7.24$) when compared to those that did utilize an at-risk alternative high school ($M = 90.61\%$, $SD = 9.16$). A statistically significant difference of 3.08% (95% CI, .52 to 5.63), $t(159) = 2.38$, $p = .019$ was associated with the independent samples *t*-test. Thus, the schools without an at-risk alternative high school were associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen's *d* was estimated at 0.37, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 4.

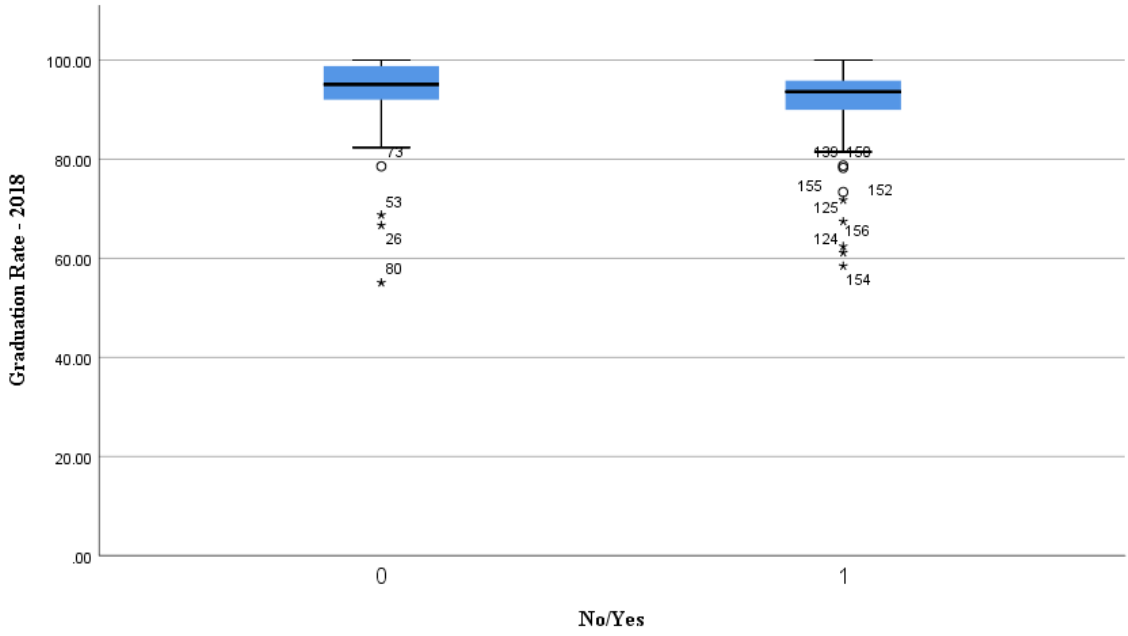

Figure 4. Distribution of data for the use of an at-risk alternative high school for year 2018 (four-year cohort graduation rate)

For schools that did not utilize an at-risk alternative high school, the median four-year cohort graduation rate was 95.12%. Q3 (75th percentile) graduation rate was 98.82%, Q1 (25th percentile) was 92.01%, and the IQR (range between Q3 and Q1) was 6.81%. Four outliers existed for this set of data. For schools that did utilize an at-risk alternative high school, the median four-year cohort graduation rate was 93.64%. Q3 (75th percentile) four-year cohort graduation rate was 95.86%, Q1 (25th percentile) four-year cohort graduation rate was 89.95%, and the IQR (range between Q3 and Q1) was 5.91%. Eight outliers existed for this set of data. Table 28 displays the distribution of four-year graduation cohort data and the use of an at-risk alternative high school for the year 2018.

Table 28

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use an At-Risk Alternative High School for Year 2018

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	95	95.12	92.01	98.82	6.81	4
Yes	66	93.64	89.95	95.86	5.91	8

Note. Median, Q1, Q3 and IQR measured in percent.

Research Question 2

What is the difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program.*

Table 29 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 29

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Years 2016-2018

Dependent Variable	*N*	Mean	*SD*
No	16	89.98	14.11
Yes	155	92.97	7.08

Note. Mean measured as a percent.

For the combined years of 2016-2018, the group that did not use a vocational/technical program ($N = 16$) was associated with a four-year cohort graduation

rate mean of 89.98% (*SD* = 14.11). By comparison, the group that did use a vocational/technical program (*N* = 155) was associated with a four-year cohort graduation rate mean of 92.97% (*SD* = 7.08). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(15.79)$, $p = 0.024$. Given that $p < .05$, it was concluded that the variances were not equal. The *t*-test was read from the bottom line of data, which considers an adjustment for the standard error of the estimate and adjustment for the degrees of freedom for equality of means results (Kent State University, n.d.). The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 3-year average graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 30.

Table 30

Shapiro-Wilk Test of Normality for Missouri Public High Schools that Do and Do Not Use a Vocational/Technical Program for Years 2016-2018

Statistic	*df*	Sig.
.69	171	< .001

This suggests that the graduation rates for 2016-2018 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 171.

The independent samples *t*-test results are displayed in Table 31.

Table 31

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use a Vocational/Technical Program for Years 2016-2018

				95% Confidence Interval	
T	*df*	Sig.	Mean Difference	Lower	Upper
-.84	15.79	.416	-2.99	-10.57	4.60

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use a vocational/technical program for the years 2016-2018. There were 10 outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$). There was no homogeneity of variance ($p = .024$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did utilize a vocational/technical program ($M = 92.97\%$, $SD = 7.08$) when compared to those that did not utilize a vocational/technical program ($M = 89.98\%$, $SD = 14.11$). An effect that was not statistically significantly different of -2.99% (95% CI, -10.57 to 4.60), $t(15.80) = -.84$, $p = .416$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.27, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 5.

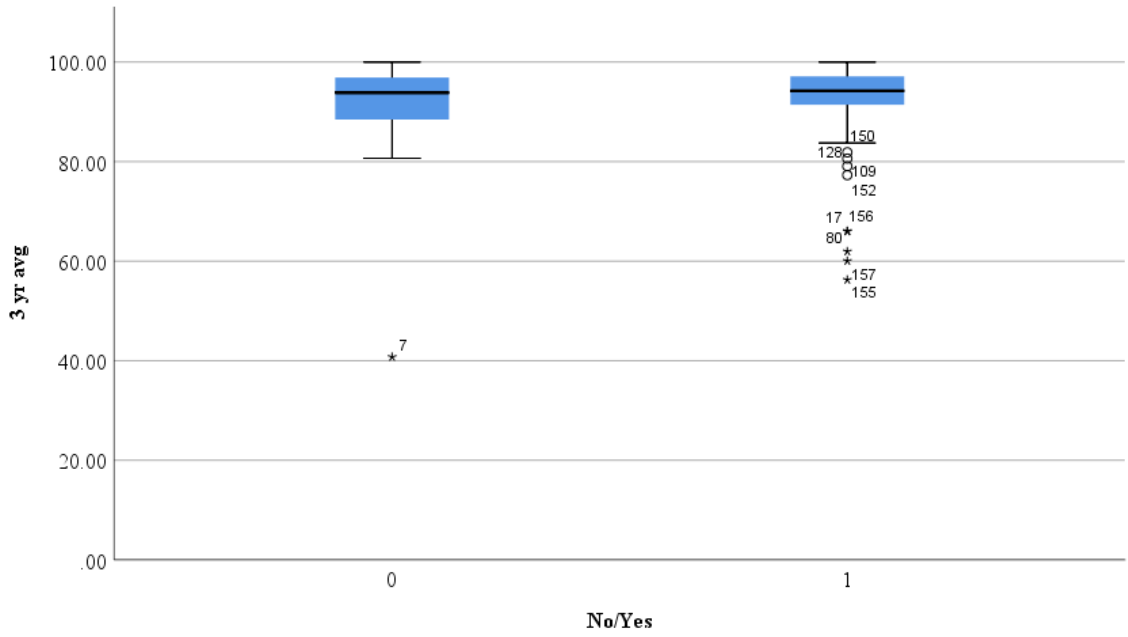

Figure 5. Distribution of data for the use of a vocational/technical program for years 2016-2018 (four-year cohort graduation rate)

For schools that did not utilize a vocational/technical program, the median four-year cohort graduation rate was 93.83%. Q3 (75th percentile) graduation rate was 96.89%, Q1 (25th percentile) was 88.45%, and the IQR (range between Q3 and Q1) was 8.44%. One outlier existed for this set of data. For schools that did utilize a vocational/technical program, the median four-year cohort graduation rate was 94.21%. Q3 (75th percentile) four-year cohort graduation rate was 97.13%, Q1 (25th percentile) four-year cohort graduation rate was 91.42%, and the IQR (range between Q3 and Q1) was 5.71%. Nine outliers existed for this set of data. Table 32 displays the distribution of four-year graduation cohort data and the use of a vocational/technical program for the years 2016-2018.

Table 32

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Years 2016-2018

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	16	93.83	88.45	96.89	8.44	1
Yes	155	94.21	91.42	97.13	5.71	9

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2016 Data

What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2016.*

Table 33 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 33

Descriptive Statistics: four-year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2016

Dependent Variable	*N*	Mean	*SD*
No	16	89.84	17.36
Yes	155	93.40	7.43

Note. Mean measured as a percent.

For the year 2016, the group that did not use a vocational/technical program (N = 16) was associated with a four-year cohort graduation rate mean of 89.84% (SD = 17.36). By comparison, the group that did use a vocational/technical program (N = 155) was

associated with a four-year cohort graduation rate mean of 93.40% (*SD* = 7.43). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(15.57)$, $p = .003$. Given that $p < .05$, it was concluded that the variances were not equal. The *t*-test was read from the bottom line of data, which considers an adjustment for the standard error of the estimate and adjustment for the degrees of freedom for equality of means results (Kent State University, n.d.). The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2016 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 34.

Table 34

Shapiro-Wilk Test of Normality for Missouri Public High Schools that Do and Do Not Use a Vocational/Technical Program for Year 2016

Statistic	*df*	Sig.
.65	171	< .001

This suggests that the graduation rates for 2016 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 171 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 35.

Table 35

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use a Vocational/Technical Program for Year 2016

				95% Confidence Interval	
T	*df*	Sig.	Mean Difference	Lower	Upper
-.81	110.33	.428	-3.56	-12.87	5.74

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use a vocational/technical program for the year 2017. There were nine outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$). There was no homogeneity of variance ($p = .003$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did utilize a vocational/technical program ($M = 93.40\%$, $SD = 7.43$) when compared to those that did not utilize a vocational/technical program ($M = 89.98\%$, $SD = 17.36$). An effect that was not statistically significantly different of -3.56% (95% CI, -12.87 to 5.74), $t(110.33) = -.81$, $p = .428$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.27, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 6.

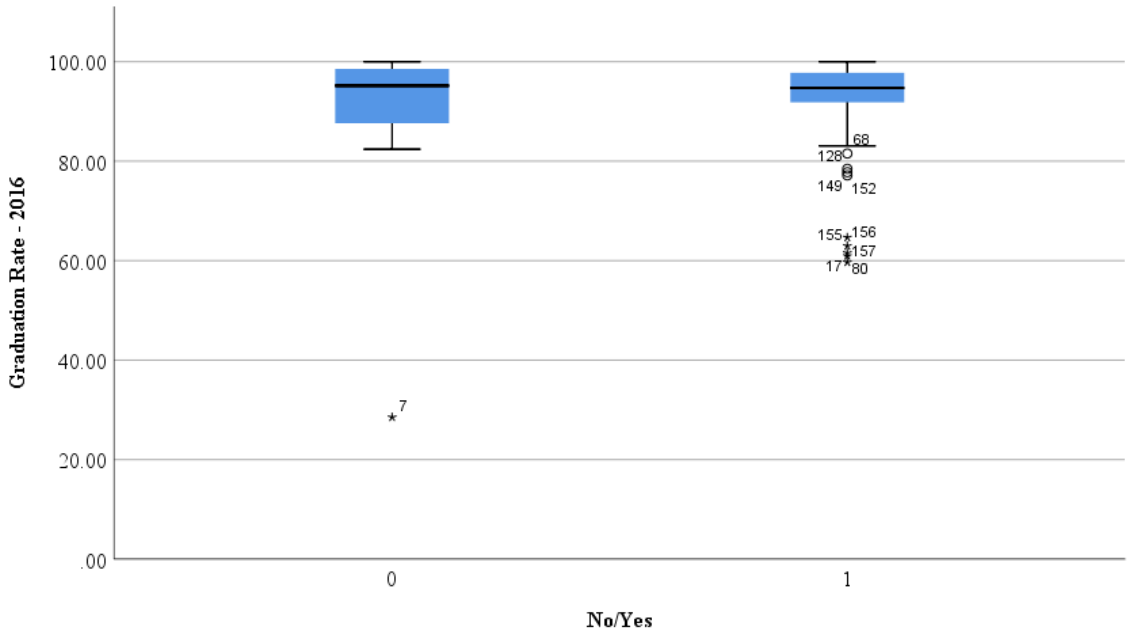

Figure 6. Distribution of data for the use of a vocational/technical program for year 2016 (four-year cohort graduation rate)

For schools that did not utilize a vocational/technical program, the median four-year cohort graduation rate was 95.18%. Q3 (75th percentile) graduation rate was 98.56%, Q1 (25th percentile) was 87.63%, and the IQR (range between Q3 and Q1) is 10.93%. One outlier existed for this set of data. For schools that did utilize a vocational/technical program, the median four-year cohort graduation rate was 94.74%. Q3 (75th percentile) four-year cohort graduation rate was 97.76%, Q1 (25th percentile) four-year cohort graduation rate was 91.82%, and the IQR (range between Q3 and Q1) was 5.94%. Nine outliers existed for this set of data. Table 36 displays the distribution of four-year graduation cohort data and the use of a vocational/technical program for the year 2016.

Table 36

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2016

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	16	95.18	87.63	98.56	10.93	1
Yes	155	94.74	91.82	97.76	5.94	9

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2017 Data

What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2017.*

Table 37 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 37

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2017

Dependent Variable	*N*	Mean	*SD*
No	16	89.16	14.65
Yes	155	92.94	7.79

Note. Mean measured as a percent.

For the year 2017, the group that did not use a vocational/technical program (N = 16) was associated with a four-year cohort graduation rate mean of 89.16% (SD = 14.65). By comparison, the group that did use a vocational/technical program (N = 155) was

associated with a four-year cohort graduation rate mean of 92.94% (*SD* = 7.79). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(15.89)$, $p = .047$. The *t*-test was read from the bottom line of data, which considers an adjustment for the standard error of the estimate and adjustment for the degrees of freedom for equality of means results (Kent State University, n.d.). The independent observation assumption was met, as no results belonged in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2016 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 38.

Table 38

Shapiro-Wilk Test of Normality for Missouri Public High Schools that Do and Do Not Use a Vocational/Technical Program for Year 2017

Statistic	*df*	Sig.
.68	171	< .001

This suggests that the graduation rates for 2017 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test was robust against the assumption of normality with a sample size of 171 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 39.

Table 39

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use a Vocational/Technical Program for Year 2017

				95% Confidence Interval	
t	*df*	Sig.	Mean Difference	Lower	Upper
-1.01	15.89	.324	-3.78	-11.66	4.10

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use a vocational/technical program for the year 2017. There were 12 outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$). There was no homogeneity of variance ($p = .047$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did utilize a vocational/technical program ($M = 92.94\%$, $SD = 7.79$) when compared to those that did not utilize a vocational/technical program ($M = 89.16\%$, $SD = 14.65$). An effect that was not statistically significantly different of -3.78% (95% CI, -11.66 to 4.10), $t(15.89) = -1.01$, $p = 0.324$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.32, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 7.

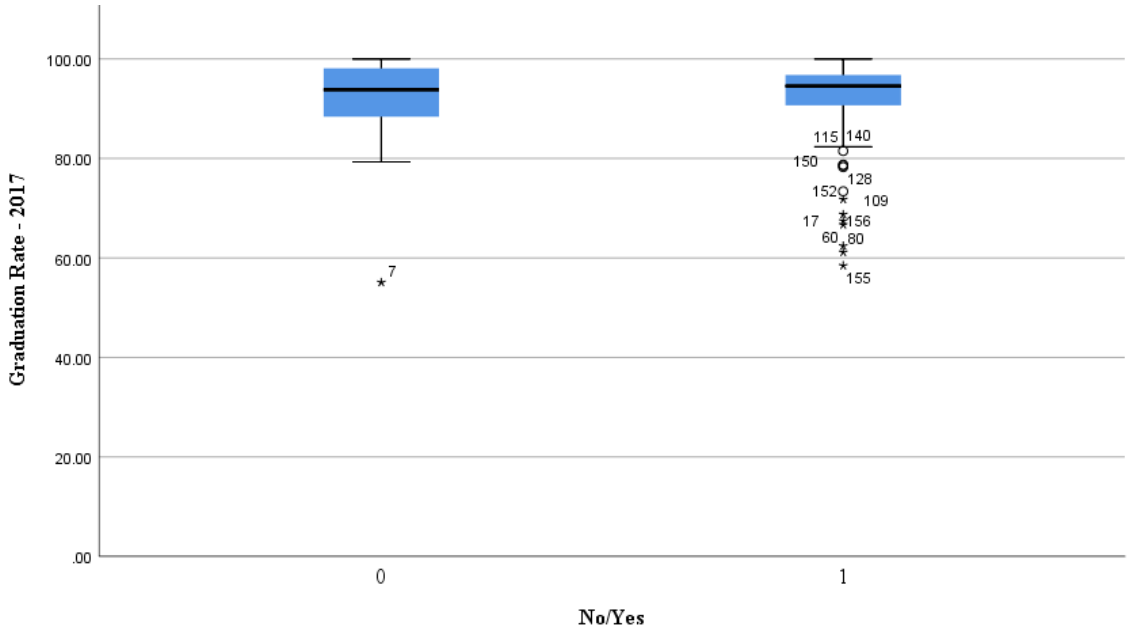

Figure 7. Distribution of data for the use of a vocational/technical program for year 2017 (four-year cohort graduation rate)

For schools that did not utilize a vocational/technical program, the median four-year cohort graduation rate was 93.50%. Q3 (75th percentile) graduation rate was 95.67%, Q1 (25th percentile) was 88.47%, and the IQR (range between Q3 and Q1) was 7.20%. One outlier existed for this set of data. For schools that did utilize a vocational/technical program, the median four-year cohort graduation rate was 95.00%. Q3 (75th percentile) four-year cohort graduation rate was 97.21%, Q1 (25th percentile) four-year cohort graduation rate was 90.95%, and the IQR (range between Q3 and Q1) was 6.26%. Eleven outliers existed for this set of data. Table 40 displays the distribution of four-year graduation cohort data and the use of a vocational/technical program for the year 2017.

Table 40

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2017

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	16	93.50	88.47	95.67	7.20	1
Yes	155	95.00	90.95	97.21	6.26	11

Note. Median, Q1, Q3 and IQR measured in percent.

Analysis of 2018 Data

What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

Null: *There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2018.*

Table 41 displays the number of schools surveyed in each group, the mean four-year cohort graduation rate for those schools, as well as the standard deviation for each category.

Table 41

Descriptive Statistics: Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2018

Dependent Variable	*N*	Mean	*SD*
No	16	90.96	11.12
Yes	155	92.57	7.70

Note. Mean measured as a percent.

For the year 2017, the group that did not use a vocational/technical program (N = 16) was associated with a four-year cohort graduation rate mean of 90.96% (SD = 11.12). By comparison, the group that did use a vocational/technical program (N = 155) was

associated with a four-year cohort graduation rate mean of 92.57% (*SD* = 7.70). To test the hypothesis that both groups were associated with mean four-year cohort graduation rates that contained no statistically significant differences, an independent samples *t*-test was performed.

The assumption of homogeneity of variance was tested through Levene's test $F(169)$, $p = 0.181$. Given that $p > 0.05$, it was concluded that the variances were equal. The independent observation assumption was met, as no results belong in both levels of the independent variables. A Shapiro-Wilk test was conducted to determine whether the 2018 graduation rates could have been produced by a normal distribution. The results of the Shapiro-Wilk test were significant, $p < .001$ and are displayed in Table 42.

Table 42

Shapiro-Wilk Test of Normality for Missouri Public High Schools that Do and Do Not Use a Vocational/Technical Program for Year 2018

Statistic	*df*	Sig.
.74	161	< .001

This suggests that the graduation rates for 2018 significantly deviated from a normal distribution. By the central limit theorem, means of samples from a population with fixed variance approach a normal distribution irrespective of the distribution of the population. The *t*-test is robust against the assumption of normality with a sample size of 171 (Kent State University, n.d.).

The independent samples *t*-test results are displayed in Table 43.

Table 43

Independent Samples t-Test for Difference in Four-Year Cohort Graduation Rates for Schools That Do and Do Not Use a Vocational/Technical Program for Year 2018

				95% Confidence Interval	
t	*df*	Sig.	Mean Difference	Lower	Upper
-.76	169	.447	-1.62	-5.80	2.57

An independent samples *t*-test was run to determine the difference in four-year cohort graduation rates for schools that do and do not use a vocational/technical program for the year 2018. There were 12 outliers in the data, as measured by examination of a boxplot. Engagement scores for each group were not normally distributed as assessed by Shapiro-Wilk's test ($p > .05$). There was no homogeneity of variance ($p = .181$) as evaluated by Levene's test for equality of variances. The independent observation assumption was met, as no results belonged in both levels of the independent variables.

The four-year cohort graduation rate was higher for those schools that did utilize a vocational/technical program ($M = 93.96\%$, $SD = 6.78$) when compared to those that did not utilize a vocational/technical program ($M = 90.93\%$, $SD = 9.41$). An effect that was not statistically significantly different of -1.62% (95% CI, -5.80 to 2.57), $t(169) = -.76$, $p = .447$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.17, which is a small effect size. A boxplot graphical representation displaying the distribution of data is displayed in Figure 8.

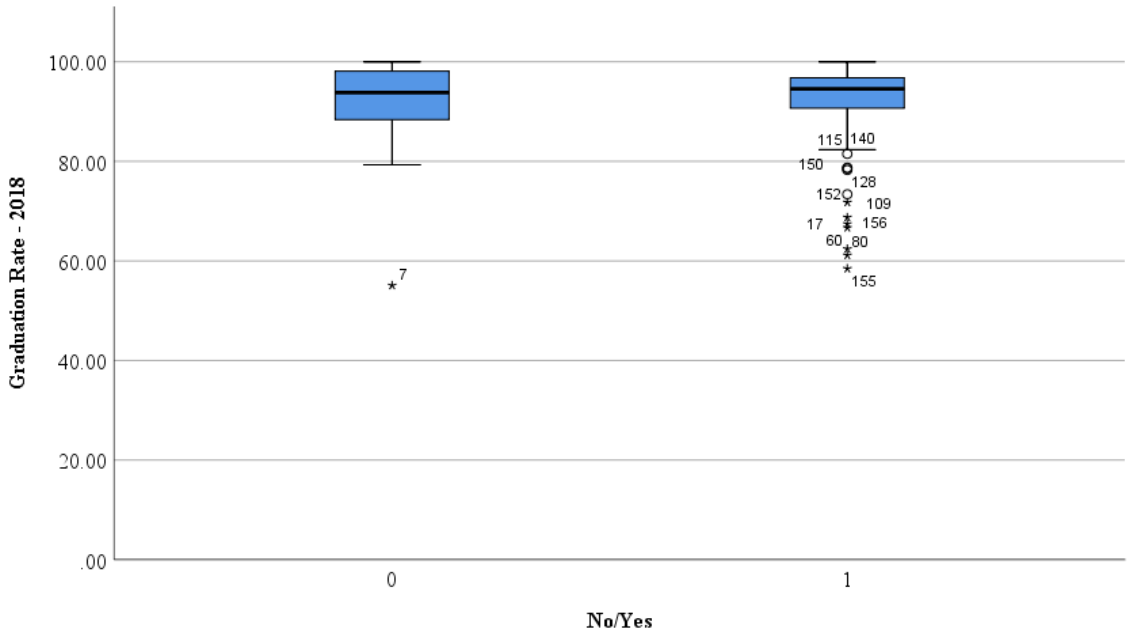

Figure 8. Distribution of data for the use of a vocational/technical program for year 2018 (four-year cohort graduation rate)

For schools that did not utilize a vocational/technical program, the median four-year cohort graduation rate was 93.80%. Q3 (75th percentile) graduation rate was 98.11%, Q1 (25th percentile) was 88.37%, and the IQR (range between Q3 and Q1) was 9.74%. One outlier existed for this set of data. For schools that did utilize a vocational/technical program, the median four-year cohort graduation rate was 94.56%. Q3 (75th percentile) four-year cohort graduation rate was 96.77%, Q1 (25th percentile) four-year cohort graduation rate was 90.68%, and the IQR (range between Q3 and Q1) was 6.09%. Eleven outliers existed for this set of data. Table 44 displays the distribution of four-year graduation cohort data and the use of a vocational/technical program for the year 2018.

Table 44

Distribution of Four-Year Cohort Graduation Rates for Missouri Public High Schools That Do and Do Not Use a Vocational/Technical Program for Year 2018

Dependent Variable	*N*	Median	Q1	Q3	IQR	Outliers
No	16	93.80	88.37	98.11	9.74	1
Yes	155	94.56	90.68	96.77	6.09	11

Note. Median, Q1, Q3 and IQR measured in percent.

Summary

The statistical analysis and results of this study exploring the differences in four-year cohort graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs from 2016 to 2018 were presented in this chapter. Two null hypotheses were tested, along with six sub-null hypotheses:

$H_0$1: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting. The null hypothesis was rejected.

$H_0$1a: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016. The null hypothesis was rejected.

$H_0$1b: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017. The null hypothesis failed to be rejected.

$H_0$1c: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018. The null hypothesis was rejected.

$H_0$2: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program. The null hypothesis failed to be rejected.

$H_0$2a: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2016. The null hypothesis failed to be rejected.

$H_0$2b: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2017. The null hypothesis failed to be rejected.

$H_0$2c: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2018. The null hypothesis failed to be rejected.

Statistical significance was observed with regard to the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016, 2018, and for the 3-year average from 2016 to 2018. For the year 2017, no statistically significant difference was

observed in the four-year graduation rate between schools that do and do not offer an at-risk alternative high school. No statistical difference was observed in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in any of the years researched in this study. Evidence and understanding were obtained concerning the connection between the use of at-risk alternative high schools, vocational/technical programs, and the four-year graduation rate of Missouri public high schools. Chapter Five will provide a summary of the outcomes, conclusions derived from the data, educational inferences, and proposals for further research.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to compare the differences in four-year cohort graduation rates between Missouri public high schools that do and do not offer an at-risk alternative high school or a vocational/technical program. By gathering data on the use of these student interventions and the graduation rates for 2016, 2017, and 2018, the researcher established a connection between these dynamics and made proposals concerning educational applications for school districts. This chapter includes a review of the research questions, synopsis of the research design techniques and approaches used in the study, findings, conclusions, discussion, implications for educational practice, and recommendations.

Research Questions

By examining data gathered from surveys and the DESE web database, the following questions were answered:

1. What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

    1a. What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1b. What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

1c. What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?

2. What is the difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2a. What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2b. What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

2c. What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?

The following null hypotheses were tested based on data gathered during the study:

$H_0$1: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting.

$H_0$1a: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2016.

$H_0$1b: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2017.

$H_0$1c: There was no statistically significant difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting in 2018.

$H_0$2: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program.

$H_0$2a: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2016.

$H_0$2b: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2017.

$H_0$2c: There was no statistically significant difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program in 2018.

Summary of Methods

All questions and associated hypotheses were considered through quantitative analysis. Survey results from Missouri public high schools and data obtained from the DESE open access web database were collected by the researcher. This information was then entered into SPSS to examine connections between the dependent and independent variables.

The first independent variable was generally defined as the use of an at-risk alternative high school as a dropout intervention. The second independent variable was generally defined as the use of a vocational/technical program as a dropout intervention program. The dependent variable was the graduation rate, which was defined as the four-year adjusted cohort graduation rate for a Missouri public high school.

An independent samples *t*-test was utilized to determine whether there was a causal-comparative relationship and a statistically significant difference between the means in two unrelated groups. As a result, school districts may investigate opportunities to provide interventions to students identified as being at-risk for dropping out of high school. This could assist in identifying staff and curriculum needs as well as financial and facility planning for school districts in order to increase high school graduation rates.

Five-hundred sixty-six high school principals received an email by survey to determine the use of at-risk alternative high schools and vocational/technical programs throughout the state of Missouri. This study used a sample size of 161 public high schools to examine at-risk alternative high schools, and 171 public high schools to examine vocational/technical programs. Schools that were identified as K-8 districts, parochial, private, and the researcher's own school were not used in this study.

Summary of Findings

In school year 2016-17, the national four-year adjusted cohort graduation rate for public high school students was 85% (National Center for Education Statistics, 2019). During the years 2016 through 2018, the four-year adjusted cohort graduation rate in the state of Missouri ranged from 88.95% to 89.23% (District Annual Dropout Rate, 2018). While these graduation rates for Missouri sit above the national average, there are still a number of public high schools throughout the state that are falling below the state average. From 2016 to 2018, an average of 98 public high schools were below the state average four-year adjusted cohort graduation. Of these 98 schools, 36 were below the state average all three years (Building Adjusted Cohort Graduation Rates, 2019). The discrepancy in these graduation rates prompted the researcher to conduct this study.

The purpose of this causal-comparative study was to test the organization and contingency theories of Max Weber and Joan Woodward (Colgan, 2018) that differences exist in four-year graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. While there is considerable research concerning programs and characteristics of dropouts, the identification of effective practices that would have a substantial impact within our nation's education system as a standard to preclude students from dropping out was not readily available. The goal of this study was to add to the body of knowledge by determining whether a statistically significant difference existed between dropout intervention programs and four-year cohort graduation rates. The subsequent sections present details concerning the outcomes of all research questions in this study.

At-Risk Alternative High Schools and Four-Year Cohort Graduation Rates

Independent samples *t*-tests were utilized in this part of the causal-comparative ex-post facto quantitative study to establish if there was a difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use an at-risk alternative high school. Research questions focused on the years 2016, 2017, 2018, and the 3-year average from 2016 to 2018. Using the sig (2-tailed) *p* value at an alpha level of .05, the data were analyzed to determine if there was a statistically significant difference between the use of an at-risk alternative high school and the four-year cohort graduation rate for 2016, 2017, 2018, and the 3-year average from 2016 to 2018.

Research Question 1: *What is the difference in the four-year graduation rate between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use an at-risk alternative high school. A statistically significant difference of 3.03% (95% CI, .35 to 5.71), $t(110.33) = 2.24$, $p = .027$ was associated with the independent samples *t*-test. With $p < .05$, the schools without an at-risk alternative high school were associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen's *d* was estimated at 0.37, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (not utilizing an at-risk alternative high school) and the dependent variable (four-year cohort graduation rate) for graduation years 2016-2018. With a large spread of

graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 1a: *What is the difference in the four-year graduation rate in 2016 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use an at-risk alternative high school for graduation year 2017. A statistically significant difference of 3.42% (95% CI, .67 to 6.18), $t(159) = 2.45$, $p = 0.015$ was associated with the independent samples *t*-test. With $p < .05$, the schools without an at-risk alternative high school were associated with a significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen's *d* was estimated at 0.39, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (not utilizing an at-risk alternative high school) and the dependent variable (four-year cohort graduation rate) for graduation year 2016. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 1b: *What is the difference in the four-year graduation rate in 2017 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use an at-risk alternative high

school for graduation year 2017. An effect that was not statistically significantly different of 2.59% (95% CI, -.19 to 5.36), $t(159) = 1.84$, $p = .067$ was associated with the independent samples *t*-test. With $p > .05$, the schools without an at-risk alternative high school were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The researcher failed to reject the null hypothesis.

Cohen's *d* was estimated at 0.29, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (not utilizing an at-risk alternative high school) and the dependent variable (four-year cohort graduation rate) for graduation year 2017. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 1c: *What is the difference in the four-year graduation rate in 2018 between high schools that offer an at-risk alternative high school setting and those that do not offer an at-risk alternative high school setting?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use an at-risk alternative high school for graduation year 2018. A statistically significant difference of 3.08 (95% CI, .52 to 5.63), $t(159) = 2.38$, $p = .019$ was associated with the independent samples *t*-test. Thus, the schools without an at-risk alternative high school were associated with a statistically significantly larger mean four-year cohort graduation rate than the schools with an at-risk alternative high school. The null hypothesis was rejected.

Cohen's *d* was estimated at 0.38, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (not utilizing an at-risk alternative high school) and the dependent variable (four-year cohort graduation rate) for graduation year 2018. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Vocational/Technical Programs and Four-Year Cohort Graduation Rates

Independent samples *t*-tests were utilized in this part of the causal-comparative ex-post facto quantitative study to establish if there was a difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use a vocational/technical program. Research questions focused on the years 2016, 2017, 2018, and the 3-year average from 2016 to 2018. Using the sig (2-tailed) *p* value at an alpha level of .05, the data were analyzed to determine if there was a statistically significant difference between the use of an at-risk alternative high school and the four-year cohort graduation rate for 2016, 2017, 2018, and the 3-year average from 2016 to 2018.

Research Question 2: *What is the difference in the four-year graduation rate between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use a vocational/technical program. An effect that was not statistically significantly different of -2.99% (95% CI, -10.57 to 4.58), $t(15.79) = -.84$, $p = .416$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated

with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.27, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (utilizing a vocational/technical program) and the dependent variable (four-year cohort graduation rate) for graduation years 2016-2018. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 2a: *What is the difference in the four-year graduation rate in 2016 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use a vocational/technical program for graduation year 2016. An effect that was not statistically significantly different of -3.56 (95% CI, -12.87 to 5.74), $t(110.33) = -.81$, $p = .428$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.27, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (utilizing a vocational/technical program) and the dependent variable (four-year cohort graduation rate) for graduation years 2016-2018. With a large spread of graduation

rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 2b: *What is the difference in the four-year graduation rate in 2017 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?*

The data were analyzed to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use a vocational/technical program for graduation year 2017. An effect that was not statistically significantly different of -3.78% (95% CI, -11.66 to 4.10), $t(15.89) = -1.11$, $p = 0.324$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.32, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (utilizing a vocational/technical program) and the dependent variable (four-year cohort graduation rate) for graduation year 2017. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Research Question 2c: *What is the difference in the four-year graduation rate in 2018 between high schools that offer a vocational/technical program and those that do not offer a vocational/technical program?*

The data were run to determine the difference in the four-year cohort graduation rates in Missouri public high schools that do and do not use a vocational/technical program. An effect that was not statistically significantly different of -1.62% (95% CI, -5.80 to 2.57), $t(169) = -.76$, $p = .447$ was associated with the independent samples *t*-test. With $p > .05$, the schools with a vocational/technical program were not associated with a statistically significantly larger mean four-year cohort graduation rate than the schools without a vocational/technical program. The null hypothesis failed to be rejected.

Cohen's *d* was estimated at -0.17, which is a small effect size. With this size of effect, the statistically significant difference was minimal between the independent variable (utilizing a vocational/technical program) and the dependent variable (four-year cohort graduation rate) for graduation year 2018. With a large spread of graduation rates in the data, this small size of effect was not surprising. There was not a meaningful difference between the two mean graduation rates of the groups.

Discussion

An analysis of data indicated there was a statistically significant difference between the use of an at-risk alternative high school and the four-year cohort graduation rate for 2016, 2018, and the 3-year average from 2016 to 2018. Those schools that did not employ an at-risk alternative high school had a higher mean graduation rate than those that did. Their lack of this intervention yielded a statistically significant difference on the percentage of students earning a high school diploma.

Data analysis showed there was not a statistically significant relationship between the use of an at-risk alternative high school and the four-year cohort graduation rate for 2017. Those schools that did not employ an at-risk alternative high school had a higher

mean graduation rate than those that did. Their lack of use of this intervention did not yield a statistically significant effect on the percentage of students earning a high school diploma.

Effect size was small for all research questions regarding at-risk alternative high schools. This means the statistically significant difference was minimal between the independent variable (utilizing an at-risk alternative high school) and the dependent variable (four-year cohort graduation rate). There was not a meaningful difference between the two mean graduation rates of the groups.

At-risk alternative high schools help meet a variety of needs for students. These needs include the educational, emotional, social and physical well-being of students who have not found success in a conventional school environment. Students that fall in these categories would gain most from this focused support at school, which lends itself to strong relationships with staff and a sense of belonging (Ellerbrock & Kiefer, 2014).

Dropping out of school is the leading choice for those at-risk students who find a traditional school setting too unyielding to accommodate for a high school diploma (Tuck, 2013). To provide support and to ensure success for all students, alternative education programs are implemented in many school districts. Alternative education programs are frequently seen as customized opportunities intended to meet the educational needs for students recognized as at-risk for school dropout (Porowski et al., 2014). This intervention creates a personalized learning environment, and brings about a sense of togetherness and develops circumstances where students and teachers can strengthen relationships (Lucio et al., 2012), and backing is provided for academic success as well as improved social and behavioral skills (Ellerbrock & Kiefer, 2014).

In a study of alternative schools, Turpin and Hinton (2000) discovered that 91% of students surveyed indicated there was an improvement in grades for those who were placed in an alternative school setting for academic deficiencies. According to Petty and Thomas (2014), implementing programs that advance the career development skills for at-risk students, such as the alternative high school, have a direct positive effect on the graduates, the community and society. In comparison, a study of two cohorts of high school students by Hutchinson and Henry (2013) observed that students who attended the alternative school exhibited a higher dropout rate when compared to a cohort of high school students in a traditional setting in the district. Research conducted by Hinds (2013) identified the difficulty in evaluating at-risk alternative schools using methods designed for a traditional setting and holding them to the same level of accountability.

The researcher did not anticipate some of the results pertaining to at-risk alternative high schools. Utilizing this specific intervention should positively affect those at-risk students that may be on the verge of dropping out. Findings from this study showed that schools not using this intervention graduated students at a higher rate than those that did. With a small effect size, the difference in four-year cohort graduation rates between those schools that do and do not use an at-risk alternative high school was significant for three of the four timeframes analyzed. This result was unexpected, as conventional thought in education would point to higher graduation rates for those schools that do offer an at-risk alternative high school when compared to those that do not.

The intent of using this type of intervention is to reach those at-risk students that may not graduate with a high school diploma in a traditional school setting. It was

surprising to see the mean four-year cohort graduation rates at a higher level for schools that did not utilize an at-risk alternative high school. While the effect size was small, the significant difference in four-year cohort graduation rates between those schools that do and do not use an at-risk alternative high school for 2016, 2018, and 2016-2018 was unexpected in that schools not using this intervention graduated students at a higher rate than those that do.

The findings from the study on at-risk alternative high schools were consistent with previous studies conducted in this area as they relate to student academic success and effect on helping students earn a high school diploma. Previous research shows mixed results on the impact of this intervention type on preventing high school dropouts. The researcher discovered that schools which offer an at-risk alternative high school had a lower mean graduation than those that do not use this program. With an emphasis placed on alternative education as a high school intervention, results that show a statistically significant difference supporting the lack of an at-risk alternative high school was unexpected, but falls in line with inconsistent results from prior research.

Analyzing data revealed there was not a statistically significant relationship between the use of a vocational/technical program and the four-year cohort graduation rate for 2016, 2017, 2018, and the 3-year average from 2016 to 2018. The schools that did utilize a vocational/technical program had a higher mean graduation rate than those that did not. Their use of this intervention did not yield a statistically significant difference on the percentage of students earning a high school diploma.

Attendance is an at-risk factor for students that can lead to potential academic problems in school. According to Schoeneberger (2012), student attendance reflects

student engagement, as students with low attendance may feel disconnected from the school environment. Research indicates that students who miss 10% or more in a given school year are at a greater risk for academic failure and potentially dropping out of school than are students who attend school on a regular basis (Chang, 2012). The implementation of engaging and relevant lessons to better involve students in their education and prepare students for success after graduation has yielded the creation of vocational/technical programs for students to help increase the rate of high school graduation (Rumberger et al., 2017).

A study by Gordon (2014) showed that Career and Technical Education programs have reformed to offer their students integrated programs of study that allow both academic and career-oriented growth. Researchers found that students in Chicago public schools who transferred to a career academy (high schools which contain smaller concentrated schools) had increased odds of completing grades beyond ninth grade and graduating from high school (Cullen et al., 2000). In contradiction, Miller and Mittleman (2012) performed a comparative analysis of 18 rural CTE schools over a ten-year span. They discovered no effect on the academic success of students, and increased inequality between disadvantaged and advantaged students in the rigor of courses taken.

The findings for vocational/technical programs were not as surprising to the researcher as those associated with at-risk alternative high schools. Use of this intervention type is intended to keep at-risk students from dropping out of high school. It was expected to see the mean four-year cohort graduation rates at a higher level for those schools that did utilize a vocational/technical program.

The results from this study align with previous research on at-risk alternative high schools and vocational/technical programs. While some studies show these interventions make a positive difference on a school's graduation rate, other investigations are contrary and question whether or not these programs are effective at helping students earn a high school diploma. These contradictions led the researcher to further investigate at-risk alternative high schools and vocational/technical programs, and the findings from this study are not conclusive as to the difference the existence of these programs have on a graduation rate.

The basis for this study was organization and contingency theory. These philosophies focus on organizational systems and methods, the connection of organizations to their external environment, and the decisions of supervisors and other personnel within organizations (Colgan, 2018). This framework aligns with the research conducted and accompanying results.

The application of organization and contingency theories was especially appropriate for this study by concentrating on a school's services, programs and policies, and the difference particular interventions have on the dropout rate of at-risk high school students. The results show that diligence must be shown by school administrators and educators when placing students in either an at-risk alternative high school or a vocational/technical program. There are many internal and external factors that must be analyzed, and the participation alone in a program does not ensure a path to graduation.

The findings discovered were consistent with this framework of thinking, and this alignment with theory was expected by the researcher. Limited statistically significant differences were found as a result of this research, and small effect sizes on graduation

rates indicate there was not a meaningful difference between the mean graduation rates of groups that did and did not use at-risk alternative high schools or vocational/technical programs. Educators must continue to thoroughly evaluate individual student circumstances and their specific educational needs for them to be successful in school.

There were several limitations identified in this study. Limitations are external factors to the study that cannot be controlled by the researcher (Creswell, 2003; McMillan & Schumacher, 2005). Special care was taken to produce valid results as this research was conducted. The following limitations were noted, and application to this study is stated:

1. The findings were a result of data compiled from public high schools from the state of Missouri. Care was exercised in an attempt to not generalize the findings of this study. This proved to be difficult as the size of schools varied greatly, with the smallest school having an average student enrollment of 65, and the largest school having an average student enrollment of 2,514.

2. A quantitative study, chosen over a qualitative study, allowed the researcher to analyze data that were accessible to a high school administrator. Not all data were available for each public high school in Missouri. Out of 566 schools surveyed, 197 answered the questions asked by the researcher. Graduation data were available for 193 of the 197 schools that responded to the survey.

3. In the study, analysis was only done based on data on Missouri public high schools and the existence of either an at-risk alternative high school setting or an alternative/technical program to determine if a potential difference existed between program existence and a high school's four-year graduation rate. Analysis of data was not

conducted on schools that utilized both interventions. In contrast, schools that used neither intervention were not studied as part of this research.

4. This study design did not have a control group and analyzed multiple school districts. The research took careful steps to ensure valid and reliable data was used. Through the process of data cleaning, all duplicate responses were eliminated.

5. The graduation rate may be due to other school district factors such as better record keeping by personnel, addition or removal of other intervention programs, curriculum changes, or personnel turnover. These elements could not be controlled by the researcher. The possibility exists that data errors occurred at the school building or district level that skewed the graduation rate data obtained as part of this study.

6. Besides the selected dropout prevention programs, other variables such as socioeconomic status of students or the high school's student population were not factored. A school administrator cannot control or change the home and community environment of individual students. The proper placement of students in the appropriate intervention program is difficult, and the existence of internal and external factors can make it difficult to place at-risk students on the proper path towards graduation.

The transferability of this study to other populations is possible, but not without its challenges. With such a great variance of enrollment sizes, and considering multiple internal and external environmental influences, it will be difficult to determine if there is a statistically significant difference in graduation rates between schools that do and do not offer an at-risk alternative high school or a vocational/technical program. Coupled with the challenge of obtaining larger effect sizes, a study of this nature may likely produce similar results as the researcher attained.

Implications for Educational Practice

There are implications that this study has on the field of education. While there were statistically significant differences found in the four-year cohort graduation rates between those schools that do and do not utilize an at-risk alternative high school in three of the four timeframes researched, the results were not as the researcher anticipated. The findings showed the mean graduation rates were higher for those Missouri public high schools that did not use this intervention when compared to those that did. Reflecting the contingency model of organization theory, educators must continue to evaluate existing systems and look to create new systems and a variety of learning opportunities for all students, and in particular, students from disadvantaged populations (Ogawa, 2014).

The findings in the area of vocational/technical programs showed the mean graduation rates were higher for those Missouri public high schools that did use this intervention when compared to those that did not. There were no statistically significant differences found in the four-year cohort graduation rates between the two groups for all four timeframes researched. The proper placement of at-risk students in a dropout intervention program will continue to be critical to a student's academic success, and is contingent on the thoroughness shown in the evaluation of existing programs and the development of new interventions (Bush, 2015).

The findings of this study indicated that teachers and administrators in public high schools must continue to be cognizant of as many internal and external environmental factors as possible. There was no definitive conclusion as to the difference at-risk alternative high schools and vocational/technical programs have on graduation rates.

Diligence must be paid to the needs of students and the path to graduation on which they are placed.

School districts, faced with the challenge of graduating at-risk students, must continue to analyze their current interventions as well as explore new programs that may be beneficial for those students that need additional support to earn a high school diploma. The results of this study may lead schools to closely scrutinize their at-risk alternative high schools and vocational/technical programs to determine if they are making a difference on their graduation rates. In addition, those districts without one or both of these programs may investigate these interventions to determine if their implementation could benefit at-risk students in their district.

Practices at the building and district level as it relates to at-risk intervention strategies and programs must work in partnership with each other to make positive strides to help at-risk students graduate from high school. The findings from this research may not impact just high schools and the school district, but lower grade levels as well. The data collected and accompanying results could lead to collaboration across grades and buildings to identify strengths and weaknesses in intervention programs that span elementary, middle, and high school buildings. This alliance between all educators in a school district could prove valuable in targeting at-risk students at all grade levels with the end goal of helping them earn a high school diploma.

This study's findings can be delivered to education practitioners in a variety of ways. The researcher can present results and recommendations within their school district, at conferences that involve multiple districts and participants, as well as informal communication via email or phone calls with other leaders in education. With the

prevalence of at-risk alternative high schools and vocational/technical programs throughout the state of Missouri, there will be many opportunities for the researcher to discuss the results with others, and spur conversations about how to better serve at-risk students.

The conclusions drawn from this study are applicable for public schools throughout the state of Missouri and across the country. At-risk students and the challenge of helping them graduate from high school are not confined to one region of the United States. The importance of reducing school dropouts is a nationwide focus, as the ramifications of a percentage of the population without a high school diploma have a large-scale effect throughout the country (Belfield et al., 2012). These findings may not be as appropriate for private or parochial schools, as student admissions at these educational institutions are selective, and they are not governed by the rules and regulations set forth by their state's department of education.

There are limitations to the findings discovered with this research. Demographics of the school setting were not considered. Factors such as socioeconomic status, school enrollment size, and student ethnicity were not included in the data collected by the researcher. In addition, the fidelity of program implementation, faculty competency and expertise level, as well as quality of curriculum did not play a part in the collection and analysis of data as it related to at-risk alternative high schools and vocational/technical programs. Not considering these elements as well as other factors limit the application of the researcher's results.

Recommendations for Future Research

Utilizing this study as a basis for future research, the next segment to study could include the comparison of school demographics and four-year cohort graduation rates for those Missouri public high schools that do or do not use an at-risk alternative high school or a vocational/technical program as an intervention for secondary students. The literature review examined the at-risk indicators of academic achievement, socioeconomic status, attendance, retention and discipline. A future study may look at the history of these factors in different states and compare the data to what was found in the state of Missouri.

Another proposal might be exclusively based on school demographics such as enrollment size (rural, urban, suburban), student ethnicity, and free/reduced lunch students. These external factors were not discussed as part of this study, but are an influence on the operation of a school. This potential study could also examine these features to see if they influence the difference in four-year cohort graduation rates and the existence of intervention programs in high schools.

Additional research could explore other secondary interventions that are currently used throughout the state of Missouri or in other states to see if there is a statistically significant difference in the four-year cohort graduation rates with their use in school districts. Programs such as Missouri Options, credit recovery, and online courses are utilized as interventions in public high schools. These interventions could be compared to study what difference the use (or lack thereof) may have on graduation rates.

Future studies might also explore other ages of students in elementary or middle schools. The progress of these students towards graduation could be tracked with the

existence of one or more intervention programs. The younger a student can be identified as at-risk and measures put in to place to aid their education, the better chance they have at not being a dropout in high school or before.

The implementation of new programs to public high schools could be studied to examine if there is a statistically significant difference in the four-year cohort graduation rates before and after these additional interventions have been put into operation. A longitudinal study of this nature would dig deeper into the organization and contingency theories in which this study is based. Further research is needed to explore the effective use of interventions in public high schools, and the proper placement of students in them.

Summary

The purpose of this causal-comparative study was to determine if differences exist in four-year cohort graduation rates of Missouri public high schools with and without at-risk alternative high schools or vocational/technical programs. Public high schools in the state of Missouri were found to have statistically significant differences in their four-year cohort graduation rates for those that do and do not use an at-risk alternative high school, with those not using this intervention having a higher mean graduation rate than those that do. For Missouri public high schools that do and do not use a vocational/technical program, no statistically significant differences were found between those groups in regards to their four-year cohort graduation rates, with those using this intervention having a higher mean graduation rate than those that do not.

A review of literature acknowledged a lack of available research studies, and extensive contradictions on the effectiveness of alternative education programs for at-risk youth. This gap in literature demonstrated the necessity for this study. The findings in this

research shed a light on the difficulty in determining what interventions have made a statistically significant difference on graduation rates. This research fills a gap in literature by concentrating not on demographics of at-risk students, but focusing on the success of high school interventions to help students stay in school and graduate.

Organization and contingency theories were used as the theoretical foundation for this study. These theories consider how organizations act and how they influence and are influenced by the environment in which they operate (Buzzelli & Allison, 2017). School management and the placement of at-risk students is not suited for the "one size fits all" approach (Bush, 2015). Looking through this lens, school administrators and teachers should attempt to simplify complex environmental factors in play for students and apply the appropriate intervention to help them be successful. The research findings showed a need for continued diligence in assessing student needs, as well as fidelity in the implementation, evaluation, and creation of programs to help at-risk youth graduate from high school.

With so many individual and societal problems that result from students not earning a high school diploma, this research was critical to perform in order to study possible increases on the graduation rate that can be made from the use of explicit intervention programs. Researching the outcomes of at-risk alternative high schools and vocational/technical programs on the graduation rate will allow school districts to more precisely identify what is making an improvement in the graduation rate in their high schools, and positively impacting the lives of American citizens. Future studies based off this research may reveal what factors, programs, or strategies make a statistically significant difference on graduation rates, and lead to a more productive society.

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