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Effects of Flex Periods on High School Student Failure Rates

Michael Ongie
mdongie1@gmail.com

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Effects of Flex Periods on High School Student Failure Rates

A Thesis

Submitted to the Faculty
of the Department of Leadership Education
College of Education
of Winona State University

by

Michael Ongie

In Partial Fulfillment of the Requirements
for the Degree of
Educational Specialist

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Abstract

Schools, in their current form, do not allow for personalized amounts of time for students to learn concepts. Students do not have the opportunity to meet with teachers during the school day to get support on specific concepts they do not understand. The purpose of this study is to research the potential link between implementation of a flex period and student achievement, measured by failure rates, in high school semester courses. The study investigates how failure rates changed after the implementation of a flex period. The sample population for this study are all students who attended a specific small rural high school in central Minnesota during the years 2015-2020. Course grades were collected from before the flex period was implemented (2015-2017) and after it was implemented (2018-2020). Course grades were then to compare what percentage of students failed each semester course pre and post flex period implementation. Results showed a decrease in the overall failure rates and significant decreases in math and foreign language classes. School leaders should consider establishing a flex period to allow for time during the school day for students to get extra intervention or enrichment as it appears to decrease the failure rate in several high school courses.

Chapter 1: Introduction

The purpose of schools is to ensure all students learn at high levels; however, there are times students miss out on essential learning outcomes in their classes. This reality is not an indictment of teachers but rather a reality of how students learn. Many students will require different amounts of time to grapple with and learn concepts (Vaughn et al., 2010). Quality schools ensure all students can learn these essential learning outcomes regardless of the time it takes. In many schools, when students do not learn a concept, they are pulled from a different general education course for remediation. This process is damaging to student learning because they lose out on more curriculum and fall farther behind (Buffum et al., 2018). DuFour et al. (2016) states schools that are committed to ensuring high levels of learning for all their students will create a systematic process to support their students. A potentially powerful process to give students extra time and support to learn is a flex period where students can get targeted small group instruction with an expert in the curriculum.

Studies on flex periods have found their usefulness in increasing student wellness and socioemotional health as well as decreasing teacher stress (Pottage & Sillery, 2016). There has been little research on how a flex period could affect student learning. A preliminary study completed by Kroll (2019) found some effect on achievement, however it was measured via end-of-semester state standardized tests which did not tell the whole learning arc of a student. State standardized tests do not show what students learned throughout the year like a teacher created test can (Ravitch, 2014). Little research has been done to see how students achieved in their classes as a result of a flexible period being implemented in the school; this research attempts to address that idea.

The purpose of this study is to research the potential link between a flex period and

student achievement measured by failure rates across all high school semester courses. The study investigates how failure rates changed after the implementation of a flex period at a singular rural high school in central Minnesota. The purpose is to add evidence for the implementation or removal of a flexible period where students can get additional support on missed learning outcomes.

Background of Problem

The historical role of schools was to separate students by their ability levels; this old model and rationale of schooling is outdated and harmful to students (DuFour, 2015). There is virtually no path to the middle class without some sort of post high school schooling or training (DuFour, 2015). The structure of many schools has not changed since their conception, particularly when looking at how the school day is arranged (Buffum et al., 2018). The traditional high school bell schedule does not permit any extra time for struggling students to receive additional time and support with their teachers during the school day. Coming in before or after school for additional help and support is often not a viable solution and only leads to a widening in the achievement gap between students of differing socioeconomic backgrounds (Sonju et al., 2019).

Flex schedules were first introduced in the 1960's and became fairly popular, however the movement wavered in the 1970's and schools moved back to the traditional high school bell schedule (Gilkey & Hunt, 1998). Flexible schedules are defined as creative uses of the time in the school day which attempt to match the instructional time and format to the learning needs of students (Daniel, 2007). Flexible scheduling allows schools to optimize time, space, staff, and facilities and to add variety to their curriculum offerings and teaching strategies (Daniel, 2007). Flexible scheduling reduces the amount of time that students spend out of class which allows for

more instructional time and less time during which students are indirectly supervised. The increase in instructional time is key for student learning because there is a strong connection between time and learning, expanding learning time in schools can contribute significantly to better student achievement (Farbman, 2015).

Problem Statement

For students to be successful in high school it is imperative they become proficient in the learning targets their schools deem essential for graduation. According to Buffum et al. (2018), students who fail in the K-12 education system are three times more likely to be unemployed, sixty-three times more likely to be incarcerated, and, on average, live at least a decade shorter than a graduate. When a student fails one core class, English, math, social studies, or science, in their freshman year, they are four times less likely to graduate from high school on time (Allensworth & Easton, 2007).

Schools, in their current form, do not allow for personalized amounts of time for students to learn concepts. With the current understanding of how students learn, it is hard to believe the school day is run with such an emphasis on time rather than student learning (Kroll, 2019). Kroll (2019) also states the single-period high school schedule increases the impersonal nature of high schools and at no other time in a person's life are they put in such a position and expected to learn and succeed. Increasing the personalized learning environment through flex periods provides a potentially promising solution to the failure dilemma caused by traditional schooling structures.

Research Questions

The following research question is used in this study: How did the implementation of a flex period two times a week at the high school level affect the percent of students who failed

semester courses?

Limitations

Limitations that must be considered in the following study are due to the lack of controls between the students, teachers, and classroom procedures. The data was collected after the students had completed the courses, meaning many factors could not be controlled by the researcher. The study took place over the span of four years; in that time, not all the courses in the study were taught by the same teacher. At the study school, there is not one set grading practice including how assignments and assessments are graded and scored in the gradebook. While many educators follow the same general guidelines, there could still be some differences occurring causing some error in the quantitative data. Some teachers also have different classroom policies and procedures which can cause students to succeed or fail at different rates due to the classroom environment and not implementation of the flex period.

Another limitation is how teachers use the flex periods. The school's only stipulation on how this time is used is it had to help students who were struggling with specific curriculum. How teachers approached these interventions varied widely. Some teachers waited until students were already failing while others used the flex periods more preemptively to help students.

Definition of Terms

Flex periods have been defined as regularly scheduled blocks of time during a school day in which students have choice, whether it is academic, wellness, or social based (Pottage & Sillery, 2016). The study high school has these regularly scheduled periods two times a week in the morning before students' first class of the day. The only difference in this definition is there were no options for wellness or social based activities, instead the school focused all time on academic interventions with students.

Intervention is defined as a structured time to provide students with supplemental help to master grade-level curriculum (Sonju et al., 2019). Interventions are led by teachers who are licensed and able to teach the curriculum students are still needing to master (Sonju et al., 2019).

Combining these two definitions, this study looks at a flexible time where students can get support in the concepts they have yet to master from teachers who have an understanding of the concept in question.

Student achievement is defined by using students' grades in the study classes. Achievement is demonstrated as passing a course with a grade above an F (Jeynes, 2019).

Failure is used to describe a student who received an F or withdrew from the course (Norton et al. 2017).

Failure rate is calculated by taking the number of students who failed and dividing it by the number of students enrolled in the course (Roblyer & Davis, 2008).

Summary

Chapter 1 provides the background of the problem, the problem statement, the study's purpose, and research questions. Chapter 1 also includes the limitations and relevant terms related to failure rates and interventions in high schools. Chapter 2 provides a literature review directly related to the problem statement and research questions guiding the study. Chapter 2 includes discussions on factors affecting high school failure rates, time in school, interventions, and high school scheduling. Chapter 2 will also discuss the theoretical framework that helps understand the role of time, interventions, and learning in high school students.

Chapter 2: Review of the Literature

Chapter 2 discusses the historical perspective on how the issue of school scheduling and failure rates arose in schools today by focusing on four crucial concepts: factors affecting student failure, time, targeted interventions, and scheduling. The first section of the literature review will focus on the factors that lead to students failing their courses in high school. The second section explores how time spent in school affects student achievement. The third section details how time can be used more effectively in high school. The fourth section will discuss how scheduling could be modified to change how time is used in the high school setting. Chapter 2 also discusses the theoretical framework that provided rational and informed the study's design. The study's theoretical framework was based on the construct of time and learning via Carroll's model of school learning developed in 1963.

The main function of a high school is to ensure students are prepared to be informed and contributing members of society. Schools create curriculum based on essential knowledge and skills they expect all students to learn before they graduate. In the current system, not all students are able to become proficient in these knowledge structures and skills which results in failing a course. The sad reality is when a student does not succeed in the schooling system, they are three times more likely to be unemployed, sixty-three times more likely to be incarcerated, and on average, lives at least a decade shorter than a college graduate (Buffum et al., 2018). A main factor in student failure is the inflexibility of high school schedules which do not provide students additional time in the school day to relearn the essential skills needed to pass their classes (DuFour, 2015).

Historical Context

Secondary education in America has not always been reserved for every child regardless

of socioeconomic background or race. Until the 20th century, secondary education was reserved for the privileged; as late as 1910, only about ten percent of American youth attended high school (The High School Leadership Summit, 2004). In the 1970's, American politicians realized the implications of the elite status of high school, America was falling behind (Powell, 2007). The government fully funded school reforms however, schools continued to run on the assumption that students should be sorted among various tracks depending on their test scores as to their suitable destinies (The High School Leadership Summit, 2004). The more the schools changed, the more they remained the same. The view of education where all students must succeed and master the curriculum high schools deem essential is relatively new in terms of American schooling history (Buffum et al., 2018). The question remains, how can schools ensure all students succeed?

Factors Affecting Failure Rates

Failure to complete high school is a nationally recognized problem and identifying the predictors of high school failure is a crucial task to create effective approaches to preventing it (Abbot et al., 2000). There are certain social and family background factors associated with an increased risk of dropping out, such as being from a single-parent family, or from a family with low educational attainment or low support for education (National Research Council & National Academy of Education, 2011). All of these factors are outside of the schooling system and are more difficult to deal with within the school. In the 1980s, researchers began questioning the role of these factors in student failure rates and began to identify school-related factors associated with dropping out of school (National Research Council & National Academy of Education, 2011).

Studies have shown many school related factors that lead to low performance among

students including: feeling as though school is boring and not relevant, low achievement, poor grades, academic failure and financial needs (National Research Council & National Academy of Education, 2011). The biggest precursor to students dropping out of high school is failing one semester of a core class (English, mathematics, science, or social studies) (Allensworth & Easton, 2007). Failing even one high school course leads to a significant increase in dropout rates which leads to the next question to address: how do schools ensure students pass their core courses? Many researchers have suggested that more time in school can help to overcome the negative effects of poverty on learning, like poorer health, less stable home lives, and fewer out-of-school learning opportunities (Farbman, 2015).

Time in School

Kubitschek et al. (2005) describe the role of time as the bare minimum for student learning to occur:

Time is a minimum condition for learning because it sets the boundaries for teachers' opportunities to teach and students' opportunities to learn. Without time available for the teaching of academic material, students will not be exposed to such material, and therefore will be unable to learn it (p. 1).

Anderson et al. (2016) discusses that even the slight uptick in student misbehaviors is not enough to outweigh the significant increase in student learning and achievement with increased instructional time. There is a strong connection between time and learning, expanding learning time in schools can contribute significantly to better performance for individual students with particular impact among populations of at-risk students (Farbman, 2015).

While there is a strong connection between time and learning, researchers argue that rather than purely time, how the time is used is what is crucial to increasing student learning and

achievement. Zepeda and Mayers (2006) argue schools must not stop with providing only time; increasing time will be counterproductive unless there is, simultaneously marked improvement on how time is used. Farbman (2015) details high performing schools do not only increase time, but also employ an integrated series of practices to maximize use of that time. The best use of additional time in the school day is deploying interventions on specific student knowledge and skills (Buffum et al., 2018).

Targeted Interventions

An intervention is anything the school does above and beyond what all students receive to help specific students succeed (Buffum et al., 2018). Buffum et al. (2018) states targeted interventions are a systemic way to ensure every student receives the additional time and support needed to achieve at high levels. Virtually every student would benefit from additional time with teacher staff on specific learning targets (Sonju et al., 2019). Additional research has shown targeted interventions help students with existing deficiencies catch up to grade level (Vaughn & Fletcher, 2012)

The key to an effective intervention time is ensuring it is during the school day and during a time where students are not missing critical new core instruction (Sonju et al., 2019). The largest roadblock to effective interventions in schools is the rigidity of many school schedules. Schools must schedule time within the school day for intervention time for them to be successful and for students to learn at high levels (Sonju et al., 2019).

High School Scheduling

Historically, high school schedules were rigid with the only events changing it being non-academic. Traditional, inflexible scheduling is based on administrative and institutional needs; new, more flexible scheduling is based on the educational needs of students, and the

professional needs of teachers (Zepeda & Mayers, 2006). The reform agenda for high schools in the 21st century called for increased accountability, higher standards, and restructuring efforts to ensure that students graduate with the skills and knowledge needed to be contributing members of society and be successful in their chosen field (Zepeda & Mayers, 2006). To implement interventions in the school day the rigid schedule of the past must be supplemented with a more fluid flexible schedule.

Buffum et al. (2018) postulates interventions should take place at least twice weekly for no less than 30 minutes and must be available to all students. Many schools have tried to implement this time within their schedule via block scheduling, however this is not flexible enough for the variable time students take to learn curriculum (Buffum et al., 2012). Schools must create a flexible time where students who have not mastered curriculum have the time and space to do so and students who have mastered the curriculum have time to extend their learning in other ways (Buffum et al., 2018).

Theoretical Framework

When creating the framework for this study of high school scheduling and achievement, student developmental needs are the primary factor. The basis of this theoretical framework is to prioritize the developmental needs of the student and then identify the scheduling structure which best progresses their development. The goal of this study was to assess if students were given variable amounts of time to learn curriculum if achievement would increase, therefore the framework includes time's role in student learning.

In the 1960s, Carroll developed a conceptual model of school learning in which the factor time plays a central role (Carroll, 1963). Carroll's model of school learning asserts 'the degree of learning effectiveness is defined as a function of the time needed for learning and the time

actually spent for learning' (Carroll, 1963). Carroll's (1963) theory emphasized the need for personalized education explaining how the amount of time a student needs to engage in learning varies from learner to learner and much of his theory focuses upon the examination of the student and determining the amount of time they individually need. Carroll's (1963) research asks the educator to examine the needs of the student particularly when it comes to learning and time.

High school students fail classes for a variety of reasons, most of which fall outside the scope of what the school can control. Studies show the more students are in school the more successful they are (Farbman, 2015, Kubitschek et al. 2005, & Zepeda & Mayers, 2006). More importantly than time is how the time is used in the school. Having specific interventions on and for students has the potential to prevent class failures from occurring. Creating schedules which allow for students to have interventions within the school day could be key for increasing student achievement and decreasing the likelihood students will fail their courses.

Summary

The literature review provided a historical overview of factors affecting high school failure rates, time in school, interventions, and high school scheduling. The theoretical framework provided the rationale for the study through the explanation of the link between time and a person's ability to learn through Carroll's model of school learning developed in 1963. Chapter 3 will discuss the research methodology with the research design, sample, setting, and data analysis.

Chapter 3: Research Methodology

The purpose of this study is to research the potential link between a flex period and student achievement measured by failure rates across all high school semester courses. Chapter three provides the methodology and rationale for this study. Additionally, chapter three includes details on the setting, participants, procedure for collecting data, and methods for analyzing the data. The following research questions guided the study:

RQ1. How did the implementation of a flex period two times a week at the high school level affect the percent of students who failed semester courses?

Research Design

This study uses a nonexperimental quantitative approach to looking at how implementation of a flexible intervention period affects student failure rates. A nonexperimental design was used here because the study looks at the relationship between two pre-existing groups. With this type of research little attempt is made to control for threats to internal validity due to the processes already occurring prior to the data being collected (Lohmeier, 2010). Due to the risk of error, the conclusions drawn from nonexperimental research are primarily descriptive in nature (Lohmeier, 2010). More specifically, the study uses a causal comparative methodology to investigate a cause-and-effect relationship between students in different years who had a flex period and those who did not (Brewer & Kuhn, 2010).

Sample and Setting

The sample population for this study are all students who attended a specific small rural high school in central Minnesota during the years 2015-2020. The school used for this study has an average student body of approximately 450 students throughout the five years of the study (Minnesota Department of Education, 2020). Additionally, the average graduation rate was

approximately 95% throughout the years of the study (Minnesota Department of Education, 2020). The demographics of the school are as follows: White 88.6%, Hispanic or Latino 8.6%, two or more races 1.9%, American Indian 0.4%, Asian 0.2%, and Black or African American 0.2% (Minnesota Department of Education, 2020). Additionally, 9% of students qualified as economically disadvantaged and 8% of students received free or reduced lunch (US News & World Report, 2019). All students who were enrolled in a course at the selected high school were a part of the research study because all courses offered at the high school were analyzed for failure rates.

There are a total of 41 staff members at the study school with the breakdown in titles as follows: 30 teachers, 1 other licensed professional, 2 paraprofessionals, 1 administrator, and 5 other non-licensed staff (Minnesota Department of Education, 2020). Out of the 30 staff members 9 of them have an advanced degree and all courses at the school are taught by a licensed staff member (Minnesota Department of Education, 2020). At the study school, there is a 15:1 student to staff ratio as well (Minnesota Department of Education, 2020).

Instrumentation

The data collection was completed through the school's online student management software JMC. Permission to use data was obtained through the school's administrator and information technology director. Since the data was previously collected there was no need for participant consent. Once approval for the project was given by the Winona State Internal Review Board, the data was analyzed to see if there was a trend in the variables.

Data Collection Procedure

Once permission was obtained, the researcher then worked with the high school's information technology director to get the course achievement data exported from the online

management software to an excel file. Maintaining a confidential and secure database is vital in the research process. Student names were erased from the database as they were unnecessary for the analysis process. Student ID numbers were kept during the initial analysis to ensure there was no data duplication in the export process. There were a total of ten spreadsheets with exported course achievement data, however, only nine of the ten were used. Data from the 2019-2020 school year was not used due to the unusual school circumstances surrounding the pandemic which caused the study school to go to full online distance learning. This data would not be comparable to the rest of the school years due the different schooling environment.

Data Analysis

Once the spreadsheets were available, they were stored on the school's secure Google Drive platform to keep the data secure on their cloud. The data was then analyzed using Google Sheets software and the Power Tools add on by Ablebits. The first step in the analysis process was to delete any excess data including student name, grade level, school year, term GPA, graduation credit, cumulative GPA, teacher, and term comment. Once this step was completed, the data that remained was the student ID number, course name, course term, and course grade. The Power Tools add-on was used to find and delete the quarter one, quarter two, quarter three, quarter four, semester one exam, and semester two exam data rows because the study only focused on semester classes. Then, Power Tools was used again to find and delete any duplicate rows to ensure validity of the data. Lastly, the student ID number was deleted to ensure protection of student data.

Once the excess data was deleted the resulting data was organized by class name. Another Google Sheet was created for data analysis on the school district's cloud to ensure another measure of data security. The researcher then went through each class for each semester

for each year and manually counted the number of students enrolled in each course and how many students failed the course in the specific semester and year. Then, for each semester and year, the failure rate was calculated by dividing the number of students that failed by the number of students enrolled.

The data was then broken up into two different categories: years when there was no flexible enrichment time (2015-2017) and years when there was a flexible enrichment time (2017-2019). Then the failure rates for the two categories were averaged and compared to one another. The data was averaged by adding up the failure rates for the specific years and dividing by the number of years available. For all years, the data for each semester was added and divided by two then the average data was added together to get an overall failure rate for each course. The two overall failure rates were then compared by subtracting the failure rate from 2017-2019 by the failure rates of 2015-2017 to see how it changed when the enrichment period was included into the high school schedule.

The data was analyzed into three different categories: semester courses, subjects, and courses overall. All three categories were analyzed to find the preflex period implementation failure rate, the postflex period implementation failure rate, the change in failure rate and the fisher's exact test for independence significance value. There were 47 courses that were analyzed. The chosen courses were all year long courses which were broken up into two semesters. All the courses kept the same general course content throughout the study period. Any course where the content was altered significantly or only lasted a single semester was not included. The 47 courses were grouped into their discipline subject to see how the failure rate changed. The courses were then grouped all together to see how the failure rate changed.

Fisher's exact test for independence was used to see if the change in the failure rate was

significant and caused by the implementation of the flex period. Fisher's exact test is used when there are two nominal variables to find whether the proportions for one variable are different among values of the other variable (McDonald, 2014). Fisher's exact test is best used when the sample sizes are under 1,000 which was the case in this study (McDonald, 2014).

Summary

Chapter 3 discussed the research methodology which includes the research design, sample and setting, instruments, and data analysis. The study uses a qualitative method to understand the relationship between the implementation of a flex period and failure rates among semester courses at the high school level. The participating high school was purposely selected for access to data. Chapter 4 will provide an in-depth analysis of the collected data.

Chapter 4: Results

Introduction

Chapter 4 explores the results of the experiments as presented in the methodology. This chapter includes a detailed description of the demographic characteristics of the courses in the study. This chapter also includes data on the failure rates of all the courses in the study; for each subject: art, career and technical education, foreign language, language arts, physical education, science, math, and social studies; and the courses overall. All the data was analyzed using a Fisher's exact test which is included in all three tables.

Description of Sample

The courses selected for the study were all year long courses which consisted of two semesters. The courses also taught the same state standards over the four-year period to ensure the content being taught was similar if not identical throughout the study. There were 47 different courses which were studied in the sample. The demographics of the courses were as follows: 17% math, 15% foreign language, 12% science, 13% social studies, 15% language arts, 9% physical education, 6% art, and 13% career and technical education.

Data Analysis

The research question in this study was how did the implementation of a flex period two times a week at the high school level affect the percent of students who failed semester courses? There were 47 courses that were analyzed. The data that was collected and analyzed for all the courses were the preflex period implementation failure rate, the postflex period implementation failure rate, the change in failure rate, and the Fisher's exact test for independence significance value. Fisher's exact test was used due to the smaller sample size for each course (McDonald, 2014). The value of the Fisher's exact test helps tell if the change in failure rate was due to the

implementation of the flex period or other factors. If the Fisher exact test p-value is 0.05 or below then, statistically, the failure rate decreased due to the implementation of the flex period (McDonald, 2014).

Twenty-seven of the 47 classes had a decrease in the failure rate, however only 8 of the 27 that decreased were found to be statistically significant based on the Fisher exact test (Table 1). The eight courses that had a statistically significant decrease in failure rate were: algebra 2, American history, biology, composition, English 9, geometry, Spanish 1, and college Spanish. The p-values ranged from <0.0001 to 1.000 showing the variance in statistical significance throughout the courses.

Table 1

Failure Rates Pre and Post Flex Period Implementation in Semester Courses

| Course Name | Failure Rate Pre Flex Period | Failure Rate Post Flex Period | Change in Failure Rate | Fisher Exact Test P-Value |
|--|------------------------------------|-------------------------------------|---------------------------|------------------------------|
| | % | % | % | n |
| Algebra 2 | 16.00 | 6.97 | -9.03 | <0.0001 |
| American History | 4.50 | 0.92 | -3.58 | 0.0008 |
| American Literature (1640 - 1860) | 0.00 | 0.00 | 0.00 | 1.0000 |
| American Literature (1860 - Modern) | 0.00 | 0.63 | 0.63 | 1.0000 |
| American Politics | 3.36 | 1.33 | -2.02 | 0.3452 |
| Animal And Veterinary Science | 4.76 | 0.00 | -4.76 | 0.3962 |
| AP Language & Composition | 0.00 | 1.12 | 1.12 | 1.0000 |
| Basic Intermediate Algebra | 8.11 | 13.51 | 5.41 | 0.9078 |
| Biology | 2.49 | 0.72 | -1.76 | 0.0365 |
| Ceramics | 1.39 | 0.00 | -1.39 | 0.2358 |
| Chemistry | 1.24 | 1.47 | 0.23 | 0.7253 |

| | | | | |
|--------------------------------|------|------|-------|--------|
| College Algebra | 1.32 | 1.89 | 0.57 | 0.8331 |
| College Calculus | 7.69 | 5.56 | -2.14 | 0.5385 |
| College German | 0.00 | 0.00 | 0.00 | 1.0000 |
| College Human Physiology | 0.00 | 0.00 | 0.00 | 1.0000 |
| College Spanish | 8.16 | 0.00 | -8.16 | 0.0461 |
| Composition | 5.22 | 0.80 | -4.42 | 0.0337 |
| Computer Applications | 1.67 | 0.00 | -1.67 | 0.5405 |
| Draw & Design 1 | 0.72 | 0.71 | -0.01 | 0.7491 |
| Economics | 0.51 | 2.07 | 1.57 | 0.9715 |
| English 9 | 3.11 | 0.89 | -2.22 | 0.0152 |
| Functions & Trigonometry | 0.00 | 2.65 | 2.65 | 1.0000 |
| Geometry | 8.37 | 2.64 | -5.73 | 0.0001 |
| German 1 | 1.99 | 2.51 | 0.53 | 0.7429 |
| German 2 | 0.72 | 1.48 | 0.76 | 0.8804 |
| Health 10 | 2.22 | 0.45 | -1.77 | 0.1131 |
| Horticulture | 2.78 | 2.86 | 0.08 | 0.7606 |
| Human Development | 1.89 | 3.28 | 1.39 | 0.8503 |
| Intermediate Algebra | 2.50 | 2.97 | 0.47 | 0.7255 |
| Intermediate Science | 0.00 | 0.00 | 0.00 | 1.0000 |
| Intro To Statistics | 4.17 | 0.00 | -4.17 | 0.2695 |
| Life Through Literature | 1.96 | 3.03 | 1.07 | 0.5701 |
| Media Studies | 2.16 | 0.00 | -2.16 | 0.3124 |
| Painting | 1.37 | 0.00 | -1.37 | 0.5489 |
| Personal Finance & Careers | 1.00 | 0.00 | -1.00 | 0.2295 |
| Personal Fitness And Nutrition | 1.34 | 0.00 | -1.34 | 0.1177 |
| Physical Science | 0.44 | 0.23 | -0.21 | 0.5117 |
| Physics | 0.00 | 0.00 | 0.00 | 1.0000 |
| Sociology | 1.32 | 0.00 | -1.32 | 0.6179 |
| Spanish 1 | 6.33 | 2.25 | -4.09 | 0.0405 |
| Spanish 2 | 4.67 | 2.31 | -2.35 | 0.1961 |

| | | | | |
|-----------------|------|------|-------|--------|
| Spanish 3 | 1.18 | 1.68 | 0.50 | 0.8036 |
| Team Sports | 0.91 | 0.00 | -0.91 | 0.4564 |
| Welding | 1.22 | 0.00 | -1.22 | 0.5190 |
| Woods | 0.00 | 0.78 | 0.78 | 1.0000 |
| World Geography | 0.89 | 0.00 | -0.89 | 0.3733 |
| World History 9 | 0.66 | 0.22 | -0.45 | 0.3031 |

The 47 courses were then grouped into their specific subjects: math, foreign language, science, social studies, language arts, physical education, arts, and career and technical education. Each of the eight subjects had a decrease in the failure rate (Table 2). Of the eight courses, five showed a statistically significant decrease in the failure rate as determined by Fisher's exact test. The six subjects that showed a statistically significant decrease were: math, foreign language, social studies, language arts, and physical education.

Table 2

Failure Rates Pre and Post Flex Period Implementation in Semester Courses in Subjects

| Subject | Failure Rate Pre Flex Period | Failure Rate Post Flex Period | Change in Failure Rate | Fisher Exact Test P-Value |
|--------------------------------------|---------------------------------|----------------------------------|---------------------------|------------------------------|
| | % | % | % | n |
| Arts | 1.12 | 0.28 | 0.84 | 0.1902 |
| Career and Technical Education | 1.25 | 0.37 | 0.88 | 0.1084 |
| Foreign Language | 3.45 | 1.84 | -1.61 | 0.0231 |
| Language Arts | 2.33 | 0.89 | -1.44 | 0.0067 |
| Math | 8.47 | 4.60 | -3.87 | <0.0001 |
| Physical Education | 1.63 | 0.47 | -1.17 | 0.0372 |
| Science | 1.21 | 0.61 | -0.60 | 0.0726 |

| | | | | |
|----------------|------|------|-------|--------|
| Social Studies | 2.17 | 0.71 | -1.45 | 0.0009 |
|----------------|------|------|-------|--------|

The course data was combined to see if the overall failure rate in the school decreased and if it was statistically significant. The failure rate before the implementation of the flex period was 3.19% and decreased by 1.67% to a failure rate of 1.52% (Table 3). The Fisher exact test p-value was <0.0001 showing the decrease was statistically significant.

Table 3

Overall Failure Rate Pre and Post Flex Period Implementation

| Failure Rate Pre Flex Period | Failure Rate Post Flex Period | Change in Failure Rate | Fisher Exact Test P-Value |
|------------------------------|-------------------------------|------------------------|---------------------------|
| % | % | % | n |
| 3.19 | 1.52 | -1.67 | <0.0001 |

Summary

Chapter 4 presented the results of the study which attempted to answer the question how did the implementation of a flex period two times a week at the high school level affect the percent of students who failed semester courses. The data was analyzed in three different categories, by course, subject, and overall. Chapter 5 will provide a discussion of the findings, leadership implications, recommendations for future research, and a summary.

Chapter 5: Discussion and Conclusions

The purpose of this study is to research the potential link between a flex period and student achievement measured by failure rates across all high school semester courses. Previous chapters discussed the background of high school scheduling and relevant research on flex periods, a review of the available literature discussing the theoretical framework that informed the study, the research question, methodology, and the study's findings. Chapter 5 includes a discussion and interpretation of the data, theoretical connections, leadership implications, and future research recommendations.

Discussion and Conclusion

This quantitative study aimed to investigate how failure rates changed after the implementation of a flex period at a singular rural high school in central Minnesota. The purpose was to add evidence for the implementation or removal of a flexible period where students can get additional support on missed learning outcomes. The following research question guided the study: How did the implementation of a flex period two times a week at the high school level affect the percent of students who failed semester courses? The data was calculated into three separate categories by course, subject, and overall failure rate.

Semester Course Failure Rates

The failure rate decreased for 27 of the 47 classes, however, it was only statistically significant for eight of those 27. The eight courses with statistically significant decrease in failure rates were algebra 2, American history, biology, composition, English 9, geometry, Spanish 1, and college Spanish. The only two subjects that had multiple classes with statistically significant decreases were math and foreign language. The two courses that saw the largest significant decrease were algebra 2 and Spanish 1. Algebra 2 is historically one of the most

failed courses in high school (Stoker et al., 2018). Algebra 2 is a roadblock for many students to achieve graduation since it is generally the third required math course for graduation. Both of these courses are important because they are widely taken by high school students and give students the most troubles. This research supports previous research on flexible block scheduling and Algebra courses. Kroll (2019) found that students scored higher on end-of-course exams in Algebra 1 when using a flex block schedule instead of a traditional bell schedule which is consistent with the decrease in failure rate in math courses.

Subject Failure Rates

The failure rate decreased for six of the eight subjects, however it was only statistically significant for five of the six subjects. The five subjects that showed a statistically significant decrease were foreign language, language arts, math, physical education, and social studies. The decrease in failure rate across these subjects is important, particularly for math and foreign languages. Math and foreign language classes are unique in that they are dependent on prior knowledge in order for students to be successful in the succeeding classes. Students cannot be successful in succeeding in math and foreign language classes unless they have the fundamentals grasped completely. Wristin (2015) states “It is highly beneficial that students master previous mathematics concepts, applications, and skills, prior to learning algebra and other higher level mathematical courses”. The data presented backs up previous research that additional time to build skills in math classes will help students pass higher level math classes such as Algebra 2 (Wriston, 2015).

Overall Failure Rates

The failure rate across all semester courses decreased by 1.67% and was found to be statistically significant. This decrease in failure rates may seem like a small percentage but when

it is applied to an entire student body it is a large number of students. In the study school it amounts to seven students not failing a course in a given year which can alter a student's high school trajectory. The research in all three categories makes clear students will fail less when they have increased one-on-one time with teachers who are targeting gaps in their knowledge.

The results of this study are consistent with the current research on flex periods. Sonju et al. (2019) postulate that students succeed at higher rates when they have small group access to their teachers to focus on specific topics. While Sonju's research states students will achieve at higher levels, the research here shows students will decrease their failure rate which is a proxy for student achievement. Pottage and Sillery (2016) add to this idea showing students and teachers feel more connected in a flexible block schedule and have more time to work in the school day which is tied to increases in student achievement.

Leadership Implications

School leaders' main role is to ensure all students are learning at high levels and will be prepared for life after high school. One of the main ways a school can ensure students reach these goals is passing their courses so they graduate on time. When students fail a course in high school, their chances of graduating on time decrease. The research presented gives a tool for administrators and school leaders to use to decrease their failure rates among high school courses. Administrators should strongly consider abandoning the rigid traditional high school schedule in favor of a flex schedule. Flex scheduling allows for more student freedom and increases small group and one-on-one time with teachers. When students are able to meet with teachers in the school day to target specific outcomes the data shows they are less likely to fail their courses. School leaders should look into establishing a time during the school day for students to get extra intervention or enrichment.

Recommendation for Future Research

Future research on flex blocks is encouraged based on the lack of current research available. Flex blocks appear to be a promising tool to increase student achievement in the classroom. Further studies could focus on flex blocks' effect on graduation rates or student grade point average. Research could also focus on students' feelings towards extra one-on-one time with teachers to see how it affects their socioemotional health. While the participants, sites, and methods used in the study were valid for the state purpose, further studies should be expanded regarding study location and sample size to validate the findings presented.

Summary

The purpose of this study is to research the potential link between a flex period and student achievement measured by failure rates across all high school semester courses. Data was collected in three difference categories to answer the research question: course, subject, and overall. All three categories saw decreases in failure rates in some fashion. The failure rate decreased the most in classes where knowledge builds on itself. These findings add evidence to the notion that students have greater class achievement when there is time built in the school day to meet with teachers in a small group setting to get targeted intervention on skills and knowledge. School leaders should take note of this study and establish time during the school day for students to get extra intervention or enrichment.

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