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THE EFFECT OF INCREASED RECESS TIME ON THE ACADEMIC
ACHIEVEMENT OF ELEMENTARY STUDENTS

A Dissertation Submitted
to the Graduate College
Arkansas Tech University

in partial fulfillment of requirements
for the degree of

DOCTOR OF EDUCATION

in School Leadership

in the Department of Educational Leadership
of the College of Education

October 2021

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Bachelor of History/Political Science, Arkansas Tech University 2002
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THE EFFECT OF INCREASED RECESS TIME ON THE ACADEMIC ACHIEVEMENT OF ELEMENTARY STUDENTS

Mark Alan Taylor

Abstract

Recess is defined as unstructured free play for students outside when possible. Recess is an important part of the school day. Recess improves social skills, time on task, positive attitudes towards school and increasing physical activity. In 2019 Arkansas lawmakers enacted Act 641, which increased recess time during the school day from 30 minutes to 40 minutes per day. The purpose of this quantitative study was to determine if increasing recess time for third, fourth, and fifth grade elementary students had an impact on ACT Aspire tests results. This study was a quantitative study using a series of independent t-tests. The researcher compared the third-, fourth-, and fifth-grade student achievement scores in the content areas of Math and Reading from the 2017-2018 school year to the 2018-2019 school year. Scores were examined pre-increase recess time and post-increase recess time. This study yielded two significant findings: 1) Math scores increased after the implementation of Act 614 of 2019 in Arkansas, although those increases were not statistically significant. 2) Reading scores, also, saw increases after the implementation of Act 614 of 2019, but like the Math scores there was not a statistically significant increases found during the data analysis.

Keywords: Recess, Math achievement, Reading achievement, Instructional time, ACT Aspire

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Chapter I: Introduction

Background of the Problem

The Arkansas Department of Education along with state legislators implemented a “letter grading” system for all schools in the state of Arkansas (A.C.A. §6-16-102). Arkansas Code Ann. § 6-15-1402, requires the Arkansas Department of Education (ADE) to annually prepare and publish a school performance report for each public school in the state, and make the report available to schools, parents, and the local community (Department of Elementary and Secondary Education, n.d.). In response to publishing the annual report card, many administrators across the state felt pressure to perform at even higher levels on state testing. Many administrators began to examine ways to increase instructional time in classrooms, and one frequent discussion item was to reduce the minutes of recess per day (Reilly, 2017).

In 2019, Arkansas lawmakers enacted Act 641 of 2019, which amended state law concerning the school day (A.C.A. § 6-16-102). This law requires at least 40 minutes of each day be used for unstructured, supervised recess, which will be outdoors when the weather allows. In New Jersey, Republican Governor Chris Christie vetoed a similar bill allowing for a mere 20 minutes a day of recess for New Jersey schoolchildren. Appearing on Fox News, Christie, a Republican presidential candidate, said it represented "crazy government run amok" (Skatz 2016). He claimed, the bill required that children play outdoors, even on cold days or during inclement weather (Brodesser-Akner, 2016). In Arkansas, the bill’s sponsor, Representative Jana Della Rosa (R-Rogers) would ultimately like to see a full hour of recess. Representative Della Rosa originally said

elementary students are currently getting about fifteen to thirty minutes a day and it is not nearly enough (Carpenter, 2019).

Instructional time has become a focal point for many schools across the state of Arkansas and across the nation (Andersen et al., 2016). High stakes testing has increased pressure on school leaders to maximize instructional time (Graham et al., 2002). When No Child Left Behind of 2002 was enacted and recently more Common Core State Standards, the debate began to stir about instructional time in the classroom. Today, students take an average of 112 mandated standardized tests between pre-kindergarten and twelfth grade, according to an analysis by the Council of the Great City Schools in 2015 (Reilly, 2017). Many educators devalue recess deeming it a waste of time that could be spent more efficiently in the classroom (Pellegrini, 2008).

Opponents of recess argue that it increases behavior problems in schools including bullying and aggressiveness. There is some evidence of aggressive behaviors; however, studies have shown that supervision at recess reduces aggressive behavior and bullying (Watson et al., 2017). By adding an additional 10 minutes a day of recess, it time will further take away valuable instructional time for teachers. Research is needed to study the relationship between increased recess time and student achievement.

Statement of the Problem

As high stakes testing became increasingly important to legislators for accountability purposes, more time has been taken away from other areas such as recess (Burriss & Burriss, 2011). Over the past 30 years, schools have been reducing the amount of time students have for recess or physical activity during the school day. Research stated that the primary rationale for decreasing recess time was to improve achievement

and standardized test scores (Pellegrini & Glickman, 1989). By furthering academic accountability standards, the No Child Left Behind Act was enacted in 2002 (No Child Left Behind [NCLB], 2002). No Child Left Behind Act initiated a trend of educational accountability that sparked the discussion of whether recess should remain a part of the elementary school day or not (Dee & Jacob, 2010). In addition, 40% of public schools either reduced or cut out recess time altogether, and most schools do not require a daily recess period (American Heart Association. 2010).

Arkansas legislators saw the need to increase the amount of recess per day from 30 minutes a day to 40 minutes a day (A.C.A. §6-16-102). “Educational leaders cannot allow for a sufficient amount of time in the school day for recess within the current construct of the instructional requirements and time allotted in a school day” (Carpenter, 2019, p.1). The consequence of less recess time are fewer opportunities for students to develop social skills with their fellow students. Due to legislators enacted ACT 641 of 2019, there is more research needed to determine if increased recess time will impact ACT Aspire scores for elementary students.

Purpose of the Study

The purpose of this quantitative study is to determine if increasing recess time for elementary students had an impact on ACT Aspire tests. The researcher compared scores from the 2017-2018 school year to those from the 2018-2019 school year. Scores from 2017-2018 represented scores before the extra recess time was added, while the 2018-2019 scores were after the recess time was increased. The researcher used Reading and Math ACT Aspire scores for students in grades three, four, and five.

Research Questions

1. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀1: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

H_A1: There is a significant statistical difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

2. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀2: There is no statistically significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

H_A2: There is a significant statistical difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

3. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

H₀₃: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status.

H_{A3}: There is a significant statistical difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019 considering the factors of gender.

H₀₄: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H_{A4}: There is a significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H₀₅: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

H_{A5}: There is a significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of economic status.

4. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after

implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

H₀₆: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

H_{A6}: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

H₀₇: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H_{A7}: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H₀₈: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

H_{A8}: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

Definition of Terms

For the purposes of this study, the following terms were defined:

- *Academic Achievement*: The extent to which a student, teacher, or institution has achieved their educational goals, which are commonly measured by examinations or continuous assessment.
- *ACT 641 of 2019*: This act increased the required minutes for recess/unstructured play to 40 minutes per day for elementary students, and defined recess as part of the instructional day (A.C.A. § 6-16-102).
- *ACT Aspire*: A test that includes a vertically scaled battery of achievement tests designed to measure student growth in a longitudinal assessment system for grades third through tenth in English, Reading, writing, Mathematics, and science (ACT Aspire. (2020)).
- *Cognitive Development*: It includes the processes of knowing, understanding and putting together the things that one has learned, and demonstrating problem-solving skills.
- *Physical Activity*: It is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen, Powell, & Christenson, 1985).
- *High-Stakes Testing*: Any test used to make important decisions about students, educators, schools, or districts. It is most commonly used for the purpose of ensuring that students are enrolled in effective schools and being taught by effective teachers (Reich & Bally, 2010).

- *Recess*: It is defined as a break period for children that typically takes place outdoors (Pellegrini & Smith, 1993). Jarrett (2009) defined recess as a time when children have unstructured free play. “Recess is a necessary break from the rigors of concentrated, academic challenges in the classroom” (Ramstetter et al. p. 183 2010). The Centers for Disease Control and Prevention (2013) defined recess as a regularly scheduled period in elementary school settings for unstructured physical activities and play.

Significance of Study

Research showed the relevancy of recess and the positive effects it has on the cognitive development of young children (Pellegrini & Bohn, 2005; Bershwiner & Brusseau 2013). It also indicated physical activity breaks can increase the academic achievement of elementary students (Pellegrini & Bohn, 2005). However, the importance of recess has been scrutinized by many educational leaders across the nation (Brez & Sheets, 2017). The findings from this research study will contribute to the existing body of research regarding the impact of recess on elementary student academic achievement. The results of this study may be shared with district personnel, district leaders, legislators, and educational cooperatives in hopes to shape policies that influence student achievement. This study will provide data for administrators to use to help determine schedules for students. By understanding the benefits of providing students physical activity breaks and the relationship to student test scores, it will be valuable for district personnel. Educators and legislators will be able to utilize the data and knowledge gained from this study to help guide decision making in the future. Students may benefit from increased recess and focus on unstructured free play.

Assumptions

It will be assumed that all students in grades three, four, and five performed their best on the ACT Aspire test. This study did not compare age groups (i.e., third to fourth, or fifth to sixth); rather, it explored any changes that may have occurred in students' achievement before and after the schedule changes to accommodate the expanded recess time.

Limitations

The study was limited to elementary students in grades three, four, and five. Only students who were tested in 2017-2018 when the recess time was at 30 minutes were used to compare the 2018-2019 scores. Due to the sample being from a single school and a convenience sample, the findings from this study may not be generalized to other elementary students. Student motivation could account for variances that could be measured.

The recess times for third and fourth grade students were from 11:00 am to 11:30 am in 2017-2018. This time was before the student's lunch break at 11:40 am. The 2018-2019 times were from 11:00 am to 11:30 am and in the afternoon from 2:15 pm to 2:35 pm. The increased time from 2017-2018 to 2018-2019 was 20 minutes.

Even though the law did not become effective until the 2019-2020 school year, the researcher was able to use 2017-2018 and 2018-2019 scores because the district was a pilot school for the increased recess time during the 2018-2019 school year.

Delimitations

This study included approximately 160 students in third, fourth and fifth grades from an elementary school in rural Arkansas. ACT Aspire scores were used from the

2017-2018 school year and compared with the 2018-2019 school year. ACT Aspire Reading and Math scores were used as the variables in this study.

Chapter II: Review of Literature

Introduction

The relationship between physical fitness and academic achievement has been studied extensively by many researcher (Ayers, 2010; Becker, Lu & Montague, 2015 McClelland, et al. 2013; Pellegrini & Smith 1993;). Teachers and administrators alike tout how beneficial physical activity is for students (Ayers, 2010). Elementary students especially benefit from physical activity and movement (Pellegrini & Bohn, 2005). After a couple of rainy day “inside recesses,” any teacher will confirm how important it is for students to have time for free play and exercise.

Physical activity can take many forms throughout our lives, and play is the primary means by which physical activity is achieved in early childhood (Burdette & Whitaker, 2005). Following the implementation of No Child Left Behind, the time devoted to recess has been on the decline with more focus given to meeting standardized requirements for Mathematics and Reading (Dee & Jacob, 2010).

Benefits of Recess and Physical Fitness

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen et al., 1985). Physical activity provides several physical and psychological benefits for children. The Centers for Disease Control and Prevention (CDC) recommends 60 minutes a day of physical activity for children and adolescents ages six through seventeen years old (Centers for Disease Control and Prevention [CDC], 2017). During school hours, recess offers students a time of unstructured play where children can run, jump, skip, and climb (Leppo & Davis, 2005).

This unstructured time for students can break up the day and reduce cognitive interferences during times of learning (Toppino et al., 2009).

Generally, schools offer two different kinds of physical activity opportunities including physical education and recess. It is important to recognize that there are differences between physical education and recess (Pellegrini & Smith, 1998). Physical education refers to an academic subject with specific educational goals using physical activity within the course. Recess is a regularly scheduled period in elementary school settings for unstructured physical activities and play time (CDC, 2013).

The benefits of recess can promote in preventing childhood obesity and improving overall health (Lu & Montague, 2015; Waite-Stupiansky & Findlay 2001). By improving health and decreasing obesity, it will develop active habits, enhance cognition, and obtain whole child benefits are among the reasons why the benefits of recess must be evaluated and promoted within schools (Lu & Montague, 2015). The obesity of children ages two to nineteen increased three-fold between 1980 and 1999. In a 2008 ethnic comparison of children ages two to nineteen, 20.8% of Mexican-American children, 20% of black children, and 15.3% of white children were found to be obese (Ogden et al., 2010). Children have become overweight and obese due to a variety of reasons. The most common factors are lack of physical activity, genetic factors, and unhealthy eating habits (CDC, 2013). Overweight and obese children are likely to stay obese into adulthood and more likely to develop non-communicable diseases like diabetes and cardiovascular diseases at a younger age (Sahoo et al., 2015). Childhood obesity can lead to a lower quality of life and can profoundly affect children's social emotional and physical well-being and self-esteem (Sahoo et al., 2015). A major factor in contributing to childhood

obesity is the sedentary lifestyle that has increased dramatically in recent years (Sahoo et al., 2015).

Children can gain up to 40% of their daily recommended daily physical activity during recess (Beighle et al., 2012). Recess is a time where students show a burst of high intensity physical activity during the first six or seven minutes (Pellegrini & Bohn, 2005). Children have the opportunity to promote their own movements during recess. Even if students do not play vigorously, their activity levels are still higher than physical education classes (Jarrett & Waite-Stupiansky, 2009).

Schoolchildren are at school for an average of six to seven hours per day. During that time, students are asked to sit still and be quiet for 30% of the day (Beighle et al., 2012). Due to parents' work schedules, parents are afraid to let their kids play outside, the lack of appropriate and safe places to play outside have impacted the the lack of physical activity children receive outside of school grounds (Burriss & Burriss, 2011). Urban areas lack open spaces for children to exert the necessary physical activity needed to maintain a healthy lifestyle. In addition, safety is a major concern for parents in allowing children to access urban playgrounds (Atmakur-Javdekar, 2016). The trends discussed previously disproportionately affect children from disadvantaged backgrounds. Data showed children who go to large, urban schools with a high minority population and schools with low-income levels are the least likely to have access to recess, and often report the shortest amount of time dedicated to recess (Massey et al., 2020). Factors contributing to the loss of recess time include environmental factors, bullying and aggressive behaviors, access to space, and adequate equipment.

The increase in childhood obesity has grown exponentially since the 1970s (Koplan et al., 2005). The obesity epidemic affects both boys and girls and occurred in all ages, races, and ethnic groups throughout the United States (Ogden et al., 2002). Overweight, as defined by the Centers for Disease Control and Prevention, is at or above the 95th percentile of body mass index (BMI). BMI is calculated as weight in kilograms divided by the square of height in meters by age (Center for Disease Control and Prevention [CDC], 2020). According to the CDC, the prevalence of childhood obesity from children 12-19 years old was 18.5% or 13.7 million children. Childhood obesity is more prevalent among certain populations. Hispanic (25.8%) and non-Hispanic Black children (22.0%) had higher obesity rates than non-Hispanic White children (14.1%). Obesity decreased with increasing levels of education within the head of household among children and adolescents aged two to nineteen years.

As discussed earlier, the socioeconomic status was an indicator of increased childhood obesity rates (CDC, 2020). Ogden et al., (2002) provided a number of reasons for the obesity crisis among adolescents including the changing context of the family, ethnic diversity, eating patterns, media use, and advertising patterns among companies luring youths into unhealthy lifestyle patterns to name a few. Interestingly, Ogden et al. (2002) noted the changing of women in the workplace had an impact on childhood obesity. From 1960 until present, there has been a drastic increase with women in the workforce, which changed the labor force participation rate and the make-up of family dynamics. These trends along with the decrease in fertility rates have changed household demographics. It has been suggested that families with smaller household's experience fewer home-prepared meals than do larger families. When preparing food at home, it

involves a set amount of time for every meal and changes minimally with the number of persons being served. By eating meals out, it involves the same marginal costs per person (Odgen et al., 2002). All of these factors have contributed to increased childhood obesity rates over the past 30 years among adolescents from two to nineteen years of age.

Recess, Mental Health, and Well-Being

The benefits of physical activity and free play to help with mental health and well-being are not always recognized (Lu & Montague, 2015). Active play can have a positive influence on young children's social skills and emotional intelligence (Burdette & Whitaker, 2005). Recess is a time where social learning is on full display. Children must learn to deal with others while organizing games, creating rules to play by, and learning self-discipline (Leppo & Davis, 2005). Children must learn to problem solve, control their aggressions, and show leadership skills (Coe et al., 2006).

Over 10% of children worldwide suffer from type of mental disorder. However, the majority of those children do not receive any mental health services (Bélanger et al., 2019). Evidence suggested that outdoor play is associated with enhanced positive mental health in children and adults. Children spending additional time outdoors relates to improved attention and cognition, and reduced attention hyper/activity disorder (Song et al., 2016). Literature suggested that people who engage in regular physical activity display better health outcomes, feelings of higher quality of life, and better states of mood (Penedo & Dahn, 2005). Active play can have a positive influence on young children's social skills and emotional intelligence. Physical activity can help children feel happier and has the potential to reduce symptoms of anxiety, depression, and sleep problems (Burdette & Whitaker, 2005).

The argument that physical activity can positively affect cognitive functioning has gained tremendous momentum in recent years (Savina et al., 2016). The most widely studied area of physical activity and mental health is depression (Biddle, 2016). A study conducted by Soyeon and Fedewa (2016) examined the effects of physical activity on children's mental health outcomes. The study found a statistically significant relationship between increased levels of physical activity and decreased levels of depression. Increased levels of physical activity had significant effects in reducing depression, anxiety, psychological distress, and emotional disturbance in children. These findings mirror results found in adult studies as well (Soyeon & Fedewa, 2011; (Ahamed et al., 2007; Hillman et al., 2004).

Children need meaningful interactions and relationships in order to thrive (McNamara et al., 2017). All humans have the need to belong (Ferguson, 2020). It is this social feeling that connects individuals to the social world (Ferguson, 2020. This need to belong drives us to connect with others and work together toward a common goal. This need to belong is so interwoven in our being, disturbances to it influences our thinking, emotions, and behaviors (Ferguson, 2020. When theorized in this way, it is easier to understand why children need a wide variety of social skills and coping strategies to enable the building and maintenance of social connections (Pellegrini & Bohn, 2005; Ferguson, 2020). If recess is viewed through the sense of belonging, it invites us to find ways to provide these opportunities to children. Recess provides chances for children to freely interact with their peers developing social and emotional development that could affect their way of life (Ferguson, 2020: McNamara, et al., 2017).

Brain research indicated that the brain makes neurological connections that are critical to learning (Isenberg & Quisenberry, 2002). Children need a break for optimal cognitive processing after periods of concentrated instruction. Younger children do not process information as effectively as do older children (Isenberg & Quisenberry, 2002). This is mainly due to the immaturity of their nervous system and their lack of experiences, which does not enable them to perform higher order cognitive tasks as efficiently as older children (Pellegrini, 2008).

Physical activity enhances memory, inhibitory control, and executive functions (Watson et al., 2017). Biological links between movement and cognitive functioning was found in a recent study ((Mandolesi et al., 2018). Neuroscientists have since been studying how physical activity affects the brain ((Mandolesi et al., 2018). This study asserted that considerable evidence demonstrated long-term physical activity strengthens the brain's executive functions. Physical activity is critical for children's overall brain health and executive function (Coles & Tomporowski, 2008).

During recess, children often seek companionship from other children. By playing an organized game and confronting problems, these are key in child development (Burriss & Burriss, 2011). Unstructured free play gives children opportunities for concept development (Burriss & Burriss, 2011). Children often use many strategies on the playground to be effective players, cooperation, sharing, problem solving and reconciling differences, which benefit a child's social development (Burriss & Burriss, 2011).

Burdette and Whittaker (2005) observed that the reduction in free play in children might be attributed to the "language" that is used to describe play. They proposed efforts to increase physical activity in young children might be more successful if physical

activity was promoted using different language that encouraged play. If a different set of outcomes were emphasized, the aspects of child well-being other than physical health would be welcomed by parents and children. Many parents believe that their child may be too active. With a huge surge in treatment of attention deficit disorder (ADD) among preschoolers, there may be a widespread perception from parents that their children are too active. The child may be active and distract the parents or caregivers from their daily routines, but it may just be the child is completely normal, active, and healthy (Burdette & Whittaker, 2005). The word “play” versus physical activity can be viewed more favorably by parents. The words exercise and physical activity are synonymous to large amounts of physical exertion on the body. Burdette and Whittaker (2005) suggested the wording be changed to maximize their children’s free play opportunities. To foster free play among children, efforts must be made beyond the home. With more and more parents now working, a tremendous number of children are enrolled in Head Start programs across the country. The mission for these programs addresses child well-being from a holistic approach. Burdette and Whittaker (2005) suggested these are ideal places to implement and promote free play.

Instructional Time in the Classroom

There have been arguments directed at taking recess away from students (Burriss & Burriss, 2011). Many administrators have used high-stakes testing to reduce the amount of time students have for recess or free play (Dee & Jacob, 2010). As the pressure mounts for students to perform well on high-stakes tests, so does the threat to reduce or eliminate physical education programs and recess (Graham et al., 2002). Shephard (1997) found that a reduction of 240 minutes per week of academic class time replaced with

increased time for physical education, led to higher scores on standardized Math examinations.

Art, music, and physical education all contributed extensively to the education of the whole child (Graham et al., 2002). These subjects can be used as stimulus to the learning concepts in Math, Reading, and science (Graham et al., 2002). Almost every working person has break built into their day to promote mental alertness. Children require breaks for the same reasons (Bershwiner & Brusseau 2017). Brain research on attention suggested that breaks are important and needed (Jensen, 2005). The brain cannot maintain attention for long periods of time and requires contrast to regain focus (Jensen, 2005). For information to be processed well, it is the necessary to have the necessary down-time to recycle chemicals crucial for long-term memory formation (Jensen, 2005).

Physical activity or recess can be added to the school curriculum by taking time from other subjects without risk of hindering student academic achievement (Trudeau & Shepard, 2008). Administrators must find creative ways to get recess and breaks into the day without sacrificing instructional time. By finding ways to integrate movement and play, it gives students brain breaks to help students and teachers focus during the day (Pellegrini & Bohn, 2005).

Physical activities can be incorporated into the school day in the form of classroom activities, gym, physical education, and recess. The state of Arkansas has legislation protecting students from having recess withheld for punitive reasons (Act 614 of 2019). The Council on School Health in 2013 implored educators not to limit recess time as punishment. Further, the recommended number of steps per day for school aged

children ranges from 10,000 to 16,500 to remain active during the day (Brusseau et al., 2013).

Research was conducted to determine how to best fit the modern classroom to maximize student learning (Brez & Sheets, 2017). Experts have begun to explore physical activity as a way to improve classroom performance (CDC, 2019). Studies focused on physical activity in the classroom often demonstrate increased alertness, attentiveness, and willingness to learn after participating in physical activity (Sallis et al., 1999). Teacher led activities such as indoor and outdoor games, jumping jacks, and walking breaks were given to students throughout the day. By participating in these breaks, it significantly increased the total number of steps taken by students in these classes (Cothran et al., 2010).

By increasing instructional time, it has been a central theme to many state governments across the country since No Child Left Behind Act of 2001. Work is good and play is bad. Some early childhood educators have often seen play and what goes on at recess as a force against work (Pellegrini, 2008). The virtues of work have been stressed over many civilizations. During the cultural revolution, the value of manual labor was stressed over intellectual activities (Pellegrini, 2008). In 2019, a review of research on the effect of increased instructional time on student achievement (Yesil, 2019). The study focused on how the amount of time spent on core subjects of Mathematics, science, and Reading/language arts, and the number of instructional days in a school year related to students' academic achievement. The researcher searched a variety of sources to find relevant research which included instructional time and student achievement. A total of 28 studies were included in the research (Yesil 2019). Unfortunately, the research

findings were inconclusive at best. There was evidence that increased instructional time may have positive effects on academic achievement. However, the evidence was mixed with some studies showing no benefit, and a small minority showing an inverse relationship between instructional time and academic achievement (Yesil, 2019).

This quantitative study examined the effect of recess on fifth grade students time on-task in an elementary classroom. The amount of time students spent on task or engaged in learning has a direct impact on academic achievement. Most instructional time is lost when students drift off-task during class. It is imperative that teachers and administrators find ways to keep students engaged and on task during instruction time (Stapp & Karr, 2018).

In the classroom, students do not have the ability to withdraw from activities. However, on the playground, children have the ability to join, leave or play in situations at their own discretion (Stapp & Karr, 2018). This open setting that children encounter at recess enables them to engage in diverse and abundant social interactions that they may not experience otherwise (Jarrett, 2002).

Academic achievement levels were determined by analyzing data from a formal standardized STAR test, which assesses both Reading and Mathematics skills ((Renaissance, *Assessments-Testing 2021*). Participants were selected through non-probability, purposive sampling and were inclusive of six female students and six male students, ages 10-12. Ethnicities of the participants were Caucasian (66.7%), African American (25%), and biracial (8.3%). Participants involved in this study exhibited a wide range of ability levels as determined by their academic achievement. Participants on- and

off-task behaviors were observed and documented on a task frequency chart prior to and after recess.

The study findings indicate that including recess in a school day's allocated time schedule increases time on-task (Stapp & Karr, 2018). Results revealed that each of the 12 participant's average time on-task increased from before recess to after recess.

Physical Activity and Academic Achievement

It has been well documented that physical activity has beneficial effects for both physical and mental health (Barbosa et al., 2020). In 2016, the American College of Sports Medicine conducted a study to determine the effects of physical activity among children age five to thirteen years old. The research questions in this study included the following: Do physical activity and physical fitness influence cognition, learning, brain structure, and brain function? Among children age 5 to 13 years, do physical activity, physical education, and sports programs influence standardized achievement test performance and concentration and attention? (Donnelly et al., 2016). The study researched 133 peer reviewed articles that presented data on physical activity, fitness, or PE/sport participation and cognition, learning, brain function/structure, academic achievement, or concentration/attention. The majority of the research results supported the view that physical activity boosts children's cognitive functions. The evidence was limited on whether physical activity supports learning. The evidence indicated that physical activity has a relationship to areas of the brain that support complex cognitive processes during laboratory tasks (Donnelly et al., 2016).

A 2008 study conducted by the Centers for Disease Control and Prevention examined the association between time spent in physical education and academic

achievement in a longitudinal study of students in kindergarten through fifth grade. Time spent in physical education (minutes per week) was collected from classroom teachers, and academic achievement was assessed by a response theory scale. A small, but statistically significant increase was achieved by girls, but no noticeable increases in boys. The study concluded that physical activity did not appear to negatively impact academic achievement in elementary school students. Consequently, any concerns about negative effects on academic achievement may not be legitimate reasons to limit physical activity programs (Carlson et al., 2008).

Coe et al. (2006), examined the association between physical fitness and academic achievement, and found there was an influence of socioeconomic status on the association between fitness and academic achievement in school-aged children. Physical activity was measured using FITNESSGRAM, which measures aerobic fitness, muscular strength, muscular endurance, flexibility, and body composition. Academic achievement was measured by standardized Math and English scores. There were no statistically significant differences between fitness groups for Math and English in third-grade students. Sixth- and ninth-grade students with high fitness scored significantly better on Math and Social Studies tests compared with less fit students. The study concluded that low socioeconomic status was the strongest variable for academic achievement, but high fitness levels are positively associated with academic achievement in school-aged youth (Coe et al., 2006).

While time for recess across elementary schools has decreased, the justification for increasing instructional time and decreasing recess may rest on the assumption that increasing instructional time improves academic performance. In 2018, a recent study

examined the effect of recess on fifth grade students' time on-task in elementary classrooms (Stapp & Karr, 2018). The researchers asked three research questions including:

1. Do on-task behaviors in the classroom increase or decrease after a 25-minute period of recess?
2. Are the average minutes of on-task behaviors higher before or after recess?
3. Are the average minutes of off-task behaviors higher before or after recess?

On- and off-task frequency charts were used to document the participants behaviors following the 25-minute recess given to students. When the behaviors of the participants were observed prior to a period of recess, 100% of the participants showed an increase time on-tasks. The students spent an average of three minutes to thirteen minutes more minutes on-task prior to the 25-minute recess. The findings of this study indicated that a 25-minute recess period significantly increased fifth grade students time on-task in the classroom (Stapp & Karr, 2018).

A similar study was conducted to determine the effect of a recess break on classroom behavior, specifically working, fidgeting, and listlessness (Jarrett et al., 1998). In this study, the researcher focused on a school district with uninterrupted instructional time, meaning no recess time was given to the students. The researcher was given permission by the school system to allow two classes to have 15-20- minute recess periods once a week, so the children's ensuing behavior on recess and non-recess days could be compared. The participants were students from second and fourth grade classrooms. This study was conducted in the students' own natural setting with the children serving as their own control group, which is a strength of the study. The study stated students significantly benefitted from recess in classrooms where students had

some freedom of movement. In more rigid classroom settings, the benefits were even more striking (Jarrett et al., 1998). The results of this study stated "...research suggests that for most children, uninterrupted instructional time may be an inefficient use of instructional time. School policies against recess should be reexamined in light of these findings" (Jarrett et al., 1998, p. 121).

Theoretical Perspective

Educators and administrators must understand from the time of birth we learned to roll over, crawl, walk, talk, and given many accolades for these types of achievements (Fede, 2012). As students enter school, the tone changes and told to sit still and be quiet. This goes against everything the human body needs to do (Fede, 2012). By thinking back to classroom experiences, the number of students who asked to go to the restroom, it was really a basic need to get up and move. An early hypothesis of Piaget was that the skills of spatial organization required for sport and other forms of active play would carry over into an understanding of the spatial relationships that comprise words and Mathematical relationships (Trudeau & Shepard, 2008).

Child development happens progressively over a couple of decades (Frost et al., 2012). Regular physical activity at school can improve students' motivation with no adverse effects on cognitive development, even if less time is allotted for cognitive tasks (St. Leger & Young, 2009). Numerous studies have displayed the beneficial effects of physical activity on brain development and various aspects of cognition such as working memory, attention, and self-regulation. Each of these aspects of cognition were predictors of early and long-term academic success among young children (Becker et al., 2014; & Rosenbaum, 2008; McClelland et al., 2013; Sattelmair & Ratey, 2009). "Evans Physical

activity presents a physiological stress to the brain that, when balanced with recovery, promotes adaptation and growth, preserves brain function, and enables the brain to respond to future challenges” (Sattelmair & Ratey, 2009, p. 125). Learning is different in recess than in the classroom. Children are using language and non-verbal communication to deal with circumstances on the playground or in the gym (Ayers, 2010).

The Theory of Cognitive Development was established by Jean Piaget in 1936. The theory explains how a child constructs a mental model of the world. Piaget stated that as children develop, they become more aware of their environment (Piaget & Gabain, 1932). Objects or persons in the environment become meaningful as children grow and gain personal experiences (Piaget & Gabain, 1932). Piaget disagreed with the idea that intelligence was a fixed trait (Brona & Fryer, 2009). Piaget held that early cognitive development involves processes based upon actions, and later progresses to changes in mental operations. Piaget’s Theory of Cognitive Development has profoundly influenced current ideas on childhood development, and shaped many preschool and primary school curricula (Babakr et al., 2019).

Classroom teachers might recall studying Piaget's stages of cognitive development. These stages are:

(1) The sensorimotor stage (birth to two years): In this stage, infants combine the use of some, or all, of the five senses with various physical and motor activities (e.g., children begin to track a moving object with their eyes and head)

(Bormanaki & Khoshhal, 2017).

(2) The preoperational stage (two to seven years). Young children engage in the acquisition of language and learning to use symbols within their environment. For

example, children create an image in their thought process (such as a ball) and attach the image to the word "ball"(Bormanaki & Khoshhal, 2017).

(3) The concrete operational stage (seven to 11 years). Children's mental operations include the ability to arrange objects in alphabetical order and to perform mental activities that reflect their enhanced capabilities for logical reasoning (e.g., arranging objects by color or size) (Bormanaki & Khoshhal, 2017).

(4) The formal operational stage (11 years and older). The adolescents' mental abilities allow them to use logic and think abstractly (e.g., transferring the practice of motor skills to a game situation, adapting what they learned to a new situation). (Bormanaki & Khoshhal, 2017, p.1002)

By connecting the mind and the body, Piaget's preoperational period of development between two and seven years of age gives a plethora of opportunities for language and motor development (Leppo & Davis, 2005). During the pre-operational stage, children discover and practice many operational and motor skills while engaging in creative play experiences (Babakr, 2019). During the preoperational stage, children begin imaginative play, and many words are necessary (Leppo & Davis, 2005). These early childhood experiences are essential in the cognitive development of a child's life (Babakr, 2019).

As young children become more aware of their body in relationship to the space around them, educators need to provide a variety of movement challenges (Leppo & Davis, 2005). Movement such as unstructured free play is important during the school day. Regular physical activity leads to better circulation and oxygen supply to the brain,

which increases in bone and muscle density, and a greater tolerance of stress (Bidzan-Bluma & Lipowska, 2018). Piaget saw the importance of movement and imaginative play for children (Bormanaki & Khoshhal, 2017). This research study examined whether increasing the time students have for recess had a positive impact on academic achievement.

Brain Based Learning Theory is grounded in the philosophy that school environments and teaching practices must be guided by an understanding of healthy brain development. A healthy brain is required for a person to learn, and a healthy brain requires physical activity (Jensen, 2016). Schools present opportunities for physical activity, as well as, such as stress, exercise, nutrition, and social conditions that are all relevant, but brain-based issues affect cognition, attention, classroom discipline, attendance, and memory (Jensen, 2008). Jensen (2008) stated that each school day changes a student's brain in some way. As it relates to physical education and recess, the evidence of exercise is strongly correlated with increased brain mass, better cognition, mood regulation, and new cell production.

The "cognitive immaturity hypothesis" associated with Dr. David Bjorklund asserted that taking a break from high demand tasks is not only beneficial, but necessary for young children (Bjorklund & Pellegrini, 2000; Pellegrini & Bohn, 2005). Traditional views of children's cognitive processing suggest that young children's cognition is an imperfect version of more mature adult processes (Pellegrini & Bohn, 2005). Young children tend to make unrealistic estimates of their own capabilities by overestimating their own cognitive and social status (Pellegrini & Bohn, 2005). The cognitive immaturity hypothesis attributes special importance to the role of peer play (Bjorklund &

Pellegrini, 2000). For example, young children's poor awareness, particularly their poor ability to judge the capability of their own performance may be adaptive in some contexts. Children who overestimate their own abilities may attempt a wider range of activities, and not perceive their less than perfect performance as failure (Bjorklund & Pellegrini, 2000). Therefore, children must apply a greater effort in the classroom, which requires more breaks as compared to older children (Pellegrini & Blatchford, 2002). This research study examined whether increasing recess time for elementary students had an impact on students ACT Aspire achievement tests and guided by the following research questions.

Research Questions

RQ1: Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀₁: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

RQ2: Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀₂: There is no statistically significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

RQ3: Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

H₀₃: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status.

RQ4: Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

H₀₄: There is no statistically significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status.

Summary

This study examined whether increasing recess time from 30 minutes a day to 50 minutes a day significantly impacted academic achievement in elementary students.

Many children encountered recess with multiple peers for the first-time when they enter school. If educators become aware that physical activity improves children's capacity to learn in all areas, they may be more apt to prioritize it in the daily schedules of students in elementary schools. Administrators and educators can work together to create a healthy environment where recess and free play is valued by schools.

Chapter III: Research Methodology

The purpose of this quantitative study was to determine if increasing recess time for elementary students had an impact on ACT Aspire test scores. Since high-stakes testing begins in the third grade, this study targeted third, fourth and fifth grade students to help define the overall trajectory of academic achievement as it related to increased recess time. Quantitative data was collected using ACT Aspire test data from 2017-2018 (pre-increased recess time) and 2018-2019 (post-increased recess time). The relationship between physical fitness and academic achievement has been studied extensively by researchers (Ayers, 2010; Brez & Sheets 2017; Pellegrini & Bohn, 2005), but increasing physical activity in elementary students by ten or more minutes a day has not been researched. This study helped fill a gap in the research. The following questions were investigated in this research study.

Research Questions and Hypothesis

1. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?
 - H₀1: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.
2. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

- H₀2: There is no statistically significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.
3. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?
- H₀3: There is no statistically significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status.
4. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?
- H₀4: There is no statistically significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status.

Research Design

This study was a quantitative study using a series of independent t-tests. The researcher compared the third-, fourth-, and fifth-grade student achievement scores in the content areas of Math and Reading from the 2017-2018 school year to the 2018-2019

school year. During the 2018-2019 school year, the researcher used scores from the same students who were promoted to fourth, fifth and sixth grades. The quantitative study allowed the researcher to objectively compare scores from the pre-increase recess times to the post-increase recess times. The researcher treated these groups as separate groups and ran a series of independent t-tests. By using this statistics method, the researcher compared the pre-increase recess achievement of each grade to its post-increase recess achievement in the content areas of Reading and Math. The researcher identified changes that occurred to third graders achievement before and after increased recess time, fourth graders achievement before and after increased recess time, and fifth graders achievement before and after increased recess time.

Participants

The research study student data was from Hector Elementary School in north central Arkansas. The data was from third, fourth and fifth grade students in the 2017-2018 school year and fourth, fifth, and sixth grade students in the 2018-2019 year who completed the ACT Aspire tests in 2018 and 2019. The sample size was approximately 126 students. There was no interaction with students in this study. The only data used was archived student data.

The student demographics in this study showed little diversity. The student demographics were White (96.6 %), Hispanic (2%), and African American (02 %), respectively. A very high percentage (77%) of the students come from low-socioeconomic backgrounds.

Sampling

The participant data in this study included third, fourth, and fifth grade students who were chosen based upon the students' enrollment in the school district where the researcher is currently employed. To be included in the study, the students must have completed the ACT Aspire tests in 2018 and 2019. Students who took alternative tests were excluded from this study.

Instrumentation

ACT Aspire scale scores range begin with a possible 400 points and goes up depending on the subject and grade. Table 3.1 shows the range of scores possible for the Math portion of the test. Table 3.2 shows the range of scores possible for the Reading portion of the ACT Aspire. Each scale is unique to the ACT Aspire and clearly differentiates ACT Aspire from other scoring scales. The ACT Aspire score scale runs from grade three to grade ten in English, Math, Reading, and science. Raw scores on the ACT Aspire tests are computed using the sum of the points an examinee earns across the multiple-choice, technology-enhanced, and constructed-response items on the administered test form (ACT Aspire, 2020).

ACT Aspire was designed to measure student progress toward college and career readiness over the course of time, specifically for grades three through ten. To this end, each of the achievement tests comprised of ACT Aspire battery produces scores that describe a student's longitudinal growth in English, Reading, Mathematics and Science. Each scale score is linked to college and career data through scores on the ACT assessment.

Table 3.1

ACT Aspire Scale Scores for Mathematics

Tested Grade	Lowest Possible Score	Highest Possible Score	Benchmark
3	400	434	413
4	400	440	416
5	400	446	418
6	400	448	420

Table 3.2

ACT Aspire Scale Scores for Reading

Tested Grade	Lowest Possible Score	Highest Possible Score	Benchmark
3	400	429	413
4	400	431	416
5	400	434	418
6	400	448	420

Statistical Analysis

Scores were collected via the ACT Aspire portal which linked with the school district database. The data was collected in spring 2021 and manually entered into an Excel spreadsheet. Once the names and other identifiable information were deleted, the data was analyzed using IBM SPSS Statistics 24.0 or later software. Each research question was analyzed using an independent t-test, and tested at the significance level of .05.

Summary

The purpose of this quantitative study was to examine the impact of increased recess time for third, fourth, and fifth grade students based on their ACT Aspire results. Scores were obtained from the ACT Aspire database. The focus was on the Math and

Reading scores of third, fourth, and fifth grade students over two school years. The researcher compared the scores from both years and the results were reported in Chapter IV.

Chapter IV: Results

The purpose of this quantitative study was to determine if increasing recess time for elementary students had an impact on ACT Aspire test scores. The researcher compared scores from the 2017-2018 school year to those from the 2018-2019 school year. Scores from 2017-2018 represented scores before the extra recess time was added, while the 2018-2019 scores were after the recess time was increased. The researcher used Reading and Math ACT Aspire scores for students in grades three, four, and five.

Research Questions

RQ1: Is there a significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀1: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

RQ2: Is there a significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?

H₀2: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

RQ3: Is there a significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity and socioeconomic status?

H₀₃: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

H₀₄: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H₀₅: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

RQ4: Is there a significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

H₀₆: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

H₀₇: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H₀₈: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

Description of the Sample

The population who was targeted for this study were third, fourth, and fifth grade students from Hector Elementary School. Hector Elementary School had an enrollment of 331 students during the 2018 school year and 327 students during the 2019 school year in grades Kindergarten through the sixth grade. Based on the study criteria, a total of 126 students' scores were examined for this study. The demographics of the students show little diversity in this study. The demographics by race were white (96.6%), Hispanic (.03%), Black (.015%), and one Asian student, respectively. A very high percentage (77%) of the students come from low-socioeconomic backgrounds.

Findings

This section outlines the data analysis and findings for the research questions in this study. The first research question examined the difference in ACT Aspire Reading scores based on increased recess time from school years 2017-2018 and 2018-2019. The second question examines the difference in ACT Aspire Math scores based on increased recess time from school years 2017-2018 and 2018-2019. The third question examined the difference in ACT Aspire Reading scores, according to gender, ethnicity, and socioeconomic status from school years 2017-2018 and 2018-2019. The fourth question examined the difference in ACT Aspire Math scores based on gender ethnicity and socioeconomic increased recess time from school years 2017-2018 and 2018-2019.

Research Question 1

RQ1: Is there a significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019? The purpose of this question was to determine if students taking the ACT Aspire Reading test scores were significantly higher or lower after the implementation of increased recess time. The hypotheses associated with this research question were the following:

H₀₁: There is no significant statistical difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

H_{A1}: There is a significant statistical difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

To test H₀₁, an independent t-test was computed using the ACT Aspire score as the dependent variable (Reading) and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores. The t-test is widely used for a variety of tests and is a very common test to determine if there is a significant statistical difference between two groups (Knapp, 2013).

There was no statistically significant difference between the Reading scores of third, fourth, and fifth grade students combined on the 2018 ACT Aspire exam ($M = 415.5$, $SD = 6.273$) and the 2019 exam ($M = 417.1$, $SD = 6.376$); $t(250) = -1.94$, $p = .053$). While the scores were slightly higher after implementation of increased recess

time, they were not significantly higher. Table 4.1 presents the results of the statistical test.

Table 4.1

ACT Aspire Reading Scores in Grades Three, Four, and Five

		Test Date	N	M	Std. Deviation	Std. Error Mean
Reading		18	126	415.50	6.273	.559
		19	126	417.05	6.376	.568

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Reading	Equal Assumed	.029	.864	-1.942	250	.053
Reading	Not Assumed			-1.942	249.934	.053

Research Question 2

RQ2: Is there a significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019? The purpose of this question was to determine if students taking the ACT Aspire Math test scores were significantly higher or lower after the implementation of increased recess time. The hypotheses associated with this research question were:

H₀2: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

H_A2: There is a significant statistical difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019.

To test H₀₂, an independent t-test was computed using the ACT Aspire score as the dependent variable (Math) and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores.

There was a statistically significant difference between the Math scores of third, fourth, and fifth grade students combined on the 2018 ACT Aspire exam ($M = 415.46$, $SD = 4.19$) and the 2019 exam ($M = 416.78$, $SD = 4.86$); $t(250) = -2.3$, $p = .022$). Scores were statistically higher after implementation of increased recess time. Table 4.2 presents the results of the statistical test.

Table 4.2

ACT Aspire Math Scores 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Math	18	126	415.46	4.19	.37
	19	126	416.78	4.86	.43

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Math	Equal variances assumed	2.52	.113	-2.30	250	.022
						.045

Research Question 3

RQ3: Is there a significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019 considering the factors of gender, ethnicity and socioeconomic status? The purpose of this question was to determine if students taking the ACT Aspire Reading test

scores were significantly higher or lower after the implementation of increased recess time, considering a number of factors. The hypotheses associated with this research question were:

H₀3: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019 considering the factor of gender.

H_A3: There is a significant statistical difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019 considering the factors of gender.

To test the hypothesis, two independent t-tests were computed. First, an independent t-test was computed using the ACT Aspire Reading scores of males as the dependent variable and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable. Second, an independent t-test was computed using the ACT Aspire Reading scores of females as the dependent variable, and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable.

As noted in Table 4.3, male Reading scores were slightly higher in 2019 ($M = 416.3$, $SD = 6.30$) than in 2018 ($M = 415.5$, $SD = 5.96$), but the scores were not statistically significantly higher, $t(131) = -.709$, $p = .480$. Likewise, female Reading scores were slightly higher in 2019 ($M = 417.7$, $SD = 6.45$) than in 2018 ($M = 415.7$, $SD = 6.68$), but the scores again were not statistically significantly higher, $t(117) = -1.652$, $p = .101$.

Table 4.3

ACT Aspire Reading Scores by Gender 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Reading Females	2018	59	415.71	6.68	.86
	2019	60	417.7	6.45	.83
Reading Males	2018	66	415.5	5.96	.73
	2019	67	416.25	6.29	.77

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Reading Females	Equal variances assumed	.300	.585	-1.652	117	.101
Reading Males	Equal variances assumed	.184	.668	-.709	131	.480

H₀4: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factor of ethnicity.

H_A4: There is a significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factor of ethnicity.

Since only one Asian student and two black students took the ACT Aspire exams, there were no statistical tests performed for those ethnicities. Four Hispanic students took the exams in 2018 and five did so in 2019, while 120 white students took the test in 2018 and 118 in 2019.

To test the hypothesis, two independent t-tests were computed. First, an independent t-test was computed using the ACT Aspire Reading scores of Hispanic

students as the dependent variable, and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable. Second, an independent t-test was computed using the ACT Aspire Reading scores of white students as the dependent variable, and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable.

There was no statistically significant difference between the Reading scores of Hispanic third, fourth, and fifth grade students on the 2018 ACT Aspire exam ($M = 412.5$, $SD = 9.53$); $t(7) = -.22$, $p = .83$ in 2018 as compared to ($M = 413.6$, $SD = 5.13$); $t(4.37) = -.21$, $p = .85$ in 2019. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher.

There was no statistically significant difference between the Reading scores of white, third, fourth, and fifth grade students on the 2018 ACT Aspire exam ($M = 415.6$, $SD = 6.187$) and the 2019 exam ($M = 417.22$, $SD = 6.37$); $t(23) = -1.890$, $p = .06$. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher. Table 4.4 presents the ACT Aspire Reading scores by ethnicity.

Table 4.4

ACT Aspire Reading Scores by Ethnicity 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Reading	18.00	4	412.50	9.53	4.76
Hispanic	19.00	5	413.60	5.12	2.29
Reading	18.00	120	415.68	6.18	.56
White	19.00	118	417.22	6.35	.58

	Levene's Test for Equality of Variances			t-test for Equality of Means		
	Test Date	F	Sig.	t	df	Sig. (2-tailed)
Reading Hispanic	18	5.71	.048	-.22	7	.83
Reading Hispanic	19			-.22	7	.83
Reading White	18	.113	.737	-1.89	236	.06
Reading White	19			-1.89	235.5	.06

Note. There was insufficient data for Asian and Black students for the 2018 and 2019 test.

H₀₅: There is no significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factor of socioeconomic status.

H_{A5}: There is a significant difference in the Reading scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factor of economic status.

To test H₀₅, an independent t-test was computed using the ACT Aspire score as the dependent variable (Reading, socioeconomic status), and testing years 2018 (pre-

increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores.

There was no statistically significant difference between the Reading scores of third, fourth and fifth grade free-lunch students on the 2018 ACT Aspire exam ($M = 414.59, SD = 5.99$) and the 2019 exam ($M = 419.62, SD = 6.47$); $t(55) = -.462, p = .64$. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher.

There was a statistically significant difference between the Reading scores of third, fourth and fifth grade paid students combined on the 2018 ACT Aspire exam ($M = 414.59, SD = 6.08$) and the 2019 exam ($M = 416.3, SD = 6.19$; $t(19) = -2.02, p = .045$). Scores were higher after implementation of increased recess time rejecting the null hypothesis. Table 4.5 presents the ACT Aspire Reading scores by socioeconomic status.

Table 4.5

ACT Aspire Reading Scores by Socioeconomic Status 2018-2019

		Test Date	N	Mean	Std. Deviation	Std. Error Mean
Reading		18	28	418.85	5.99	1.13
Paid		19	29	419.62	6.47	1.20
Reading		18	96	414.59	6.08	.62
Free		19	95	416.38	6.19	.63

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Reading	Equal variances assumed	.49	.48	-.46	55	.646
Paid	Equal variances assumed	.019	.89	-2.02	189	.045

Research Question 4

RQ4: Is there a significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status? The purpose of this question was to determine if students taking the ACT Aspire Reading test scores were significantly higher or lower after the implementation of increased recess time. The hypotheses associated with this research question were:

H₀₆: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

H_{A6}: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender.

To test H₀₆, an independent t-test was computed using the ACT Aspire score as the dependent variable (Math, gender), and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores.

There was no statistically significant difference between the Math scores of third, fourth, and fifth grade female students according to gender on the 2018 ACT Aspire exam ($M = 415.5$, $SD = 4.21$) and the 2019 exam ($M = 417.13$, $SD = 4.91$); $t(131) = -.46$, $p = .64$. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher.

There was a statistically significant difference between the Math scores of third, fourth, and fifth grade male students according to gender on the 2018 ACT Aspire exam ($M = 415.53$, $SD = 4.15$) and the 2019 exam ($M = 416.32$, $SD = 4.88$); $t(131) = -1.03$, $p = .031$. Math scores were significantly higher after implementation of increased recess time. Table 4.6 presents the ACT Aspire Math scores by gender.

Table 4.6

ACT Aspire Math Scores by Gender 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Math	2018	59	415.50	4.21	.54
Females	2019	60	417.13	4.91	.63
Math	2018	66	415.53	4.15	.51
Males	2019	67	416.32	4.88	.59

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Math Females	Equal variances assumed	.498	.483	-.462	55	.646
Math Males	Equal variances assumed	1.052	.307	-1.013	131	.031

H₀7: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

H_A7: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of ethnicity.

To test H₀₇, an independent t-test was computed using the ACT Aspire score as the dependent variable (Math, ethnicity), and testing years 2018 (pre-increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores.

There was no statistically significant difference between the Math scores of third, fourth, and fifth grade students on the 2018 ACT Aspire exam according to ethnicity. There was insufficient data for Asian students on Reading scores of third, fourth, and fifth grade students with only one participant in both years. There was insufficient data for Black students on Math scores of third, fourth, and fifth grade students. Only one black student tested in 2018 and two students tested in 2019.

There was no statistically significant difference between the Math scores of Hispanic third, fourth, and fifth grade students on the 2018 ACT Aspire exam ($M = 415.25, SD = 7.13$) in 2018 as compared to 2019 ($M = 415.4, SD = 7.33$); $t(7) = -.031, p = .976$. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher.

There was a statistically significant difference between the Math scores of white, third, fourth and fifth grade students on the 2018 ACT Aspire exam ($M = 415.4, SD = 4.1$) and the 2019 exam ($M = 416.86, SD = 4.79$); $t(236) = -2.36, p = .019$. Math scores for white students were higher after implementation of increased recess time rejecting the null hypothesis. Table 4.7 presents the ACT Aspire Math scores by ethnicity.

Table 4.7

ACT Aspire Math Scores by Ethnicity 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Math	18.00	4	415.25	7.13	3.56
Hispanic	19.00	5	415.40	7.33	3.28
Math	18.00	120	415.49	4.14	.37
White					

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	df	Sig. (2-tailed)
Math	Equal variances assumed	.08	.77	-.031	7	.976
Hispanic	Equal variances assumed			-.031	6.65	.976
Math	Equal variances assumed	2.27	.13	-2.36	236	.019
White	Equal variances assumed			-2.36	229.9	.019

Note. There was insufficient data for Asian and Black students for the 2018 and 2019 test.

H₀₈: There is no significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

H_{A8}: There is a significant difference in the Math scores of third, fourth and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of socioeconomic status.

To test H₀₈, an independent t-test was computed using the ACT Aspire score as the dependent variable (Math, socioeconomic status), and testing years 2018 (pre-

increase recess time) and 2019 (post-increase recess time) as the grouping variable to determine if there was a statistically significant difference in scores.

There was no statistically significant difference between the Math scores of third, fourth, and fifth grade free-lunch students on the 2018 ACT Aspire exam ($M = 417.56$, $SD = 4.35$) and the 2019 exam ($M = 418.93$, $SD = 4.74$); $t(59) = -1.173$, $p = .246$. While the scores were slightly higher after implementation of increased recess time, they were not significantly higher.

There was a statistically significant difference between the Math scores of third, fourth, and fifth grade paid students combined on the 2018 ACT Aspire exam ($M = 414.80$, $SD = 3.9$) and the 2019 exam ($M = 416$, $SD = 4.71$); $t(189) = -2.023$, $p = .044$. Scores were higher after implementation of increased recess time rejecting the null hypothesis. Table 4.8 presents the ACT Aspire Math scores by socioeconomic status.

Table 4.8

ACT Aspire Math Scores by Socioeconomic Status 2018-2019

	Test Date	N	Mean	Std. Deviation	Std. Error Mean
Math Free	18	30	417.56	4.35	.79
	19	31	418.93	4.74	.85
Math Paid	18	96	414.80	3.94	.40
	19	95	416.07	4.71	.48

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	df	Sig. (2-tailed)
Math Free	Equal variances assumed	.279	.59	-1.17	59	.246
Math Paid	Equal variances assumed	2.59	.11	-2.02	189	.044

Chapter Summary

This chapter presented the findings of the quantitative research study. The researcher analyzed data in response to the research questions outlined in the study to determine if there was a significant statistical difference in ACT Aspire Reading and Math scores before and after the implementation of Act 641 of 2019. The data was obtained from the Hector school's ACT Aspire database and an independent t-test was computed to determine if a statistically significant difference existed. The results indicated Math scores overall showed a statistically significant increase after increased recess time in 2019. The results indicated Math scores among white students showed a statistically significant increase, as well as paid-lunch students according to socioeconomic status. The results also indicated there was a statistically significant difference in Reading scores for paid students. The results indicated there was no

statistical difference in Reading scores according to gender or ethnicity. The Math scores for all other ethnic groups showed no statistically significant increase either.

Chapter V: Discussion and Conclusions

The purpose of this quantitative study was to determine if increasing recess time for elementary students had an impact on ACT Aspire test scores. Since high-stakes testing begins in the third grade, this study targeted third, fourth, and fifth grade students to help define the overall trajectory of academic achievement as it related to increased recess time. Quantitative data was collected using ACT Aspire test data from 2017-2018 (pre-increased recess time) and 2018-2019 (post increased recess time). The motivation for this study came from the interest that students need physical activity and movement. During school hours, students are asked to sit still and be quiet for much of the school day (Dee & Jacob, 2010). This researcher sought to explore the relationship between physical activity and academic achievement in hopes to better inform educational practitioner's use of recess and unstructured play. This chapter provides a summary of the research findings, implications for practice, and recommendations for future research. The following questions guided this study:

1. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?
2. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019?
3. Is there a statistically significant difference in Reading scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after

implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

4. Is there a statistically significant difference in Math scores of third, fourth, and fifth grade students, as measured by the ACT Aspire before and after implementation of Act 641 of 2019, considering the factors of gender, ethnicity, and socioeconomic status?

Summary of Results

The intention of this study was to determine if increasing recess time for elementary students had an impact on ACT Aspire test scores. The literature review revealed that increased recess time and unstructured free play in relation to academic achievement while overall good for student health and well-being, it was inconclusive in increasing academic achievement (Ayers, 2010; Burriss & Burriss; Carlson et al., 2008; 2011; Chang & Coward, 2015). The researcher discovered increases from the 2018 pre-increase recess time to the 2019 post-increase recess time. Student scores improved in Reading and Math, but not all increases were statistically significant.

The increase in Reading scores were among the paid lunch students in the socioeconomic category. Reading scores from every ethnic group, gender, and socioeconomic group saw increases, but were not statistically significant. ACT Aspire Math scores saw the biggest increases from 2018 to 2019. Overall, Math scores showed statistically significant increases but not practically significant. White students and paid lunch students showed the largest increases in scores. Data was inconclusive with Asian and Black different groups due to the extremely small sample size of these ethnic groups, which made the data insufficient for use in this study. Hispanic students showed no

statistically significant increases in Reading or Math scores. White students showed statistically significant increases in Math scores, but saw no statistically significant increases in Reading scores. Free lunch scores showed no statistically significant increases in Reading or Math scores; however, paid lunch students showed statistically significant increases in Reading and Math scores, respectively.

In summary, two very important findings from this study were Math scores experienced increases after the implementation of Act 614 of 2019 in Arkansas, those increases were not statistically significant and even the ones that were statistically significant were not practically significant. Reading scores saw increases after the implementation of Act 614 of 2019, but there were no statistically significant increases found during the data analysis.

There were potential factors the researcher found why data did not support the research. The researcher found of the nine classrooms where data was gathered in the 2017 school year, seven of those classrooms experienced new teachers the following year in 2018. Of the seven new teachers, only one teacher had prior classroom teaching experience. Expert teachers make a conscious effort to ensure that their teaching intentions are in accord with the learning expectations they have for their students. Novice teachers lack experience in classroom management, connecting with curriculum goals and aligning informal and formal assessments with the standard. In all instances scores increased from the previous year.

Another potential factor research did not support the data was the R.I.S.E. initiative passed by legislators in 2017 and the Division of Elementary and Secondary Education of Arkansas. R.I.S.E. During the 2017 legislative session, Arkansas legislators

passed Act 1063, also known as The Right to Read Act. This legislation targets educators in the pivotal role of reading instruction to be properly trained in knowledge and skills of the science of reading. Teachers in K-6 core content areas of English, Science, Math, Social Studies and teachers in K-12 Special Education must show proficiency in the science of reading by the 2021-22 school year. (Reading Initiative for Student Excellence) Arkansas encourages a culture of reading by coordinating a statewide reading campaign with community partners, parents, and teachers to establish the importance of reading in homes, schools, and communities. Act 83 states that “.....A public school district and an open-enrollment public charter school shall include a literacy plan in the annual school-level improvement plan for approval by the public school district and public school district board of directors for implementation in the following school year” This initiative changed the way teachers taught reading in elementary schools. Teachers required multiple hours of training to be able to deliver instruction to meet the parameters of the law. Teachers struggled with many of the changes implemented during the RISE initiative during the 2018-2019 school year. The lack of training for all teachers during the first year could have impacted larger increases in Reading test scores for students included in this study. Further interpretation and discussion of the overall finding of this study were warranted for additional analysis.

Discussion

This study was conducted due to the passage of Act 614 of 2019 in the Arkansas legislature. Arkansas lawmakers enacted Act 641 of 2019 and amend state law concerning the school day (A.C.A. § 6-16-102). The law requires at least 40 minutes of each day be used for unstructured, supervised recess, which will be outdoors when the

weather allows. This area was of focus on because children have less opportunities to experience exercise through free play both inside and outside school settings (Ramstetter, Murray, & Garner, 2010). As high-stakes testing becomes increasingly more important to legislators for accountability purposes, more time has been removed from other areas such as recess (Burriss & Burriss, 2011). Over the past 30 years, schools have been reducing the amount of time students have for recess or physical activity during the school day. Recess for the purpose of this study was defined as unstructured, free play time, where students are allowed to choose what they do during their recess and adults do not direct their activities.

Overall, the study found scores increased on Reading tests in all grades and sub-groups including gender, ethnicity, and socioeconomic status (free-lunch, paid lunch). However, there were no statistically significant differences between the Reading scores between 2018 (pre-increased recess time) and 2019 (post-increase recess time).

There was a statistically significant difference between the Math scores of third, fourth, and fifth grade students. Scores were statistically higher after the implementation of increased recess time. However those increases even though they were statistically significant were not practically significant. Students who were not classified as economically challenged (paid lunch) showed a statistically significant increase from 2018 to 2019. However, the increase was from 414.80 to 416.07, an increase of 1.73 which is very slight on a scale of over 400.

Implications for Practice

The findings from the data analyses supported the idea that the scores from the ACT Aspire and increased recess time were related. There were several significant

implications from this study that could impact educators in the immediate future and beyond, as the field of education continues to follow the Every Student Succeeds Act requirements, and develop schedules to address individual student needs.

Accountability

Accountability from the state and federal government provide school districts, administrators, teachers, and students with a rubric for identifying academic progress and growth. ACT Aspire scores are used for accountability and predictability for student success by the Arkansas Department of Education. These scores include a vertically scaled battery of achievement tests designed to measure student growth in a longitudinal assessment system for grades third through tenth in English, Reading, Writing, Mathematics, and Science (ACT ASPIRE, 2016a).

Administrators and Teachers

Administrators and teachers can use the findings from this study to develop an informational guide to assist in educating students, parents about the benefits of physical fitness, and recess. School districts can use data to develop schedules for student success which include fitness breaks throughout the school day. Physical activity or recess can be added to the school curriculum by taking time from other subjects without risk of hindering student academic achievement (Trudeau & Shepard, 2008).

Students

Student success is the primary reason for this study. The literature review for this study revealed that physical fitness and recess are necessary and vital for student success. The benefits of recess include decreased disciplinary problems, increased academic achievement, and improved mental health for elementary students' children (Becker et

al., 2014; Brez & Sheets 2017; McClelland et al., 2013; Sattelmair & Ratey, 2009).

Arkansas mandates all public and charter school students in grades kindergarten through sixth grade require at least 40 minutes of each day be used for unstructured, supervised recess, which will be outdoors when the weather allows. Child development happens progressively over a couple of decades and physical activity at school can improve student motivation (St. Leger & Young, 2009).

Implications for Future Research

This research provided very important findings for the Hector Elementary School. Mean scores in Math and Reading for all third, fourth, and fifth grade students increased after the implementation of increased recess time. All groups according to gender, ethnicity, and socioeconomic status showed increases in mean scores in both Math and Reading. However, there are questions yet to be answered that were outside the scope of this research. This section will focus on research opportunities that could provide valuable insight to administrators, teachers, and parents that could affect students at Hector Elementary School. The researcher feels that further exploration of the link between recess and academic achievement would be of benefit with a wider range of sample populations surveyed, and interviewed about their scheduling of the school day. By exploring the impact of play on elementary students, it would also be conducive to positive school achievement and behavior. Due to the limitations as well as the findings of this study, further research is recommended and utilize the following:

- A larger sampling size of students
- Involving more grade levels Kindergarten through eighth grade
- Increasing recess time before lunch and after lunch

- Varying times of recess to determine best fit for students

Varying amounts of recess time to determine best fit for students

Replicate Study

Elementary schools that have implemented increased recess time would benefit by replicating this study at their school level. Elementary schools in Arkansas have the ACT Aspire database available to use data to compare scores from pre-increase recess time and post-increase recess time. Information could be used to determine when the best possible times for recess should be implemented at school. Schools could use this data to determine scheduling for student success.

A replication of this study could include comparing 2018 3rd grade scores with 2019 4th grade scores. These scores would involve the same students. A comparison between 4th grade in 2018 and 5th grade in 2019 could produce interesting results from pre-increased recess time to post-increased recess time.

Extend Scope

School districts would benefit by using data from the ACT Aspire database to determine the benefits of recess. By including student data such as behavioral references, mental health referrals, school attendance, and measuring body mass index of students before and after the implementation of increase recess time, it would be valuable for future studies.

Conclusion

Children naturally play when given unstructured free-time. Play is the “language” of children. States have stripped children of their natural language in the school setting by increasing academic time and decreasing recess time. Children develop social and

emotional skills during recess. Children learn to problem solve, organize, conflict, and resolve problems that arise when playing with other children. It is the hope of this researcher for school districts continue to increase free play time for students in elementary schools, and possibly into the middle-level grades at schools. Research of the human brain has revealed that continuous instructional periods can actually inhibit learning and retention of the learning matter (Jensen, 2002). Schools must take notice to this research and continue to allow students to do what they do best, and let them play.

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