Does the Decision to Swim Year-Round Affect Standardized Reading Test Scores/Swim Performance?

By Kaari Bloedow

Faculty Mentor Carol Winkle

Content Reader Karen Aupperlee

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Abstract

Established through stereotype, many athletes struggle as students, whether at the collegiate or youth level. The stereotype of the child as a “jock” often does not include him as a “student.” Peers do not see “jocks” as “students.” Not all sports hold to the same athlete-as-student stereotype. Swimming has proven to be a sport that is attractive to the child as both the athlete and student. High demands of the sport require good time management skills, efficient study habits, and a strong work ethic.

When the swimmer makes a decision to commit to the sport year-round, and compete exclusively as a swimmer, it has been observed that the attitude toward school changes. More emphasis seems to be on homework, and general attitude toward school seems to improve. At some point, it has been observed, the swimmer transitions to a more competitive athlete. His skills in the pool improve which is supported by improved swim times. The researcher seeks to understand if this is true.

Based on the researcher’s experience with youth swimmers ages 12-16 over an eight year period, it has been realized that students who have chosen to swim competitively year round, with swimming their primary sport, have improved two factors: increased academic performance and improved athletic performance. Observations have led to the belief that time management and study habits change once swimmers make the decision to swim competitively, thus leading to better school performance. The researcher seeks to determine if there is a correlation between standardized reading test score improvement and swim performance for year round swimmers.
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Organized youth sports have increased in popularity over the last few decades. It is often believed that there is a benefit to athletic participation. This participation of sports does not necessarily produce benefits during childhood (Journal of Physical Education, Recreation & Dance, p. 8, 2013). Much depends on outside factors such as how the sport is organized, the relationship the child has with parents, coaches and peers, what the child gives to the sport, and how the child integrates the experience of sport into different aspects of his life (p. 8-9).

However, the favorable effects rely on “…positive and supportive relationships with teammates, coaches, and parents…”, physical and interpersonal skill development, command, proficiencies, decision-making opportunities about the sport, and “…experiences that are consistent with their particular needs and developmental levels” (p. 9). Given the positive potential of sport, one might presume there is a carry-over from the sport field into the classroom. Yet athletes are often given a stereotype in the classroom.

It has been assumed through this stereotype that many athletes struggle academically, whether at the collegiate or youth level. The stereotype of the child as a “jock” does not include him as a “student” in many sports, meaning people, including the student, do not necessarily view the “jock” as one who performs in the classroom, just one who performs in his sport. This reins true in urban areas as well as E. DeMeulenaere, PhD. explained about urban students that, “…youth…understand well that engagement in school could undermine their social reputation among peers” (p. 82, 2010). He continued by saying that student-athletes can “…justify their high grades and efforts to study on eligibility requirements for involvement in sports. …[s]ports
promote[s] their popularity overall; they then [use] this reputation as an athlete to overshadow any negative labels they might otherwise acquire from their successful academic performance” (p. 82). It was here that DeMeulenaere acknowledged that involvement in such structured activities “may inhibit delinquency, it may also compete with time needed for academic work” (p. 78). In addition, sport participation offered “an effective strategy for negotiating the conflicting contexts these students inhabit…” (p. 82).

In order to dispel this negativity of the athlete as a student and to help improve academic performance among its high school athletes, the National Collegiate Athletic Association (NCAA) increased its requirements for student-athletes in 2016. Prior to 2016, the NCAA required that student-athletes maintained a core subject GPA of 2.0 to compete at the Division 1 level. Those subjects included four years of English, three years of math (Algebra 1 or higher), two years of natural or physical science, two years of social science, and an extra year of English, math or science. Four years of religion, philosophy, foreign language or additional years of the above listed courses were also required. The minimum SAT score was 400 for math and reading only, and the ACT sum score was 37. Finally, a student’s GPA and SAT/ACT scores had to meet the sliding scale requirements. In 2016, student-athletes are now required to have a 2.3 GPA, ten of the sixteen core courses must be completed before the student’s senior year without retaking the course prior to senior year, and the GPA/SAT/ACT sliding scale has increased by 0.5 points (NCAA, 2016).

Yet studies show that athletic involvement appeared to heighten students’ academic performance (Stephens and Schaben, 2002). Stephens and Schaben continued on to say that athletic participation helped students “…build discipline, set goals, organize time, and develop self-confidence” (2002). The sport of swimming has proven to be a sport that does all these
things and is attractive to children as both the athletes and students (Chan, 1996). The high
demands of swimming require good time management skills, efficient study habits, and a strong
work ethic. Chan attributes difficult training and competition experiences to the enhanced
benefits of swimmers’ performance and cognitive development (1999). Time management also
becomes an important factor for swimmers. Chan states that swimmers “…worked even harder
than before due to the time constraints” working more “…efficiently in lesser time by managing
their time more wisely” (p. 45). In addition to time management, swimmers tend to use
swimming to help them sort out failures in their everyday lives. In Chan’s study reviled that
over half of those interviewed used swimming to encourage themselves when “…adverse
emotion came after a failure and found it very effective in uplifting their depressed mood” (p.
45-46). All factors, including time management, efficient study habits and strong work ethic
among them, encouraged swimmers to use their experiences from the pool to sort out and
override their conceived failures out of the pool. These effects are becoming more evident and
the benefits of swimming are slowly coming into view from an academic standpoint.

Setting

Like most of today's youth, West Michigan students, specifically in Kent and Ottawa
counties, participate in many sports programs. Among those sports is swimming. Many
organizations around West Michigan offer opportunities for youth to learn to swim, typically
referred to as swim lessons. Once the child learns the strokes, and wishes to further his
experience in the water, typically around 5-8 years of age, he may move to a competitive swim
club where he will learn what a swim team is all about. Many youth begin with a pre-
competitive program where they become better swimmers and learn what competitive swimming
is all about. The swimmer will learn how to move more quickly in the water by developing all
four competitive strokes, do flip turns, dive off starting blocks, touch the wall hard enough to stop the clock with the touch pad, learn to cheer his team mates, build strong peer bonds, learn about a pace clock, and many other skills. Those who choose to further their involvement move to practice groups where they continue to build on previously learned skills. The next step at this level is to attend swim meets. Youth are typically between the ages of 6-10 years of age. Here, students learn how to compete both against others and the clock. They can compare their times with their team mates and other competitors. They are given places based on their times within their age group and gender. They continue working hard through practices and watch their times drop and their skills improve. If the child enjoys the competition, he will enter more meets and watch the improvement continue. He may even qualify for post-season competition. If the program the child is in is a USA affiliated program, the child has several goals to work toward. Typically, there are three post-season meets a child can attend. The lowest level meet is Districts. The only stipulation is that the child may not swim an event where he has qualified for the next level, Junior Olympics (JO). The JO meet is a middle tier meet where the swimmer has to be equal to or faster than the JO qualifying time in an event but slower than the next level (State) in that event. The top level for most children this age is the State meet. Here, swimmers compete against other children in their age group from all over the state. Most of these swimmers have reached the highest level available to them. Some, however, do go on to compete at the Zone meet which is typically out of state and difficult to qualify for.

The same stepping stones are available for children ages 11 and older. However, the difference is the competition begins to increase. The swimmers work to qualify for the State meet as well; however, some are also beginning to consider higher level meets like Sectionals or Junior Nationals. Most of these swimmers are between 15 and college age. Aside from the
changing competition, the quality of swimmers increases. At some time during this age range, puberty and social influences begin to occur. Children have or are becoming adolescents. Many are entering middle school or high school. Their worlds are changing both in the pool and in the classroom. They are beginning to make decisions that reflect the young people they are becoming. Some choose different activities, and others continue in the pool. This is as consistent in West Michigan as it is throughout the rest of the country.

West Michigan swimmers work hard and are competitive in the state. They follow the same path as all USA swimmers follow and continue to challenge themselves as they progress in their areas of interest.

Problem Statement

The purpose of this study was two-fold. First, the researcher hoped to learn what happens to young swimmers’ standardized reading scores after they decided to swim competitively, and second, what happened to swim performance at this same stage. As children transition into their adolescent years, their interests may change. Those who have been swimming most of their lives in some capacity or another decide to continue to swim or to move on to another sport. Swimmers who decide to continue swimming have chosen to dedicate their lives to the sport and typically do so through high school and, in some cases, college. These are the people who have become elite swimmers. These swimmers have competed at the state level and in some cases sectional and junior national levels as well. These swimmers are in the water early in the morning and sometimes again later in the day. They train hard, go to school, do their homework, eat and sleep-every day. A few may participate in school organizations or work part time as well. They are competitive in their age groups and strive to reach the next level of competition. They are dedicated and goal driven to reach that next level. The researcher wished
to determine if the drive to compete in the pool translated to the academic drive to excel on standardized reading test scores.

Statement of Purpose

The researcher has observed that when swimmers make a decision to commit to the sport full-time, and compete exclusively as swimmers, their attitude toward school changes either positively or negatively. The researcher sought to understand if this change in attitude positively affected their standardized test scores. In addition, the researcher wanted to examine if after the decision was made to compete year-round, the athletes put more emphasis on school and homework, and general attitude toward the importance of school improved. Swimming year-round is often not taken lightly as the commitment level becomes greater for both the athlete and his family. There are more meets, more practice times, more travel and, with that, more expense. With gradual stepping stones put in place by USA Swimming, and, specifically time qualification standards, swimmers are quickly rewarded for their hard work with faster times. They also see their improvement against the performance of their peers. At some point, it has been observed by the researcher, swimmers transition to becoming more competitive athletes. Their skills in the pool improve and the individuals see evidence on the clock after a race.

Over an eight year time period, the researcher had casually observed through conversations with parents and athletes that once children between the ages of 12-16 decided to commit to swimming full-time, there was a change in their academic performance as well as their athletic performance. This observation had led the researcher to believe that time management and stronger study habits and strong work ethic changed once swimmers made this decision, thus leading to better performance in the classroom and pool. The researcher sought to
determine if standardized test scores improved as swim performance improved once the student had decided to swim year round.

Research Questions

Specifically, what happens to the standardized reading test scores of the elite swimmers who choose to compete in the sport of swimming exclusively? What happens to the swimmers’ times when this decision is made?
Chapter II—Literature Review

The health benefits of physical activity are well known and many studies have indicated a positive relationship between physical activity and classroom performance (Journal of Physical Education, Recreation & Dance, 2010; Zhang et. al., 2009; Fedewa et. al., 2011; Journal of Physical Education, Recreation, & Dance 2013). These studies include after school fitness programs as well as physical education classes. For example, The Journal of Physical Education, Recreation & Dance (2010) indicates “…that students with higher levels of physical fitness did better on standardized tests than their less fit peers” (1). In addition, much information has been found regarding sports in general and academic improvement (DeMeulenaere, 2010; Santesmases, 2010). DeMeulenaere (2010) finds a positive link between urban minority youth and improved academic performance. This study details the struggle minority children who were involved in gangs or in juvenile detention centers have with staying in school. Demeulenaere indicates this is because there is a stigma for urban students who perform well academically. However, the youth involved in this study were given an opportunity to change their lives by participating in athletics. The negative perception of school changed for these students when they became athletes and were required to meet a certain academic standard to be able to play the sport. The results were astounding. All of the children in this study were on the verge of dropping out of school all together. They all graduated on time with their classmates.

Stephens and Schaben (2002) learned that participation in interscholastic sports and academic performance at the middle school level impacted students in a positive way. The study, conducted during the 1998-1999 school year in an urban middle school in Omaha, NE, found that there is “…a strong relationship between academic success and athletic participation”
The participants included 73 athletes and 63 non-athletes, all eighth graders. The athletes consistently maintained higher GPAs and standardized test scores.

Fredricks (2012) cautioned about over-scheduling of student-athletes. However, Fredricks also indicated that among 10th grade students, there were “positively associated…math achievement test scores, grades, and educational expectations at 12th grade” (p. 295). In addition, the well-being of the 10th graders “…increased as the number of hours and time in extracurricular activities increased” (p. 303). This indication only applied when the athlete participated in 5-7 activities, and no more than 14 hours of participation each week. At this point, “…the academic well-being of these youth declined” (p. 303). Yet, adjustments of 10th graders participating in extracurricular activities “…at high levels was higher than 10th graders who were not involved in any organized contexts” (p. 303). Fredricks indicated that the number of activities and the time involved in the activities “at 10th grade also predicted educational status at 2 years post high school” (p. 295). The conclusion indicated that few high school students were over-scheduled and that a greater portion of students were not involved in activities. For those who did participate, there were many positive benefits, including better academic performance and higher test scores, but only to a point. The greater involvement a student had did not necessarily increase the academic benefits.

Santesmases (2010) compared basketball players and swimmers to those who had did not participate in sports at all. Basketball and swimming were not separated into their own categories. The findings indicated that between the ages of 12-14, the athletes performed better in school compared to the general population. However, when the students reached ages 15-18, the general population had improved grades and those of the basketball players and swimmers decreased. However, this study also indicated that “…sporting students demonstrate that they
can have academic performances over the inactive people during the entire compulsory secondary education” (p. 108). Also, between 12-14 years of age, the general population, “…without demanding sports commitments, study fewer hours…[therefore,]…it is not correct to remove children from the sports activities supposing that in this way they will devote more hours to study” (p. 108).

According to Josep Sola Santesmases, the studies that were reviewed “…present such a variation of results that it becomes difficult to affirm if correlations between the level of physical activity and improvements in academic performance were casual or if they were really due to cause and effect” (p. 101). Noteworthy was a reference to a study Santesmases included where nearly 7,000 students ages 14-19 years of age from Catalonia high schools showed the teenagers who voluntarily participated in physical activity once a week “…not only achieved better grades, but they also felt better about their body and had better social relationships with their family and in the school environment…The study argued that if physical activity was made, the risk of achieving bad grades was reduced by 26% in boys and 34% in girls” (p. 101). Santesmases studied “…four population groups differentiated by ages…: 12 years (born in 1997, primary), 14 years (born in 1995, secondary), 16 (born in 1993, secondary) and 18 years (born in 1991, high school)” (p. 102). The results indicated “…a coefficient of correlation of Pearson of 0,997…The significance of this finding means that as the age and educational level increase, the differences between the grades of the sportsmen and of general population decrease” (p. 104). Two sub groups, the general population and sport population, were indicated in the conclusion. “The general population has maximum grades in the higher academic years; the sports population has the maximum grades in the academic years of younger people” (p. 107).
Chan (1996) indicated that “there is no absolute generalization and consistency found in the attributional style of the Age Group Swimmers and Academics” (1996). Yet “…this specific experience that Swimmers gained had a positive influence on their attitudes…” (p. 46). Chan also stated that novice swimmers were able to “…show their awareness of the help coming from the competitive experience which was accumulated in the past when they were evaluating their success in Swimming” (p. 44). The ability to use sport to evaluate emotions appeared strong. “One Novice swimmer mentioned that he felt less depressed after being involved in swimming when failure came to him while one Elite swimmer mentioned that she seldom thought of giving up when problem[s] came to her after she [was] involved in swimming” (p. 44-45). Chan indicated the shortcomings of the swimmers improved with the involvement of swimming and the swimmers described themselves as having more confidence, happiness, were more aggressive, “…more diligent, more attentive and [healthier] after [being involved] in swimming” (p. 45). It can also be said that some swimmers felt the opposite effects as “…the adverse influence was the shortage of time for studying after training…” (p. 45). Yet these swimmers worked harder to use their time more efficiently and were able to accomplish more because they were wise about their time management (p. 45).

Finally, there is much parental speculation among the competitive age group swim arena community about the athletes and their ability to focus on academics during the swim season. For the purpose of this study, the researcher was unable to find much specific research about negativity or test scores at this specific age level related specifically to the sport of swimming. The information below is informal and not well documented, but rather gathered by parents through conversations during hours spent in the stands watching children swim. Little research specific to academic performance and swimmer success among 12-16 year olds from the United
States has been found. However, among national-level swimmers, a relationship between genotype and positive psychological development has been studied (Golby et. al., 2006). The study was not conclusive enough to indicate whether or not genes play a significant role in swim performance. However, Golby et. Al. references another study that discusses “Positive psychology”, meaning “the study of optimal functioning, human strengths, and positive psychological outcomes” (2006). Golby explains the continued studies that include “mental toughness, hardiness, self-esteem, self-efficacy, dispositional optimism, and positive/negative affectivity” (2006). At this point, the nature vs nurture question comes into play. It is indicated that these “…are not mutually exclusive, but rather interact to influence human behaviour in many ways” (2006). Time management, efficient study habits, and strong work ethic are potentially among these human behaviors.

Extracurricular activities and sport appear to positively influence students academically as long as they are not over scheduled or over worked. Students value their time and do what is necessary in the classroom to continue the hard work in order to participate in sport. The stigma of school for urban students fades as they become involved in athletics. Time management also plays a role in the success of athletes, both non-swimmers and swimmers alike. Swimming appears to have a positive impact on attitude toward hard work and dedication. It becomes necessary for athletes to manage their time to complete their school work as well as train, which forces completion of homework and the cycle continues for another day resulting in good work habits in and outside of the pool.
Chapter III - Methodology

After a review of the literature, the researcher found that more study was necessary to determine if a swimmer’s decision to swim year-round impacted his standardized reading test scores.

This research sought to understand the connection between a swimmer making a decision to swim year-round and his/her academic performance on standardized reading tests. It also sought to determine how, if at all, the swimmer’s decision changed his/her performance in the pool. It compared standardized reading test scores to swim times of all available strokes and distances for middle school and early high school swimmers who have been competing in swimming since third grade or eight years of age.

One purpose of this study was to determine if there is a correlation between competitive year-round swimming and standardized reading test scores in the form of Michigan Education Assessment Program (MEAP). The second purpose was to determine how the swimmer preformed in the pool once this decision to swim competitively year-round was made.

The research focused on the following questions:

What happens to the swimmer’s standardized reading test scores once he/she decides to swim year-round?

How does this decision affect swim performance?

What is the connection between swimming year-round and standardized reading test scores?

Is there a connection to the decision to swim and performance in the pool?

Description of Action
The research methods for this study were correlational and comparative. The researcher correlated the decision the swimmer made to swimming competitively year-round to his/her reading test scores once this decision was made. The researcher also compared swim performance based on times before the swimmer’s decision and after. Clubs from West Michigan were selected based upon knowledge the researcher had on club performance at the U.S.A. state championship swim meets. Criteria for participation in the study included male and female swimmers between the ages of 12-16. They must have been affiliated with a USA swim club and have participated in the sport of swimming prior to age 11. Eligible participants must have maintained a consistent 70% participation in practices during the current and previous seasons. In addition, participants must have qualified for either the long course or short course state swim championship for a minimum of two consecutive seasons. High school swimmers qualified as well provided they met both the age and the USA requirements. Coaches were given criteria for swimmer selection and then provided swimmer names to the researcher.

Parents/guardians were notified regarding selection of their child(ren) and were asked for consent to participate. Parents/guardians were also asked to obtain the test scores dating from third grade to the present for their swimmer(s).

The USA Swimming website, http://www.usaswimming.org was consulted to obtain swim times for each participant.

Standardized reading test scores were then compared to swim times to determine a correlation between the two. Line graphs were developed to visualize the connection.

Population and Sample
Participants were from one to five USA affiliated swim clubs from Grand Rapids, MI and the surrounding area, specifically Kent and/or Ottawa counties. Clubs from West Michigan were
selected based upon USA affiliation as well as knowledge the researcher had on club performance at the state championship swim meets. The participants for this study were male and female middle school and high school students who participate in a USA affiliated age group swim program throughout the calendar year in West Michigan. These swimmers began swimming competitively prior to sixth grade. In addition, the swimmers used for this study attained a minimum practice attendance of 70%. Finally, the population consisted of swimmers who, at minimum, had qualified for the Michigan State Championships in either long course or short course for two consecutive seasons. The age range was between 12 and 16 years of age. The demographic population was a multi-ethnic group consisting of eight participants from four families, 2 females and 6 males. The study began in April of 2016.

Instrumentation

Two sets of data were collected for this study. The first set was swim times available at the USA Swimming website, http://www.usaswimming.org. Swim times were needed to help determine the correlation between swimming and academic performance.

The second set of data was collected from participating families. Participating families were asked to present standardized test scores for each swimmer from 3rd grade, or age 8, to the present. Reading scores were then compared with swim times using Pearson correlation to determine any correlation between the two. Scatter plot graphs were then used to determine the results of the connection between swim times and reading test scores.

Data Collection Procedures

The researcher contacted USA affiliated swim clubs in the West Michigan area based on club performance at USA state swim championship meets that are held twice a year. Coaches were
asked to identify swimmers from their clubs who have participated in the sport of swimming since at least 6th grade, attended practices a minimum of 70% of the time for a minimum of two consecutive seasons, qualified for the state championship swim meet at least two consecutive seasons, and were between the ages of 12-16. Once coaches identified the swimmers, the researcher invited parents/guardians to participate. Letters of consent were distributed to families via secure email and returned to the researcher via sealed envelope through U.S. mail or secure email.

Once consent forms were returned to the researcher, swim times were collected via the USA Swimming website, http://www.usaswimming.org. The researcher conducted an individual time search by inputting each participant’s last name, first name, time period (9/1/2007 through 5/5/2016), event information, and age range (8 to 16). All times and events for each swimmer were then presented on the screen. This information was then input onto a spreadsheet.

Participants were assigned a numbered one through eight for anonymity. Swim times collected from this site are updated shortly after every USA affiliated swim meet across the country for every participant and every event swum. Results were up-to-date.

Standardized test scores from Michigan Education Assessment Program (MEAP) were collected from parents of participants via secure email or U.S. mail. All subject areas evaluated for each grade for the testing purposes were among the scores provided; however, only the reading scores were used for this study. The scores of each participant were then added to the spreadsheet adjacent to the assigned participant number.

Data was placed on a graph using Pearson scatter plot graphs to determine the relationship between test scores and swim times. Participants, reading test scores, and times for
each specific event (50 freestyle, 100 freestyle, 200 freestyle, 500 freestyle, 100 backstroke, 100 butterfly, 100 breast stroke, 100 individual medley, and 200 individual medley) were graphed.

Data Analysis

The data collected from http://www.usaswimming.org were converted to seconds and rounded to the nearest second. Participants were assigned a number (1-8) and times were then grouped according to age (3rd grade through 10th grade), event (50 freestyle, 100 freestyle, 200 freestyle, 500 freestyle, 100 backstroke, 100 butterfly, 100 breast stroke, 100 individual medley and 200 individual medley). All times were input directly to an Excel spread sheet. MEAP reading scores were input onto the spread sheet adjacent to the participant number and swim time for each specific event. Using the Pearson correlation coefficient, swim times and reading test scores were compared. A scatter plot graph was then calculated to determine the correlation for the group of participants and the event swum for each event.

There appears to be a direct correlation between swim times and standardized reading test scores at the early grades. However, as students move into the upper grades, the correlation between swim times and standardized reading scores is not as definitive.
Chapter IV-Findings

The purpose of this study was two-fold. First, the researcher hoped to learn what happened to young swimmers’ reading scores after they decided to swim competitively, and second, what happened to swim performance at this same stage. This study discussed the relationship between swim times and reading scores for third grade through eighth grade students once students decided to swim year round. Swimmers ages 12-16 from West Michigan were chosen based on their participation at the USA state championship swim meets, regular attendance at practice, and the age at which they began swimming, which was prior to age 11. Using reading test scores from the Michigan Education Assessment Program (MEAP) and swim times from the USA Swimming site, data was collected and graphed.

The expected correlation did occur, but is not consistent in all age groups, and differs from event to event. In addition, a consistency was noticed between 5th and 6th grades. The correlation was notably weak for both grade levels except 6th grade in the 200 and 500 yard freestyle events, where the data showed a moderate correlation. The reverse exception was true for 5th and 6th grades where the data showed a weak correlation for 6th grade and a moderate correlation for 5th grade.

The greatest consistency was noted in third and fourth grades where there was a moderate to strong correlation in all events. The 200 yard freestyle, 100 yard breast stroke, 100 yard individual medley, and 200 yard individual medley events all showed a strong correlation for both 3rd and 4th grades. Third grade showed a moderate to moderately strong correlation in the 50, 100, and 500 yard freestyle events, 100 yard backstroke, and a strong correlation in the 100 yard butterfly. 4th grade showed a moderately strong correlation in the 50, 100 and 500 yard freestyle, 100 yard back stroke, and the 100 yard butterfly.
In addition, the data collected for 7th and 8th grades was minimal at best, and inconclusive. As a result, much data for these age groups could not be counted either because one set of standardized data was used or swim times were unavailable for enough participants. Only MEAP reading scores were used in this study, and the state of Michigan switched from MEAP to Michigan Student Test of Education Progress (M-Step) at the beginning of data collection.

The 50 Yard Freestyle showed a strong negative correlation at 3rd grade, age 9 \((r = -0.63)\), but a greater negative correlation, strong to very strong, at 4th grade, age 10 \((r = -0.84)\). However, at 5th and 6th grades, ages 11 and 12 respectively, there was either a weak or negligible correlation. At 7th grade, age 13, a strong negative correlation was found. There was not enough data to give adequate analysis for 8th grade, age 14.
The Pearson r value for the 50 Yard Freestyle at 3rd Grade showed a strong negative correlation of -0.63.
The Pearson r value for the 50 Yard Freestyle at 4th Grade showed a strong to very strong negative correlation of -0.84.
The Pearson r value for the 50 Yard Freestyle at 5th Grade showed a weak negative correlation of -0.26.
The Pearson r value for the 50 Yard Freestyle at 6th Grade showed a negligible correlation of 0.12.
The Pearson r value for the 50 Yard Freestyle at 7th Grade showed a strong negative correlation of -0.69.
The 100 Yard Freestyle showed a very strong negative correlation for both 3rd Grade and 4th Grade, with 4th Grade being strongest of the two. The relationship for 5th grade showed a moderate negative correlation, and 6th grade strong positive correlation. Data for 7th and 8th grades was inadequate.

The Pearson r value for the 100 Yard Freestyle at 3rd Grade showed a very strong negative correlation of -0.76.
The Pearson r value for the 100 Yard Freestyle at 4th Grade showed a very strong negative correlation of -0.87.
The Pearson r value for the 100 Yard Freestyle at 5th Grade showed a moderate negative correlation of -0.38.
The Pearson r value for the 100 Yard Freestyle at 6th Grade showed a strong positive correlation of 0.41.
The 200 Yard Freestyle indicated a very strong negative correlation at 3rd Grade and 4th Grade. Grade 5 showed a moderate negative correlation, while 6th Grade was a strong positive correlation. Again, data at 7th grade and 8th Grades was inadequate.

![Graph showing 200 Yard Freestyle Grade 3/Age 9](image)

The Pearson r value for the 200 Yard Freestyle at 3rd Grade showed a very strong negative correlation of -0.95.
The Pearson r value for the 200 Yard Freestyle at 4th Grade showed a very strong negative correlation of -0.87.
The Pearson r value for the 200 Yard Freestyle at 5th Grade showed a moderate negative correlation of -0.35.
The Pearson $r$ value for the 200 Yard Freestyle at 6th Grade showed a strong positive correlation of 0.55.
The 500 Yard Freestyle Pearson r value indicated that at Grade 3, there was a strong negative correlation, and a very strong negative correlation in 4th Grade. 5th Grade showed a negligible correlation, and a strong negative correlation presented itself at 6th Grade. Too little data was available for 7th and 8th grades.

The Pearson r value for the 500 Yard Freestyle at 3rd Grade showed a strong negative correlation of -0.68.
The Pearson r value for the 500 Yard Freestyle at 4th Grade showed a very strong negative correlation of -0.78.
The Pearson r value for the 500 Yard Freestyle at 5th Grade showed a negligible correlation of 0.08.
The Pearson r value for the 500 Yard Freestyle at 6th Grade showed a strong negative correlation of -0.60.
The 100 Yard Backstroke indicated a very strong negative correlation was evident for 3rd Grade and a strong negative correlation for 4th Grade. 5th Grade showed a strong negative correlation, and 6th Grade was negligible. At 7th Grade, there was a strong negative correlation. Not enough data was available for 8th Grade.

The Pearson r value for the 100 Yard Backstroke at 3rd Grade showed a very strong negative correlation of -0.76.
The Pearson r value for the 100 Yard Backstroke at 4th Grade showed a strong negative correlation of -0.68.
The Pearson r value for the 100 Yard Backstroke at 5th Grade showed a strong negative correlation of -0.47
The Pearson r value for the 100 Yard Backstroke at 6th Grade showed a negligible correlation of -0.09.
The Pearson r value for the 100 Yard Backstroke at 7th Grade showed a strong negative correlation of -0.57.
There was a very strong negative correlation in the 100 breast stroke at the 3\textsuperscript{rd} and 4\textsuperscript{th} Grade levels. At 5\textsuperscript{th} Grade, there was a strong negative correlation, and 6\textsuperscript{th} Grade, a weak negative correlation was evident. At 7\textsuperscript{th} grade the correlation was very strong.

The Pearson r value for the 100 Yard Breast Stroke at 3rd Grade showed a very strong negative correlation of -0.89.
The Pearson r value for the 100 Yard Breast Stroke at 4th Grade showed a very strong negative correlation of -0.92.
The Pearson r value for the 100 Yard Breast Stroke at 5th Grade showed a strong negative correlation of -0.50.
The Pearson r value for the 100 Yard Breast Stroke at 6th Grade showed a weak negative correlation of -0.23.
The Pearson r value for the 100 Yard Breast Stroke at 7th Grade showed a very strong negative correlation of -0.75.
The 100 Yard Butterfly indicated a very strong negative correlation at 3rd and 4th Grades. At 5th grade, there was a weak negative correlation, and 6th Grade was negligible. At 7th grade, there was a strong negative correlation.

The Pearson r value for the 100 Yard Butterfly at 3rd Grade showed a very strong negative correlation of -0.93.
The Pearson r value for the 100 Yard Butterfly at 4th Grade showed a very strong negative correlation of -0.73.
The Pearson r value for the 100 Yard Butterfly at 5th Grade showed a weak positive correlation of 0.24.
The Pearson r value for the 100 Yard Butterfly at 6th Grade showed a negligible correlation of 0.09.
The Pearson r value for the 100 Yard Butterfly at 7th Grade showed a strong negative correlation of -0.47.
The 100 Yard Individual Medley indicated a very strong correlation at the 3rd and 4th Grades. At 5th and 6th Grades, there was a negligible correlation. The data was inadequate to interpret 7th and 8th grades.

The Pearson r value for the 100 Yard Individual Medley at 3rd Grade showed a very strong negative correlation of -0.97.
The Pearson r value for the 100 Yard Individual Medley at 4th Grade showed a very strong negative correlation of -0.84.
The Pearson r value for the 100 Yard Individual Medley at 5th Grade showed a negligible correlation of -0.02.
The Pearson r value for the 100 Yard Individual Medley at 6th Grade showed a negligible correlation of 0.02.
The 200 Yard Individual Medley showed a very strong negative correlation at the 3rd Grade and 4th Grade. The correlation was negligible at 5th and 6th Grades. There was a strong negative correlation at 7th Grade. Not enough data was available for 8th grade.

The Pearson r value for the 200 Yard Individual Medley at 3rd Grade showed a very strong negative correlation of -0.98.
The Pearson r value for the 200 Yard Individual Medley at 4th Grade showed a very strong negative correlation of -0.83.
The Pearson r value for the 200 Yard Individual Medley at 5th Grade showed a negligible correlation of -0.02.
The Pearson r value for the 200 Yard Individual Medley at 6th Grade showed a negligible correlation of 0.05.
The Pearson r value for the 200 Yard Individual Medley at 7th Grade showed a strong negative correlation of -0.5.
Conclusion

The research concluded as indicated in the above data that there is a strong to very strong negative correlation to 3rd and 4th grade swimmers and their standardized reading test scores. Therefore, one can extrapolate that swimming is beneficial to younger students at this age. The results become more inconsistent for 5th and 6th grade swimmers. At 5th Grade, a moderate negative correlation is evident in the 100 and 200 Yard Freestyle events and a strong negative correlation is apparent with the 100 Yard Backstroke and Breast Stroke. 6th grade shows a strong positive correlation in the 100 and 200 Yard Freestyle events and a strong negative correlation in the 500 Yard Freestyle. The consistency of a lack of uniformity at this age, speculation might assume, may be due to pre-adolescent growth. Perhaps there is an additional consideration as swimmers are still refining their stroke and distance events (Backstroke, Breast Stroke, Butterfly and 500 Yard Freestyle). Further study is necessary to verify this inconsistency. The data is inconclusive for 7th grade through 10th grades, but preliminary findings show a consistent very strong to strong negative correlation at 7th Grade. Further research is necessary to verify any findings at this age level.
Chapter V-Recommendations

The research conducted should be encouraging for younger students, parents, coaches and teachers. The data clearly indicates a direct correlation to swim times and standardized reading test scores for third and fourth grades. However, as students begin to move through the pre-adolescent-adolescent stage, the data lacks correlation. A larger population may be more definitive. At the middle grades, there is more correlation fluctuation, and further, more in-depth study is necessary. The data collected for the upper grades, 7th through 10th grades, was either non-existent or was not compared in this study due to a lack of data. First, the state of Michigan changed its format of testing from Michigan Education Assessment Program (MEAP) to Michigan Student Test of Education Progress (M-Step) and there was not enough data to evaluate for the participants in this study. On other occasions, swimmers may not have swum some events during a given year, thus no times were available for those events which lead to fewer participants in the study for the upper grade levels.

Furthermore, as students enter high school, two changes occur. First, standardized assessment methods move toward college entrance testing such as ACT and SAT. Second, during the high school season, many high school swimmers are involved with their school swim teams and not as involved with the USA clubs. In Michigan, high school swim times are not registered with USA Swimming until the post season and only select events are allowed at the high school level; high school athletes do not swim all the same events as their club counterparts. Continued evaluation in the upper grades needs different consideration. Rather than using MEAP or M-Step scores to evaluate a correlation, ACT or SAT scores would be necessary. Post season high school swim meets such as conference and state meets may need to be considered as
well. Finally, it is recommended that math scores also be considered. Doing so would give a more in-depth perspective of swimming and its correlation to standardized test scores.
References


