RUNNING HEAD: Scheduling Differences

DIFFERENCES BETWEEN BLOCK AND TRADITIONAL SCHEDULING IN THE END OF COURSE EXAM SCORES

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ABSTRACT

This study was completed to find if there is a significant difference in ACT standardized test scores on the basis of traditional and block scheduling. Different learning styles should be considered when developing classroom instruction that in turn affect how students perform on the ACT standardized test. The findings of this study show that in six randomly selected Missouri high schools, students in traditional bell schedules are outperforming students in block bell schedules on the ACT standardized exam. The reasoning behind this is not precisely pinpointed in this study, but there should be a halt of the rush to block scheduling until further research may be completed. After compiling and reviewing the findings of this study, current research and literature, and the statistical data from the state, it is found that school administrators should think twice before switching from a traditional to a block bell schedule.

INTRODUCTION

Background, issues and concerns.

There have been concerns about student performance on standardized state tests, specifically on the ACT exam, in the state of Missouri. Belief is that too little thought and action have been given to the educational and emotional impact of a school schedule on the lives of students and teachers. It is believed that a well-designed schedule can be a catalyst for critical changes needed in high schools across America by solving problems related to the delivery of instruction. In order to perform at a high level on these tests (ACT), it is important school districts discover the best possible method to deliver instruction via scheduling. Across the United States in recent years, education has seen an increase in the modification of traditional school schedules. This modification has taken the form of moving from a traditional 7 periods per day, where students meet their teacher every day for 50 to 60 minutes, to some form of a block schedule, where students see their teacher every other day but for a longer period of 80 to 100 minutes. One way to assess which schedule is better for students is to research the opinions of educational psychologists. Another way to accomplish this task is to compare the ACT results from schools that have made the change to block schedule against traditional scheduled schools.

Practice under investigation.

ACT standardized test scores were used to evaluate the practice under investigation. An investigation was conducted to see if there is a significant difference in ACT test scores based on school schedules. By looking at the data provided by the Department of Elementary and Secondary Education (DESE) it was determined if students have a greater benefit by being in block or traditional scheduling. With a significance difference result, research was used to see how improvements in scheduling could benefit student learning in the classroom.

School policy to be informed by study.

Every school district in the state of Missouri must meet the state standards on the and ACT standardized test, so if there is a significant difference in test scores based on scheduling, then school districts should make sure they are utilizing the best schedule possible to benefit all students.

Conceptual underpinning.

Every learner in the classroom is different, but one major difference is how their schedule is designed for them. Students learn at different and achieve at very different levels. Too little thought and action have been given to the educational and emotional impact of a school schedule on the lives of students and teachers. While some high level learners might benefit from having only four classes a day, other students may greatly be affected due to the inability of seeing and benefiting from a teacher daily. Students in low socioeconomic situations have a different outlook then students in high socioeconomic situations. A student on the low end of the spectrum walks out of an 80- minute class, after not being able to pay attention for nearly half of it, and forget everything that was said and everything that is due the next time the class will meet. Many times the class may not meet for up for up to four days. Based on Dr. Robert Canady's theory of scheduling, a well-designed schedule can be a catalyst for critical changes needed in high schools across America. He argues that when a district chooses which scheduling format to use they are responsible for the power within that decision, but too little time and though is put into making it. (Canady, 2006) Student achievement, as measured by the ACT, will be stronger in a block schedule as compared to traditional schedule because teachers see students every day.

Statement of the problem.

If there is a gap on the performance of the end of course test school districts need to know so they can use the best practice to maximize student performance.

Purpose of the study.

To find if there is a significant difference in student achievement as measured by the end of course test between block and the traditional scheduled day.

Research questions.

RQ#1: Is there a difference in student achievement as measured by ACT standardized test scores between block scheduled classes and traditionally scheduled classes?

Null hypothesis.

There is no significant difference in student achievement as measured by ACT standardized test scores between block scheduled classes and traditionally scheduled classes.

Anticipated benefits of the study.

If there is a difference in block and traditional scheduled students ACT scores, school districts will need to utilize the best practice to maximize student learning.

Definition of terms.

ACT- American College Testing: Established in 1959 to compete with the SAT test.

NCLB- No Child Left Behind Act: Passed to bring new rigor and standards across the United States to leave no children behind in their education.

EOC- End of Course Exam: test given at the end of certain required courses (Algebra, English, Government, Biology) in the state of Missouri.

MSIP- Missouri School Improvement Plan: Currently in its fifth generation, the MSIP is utilized in the process of accrediting school districts as mandated by state law.

AYP- Annual Yearly Progress: Required by the No Child Left Behind Act, instituted in 2000, that requires schools to reach certain goals to achieve to show student performance yearly.

DESE- Department of Elementary and Secondary Education in the state of Missouri.

Traditional Schedule: Seven to eight, forty-five minute period classes per day.

Block Schedule: Four, eighty-minute period classes every other day.

Summary.

A study was conducted to see if there was significant differences in ACT test scores of students in traditional or block-scheduled schools. If the t-test concludes there was a significant difference, school districts should implement the schedule practice proven most successful so every student can perform at a high level of performance. Since students have different learning styles attention spans it is necessary to understand which scheduling practice best helps students be successful. After the study is completed, school districts can benefit by knowing which scheduling practice can best increase students potential in student learning as evaluated by ACT standardized test.

REVIEW OF LITERATURE

Standardized testing is a cornerstone of education today. Tests, administered by state education departments, are also at the center of controversy for many teachers and education reformers. Standardized testing in the United States ramped up in 2002 due to the adoption of the No Child Left Behind Act (NCLB). The act aimed to hold all public schools to a high standard of education, measured by their students' scores in statewide-standardized tests. Under NCLB, test scores impact how much funding a school gets from the government, as well as how much autonomy a school has. Low-performing districts run the risk of state officials taking over operations and leaving them with little freedom to make independent decisions. One such test, the ACT test has been given since 1959 as an alternative to the SAT developed in 1926.

Students are taking more standardized tests than even before. The development of these tests became necessary as schools attempted to categorize students for the work force and prepare them accordingly. The earliest reordered standardized tests came from China where they utilized them to categorize their job skill set. During the Industrial Revolution students began leaving farms in the countryside to join the workforce in the West (Fletcher, 2009). This led to an increased use of standardized tests to qualify students for jobs quickly and efficiently. In 1959, an education professor at the University of Iowa named Everett Franklin Lindquist developed the ACT as a competitor to the SAT. Originally an acronym for American College Testing, the exam included a section that guided students toward a course of study by asking questions about their interests (Fletcher, 2009). This has never been more important as represented recently by the recent passage of the fifth generation of the Missouri School Improvement Plan (MSIP) that states Missouri's expectations for student achievement with the ultimate goal of all students graduating ready for success in college and careers (DESE, 2012).

The ACT and its counterpart, the SAT, have become one of the largest determining factors in the college-admissions process, particularly for elite schools (Fletcher, 2009).

Without a well-defined and routine schedule the classroom becomes chaotic and can quickly spiral out of control. The relevance of a well-defined schedule cannot be lost just on the importance in the classroom. Within the whole school setting, a schedule should be designed to increase student achievement and benefit the students first. A schedule for the school setting should not just be created to ease the burden on teachers or administrative staff. In their book, Canady and Retting (1993) examine the importance of school scheduling and its relationship to school success. They argue that when a district chooses when scheduling format to use they are responsible for the power within that decision. Belief is that too little thought and action have been given to the educational and emotional impact of a school schedule on the lives of students and teachers. The book is based on research the two conducted with hundreds of high schools across 32 states. The two believe that a well-designed schedule can be a catalyst for critical changes needed in high schools across America by solving problems related to the delivery of instruction, instead of being a major source of problems as it is currently.

The focus of this action research paper is to examine how block scheduling affects students on the results of their ACT composite scores. Why is time such an important concept found in the literature on change reform for American schools? Time is directly related to school reform. The way in which time is allocated by teachers and students is an essential element to school reform. Often times, school reform becomes too political and students and teacher experience to much change in regards to the school schedule and the amount of time in the classroom. Anderson (1984) reflects upon this issue:

> For the entire twentieth century schooling has been defined in terms of time. In the USA, for example, Carnegie units, largely time-based entities, are used to

> certify high school graduates. More pragmatically, class periods have been based on the allocation of fixed amounts of time; so many minutes are allocated to reading, mathematics, and other academic and non-academic subjects. Since students enter schools and classrooms differing in the knowledge, skills, or abilities they posses, under these fixed-time conditions these differences. (p. 1)

Across the United States in recent years, education has seen an increase in the modification of traditional school schedules. This modification has taken the form of moving from a traditional 7 periods per day, where students meet their teacher every day for 50 to 60 minutes, to some form of a block schedule, where students see their teacher every other day but for a longer period of 80 to 100 minutes. The move to a block schedule in many cases has been for the benefit of the teaching staff and administration instead of student achievement.

It is estimated that about 50% of American secondary schools are on some form of block scheduling (Wild, 1998). The change from traditional to block scheduling without proper research and designed outcomes will create more confusion and only hurt student achievement long term. Block scheduling was first suggested as a challenge to high school structures by Trump (1959) who proposed Flexible Modular Scheduling. The Trump Plan called for flexible scheduling arrangements. This would depend on the academic needs of the students. In his call for Flexible Modular Scheduling, Trump advocated for teachers and administrators to be flexible in how the school day was used. Trump further proposed the school day should be flexible, fluid, and dependent upon the wish to improve student learning. Positives and cons both exist for the original block schedule plan, Flexible Modular Scheduling. Advantages include more student contact per class, greater availability of teacher per class, improved team relationships with teachers, and greater accessibility of guidance library materials to students. Among disadvantages are a greatly increased workload, student truancies, and a necessity for counselor involvement in supervisory activities.

In 1994, the National Commission on Time and Learning published its report, Prisoners of Time, which warned that schools must be reinvented to focus on learning, not time. However in its recommendations, the commission recommended using block scheduling to give teachers the time to engage students in active instruction. Even while they were insisting time is not a factor, the commission effectively listed time as the key factor in student achievement and promoted the idea of block scheduling to increase achievement. In the report, the commission stated:

> Block scheduling—the use of two or more periods for extended exploration of complex topics or for science laboratories—should become more common. Providing a more flexible school day could also permit American schools to follow international practice—between classes students remain in the room and teachers come to them. (*National Commission,* 1994)

The commission did not specify if they would promote a mixed or fully block schedule school day, however it is usually taken to support a fully implemented block schedule.

The Carroll Model of School Learning may be used to better understand the relationship between achievement, school reform and time in the classroom. Carroll argued that the best estimate of time needed for a student to learned is the student's aptitude (Carroll, 1989). A student's aptitude can be defined by their ability to accomplish a task within their means. A student's aptitude or ability to accomplish a task can be increased or decreased based on the quality of instruction the student receives. If the student receives positive instruction their aptitude level will increase and they can learn the material in less time, if the student receives poor instruction they would need more time to complete a task. According to Carroll 1989, "the model of school learning assumes that students differ in the amount of learning time they need. If these differences are to be adequately taken account of, considerable skill in classroom management is required by teachers." (p. 29). The Carroll Model of School Learning can be

used to better understand the political reasoning behind the reform to block scheduling. The acknowledgement in the educational community is that many poor teachers exist and student's achievement is declining because of poor instruction. One of the quick and easy solutions to fix this is to give students more time to complete a task, which they hope will overcompensate for the poor instruction they might receive. Anderson (1984) reflects upon this issue:

> Poor quality of instruction and difficulty understanding instruction both increase the amount of time a student will need to spend in order to learn beyond that required by virtue of the student's aptitude. There is, however, an inverse relationship between quality of instruction and ability to understand instruction. Students with lower abilities to understand instruction require a higher quality of instruction. (p. 32).

The Carroll model does not just define aptitude. According to Carroll's theory, a student's ability to understand instruction, student perseverance, opportunity to learn and quality of instruction are they other key aspects of the model (Anderson, 1984). When a school changes to block scheduling for just one aspect of the model they are indicating the need for more research. A block schedule will not be successful if it was implemented only to increase the time students are given to solve their aptitude problem, but a students' perseverance level was not taken into consideration. Student perseverance refers to the amount of time a student will be willing to be an active member of the learning process within the classroom. The Carroll Model of School Learning brings up the debate of time-on-task versus academically engaged time. These two terms are not the same. By giving students more time in the classroom to increase their aptitude ability does not necessarily mean you are helping them understand and benefit from the material. If the time given to students is not promoting academic engagement and instead is only have students stay on task it could be decreasing their ability to learn and gain knowledge from material in class.

When making the transition from traditional to block scheduling, fragmented instructional time is often the number one reason. However, fragmented instructional time is an issue at all levels. At the high school level fragmentation occurs depending on if students are traveling through a traditional or block scheduled day. According to Rettig and Canady (1995), with block scheduling, instructional time is not fragmented by frequent transitions between classes. Fewer distinct classes means less time spent on classroom management activities, such a calling attendance and organizing and focusing the class. In addition, there are fewer opportunities for students to arrive late to class (Canady & Rettig, 1995). A block-scheduled class usually allows for more opportunities for wasted time on focusing the class and taking attendance. It is hard for a teacher not to fall into the trap that the class time has extended which increases the amount of unnecessary time spent not on learning or increasing student achievement. Often times this defragmentation leads to less instead of more instructional time. No matter how well planned a teacher may be, on many days the teacher may end up with 10-15 minutes for the students to begin their homework. When all of the time is added up at the end of the semester, less information and material is covered.

Many problems can occur due to the change to block scheduling. In a study, Queen (2000) found that a majority of educators using block schedules remained loyal to the basic tenets of the model, while some principals have limited understanding of the science of scheduling and lack specific skills in evaluating effective teaching practices. Moreover, they found a growing percentage of teachers do not follow pacing guides. And those same teachers tend to use lecture and teacher directed discussion extensively and to limit the 90 minute class to approximately 60 minutes of actual instruction. Many times the extra time allotted per class within a block schedule is not used correctly and much instructional time is wasted throughout

the class as a result. This is often a concern in the music and performing arts departments. In the book “All Around the Block: The Benefits and Challenges of a Nontraditional School Schedule”, Michael Rettig and Robert Canady acknowledged that performing arts teachers, and in particular band directors, feared that limiting instruction in band to one semester would negatively impact their performance quality (Canady & Rettig, 1996). Exact figures may vary from class to class of the loss of total instructional time involved in moving to block scheduling. In John Benham’s case study entitled “Block Schedule- The Perils,” he reports that during a traditional six period day, classes meet one hundred and eighty times for fifty-five minutes for a total of 9,900 classroom contact minutes. Block schedules meet ninety times for eighty-five minutes for a total of 7,650 classroom contact hours. This is a total of 2,250 minutes of lost classroom instructional time due to the block schedule. This is equivalent to eight weeks of instruction. (Bentham, 2006)

RESEARCH METHODS

Research design.

A quantitative study using the t-test was conducted to see if there was a gap in achievement on the EOC tests based on which scheduling method students were in. The independent variable being tested was type of schedule, while the dependent variable EOC exam scores. If the difference is found significant in scores based on traditional vs. block schedule, school districts should be informed and implement the proven schedule to best increase student learning.

Study group description.

Students from similar selected school districts in the state of Missouri who have reported the ACT test scores from 2009 to 2013 and have either traditional or block scheduling were chosen as the group evaluated.

Data collection and instrumentation.

Archived data from DESE was collected to identify raw scores of traditional vs. block scheduled students on the End of Course test scores from the 2009-2010 and 2011-2012 school years.

Statistical analysis methods.

A t-test was conducted to find if there is a significant difference in EOC test scores based on scheduling. The source was broken into two categories: traditional and block schedules. The mean, mean D, t-test, df, and p-value were concluded from this test. The Alpha level was set at 0.25 to test the null hypothesis: There is no difference in student achievement as measured by End of Course test scores between block scheduled classes and traditionally scheduled classes.

FINDINGS

A t-test was conducted to decipher whether there was a difference in performance on the 2009 to 2013 ACT Composite test score based on scheduling differences. The following tables, graphs, and charts will depict the organized findings based on the statistical raw data found on the Missouri DESE website in 2014.

Figure 1

t-Test Analysis Results for 2009-2013 Block and Traditional Scheduled ACT scores

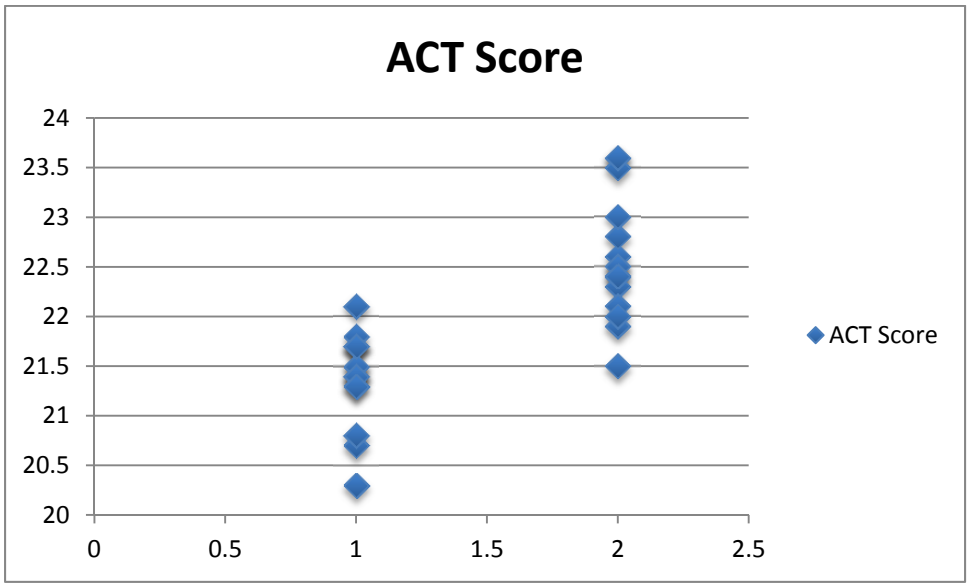
Source	Mean	Mean D	*t*-Test	df	*p*-value
Block Schedule	21.37				
Traditional Schedule	22.58	-1.21	-5.99E0	2.8E1	1.86E-6

Note: Significant when p<=0.25

The independent variable was the schedule. The independent variable was broken into 2 components: block schedule and traditional schedule. The dependent variable was the ACT score. 6 randomly selected school districts were divided into 2 groups. There were 3 school districts in the group with the block schedule and 3 school districts in the group with the traditional schedule. The mean ACT score for the block scheduled group was 21.37, while the mean ACT score for the traditional scheduled group was 22.58. The difference between the mean scores (Mean D) was -1.21. The t-test value was -5.99E0. The degrees of freedom were 2.8E1. The null hypothesis was: There is no significant difference in student achievement as measured by ACT standardized test scores between block scheduled classes and traditionally scheduled classes. The null is rejected because the p-value is 1.86E-6, which is less than the alpha level of 0.25. This means that there a significant difference between block and traditional

scheduled groups and ACT scores. If a student is in a traditional scheduled school, their ACT score will be higher.

Figure 2



The mean of the block scheduled students' ACT test scores in the years 2009 to 2013 was 21.37. The mean of the traditional scheduled students' ACT test scores in the years 2009 to 2013 was 22.58. The scatter chart shows what the average composite ACT score was for each year in the 3 block scheduled schools and 3 traditional scheduled schools. The lowest composite ACT score the traditional schools received of 21.5 was near the top composite ACT score of the block scheduled schools in the five year period.

All of the findings compiled answered the research question: "Is there a difference in student achievement as measured by ACT standardized test scores between block scheduled classes and traditionally scheduled classes? Figures 1-2 reported there was a significant difference in performance on the 2009-2013 ACT standardized exam. Although all schools did perform fairly well, the students in a traditional scheduled school setting did outperform the

students in a block scheduled school setting. Figure 2 represented that there was a significant difference in highest performance on the ACT exam within the traditional schools and the highest performance within the block scheduled schools. Consistently every year the composite ACT score within the traditional scheduled schools outperformed that of the block scheduled schools.

CONCLUSIONS AND RECOMMENDATIONS

The outcomes reported from this study show that students in traditional scheduled schools are currently performing better than students in block scheduled schools on the ACT standardized exam. The findings show there is a significant difference between block and traditional scheduled student performance on the ACT test. The t-test results from the 2009 to 2013 testing years indicated that the p-value was 1.86E-6, much lower than the alpha level set at 0.25; therefore, the null hypothesis tested is rejected. There is a difference between block and traditional scheduled student performance on the ACT exam.

The conceptual underpinning of Dr. Robert Canady's theory of crafting a well-designed schedule to bring critical changes to education in America is strongly supported by these research findings. Dr. Canady argues that when a district chooses which scheduling format to use, they are responsible for the power within the decision, and he believes too little time is put into making such a decision. The block schedule format is not a one size fit all model as many are using it across schools in America. Often times block scheduling leads to wasted instructional time, and this may lead to a decrease in test scores as found in this study. Teachers may try to fragment instructional time within a block scheduled format, but the fact of the matters remains that it is usually found teachers lose time. In John Benham's case study entitled "Block Schedule- The Perils," he reports that just the initial switch from a traditional to block schedule equates to eight weeks loss of instruction. (Bentham, 2006) Block scheduling can also become a negative for students who need daily lessons are cannot go long periods of time without guidance from an instructor. This prolonged period of time may increase the loss of student retention of the material and also create a longer period of time for the student to make up the missed class time or missed schoolwork. With an absence under block scheduling, Evans

(2002) found that students have more difficulty getting on track with the other students, even more so when it is an extended absence.

After concluding this study there are some further studies that could be conducted. A study could be performed to see if these findings are still valid in a higher volume ratio. For instance, research could be done to see if the trends in this study hold true for all block and traditional schedule students in the state of Missouri. There could also be a nationwide study to see if these findings are true for the United States as a whole.

Questions could also be asked if the type of schedule a student is in reflects their attendance or discipline? More data could be collected from the DESE website to perform another study to see if discipline rates decrease or increase depending on what schedule a school uses. This would help to decipher whether the change in schedule is just represented in ACT scores, or if it also affects student's performances in other areas as well.

School districts need to make sure they are involved in professional development and deep research before conclusively deciding on a schedule change. School districts need to look at both the positives and the negatives of block scheduling to fully determine if it is the correct move for their student population. If high school students, who are learning in block schedules, are not seeing positive outcomes when they go to college, compared to other students who were learning in traditional schedules, then this new shift towards block scheduling should be re-assessed. Input from teachers should also be considered, because it is often found that teachers do not fully understand the key differences between the many variations traditional and block schedules.

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