9-29-2014

An exploratory investigation of looping high school math and English and student achievement

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AN EXPLORATORY INVESTIGATION OF LOOPING

HIGH SCHOOL MATH AND ENGLISH AND STUDENT ACHIEVEMENT

by
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A Thesis

Submitted to the
Department of Educational Services, Administration & Higher Education
College of Education
In partial fulfillment of the requirement
For the degree of
Masters of Arts in School Psychology
at
Rowan University
May 6, 2014

Thesis Chair: Terri A. Allen, Ph.D.

Abstract

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2013/14
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Master of Arts in School Psychology

The purpose of this exploratory investigation was to compare the standardized test scores of students in looped (n=47) and non-looped (n=38) settings in high school Math and English classes. In doing so, the scores were compared to see if instruction from the same teacher for more than one year had an effect on student achievement as measured by the High School Proficiency Assessment (HSPA). The HSPA is broken down in to a Math and English section with a possible score of 300 on each; student scores fall in to Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP). Other factors that were studied to see if they impacted achievement on HSPA were: which teacher a student had for Math or English, gender, year of graduation, and which classes the student was looped for. The findings of the investigation showed a significant relationship between those students in a looped English setting and their achievement scores versus those like students in a non-looped English setting. There was no significant relationship between looped and non-looped students in Math classes and their achievement on the HSPA test.

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Chapter 1

Introduction

Need for Study

The current research focuses mainly on looping in the lower grades (elementary through middle school, K-8), and special education classes. The demands put on high school students to be academically, athletically, and socially successful are getting greater with each passing year. Students are expected to push themselves in to AP and honors classes, join extracurricular activities, and join sports teams all in the name of college application boosting. This puts added pressures not only on students to be successful, but also pushes schools to find evidence based practices that can accommodate the well-rounded student. The need for the study of looping high school content courses (Math and English) is needed to determine the possible positive affect it would have on student achievement, as well as the difference in achievement of like students in looped and non-looped settings.

Purpose

The current study is aimed to examine the relationship between looping and student achievement in core subjects based on student achievement scores on the HSPA test. The main focus of the study is the effect of looping on student achievement in Math and English in a like sample of high school aged students. The questions this study will aim to answer are:

Do students perform better on standardized tests after receiving instruction from a teacher for more than one year?

Is there a difference in achievement scores depending on the subject in which there has been looping?

Does the number of years a student has had a teacher have an effect on his or her achievement in Math or English?

Null Hypothesis

There will not be a difference in student achievement scores on a standardized test based on the number of years the student has the teacher (looping).

Hypothesis 1

There will be a difference in student achievement scores on the Math portion of the High School Proficiency Assessment based on the number of years the student has a teacher (looping).

Hypothesis 2

There will be a difference in student achievement scores on the English portion of the High School Proficiency Assessment based on the number of years the student has a teacher (looping).

Hypothesis 3

There will be a difference in student achievement scores in both subgroups between males and females and educational setting

Operational Definitions

This study was conducted and conclusions were made in light of the following operational definitions:

Looping is defined as an educational practice in which a single graded class of children stays with a teacher for two or more years or grade levels. The children and the teacher remain together as the class is promoted. At the end of the second (or third) year in the pattern, the children move on to a new teacher while the looping teacher returns to the lower grade level to receive a new group of students (North Central Regional Educational Laboratory). Non-looping, in contrast, refers to a student transitioning to a new teacher for each year and each subject of instruction.

HSPA refers to High School Proficiency Assessment, the standardized test given to high school Juniors in New Jersey. The test measures a student's achievement in English (reading and writing) and Mathematics.

Sequential courses refer to the suggested course of study in a given subject that the Lenape Regional High School District suggests to all students. In English, sequential courses are English I, English II, English III, and English IV. In Mathematics, sequential courses are Algebra 1, Geometry, Algebra II, Pre-Calculus, and Calculus.

Assumptions

Data obtained from school accurately represents students' achievement and has not been tampered with in any way. HSPA scores were reported to the school district and recorded following the New Jersey Department of Education's protocol as well as the District's policy.

Limitations

All data gathered is from a high school in which no official practice of looping is used in the classroom. The population of students is not diverse and ability levels within accelerated courses might vary. Different teachers that teach the same subject may have different teaching styles, focusing on different areas within the specific subject (i.e. one Algebra I teacher may spend more time on graphing inequalities than another teacher that also teaches Algebra I)

Summary

The current literature review focused on looping in an elementary or middle school setting. Looping research also relied heavily on European data as the practice is more popular in those countries. Current research (within the past 5 years) is limited as well, except for curriculum looping as it relates to standardized testing. Special education classes also provided more research than regular education placements. The research heavily supported the positive outcomes of a looped classroom, including academic, social, and behavioral benefits.

Chapter 2

Literature Review

The focus of current literature for this topic started with the current trends in educational initiatives, including a variety of popular evidence-based practices used in today's schools. Then, research shifted to looping; the history of the practice, how it is used around the world compared to the United States, and current definitions in the US. Finally, the effects of looping on school culture, classroom practices, student-teacher relationships and student achievement. After a thorough review of the current literature it is clear that we do not have enough information on how possible looping at the high school level could possibly affect student achievement.

Educational Initiatives

In the United States there are (approximately) 60 million students being taught by 6 million teachers and staff in 90,000 schools within 15,000 school districts (Fixen, 2013). America's high schools face the challenge of improving student learning in an ever-changing global world. Fueling the need for reform is the urgency of graduating more highly skilled citizens and the demand from feral and state government. Recent legislation, like the No Child Left Behind act and the ever-changing teacher evaluation systems, are holding teachers and schools more accountable for student success. (McBrady & Williamson, 2009). Education has been put under the microscope in this country with concerns calling for our students to catch up with their international counterparts in Asian and European countries. The United States ranked 27th in science

and 30th in mathematics in the latest Program of International Student assessment (Basham & Marino 2013). Global competitiveness has influenced teachers to make learning more meaningful, moving away from rote memorization to having students explain in their own words what they are learning and why it should mean something to them. Learners need to make connections between the language and content they are learning in class and their own relations to the world (Payton, Moore & Young, 2010). A lot of the pressure has been put on core content subjects like Math, Science, and Technology. Educational initiatives have pushed for multidimensional teaching strategies to meet the needs of all different types of students and assessing these students with standardized testing. School achievement trends are critical gauges of the effectiveness of school support efforts, particularly efforts to improve low academic performance (Crane, Huang, Barrett, 2013). Although many efforts have been made to bolster the well-being of students, teaching practices are perhaps what matters most in helping students become well-adjusted individuals within the classroom (Troia & Olinghouse, 2013 pg. 344).

Evidence-Based Practices

In an effort to inform and improve instructional practice at all levels of education, the US Department of Education used scientifically based research findings to develop a system of education (Peyton, Moore & Young 2010). The evidence-based strategies that came out of this initiative were based on the findings of expert literature review panels, research studies of experimental strategies, and analyzing validity and reliability of assessments of practices (Peyton, Moore & Young 2010). In order to keep education more streamlined and efficient, teachers now follow the Common Core State Standards.

The Common Core State Standards Initiative, in its aim to align diverse state curricula and improve educational outcomes, calls for K-12 teachers in the United states to engage all students in mathematical problem solving along with reading and writing complex text through the use of rigorous academic content (Youngs, 2013 pg.1). The Common Core State Standards have been formally adopted by 45 states and the District of Columbia, with most participating states to be fully compliant by the 2014-2015 school year (Troia & Olinghouse, 2013).

Evidence-based practices play a large role in CCSS as teachers are expected to continue their own learning in order to offer their students the best strategies to learn and retain new material. Although evidence-based practices are trusted by most teachers, some experts point out the importance of teachers' opinions on certain strategies. Biesta (2010) warns that the uptake of the idea of evidence-based practice in education cannot replace professional judgment and we must pay attention to the aims and ends and the conduct of education. Most committees charged with addressing underachievement are overwhelmingly comprised of educators, policymakers, and parents. Consequently, their recommendations rarely privilege the voices of the students being served (Jenkins, 2009). Fixsen (2013) defined evidence-based programs as "collections of practices that are done within known parameters and with accountability to the consumers and funders of those practices. Such programs, for example, may seek to integrate a number of intervention practices within a specific service delivery setting, and organizational context for a given population" (p. 213). Evidence practices are implemented in a stages process, starting with exploration, installation, initial implementation and finally full implementation

(Fixsen, 2013). Constant communication must be used to give feedback to the implementation team to ensure that evidence-based practices are having a positive impact or if changes need to be made. An EBP is not a cure-all, but when chosen wisely and implemented appropriately it can be used as a guide to the practices most likely to work. It can aide teachers by getting rid of guesswork and providing options for all populations, especially those students with special needs in order to improve academic performance (Torres, Farley & Cook, 2012).

STEM (science, technology, engineering, and mathematics) education has been a hot topic especially in secondary education. In the US, and many other countries, many careers are now requiring a basic understanding of application of STEM knowledge and are replacing traditional manufacturing jobs (Basham & Marino 2013). In order to have students build a foundation of STEM knowledge, certain habits of mind are encouraged by teachers during instruction. These habits of mind include systems thinking, creativity, optimism, collaboration, communication, and ethics (Basham & Marino 2013). The development of habits of mind in students, especially in primary grades, can help to develop a more well-rounded and open student who can grasp concepts more quickly across subject areas. Kennedy and Wexler (2013) used an evidence-based approach to STEM education using a multi-media approach that can reach all students with various ability levels and has a basis in language acquisition. First, students identify word parts that contribute to the term's meaning, then they find student-friendly definitions for word parts. Next, students put parts together to understand entire terms and finally images are pairs to represent content (Kennedy & Wexler, 2013). This approach to make STEM

knowledge more meaningful follows the educational trend in this country for more difficult material.

In a January, 2007 memo from Lucille E. Davy, New Jersey's Commissioner of Education, to Chief School Administrators and Charter School Lead Persons, Davy points out the importance of science and math instruction in high school. She stated "that more so than language arts and other content areas, mathematics and the sciences demand discipline-specific instruction and assessment. Increasingly, states such as those involved in the American Diploma Project (ADP) consortium, of which New Jersey is a member, are deciding to implement end of course measures in science aligned to specific proficiencies in biology, physics, chemistry, and environmental science. ADP is also recommending that states consider such end of course assessments in the mathematics disciplines. Several states, such as Maryland and Indiana, already have such assessments in place" (State of New Jersey, Department of Education, 2014).

Biesta (2010) points out that there must be a transition from evidence-based to value-based education. This means that we as educators can utilize all the research and science based strategies to have a student understand certain concepts set forth by the Core Content State Standards. However, if our students are not gaining more than facts in our classrooms we are not being successful as teachers. Our students have to gain values as well to enhance their character, social skills, and relationships as young adults. McBrady and Williamson (2009) highlight the crucial 9th grade school year. They have found that freshman in high school are dropping out at a higher rate and that this is a pivotal year to transition young adults to high school and make learning especially

personal and meaningful so that graduation rates can improve. Adolescents who do not connect with school or do not find a common bond with a teacher or counselor are more likely to drop out of school, and how an adolescent feels about school could determine if he or she continues to graduation. Amidst the call for evidence-based practices and research driving education, there is an even louder call to keep students in high school and make learning important to them (McBrady & Williamson, 2009). The best combination of evidence-based practice and value-based educational practice is looping, socially and academically the benefits far outweigh any other classroom practice in schools around the world.

History of Looping & Global Development

Looping is not a new educational concept by any means. Rudolf Steiner founded the Waldorf Schools in Germany in the early 1900's, believing that students would benefit educationally if they formed a lasting relationship with a teacher. Back then, teachers stayed with their students in the Waldorf Schools from grades K through 8th. Now in Germany, students will typically stay with their students during primary years, kindergarten through 4th grade (Cistone, 2004). Only in the early 20th century did the idea of rigid classes and grade levels begin to keep groups of students together and advance to a new teacher at the beginning of each new school year (Elliott & Capp, 2003). In America, Deborah Meier started to use looping in New York City in 1974. An author and an educator, Meier came to the conclusion that teachers needed the time that looping allowed in order to get to know their students well enough to establish the necessary level of communication to allow for learning to happen in a safe environment

(Cistone, 2004). Looping around the world is built on this general idea of building a long-lasting relationship by having one teacher stay with a group of children.

In some Asian countries, elementary teachers stay with their classes for two or more years, and classes also remain together for this period. For example, high school teachers remain with a class throughout its four years in the same subject area. The same group of students may have the same instructor for algebra, geometry, and other advanced mathematics courses (Nichols, 2002). Italian preschools, considered by some the best in the world, utilize a model of three-year assignments of students to teacher, and both parents and teacher as team members (Burke, 1997). Japanese teachers developed a two-year loop that has a two-fold purpose. The teachers use the first year to get to know the students, how they learn and how they interact and work together, while the second year is focused more on instruction that can be delivered effectively to each student in the class (Krogmann & Van Sant, 2000). Looping at the younger grades, or even with preschool aged children, is a common practice in the United States.

Past and Current Definitions of Looping

When looking at the definitions that have been and are currently being used for looping in education, another concept comes up quite constantly. There is a feedback loop in education, which allows students to learn certain concepts and show the teacher their understanding. The teacher tells them if they have achieved appropriate understanding or if they need to keep reading or writing or practicing; this is known as a feedback loop. A new idea is a double feedback loop, in which students might have to back and change a factor of learning that is not working and check their answer a second

time (Tagg, 2010). This idea that student benefits from having more time and communication in order to make learning meaningful further supports the idea of looping in education, that students have more time to establish a relationship with a teacher so that communication can occur more often and freely to enhance learning.

Grant (1996) wrote the official handbook on looping, and points to the initial US Department of Education term "teacher rotation" in 1913, followed by "family style learning", "two-cycle learning", "student-teacher progression", and "multiyear instruction". Continuity of care of looping is the practice of keeping the same caregivers with a group of preschool children, infants and toddlers for two to three years (Hegde & Cassidy 2004). The definition stays very consistent as it refers to different age groups and grade levels. Looping occurs when a teacher is promoted with his or her students to the next grade level and stays with the same group of children for two or three years (Nichols 2002). The differing terminologies have been used to denote the same underlying notion, that is, the same teacher educating and caring for a group of children for at least two years (Hegde & Cassidy 2004). Nichols (1998) says the idea of looping, defined as a core group of students and a single teacher remaining together for multiple years, or family grouping, is not a new concept in America's educational history. The technique of looping is gaining popularity for its ability to build stronger relationships between students and teachers and to cut down on the time needed for the annual back-to-school review ritual (Jacobson, 1997).

Benefits of Looping-Culture, Classroom, Student-Teacher Relationship, Academic

Looping is a practice that can be considered innovative; even though it does not work in every educational situation and there can be difficulties, there is still strong evidence to support that looping can be a highly effective strategy for teaching and learning (Hooks & Corbett, 2005). Gaustad (1998) says that for students, having the same teacher and classmates for two or more years "provides stability and builds a sense of community, and that looping reduces anxiety and increases confidence for many children, enabling them to blossom both socially and as learners" (p. 2). A student feeling valued is imperative to build a strong education foundation on. The idea of "soka", or value-creating, education, is one believed by Monte Joffe. Joffe (Joffe, 2009) says that students frequently changing schools creates anxiety and shock among students and parents. He believes. having grades K-12 under one roof would foster a more in-depth understanding of the children, a family-like relationship, a sense of community and deep and trustful bonds. A running theme throughout most of the literature is the feeling of a family being a positive effect of staying with a teacher for more than one year. School reported dramatic effects on both student academic achievement and parental involvement as a result of the "extended family" aspect of looping. (Burke 1997). Nichols (2002) used a 5-point instrument to survey 455 parents of looping and nonlooping students to examine the attitudes of parents toward the teacher, school, academic support, student behavior, child's attitude, child's academic ability, motivation, and classroom environment. The data showed that a student's simply remaining with the same teacher and cohort group for multiple years may have several positive outcomes, including more positive attitudes

toward the school and the teacher. This study has some limitations, especially the impact that a few disgruntled parents may have on the outcome of the data from the 5-point questionnaire. However, it is mostly encouraging because the parent attitude towards their child's teacher and school. Parental support of the education system is crucial, so this data might offer a support to school board's to implement a looping model at a school that has never tried one. Still, this study only focused on the parent attitude toward the teacher, not the student attitude or trust level with the teacher.

George (2000) found significant school culture impacts when studying a three year student-teacher relationship, including knowing more about their students, noticing more voluntary classroom participation, more classroom and school pride among students, and more positive relationships with parents.

Trust is established at all grade levels between a student and not only their teacher, but with the entire educational establishment. After an examination of literature, Hoy and Tschannen-Moran (1999) define trust as an individual's or group's willingness to be vulnerable to another party based on the confidence that the latter party is benevolent, reliable, competent, honest, and open. However, Hoy and Tschannen-Moran focused their study faculty trust in their principal, colleagues, and clients. The trust scales developed became a basis for school trust scales in the future, but did not gear them towards students initially.

Van Meale (2011) designed a study that again focused more on the teacher end of the student-teacher trust relationship. The main purpose of Van Meale's study was to explore whether characteristics of secondary schools' organizational context associate

with teachers' trust in students. The study used 4 measures (teacher trust in students, students' teachability, student contact, and students' study culture) to collect data. All of the measures used teacher responses to collect data on their students, which is a limitation in itself because it is using subjective data from one side of a relationship that might not match those responses of the students. The population size of the large districts used would match a high school population size targeted by this study, but the limitation of teacher data versus student data is a big limitation.

Sergiovanni (1994) claims that we become connected for reasons of commitment rather than compliance, and that people are bonded to each other as a result of their mutual bindings to shared values, traditions, and ideals. John Trottier (1999) interpreted Mr. Sergiovanni's observations to mean that students need to feel connected to the class, will not listen to us [teachers] just because we are the teacher, and students need to understand and share our goals and beliefs. In regards to student teacher relationships, there are many factors that come in to play when discussing how and why these relationships form the way they do. Blume, Baldwin, and Ryan (2012) identify a personal characteristic called communication apprehension, which they define as "an individual's level of fear or anxiety with either real or anticipated communication with another person or persons"; common communication situations relevant to CA include one-on-one conversations participating in a group discussion or meeting, and giving a formal presentation or speech. Blume, Baldwin, and Ryan (2012) go on to suspect that communication apprehension can prevent otherwise high capable students from reaching their full potential. This apprehension to communicate is like any other social anxiety,

made worse in a classroom setting by how a student perceives their level of stress or relationship with his or her peers and teacher.

Sherman, Fitz, and Hofmann (2002) surveyed middle school students on three different teams in seventh and eighth grades. Overall, they found that students seemed to be most satisfied with the social aspects of their teams and less satisfied with curricular aspects. The study also revealed that students were more satisfied after they have been part of a looping/teaming structure. The results of this study were encouraging for a middle school population. The limitations of this study were population and the setup of options given to the students. An eighth grade population of 172 was used for the study, which would be a fraction of a high school population. Also, the program that was set up for the study offered middle school students the option to "switch teams". This could have altered the data that supported a positive social experience as students might have been focusing on staying with their friends rather than forming connections with their teachers. The social interactions between teachers and students is learning itself (Burke, 1997), and can only help to grow meaningful, long-lasting, and positive interpersonal relationships.

Nannette Dacus (Little & Dacus, 1999) participated as an elementary teacher in a two-year looping program. She described the beginning of her second year as smooth, with no student apprehension about getting a new teacher, no lectures about daily procedures and classroom rules, and no testing for weeks trying to determine a student's reading level. Hooks and Corbett (2005) even studied looping in graduate program cohorts, a practice that is becoming increasing popular in higher education institutions

because of the positive results in public education environments. In addition to saving money by not running courses every semester, academic departments at colleges that have cohorts have found that students know what to expect from their schedule and the professors know what knowledge their students should have coming in to their own course (Hooks & Corbett, 2005).

Students experience many individual benefits from a looping environment that are well represented in the literature. Kenney (2007) did a study in a third grade classroom participating in a two-year looped classroom setting. She found that students "felt happy to have the same teacher, participated in class more, and were excited to come to school every day" (p. 20). Kenney (2007) also found that the looped setting "made students feel safe because of the consistency of the environment, allowing them to take more academic risks. There are also less disciplinary problems, an increase in classroom attendance, and students who are more willing to work together in a looped classroom" (p. 22).

Individual academic growth is well represented in the literature. Burke (1997) researched academic benefits to include "(a) reports of improved student achievement; (b) increased time-on-task through the "extra Month" of schools ruing year tow of a loop, and the potential for summer learning at the end of year one with the assignment of high interest reading and project activities; (c) more time for slower students to learn basic skills without the need for retention; and (d) more opportunities for bonding between teachers and students, and teachers and parents" (p. 4). A pilot program, F.A.S.T. (Families Are Students and Teachers) in Cleveland, Ohio achieved significant academic gains from implementation of a looping program that included multi-year teacher-student

assignments in the primary grades. Students in the program exhibited substantially higher reading and mathematics achievement scores on standardized tests than did students in the traditional grade organization, even when taught by the same teacher (Burke, 1997).

In researching looping and all the implications it has in the classroom, as well as the impact it has on a wide range of students across the globe, I expect to see a positive relationship in this exploratory investigation. As the HSPA measures both Math and English, I will be looking at each subgroup separately first to determine if there is a substantial difference between students in each subject. Then, I will look at student achievement as a whole in looped versus non-looped groups.

Chapter 3

Methodology

The research was to determine if a looped classroom setting in either Mathematics or English would have any effect on student achievement, as measured by the New Jersey High School Proficiency Assessment.

The advantage of using quantitative data is the direct comparison that can be made between the number of years a student was taught by a teacher and that student's HSPA score. The HSPA is given to all high school Juniors (11th graders) unless otherwise specified by the student's individual IEP or Child Study team decision. The HSPA is administered over a three-day period in March every year. In the Lenape Regional High school district, graduation requirements of 130 credits must be met in order to receive a high school diploma. Graduation requirements for Mathematics are 15 credits (3 classes), and for English students must take 20 credits (4 classes, English I-IV); electives in both subjects are offered and students may take more than the required number of credits in either subject. For this research, only accelerated courses were studied.

The independent variables included in the study were gender, number of years each student had a teacher in Math and English, the level of the courses taken, and the subject (Math or English). The dependent variables studied were the student's HSPA scores and grades in each class. These variables were included to answer a variety of questions, including:

Does a looped setting in Math or English (having a teacher more than 1 year) have an effect on comparable students' achievement on HSPA testing?

Is there a difference in subject achievement (Math or English) and looped setting?

Is there a difference in gender specific achievement and looped setting?

When comparing like classes (ex. English 1 or Algebra), does a looped setting have an effect on classroom grading?

Participants

For this research, only Seniors (grade 12) and current Juniors were studied due to the fact that the HSPA is administered in March of a student's Junior year; also, in looking at only Seniors there was an increased chance of a student experiencing a looped setting as they have had 4 years in the high school. The study included 85 seniors from the school year 2008-2009 to the present in both looped and non-looped classroom settings. Categories that the students were classified in to included non-looped Mathematics setting (NLM) n=18, non-looped English setting (NLE) n=20, looped Mathematics setting (LM) n=26, and looped English setting (LE) n=21. Using the district's website for archival data, Genesis, demographic and academic data was recorded in a spreadsheet for each student; data included gender, senior year, courses they took with the teacher, level of courses, and HSPA scores.

Materials

In order to obtain an optimal group of students that could produce student groups from both looped and non-looped settings, a group of teachers was selected that had been teaching the same sequential courses for a number of years. Teacher schedules were analyzed from 2008-2014 to determine which teachers taught sequential classes; three English teachers and three Math teachers were selected and their class rosters were pulled for 6 years. Genesis data for students was put into a spreadsheet, including gender, teacher's name, course name, and graduation year. HSPA scores for each Senior class (graduation 2008-2014), and for the current Junior class (graduation 2015), were put in to a spreadsheet according to student ID numbers.

Design

An exploratory research design was chosen in order to best utilize archival data in Seneca high school, a rural high school in Tabernacle, NJ. The investigation was designed to see if there is a correlation between a looped educational setting and student achievement on the High School Proficiency Assessment (HSPA). As there is no official looping used at the high school, archival data was studied to extrapolate a group of students that had inadvertently experienced a looped educational placement (being with the same teacher for more than one year during their four years in Seneca).

There are six different levels of courses offered at Seneca: Advanced Placement, Honors, Accelerated, College Prep, Modified, and Pull-out Replacement. There is also a Multiple Disabilities and Emotional Disabilities program within the school for students

with more involved special needs. The majority of the students take Accelerated courses or above, so in order to get a like group of students only those in an Accelerated class were chosen for the study. This would give the most accurate results as the sample size would represent that majority and would fall within the outliers set by Advanced Placement and Pull-out replacement students. Finally, a mixed design two way analysis of variance (ANOVA) was used to analyze the data collected from the website archives.

Procedure

First, a group of teachers had to be selected that would potentially offer the largest number of looped students. Again, there is no official looping used in the high school so teachers who have consistently taught sequential courses would offer the most looped students. Once six teachers were selected, their schedules from 2008-2014 had to be studied to create a list of all the sequential courses each teacher taught from the 2008-2009 school year to the 2013-2014 school year.

Second, students had to be classified as looped or non-looped from each class list for each teacher in the subjects that were sequential. This required an administrator to have one class roster from Genesis up on his screen from one school year, and I was looking at the class roster for the next class in line that the teacher taught. If the teacher did not teach the course the following year, or the next year in line for that subject, then we had to choose another year for the teacher. Once we found the right classes in the right years, I would read the names of the students from the roster and if we had a match they would be put in the looped group. Once a class list was done, I would go back and

randomly select students to be put in the non-looped group to get a sample size for both subgroups.

Once we went through all teachers' lists and had students in both looped and non-looped groups for both Math and English, each student's gender, teacher in the looped or non-looped subject, and graduating year was recorded next to their name. This is because once student identification numbers replaced names it would be easier to find data for the student within a graduating class list. Each student's name was replaced with their student identification number, a six-digit number that is randomly assigned to them at freshman orientation before they come to Seneca. Student ID numbers were retrieved from Genesis and the original copy with names is digitally written over and erased permanently. After this, the students HSPA scores were retrieved from archival data. Paper copies of each graduating class with HSPA scores are kept in the main office and access to these requires them to be signed in and out. The student's ID number was looked up and his or her HSPA scores in both Math and English were recorded in the data spreadsheet. The design of the investigation was to find looped and non-looped students in the high school setting, and it had to be separated because those students who were looped in English might not have been looped in Math as well. Student achievement scores had to be looked at specifically in the subject that students were looped in. For the non-looped setting, students were taken from like courses so that the students were as similar as possible.

Finally, the data collected from the archival data was analyzed to investigate whether correlations exist between a looped academic setting and student achievement on

the HSPA test. Analyses were conducted separately on Math and English to determine subject-specific student achievement, as well as gender-specific student achievement in all subgroups. Finally, analyzed data was used to make interpretations and extrapolations depicted in the later sections of this investigation.

Chapter 4

Results

Before discussing results, an understanding of how the High School Proficiency Assessment is scored is important, as this is the measure of student achievement.

The HSPA measures achievement of eleventh- grade knowledge and skills in the areas of Mathematics and Language Arts Literacy as described in the Core Curriculum Content Standards (New Jersey Department of Education, 2013 p.2) Proficiency levels for the Mathematics and Language Arts Literacy sections of the HSPA were established in 2002 by experienced educators who recommended proficiency levels for each test section based on 2002 test performance. With the committees' recommendations, the State Board of Education, in consultation with the Commissioner of Education, adopted the standards which established the proficiency levels. A procedure called statistical equating is used to make sure that all future scale scores are equivalent to those established for the March 2002 test. (New Jersey Department of Education, 2013 p.3). The multiple-choice questions are machine-scored by a company hired by the New Jersey Department of Education. Each correct response to a multiple- choice question counts as one point; students are not penalized for guessing. The same company also conducts the scoring of all open-ended items in Mathematics and Language Arts Literacy. The company has a staff of raters who undergo extensive training and are continuously monitored during the scoring process.

The total number of points make up a score known as the raw score. The raw scores are then converted into scale scores, which are the scores that are reported for

Mathematics and Language Arts Literacy. The scores on each section of the test range from 100 to 300 and the passing score is 200. Each section of the test is scored separately. In order to pass the entire HSPA, a student must obtain a passing score of 200 on each section . (New Jersey Department of Education, 2013 p.3).

All data was analyzed using a comparison of means and a two-way analysis of variance (ANOVA).

Descriptive Analyses: Sample Population

Descriptive statistic procedures were conducted on the entire body of archival data collected through the procedures described earlier. These results are an important indicator of the overall representation of students in the sample population. The results in Table 1 are descriptive statistics pertaining to the entire body of students from which archival data was collected from and their corresponding HSPA scores within each subgroup. To summarize, the mean score of the looped English students (n=244) was 244 (SD=8.70), and the mean score of the looped Math students (n=244) was 244 (SD=19.77); there scores were both higher than their non-looped counterparts in both English (n=232), in which the mean score was 232 (SD=12.28) and Math (n=242), which was 242 (SD=242). Also, in the looped subgroup of Math, the maximum score was higher than the non-looped subgroup; the maximum score in the looped math group was 295 versus the non-looped math group which was 276.

Table 1

Descriptive Statistics: Sample Population

HSPA score by group	N	Mean	SD	Min	Max
Looped Mathematics students	26	244	19.77	211	295
Non-looped Mathematics students	18	242	18.57	211	276
Looped English students	22	244	8.70	227	254
Non-looped English students	19	232	12.28	208	259

Note. Scores range from 100 to 300. Passing score is 200.

Descriptive statistics was run on each subgroup in the investigation as well. The entire sample of 85 students was split in to two subgroups, Math (n=44) or English (n=41), as per the two HSPA subjects that scores were obtained in. Then, both the Math and English subgroups were split in to Looped and Non-looped so that four subgroups were studied in the investigation. In Tables 2 and 3, all of the subgroups are further split by gender and descriptive statistics were run.

In Table 2 descriptive statistics are shown for HSPA scores specific to gender in all Math subgroups. The four subgroups included are Looped Math Female (n=15), Non-looped Math Female (n=9), Looped Math Male (n=11), and Non-looped Math Male (n=9). The results of the descriptive statistics for the Math subgroups showed that the mean HSPA score between looped and non-looped females was slightly lower for the looped subgroup. The mean HSPA math score for looped females was 241 (SD=17.48)

and the non-looped math mean HSPA score was 242 (SD=20.09). The mean HSPA score between looped and non-looped males revealed that the looped group scored higher on average. The mean HSPA score in math for looped males was 248 (SD=22.83), and the mean score for non-looped males was 242 (SD=18.14). The mean average scores in the Math subgroups did eventually prove to be insignificant (as shown in the Analysis portion of this section). Finally, in comparing females and males in Looped and Non-looped subgroups in the Math section, male subgroups were on average higher achieving than both female subgroups.

Table 2

HSPA Score Specific to gender in Mathematics subgroups

Subgroup	n	Mean	Minimum	Maximum	Standard Deviation
Looped Math Female	15	241	216	281	17.48
Non-Looped Math Female	9	242	215	276	20.09
Looped Math Male	11	248	211	295	22.83
Non-looped Math Male	9	242	211	270	18.14
Total	44	243	211	295	19.09

Note. Scores range from 100 to 300. Passing score is 200.

In Table 3 descriptive statistics are shown for HSPA scores specific to gender in all English subgroups. The four subgroups included are Looped English Female (n=12), Non-looped English Female (n=13), Looped English Male (n=10), and Non-looped English Male (n=6). The results of the descriptive statistics for the English subgroups revealed that the mean HSPA score between looped and non-looped females was higher for the looped subgroup. The mean HSPA English score for looped females was 241 (SD=9.55) and the non-looped English mean HSPA score was 232 (SD=12.61) The mean HSPA score between looped and non-looped males revealed that the looped group scored higher on average. The mean HSPA English score for looped males was 247 (SD=6.78) and the non-looped English mean HSPA score was 232 (SD=12.72) The mean average scores in the Math subgroups did eventually prove to be significant (as shown in the Analysis portion of this section). Finally, in comparing females and males in Looped and Non-looped subgroups in the Math section, male subgroups were on average higher achieving than both female subgroups.

Table 3

HSPA Score Specific to gender in English subgroups

Subgroup	n	Mean	Minimum	Maximum	Standard Deviation
Looped English Female	12	241	227	252	9.55
Non-Looped English Female	13	232	208	254	12.61

Looped English Male	10	247	236	254	6.78
Non-looped English Male	6	232	208	259	12.72
Total	41	238	208	259	11.84

Note. Scores range from 100 to 300. Passing score is 200.

Based on descriptive statistics alone, mean HSPA scores across all subgroups in both English and Math were mixed on supporting the original hypothesis that students in Looped subgroups would achieve higher on the HSPA test than those students in non-looped educational settings. Also, HSPA achievement specific to gender did eventually prove to be insignificant even though the mean scores showed males achieving higher than females in most subgroups.

Analyses Investigating Overall Achievement in Student Subgroups

A two way analysis of variance (ANOVA) was used to determine if there was a statistically significant difference between student achievement, measured by HSPA scores in Math and English, and a Looped or Non-looped educational setting; the independent variable of gender was also included in the analysis.

The HSPA subjects of Math and English were analyzed separately, as mentioned in the design of the exploratory investigation. The analysis in table 4 examined the differences between the Math HSPA scores of those students in both educational settings (Looped and Non-looped) and the gender of the student. In the Math subgroup $F(1,40)=.152$, $p=.698$ there was no significant findings between student achievement and

the educational setting the student was taught in. Gender F(1,40)=.339, p=.564 was also not a significant factor in student achievement in Math. Further, there is no significance when student achievement in Math was compared with both an educational setting as well as gender, F(1,40)=.277, p=.601. The results specific to this ANOVA are shown in Table 4.

Table 4

Variance of HSPA Score Between Subjects-Dependent Variable HSPA Math scores

	df	*SS*	*MS*	*F*	*p*
Math subgroup	1	58.488	58.488	.152	.698
Gender	1	129.911	129.911	.339	.564
Gender*Math subgroup	1	106.422	106.422	.277	.601

Note. No significant findings within Math subgroups (Looped/Non-looped or gender)

The same analysis was done on student achievement based on HSPA scores in English for students in both looped and non-looped subgroups. In the English subgroup F(1,37)=11.230, p=.002 there was a significant finding between student achievement and the educational setting the student was taught in. Gender F(1,37)=.668, p=.419 was not a significant factor in student achievement in English. Further, there is no significance when student achievement in English was compared with both an educational setting as

well as gender, F(1,37)=.655, p=.423. The results specific to this ANOVA are shown in Table 4.1.

Table 4.1

Variance of HSPA Score Between Subjects-Dependent Variable HSPA English scores

	df	*SS*	*MS*	*F*	*p*
English subgroup	1	1254.480	1254.480	11.230	.002**
Gender	1	74.570	74.570	0.668	0.419
Gender*English subgroup	1	73.221	73.221	0.655	0.423

*Note. **significant findings in Looped vs. Non-looped subgroups on HSPA English*

Chapter 5

Discussion

Conclusions Regarding Sample Population

When comparing the results from the sample population's archival data, the original hypotheses of this investigation were addressed. There is no significant effect of an educational setting on student achievement in Math. There is a significant effect of an educational setting on student achievement in English. There is no significant effect of gender on student achievement. Another conclusion from the analyses was that there is also no effect when the independent variables are combined, and gender and educational setting combined do not have an effect on student achievement.

Limitations

The limitations of the study include the sample size in all subgroups, changing assessments over multiple years, level of courses, personal factors specific to the teacher, student-teacher relationships, personal factors specific to the student, and the student-teacher relationship.

Within a high school of 1,200 students during the 2013-2014 school year, and between 850 and 1,300 during the years of study (2008-2009 school year until current school year) there was a very large population to possibly gather a sample size from. Many factors lead to an overall sample size of 85 students which is only a very small fraction of the total number of students available. Given a larger sample size the significance of the data could be affected.

High school students in New Jersey are given a variety of assessments that have begun their administration during the school years that archival data was collected. High school juniors have always taken the HSPA exam, a Biology and Algebra assessment was also introduced. In May 2008, all New Jersey public high school students enrolled in a requisite Biology course were required to participate in the End of Course Biology Test, which replaced HSPA Science. In 2010, the End of Course Biology test was renamed New Jersey Biology Competency Test (NJBCT). For the NJBCT, all New Jersey public high school students, regardless of grade level, who are enrolled in a Biology course or content equivalent during the school year must take the test, regardless of prior testing exposure and experience (New Jersey Department of Education, 2014). In May 2005, an end-of-course exam was developed at the Algebra II level. New Jersey was planning to require or strongly encourage students to take an Algebra II level course in order to better prepare them for college and careers, as Algebra II or its equivalent serves as a gateway course for higher education and teaches quantitative reasoning skills important for the workplace. State leaders recognized that using a common end-of- course test would help ensure a consistent level of content and rigor in classes within and across their respective states. The development of the Algebra I end-of-course exam was a natural extension of this effort and was designed to support the goals of the Algebra II initiative (Achieve ADP Assessments, 2009). In the coming years, Seneca has discussed implementing the PARCC test and did field testing in April, 2014. All the changing assessments, although reliable and valid in their own right, sets a different standard for each group of students because the testing will not be consistent from school year to school year.

This study only used archival data from Accelerated courses at Seneca High school. Since the time the school opened courses have changed from being referred to as Level 1, Level 2, Level 3 and so on to being referred to as Honors, Accelerated, College Prep and Modified. Using archival data from a variety of levels would give the study HSPA scores from students with ability levels that vary with the course level. The individual doing the investigation would have to take in to account the outliers that the variety would bring to the study.

Another limitation of the study is the personal factors of each teacher, including leaves of absence due to pregnancy or other medical needs, and personal preference of classes. Many teachers are not able to teach sequential classes of students because personal leaves take them out of the classroom for semesters or entire school years. This affects class schedules and which teachers are teaching which courses. A teacher might get personal preference based on seniority as to which classes they would like to teach, and some teachers might choose to teach the same course year after year; this would eliminate the possibility of a looped educational setting for that teacher. Students also have personal factors that would affect the study; some students do not test well on standardized tests due to test anxiety and accommodations that cannot be met. The relationship between the student and the teacher is also crucial to student achievement according to the literature review. Any significance found in the data could be affected by this relationship as a looped educational setting would not be advantageous if the student did not get along with the teacher or if a teacher had prior feelings about a student's achievement.

The limitations of the study are encouraging for any future direction of study that this data could be taken in.

Further Directions

Future research with a larger sample size might include a number of different directions given the significant debates regarding the best practices to use while teaching students from kindergarten to grade 12. Different countries, states, school boards, and school districts are employing evidence-based practices that they believe are going to work best on their specific population of students. In the United States, the Department of Education developed the Common Core State Standards to hold all schools to the same standards of student excellence and achievement. After researching the looping practice of having students stay with one teacher for more than a single year of instruction I believe this is a key to success. All the research and studies point to the common denominator of student's being more academically successful when they feel safe, respected, and genuinely cared about by their teacher. The research further shows that looped promotes a positive relationship between a teacher and his or her students, which gives students the environment to be successful. Looping is a practice more commonly used in pre-kindergarten and elementary schools, however, I believe a direction this exploratory investigation could be taken in is researching just how well students perform on high school standardized testing after receiving instruction from the same teacher in the same subject for more than one year.

Future research would need to be taken on a much larger scale, setting up a system to gather data when the schedules are made at the beginning of a student's senior

year and to include their HSPA scores in both Math and English. Gathering data on a larger scale might better describe the impact of looping on student achievement. Also, in New Jersey the HSPA is being amended as are other standardized assessments so that scores could even be compared across assessments as well as in other subjects such as Science and History. Proving reliability and consistency across different assessments and a variety of subjects would further help explore possible differences in student achievement.

Additionally, future research might explore whether having teachers certified in a specific subject and teaching sequential courses would deepen their understanding and mastery of that specific subject, and furthermore, improve teaching effectiveness. For example, at the high school utilized in this study, teachers are certified in a field and are expected to teach whichever class they are assigned. This means that even though a teacher might teach only Algebra 1 and Geometry one year, the next school year the number of students that need a certain course might change and that same teacher might end up teaching Algebra 1 and Algebra 2. The needs of the student population are ever changing, so our teachers are expected to adapt and teach the curriculum they are assigned to. Teachers are certified in a field, not a specific course; English teachers can teach all levels of English, Math teachers can teach all levels of math, and so on for other core subjects like Science, History, Business, etc. (state by state accreditation would vary on what each certification allows a teacher to teach). That being said, it would be interesting to do a study that asks teachers how they feel about teaching different levels of their specific subject field year after year. Would the study reveal that teachers prefer

to stay within their comfort zone in only one or two specific classes? Or would teachers broaden their own knowledge base of English or Math by teaching many different levels and classes within their subject? If a study revealed that teachers were willing to teach, for example, English 1, 2, 3 & 4 over a few years, then this could be used to then implement an experimental looping group in a high school setting to compare student achievement scores at the end of the loop.

Finally, satisfaction ratings of those students and teachers involved in a looped educational setting within a high school might be examined. As students get older their ability to trust adults and form meaningful relationships shifts along with the expectations of being a teenager. For example, the relationship between adult male teachers and female teenage students is delicate, and vice versa for female teachers and male students. Boundaries must be clear and the dynamics of the relationship must strike a balance between professional teacher-student relationship and caring between the teacher and student. If a positive relationship can be formed with respect on the side of both the teacher and student, then according to previous research a student can really experience academic success. A study to determine both the student and teacher's view on the classroom relationship built over one year versus one built over two or more years could be used to further gather looping data at the high school level. Even further, at the high school level there are many teacher-coaches that get to know students outside of the classroom and the impact of that relationship on achievement is worthy of study. In conclusion, given the established impact of the teacher student relationship, additional research on the practice of looping within a high school setting is suggested.

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