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Factors Affecting Student Motivation and Achievement in Science in Selected Middle School Eighth Grade Classes

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ABSTRACT

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FACTORS AFFECTING STUDENT MOTIVATION AND ACHIEVEMENT IN SCIENCE IN SELECTED MIDDLE SCHOOL EIGHTH GRADE CLASSES

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Dissertation dated May 2017

This study examines factors that affect student motivation and achievement in the middle school eighth grade science classroom, including, teacher-student relationships, student-peer relationships, teacher expectations in science, student preference of instructional delivery (labs vs. lecture), teacher demographics (experience at local school, professional experience, qualifications, age range), and student perceptions of teacher expectations in science. One hundred fifty survey participants were used in this quantitative study which included an analysis of the independent variables affecting student motivation and academic achievement. The findings of this study determined that there is a statistically significant relationship between student motivation and student perceptions of teacher expectations, actual teacher expectations, teacher's age, teacher's highest level of education, and whether or not a student received free or reduced lunch.

FACTORS AFFECTING STUDENT MOTIVATION AND ACHIEVEMENT IN
SCIENCE IN SELECTED MIDDLE SCHOOL EIGHTH GRADE CLASSES

A DISSERTATION

SUBMITTED TO THE FACULTY OF CLARK ATLANTA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF EDUCATION

BY

NAOMI J. BULLOCK

DEPARTMENT OF EDUCATIONAL LEADERSHIP

ATLANTA, GEORGIA

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This achievement and work was only possible in the presence of favor and grace. I give honor to God for all his many blessings and for keeping me steadfast and unmovable throughout this journey. I honor my late father, Willie Roberson, and my most loving mother, Lula Roberson, for instilling in me a love for knowledge and understanding.

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CHAPTER I

INTRODUCTION

The purpose of this study was to examine how student motivation and achievement in the middle school eighth grade science classroom were impacted by teacher-student relationships, student-peer relationships, teacher expectations in science, student preference of instructional delivery (labs vs. lecture), teacher demographics (experience at local school, professional experience, qualifications, age range), and student perceptions of teacher expectations in science. According to *Merriam-Webster's collegiate dictionary* (2015a), motivation is the condition of being eager to act and is a force or influence that causes someone to do something. Factors associated with student motivation and student achievement and the impact on learning outcomes in an eighth grade science classroom were examined.

The increase in diversity, including range of academic achievement and ability, socioeconomics, ethnicity, and religion in the science classroom dictates the need for identifying factors that affect students' motivation and their desire to be engaged partners in the educational process at the middle school level. There is a need for teachers to learn how to build relationships with students who come from a multitude of backgrounds. With increased accountability and high stakes testing, school leaders are faced with an increased number of difficult decisions to make as it relates to students and academic achievement. Standard 5 of the Interstate School Leadership Licensure Consortium

Policy Standards (ISLLC) states that a school administrator is an educational leader who promotes the success of all students by acting with integrity, fairness, and in an ethical manner (North Dakota Lead Center, 2009). School leaders have the responsibility to exercise moral and ethical character while making fair and ethical decisions which are in the collective interest of their students and staff members, including all members of diverse school populations.

Educators are charged to teach students and help them reach their greatest potential in the most appropriate environment as possible. This leads to the discussion of ethics of care, which is also known as care ethics. Ethics of care is a philosophical perspective that uses relational and a context-bound approach toward decision making and morality (Burton, 2016). According to Walker (2016), caring is more important and relevant to our education system than achievement. Theorists such as Nel Noddings believe that reason and emotion should be included in the curriculum and would help to strengthen the leadership qualities of students and increase the capacity to resolve conflict through collaboration (Walker, 2016). Therefore, the responsibility to students is not just to teach academics but to provide an atmosphere that creates a sense of belonging and caring.

According to the Nations Report Card, eighth graders' performance in science improved from 30% in 2009 to 32% in 2011 at the *Proficient* level on the NAEP assessment (National Center for Education Statistics, 2012). The National Assessment of Educational Progress (NAEP) has been conducted since 1969 in reading, mathematics, science, writing, U.S. history, civics, geography, and other subjects. The achievement is collected and reported as a way to inform us of our nation's progress in education. The

science framework assessed included three broad content areas: physical science, life science, and earth and space sciences; the framework also included science practices: identifying science principles, using science principles, using scientific inquiry, and using technological design. The eighth grade assessment included 144 questions which consisted of multiple choice and constructed response questions. There were 122,000 eighth graders from 7,290 schools across the nation who took the 2011 NAEP science assessment. The nation's average score in 2009 was 149, 151 in 2011, and 153 in 2015; in Georgia, the average NAEP score was 147, 151, and 152, respectively.

Student motivation may be different for each individual and varies from person to person in each classroom setting. According to Lumsden (1994), students may be intrinsically motivated or extrinsically motivated to learn. Some students may complete an activity simply for the enjoyment of it, while others may complete an assignment to obtain a reward or avoid a punishment of some sort.

This study was conducted to determine factors that affect student motivation and achievement and also increase the awareness of the internal and external circumstances that may increase or hinder student motivation in the middle school classroom.

Statement of the Problem

The data for student achievement illustrate science as a challenge for middle school students. According to the National Center for Education Statistics (2015), on the 2011 Trends in International Mathematics and Science Study (TIMSS) test, the average science score of U.S. fourth graders was 544 in comparison to 500, the international TIMSS scale average. The U.S. ranked 11th while Singapore, with an average score of

606, ranked as number one. The average science score of U.S. eighth graders was 525, while 500 was the TIMSS scale average; however, The U.S. ranked 10th while Singapore, in first place, had an average science score of 590.

The Programme for International Student Assessment's (PISA) 2012 key findings indicated that among the 34 Organizations for Economic Co-operation and Development (OECD) countries, the United States ranked 27th in science. The top performing city in China was Shanghai with a mean score of 580 in comparison to 497, the U.S. mean score (OECD, 2015).

The National Assessment of Educational Progress (NAEP) administers assessments that measure the knowledge and skills students have learned in science. In 2011, the Nation's Report Card asserted that 30% of the students in Georgia performed at or above the NAEP Proficient level. The average score in Georgia was 151 based on a 0-300 scale (National Center for Education Statistics, 2012). On the 2015 NAEP assessment, 34% of the students in Georgia performed at or above the *Proficient* level and the average score in Georgia was 152 (NAEP, 2016b).

During the 2014-2015 school year, 68% of students across Georgia did not show proficiency on the Georgia Milestones Assessment System (Georgia Milestones) eighth grade science subtest, while 73% did not show proficiency during the 2015-2016 school year (Georgia Milestones Assessment System, 2016). The Georgia Milestones is a comprehensive summative assessment that measures how well students have learned the knowledge and skills outlined in the state-adopted content standards (Georgia Milestones Assessment System, 2016).

There is definitely room for improvement in the area of middle school science student achievement at both the local and national level. There are several factors that will be discussed which may affect student motivation and student achievement in the middle school science classroom, including teacher backgrounds as they relate to teaching science and student interest in the science curriculum.

Meece (2003) asserted that children at the middle school level need time to adjust to the structure of their new setting in addition to adjusting to their changing bodies. As students enter middle school, they begin to focus on social relationships, developing a concept of self, developing morality, and making ethical decisions (Meece, 2003).

Middle schools are also different from elementary schools. At a time when early adolescents need more autonomy and more challenging learning environments, they enter middle schools where there are fewer opportunities for choice, the class environments are less cognitively demanding but more competitive, and yet teachers are more controlling and focus more on discipline and less on building relationships (Meece, 2003).

School and classroom environmental factors also play a role in the traditional middle school classroom and student motivation (Eccles, Wigfield, Midgley, Reuman, Iver, et al., 1993). There are several factors that affect student motivation in the middle school classroom such as interest in school, intrinsic motivation, self-concepts of ability, and self-esteem (Eccles et al., 1993).

Background of the Problem

The middle school from which this study was conducted includes a total of 1,844 students. This is a Title I school in which 74% of the students receive free or reduced

lunches. The student population consisted of the following: Gifted 12%, students with disabilities (SWD) 16%, students who spoke English as a second language (ESOL) 1%, 72% African-American students, 13% Hispanic students, and 9% Caucasian students. Socioeconomic status may be a factor in student motivation in the middle school science classroom (Roth, 2011).

Over 400 students failed one or more courses during the first semester of the 2015-2016 school year at the local school. As of November 2016, 46% of students were at risk of failing one or more courses. There are five eighth-grade science teachers at this site—two are new teachers at this local school and one is a second-year teacher. Teacher efficacy and content knowledge may be a factor in student motivation (Eccles et al., 1993).

Teaching experience and qualifications may also be a factor in student motivation (Eccles et al., 1993). Tables 1 and 2 indicate the results of eighth graders' performance on the Georgia Milestones Science subtest state assessment for the 2014-2015 and 2015-2016 school years (Georgia Milestones Assessment System, 2016).

Table 1

2014-2015 Student Test Results

	Mean	%	%	%	%	%	%
	Scale	Beginning	Developing	Proficient	Distinguished	Developing	Proficient
	Score	Learner	Learner	Learner	Learner	Learner & Above	Learner & Above
State	499.2	38.5	29.8	24.8	6.9	61.5	31.7
District	511	32.3	28.6	28.8	10.3	67.7	39.1
Local School	495.7	42.4	31.2	18.7	7.8	57.6	26.5

Table 2

2015-2016 Student Test Results

	Mean	%	%	%	%	%	%
	Scale	Beginning	Developing	Proficient	Distinguished	Developing	Proficient
	Score	Learner	Learner	Learner	Learner	Learner &	Learner &
						Above	Above
State	494.4	40.4	32.3	21.9	5.4	59.6	27.3
District	473.2	52.7	34.7	11.7	0.9	47.3	12.6
Local school	486.3	39.8	40.4	19.2	0.6	60.2	19.8

There are 4 achievement levels on the Georgia Milestones which describe an indication of how well a child has learned the knowledge and skills for that curriculum area. The test also informs parents and teachers when a child is ready to move on to the next grade level or course. Students at the *Beginning Learner* level do not demonstrate proficiency and need additional academic support to prepare for the next grade level. Those who are a *Developing Learner* demonstrate partial proficiency. A child at the *Proficient Learner* level demonstrates proficiency in the knowledge and skills according to the Georgia state standards and are ready to move on to the next grade level. Students at the *Distinguished Learner* level show advanced proficiency and are well prepared for the next grade level.

Purpose of the Study

The purpose of this study was to examine factors that affect student motivation and achievement in the middle school eighth-grade science classroom including the following: teacher-student relationships, student-peer relationships, teacher expectations in science, student preference of instructional delivery (labs vs. lecture), teacher

demographics (experience at local school, professional experience, qualifications, age range), and student perceptions of teacher expectations in science. Students in the middle grades are at a different stage of development than those who attend elementary school or high school. Younger children usually have high expectations for success even when they repeatedly experience failure, unlike older children who tend to correlate failure with self-worth which may affect motivation in the science classroom (Lumsden, 1994).

Research Questions

- RQ1: Is there a significant relationship between student motivation and student perceptions of teacher expectations in science?
- RQ2: Is there a significant relationship between student motivation and student-teacher relationships?
- RQ3: Is there a significant relationship between student motivation and student preference for instructional delivery in science?
- RQ4: Is there a significant relationship between student motivation and peer affiliations?
- RQ5: Is there a significant relationship between student motivation and teacher expectations in science?
- RQ6: Is there a significant relationship between student motivation and teacher demographics?
- RQ7: Is there a significant relationship between student motivation and student achievement?

RQ8: Which of the independent variables seems to have the greatest impact on student achievement?

Significance of the Study

This study will add to the literature on the relationship between student motivation and student achievement as it relates to students in the middle grades science classroom. Additionally, this study will add to the literature of leadership for urban school districts on the factors that affect student motivation the most. This study will also provide a framework for administrators to advance continuous quality improvement serving as instructional leaders with a focus on student achievement. Administrators can use the findings from this study to create professional development opportunities for teachers and staff in local schools and across the district.

As accountability for student achievement increases across the nation, policy makers can use the findings from this study to create a standardized approach for training administrators and teachers in best practices to increase student motivation and achievement in the science classroom, in addition to improving evaluation systems to measure teacher effectiveness. Based on the factors found to increase student motivation in the science classroom, school leaders can also use the findings from this study to develop interview questions to help attain knowledgeable staff.

Students tend to fully participate in active learning when they experience caring and supportive classroom environments (Lumsden, 1994). Teachers at the middle school level tend to have less time to build relationships with students due to the large number of standards one must teach throughout the school year. However, if teachers were to

receive training on how to encourage student motivation and engagement, then there may be an increase in student achievement.

Non-instructional aspects of classrooms may affect student motivation and engagement including feelings of belongingness and being cared for (Wentzel, 1997). The findings from this study can also be shared with all stakeholders including cafeteria workers, bus drivers, counselors, custodians, and parents. All stakeholders can benefit from training and information on how to create calm classroom environments and foster relationships with students.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the literature related to the dependent variables, student motivation and student achievement, and independent variables that may have an effect on them. In addition, this chapter draws inferences about student motivation based on studies related to middle school students and science. This literature is reviewed under the following headings: student motivation, student achievement, student-teacher relationships, student preference of instructional delivery, student-peer relationships, teacher expectations, and teacher demographics.

Student Motivation

Student motivation can be affected by the types of class activities provided for students in science class (Chen & Howard, 2010). Students will benefit in all academic areas, not just science, if they are given the opportunity to experience new learning and can apply it to real-world situations or circumstances. Administrators must help to build the capacity of teachers to provide learning opportunities for students using a constructivist approach (Chopra & Gupta, 2011). This approach will allow students to make meaningful real-world connections in the classroom as they link the relevance between what they learn in the classroom and their potential careers in the future. Students can retain knowledge longer when they are active participants in the learning process (Chopra & Gupta, 2011).

Skinner and Belmont (1993) conducted research on complimentary perspectives between teacher behavior and student motivation. Skinner and Belmont asserted there is a relationship between student engagement and teacher behavior such as providing structure, providing autonomy support, and interpersonal relationships. This study included 144 children in grades 3 to 5 and their 14 female teachers located in a rural-suburban school district in upstate New York (Skinner & Belmont, 1993). The researchers' findings concluded that how teachers interact with their students have both direct and indirect effects on student engagement and motivation in the classroom (Skinner & Belmont, 1993). Engagement was influenced by both student perceptions of their teachers as well as the actual teacher behaviors (Skinner & Belmont, 1993).

Student Achievement

The middle school model has been around for about 40 years (Rockoff & Lockwood, 2010). There are more than 14,000 public middle grades schools in the United States in which middle schools represent more than half and junior high schools account for about one-third (Heller, Calderon, & Medrich, 2003). Science academic achievement in middle grades has fluctuated over time; there was a decline in achievement in the 1970s, an increase in the 1980s, and a decline again in the 1990s (Heller et al., 2003).

Research from Rockoff and Lockwood (2010) concluded that the middle school model may have a negative effect on student achievement in math and language arts. Data from standardized assessments were pulled from students from grades 3 to 8 in New York City public schools during the 1998-1999 through 2007-2008 school years (Rockoff

& Lockwood, 2010). Test scores declined for those students who attended the sixth to eighth grade school compared to those who attended a kindergarten to eighth-grade school (Rockoff & Lockwood, 2010). Math scores declined by 0.18 standard deviations for sixth graders transitioning to middle school and by 0.16 standard deviations in English (Rockoff & Lockwood, 2010).

According to the survey results of middle school students in the Redwood City School District (RCSD), students' motivational beliefs are significant precursors to their achievement (Borsato & Stobel, 2013). Results over the years have shown that classroom practices that encourage effort, understanding, and caring classrooms are associated with more positive motivational beliefs which, moreover, predict higher achievement (Borsato & Stobel, 2013). The results from the 2012 RCSD middle-school survey showed that students in classrooms where there was an emphasis on grades and test scores were likely to score lower on the state standardized assessment. Conversely, students found in classrooms where they were pressed to embrace academic challenge had higher achievement scores (Borsato & Stobel, 2013). Higher achievement was also found in classrooms with the combination of a high press for academic challenges and low emphasis on grades and test scores (Borsato & Stobel, 2013).

Student-Teacher Relationships

Students may engage in classroom activities if they believe the teacher cares about them (Wentzel, 1997). Students' perceptions about caring from teachers might be a critical factor to motivate middle school students to engage with activities happening in class (Wentzel, 1997). Students' perceptions of caring from teachers were positively and

significantly related to students' pursuit of prosocial and social responsibility goals and to academic effort.

Wentzel (1997) conducted a study with a focus on identifying students' perceptions of teacher caring and its relationship to student achievement. Students' perceptions of caring were related significantly and positively to internal control beliefs and negatively to powerful other and unknown control beliefs, and to student reports of distress.

Students in a suburban middle school in a mid-Atlantic state completed a survey in grades 6 and 8 from 17 classrooms that measured the following: perceived caring from teachers, psychological distress, control beliefs, pursuit of social goals, academic effort, irresponsible and prosocial behavior, academic achievement, and characteristics of caring teachers (Wentzel, 1997). Several documents were used to collect student information including the Teacher Social and Academic Support subscales of the Classroom Life Measure, the Weinberger Adjustment Inventory-Short Form, and subscales of Cornell's (1985, cited in Wentzel, 1997) Multidimensional Measure of Children's Perceptions of Control. Students described caring teachers as individuals who demonstrated democratic interaction styles, developed expectations for student behavior regardless of personal differences, modeled a "caring" attitude, and provided constructive feedback.

Rimm-Kaufman and Sandilos (2015) asserted students with positive relationships with their teachers experienced more academic success because they felt accepted. Although improving student-teacher relationships alone will not produce gains in achievement, positive teacher-student relationships can have an effect on both the students' academic and social development (Rimm-Kaufman & Sandilos, 2015). Student

developmental and emotional/academic needs can be met in classrooms where teachers foster positive relationships with their students (Rimm-Kaufman & Sandilos, 2015). Students will have higher levels of achievement when creating close, positive, and supportive relationships with their teachers than those who have more conflict with their teachers (Rimm-Kaufman & Sandilos, 2015). Students who have positive relationships with their teachers are drawn into the process of learning and their desire to learn can be promoted (Rimm-Kaufman & Sandilos, 2015).

Student Preference of Instructional Delivery

According to Chopra and Gupta (2011), a constructivist environment allows students to experience science and construct their own meaning of concepts in which they critique and reevaluate their understanding. Students must use their prior knowledge to gain a better understanding as they create new meanings of concepts alongside peers and teachers (Chopra & Gupta, 2011). In a constructivist environment, the teacher's role changes from the content expert to a facilitator who guides students by asking questions that lead them to develop their own conclusions (Chopra & Gupta, 2011).

The experimental study conducted by Chopra and Gupta included two groups, experimental (25 students) and control (25 students). An achievement test was administered to the eighth-grade students as a pretest and a posttest. The control group of students received lessons in the traditional manner of lectures and the experimental group was taught through the constructivist approach including exploration, extensions, and evaluation (Chopra & Gupta, 2011). The results of the study concluded that the experimental group performed better than the control group on the achievement posttest.

The t-ratio of the experimental group was 32.2 and the t-ratio of the control group was 12.13 which were significant at the .01 level (Chopra & Gupta, 2011).

Chen and Howard (2010) conducted research to find if live simulation affected middle school students' attitudes toward science. A live simulation was delivered in the classroom with the use of distance learning via the use of the internet and video conference equipment under the direction of a flight director at mission control from the Challenger Learning Center. The Test of Scientific related Attitudes (TORSAs) instrument was used to measure the subconstructs of attitude toward science among middle school students. The one-way ANOVA did show significant difference between before and after the simulation on the normality of scientist. Males were also found to view scientific careers and attitudes more favorable than female students. There was also a significant difference in student content knowledge among the seven teachers involved in the study.

Student-Peer Relationships

Peer relationships and affiliations affect student motivation. Peer influences are important to adolescents especially when faced with new developmental challenges, such as autonomy and identity exploration, as students interact with peers. Williams and Anthony (2013) conducted a study that focused on how family and peer relationships affect student well-being.

A nonrandom diverse, large, ethnic and socioeconomic sample of 37,354 middle and high school students completed the School Success Profile (SSP) which is designed to assess neighborhood, school, family, and peer social domains with items that assess student health, well-being, and academic performance. Students were from the following

states: Arizona, Florida, Georgia, North Carolina, Pennsylvania, South Carolina, and Virginia (Williams & Anthony, 2013). The study by Williams and Anthony found that family togetherness, parental behavioral expectations, and friend support were associated with greater student health and well-being, while parental behavioral expectations and friend support were associated with reduced school behavior. Family togetherness and parent behavioral expectations were associated with reduced susceptibility to peer pressure, yet susceptibility to peer pressure was associated with greater school misbehavior and poorer health and well-being (Williams & Anthony, 2013). The study also found significant associations between younger adolescents and boys to have greater susceptibility to peer pressure, boys and lower socioeconomic (SES) students were associated with greater school misbehavior, and younger students and boys were associated with greater health and well-being (Williams & Anthony, 2013).

Peer relationships present several roles in students' personal and social development including friendships, social and emotional support, and acting as socialization agents (Ormond, 2008). Friendships provide the opportunities for students to practice a variety of social skills including compromise, conflict resolution, and cooperation (Ormond, 2008). As children grow older, their peers begin to provide the comfort and safety they need such as with whom they eat lunch, who they turn to during times when they need emotional support, and in times of trouble or confusion (Ormond, 2008). Peers also help individuals to mold their behaviors and beliefs by providing acceptable behavior, showing what is admirable, or reinforcing what is deemed appropriate (Ormond, 2008).

Teacher Expectations

Student motivation can be affected by internal and external factors. According to Kiefer, Ellerbrock, and Alley (2014), successful middle schools have teachers who value, engage, and challenge their students with high expectations. In this descriptive, interpretive case study, an inductive approach to data analysis was used. This study was completed at a middle school in a large, socioeconomically and ethnically diverse school district in the southeastern United States (Keifer et al., 2014). A purposeful sampling was used to select participants which included a total of 24 participants: 18 students, 5 teachers, and 1 administrator. Each participant was interviewed and themes emerged from the audio-transcribed interviews (Keifer et al., 2014). Several teachers identified a relationship between holding high expectations and supporting student academic motivation (Keifer et al., 2014). Students also expressed the desire to do their “best” work for teachers who they felt cared for them and felt they would let the teacher down if they submitted anything less (Keifer et al., 2014).

Teacher expectations can affect student performance directly or indirectly (Good, 2008). Teachers express their expectations based on a child’s previous performance. Students are also aware of their teachers’ expectations by the interactions they have with them in the classroom.

There are several forms of teacher expectations including self-fulfilling prophecy and sustaining expectations (Good, 2008). Self-fulfilling prophecies can be described where original false expectations formed by the teacher are confirmed at the end by student efforts (Good, 2008). For example, a teacher is told that a child has above average ability and provides learning opportunities at this level, and although the student may

begin below average, he or she will perform at the above average level at the end of the year due to the teacher's expectations. Sustaining expectations can be described as when teachers do not make adjustments in teaching and learning opportunities in line with the actual student performance (Good, 2008). For example, students are expected to have average level ability, the teacher teaches at the average level, the student performs at the above average ability, but in the end the student is average.

Teachers can also form expectations based on certain student characteristics including social class, ethnicity, gender, student attractiveness, student background, personality, language style, social skills, names, and other siblings (Good, 2008). Overall, teacher expectations can influence the types of learning experiences a child is exposed to and has a greater impact on how a student performs than not (Good, 2008).

Teacher Demographics

A well-equipped teaching force is necessary for the diverse student population that is served presently. The Report of the 2012 National Survey of Science and Mathematics Education reported the following findings shown in Table 3. According to the table, the majority of teachers in this study were over 40 years old (Banilower, Smith, Weiss, Malzahn, Campbell, et al., 2013). This raises a concern of whether or not there will be an adequate supply of teachers for the future.

Table 3

Teacher Demographics Summary

Teacher Demographics	Elementary School Teachers	Middle School Teachers	High School Teachers
Age Range	53% over 40	61% over 40	53% over 40
Years at School	70% -10 years or less	68% -10 years or less	67% -10 years or less
Teacher Qualifications	4% have Science related degree	26% have Science related degree	61% have Science related degree

Table 3 also shows that a large majority of teachers have spent 10 years or less at their current school (Banilower et al., 2013). The results of the survey also revealed that elementary school teachers were less prepared to teach science courses and high school teachers are the most prepared to teach science courses based on the types of degrees they hold (Banilower et al., 2013).

Guo, Connor, Yang, Roehrig, and Morrison (2012) asserted that teacher characteristics predict student outcomes significantly even when student background and previous achievement are considered. This study examined the effects of teacher self-efficacy, teacher years of education, and years of teaching experience on observed classroom practices in relationship to teacher support for student learning and time spent on academics (Guo et al., 2012).

The researchers used data from the Phase III study of the larger, ongoing longitudinal National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). The participants included 1,043

students and their fifth grade teachers from Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI (Guo et al., 2012).

There was a negative correlation between teachers' education and the construct of time on academics (Guo et al., 2012). Teacher self-efficacy was significantly positively correlated with classroom environment and teacher sensitivity (Guo et al., 2012). Three significant direct paths were found between the following: teacher's self-efficacy to teacher support for learning, teacher's self-efficacy to time spent on academics, and teaching experience to time spent on academics (Guo et al., 2012).

Summary

In summary of this literature review on selected factors associated with student motivation in the K-12 classroom, there are several internal and external influences that affect student motivation and academic achievement. Additionally, there is more work to be done in the area of providing support to adolescents as they transition from elementary to middle grades.

It has been noted that students respond to caring teachers who foster positive relationships to pursue higher goals and academic efforts (Wentzel, 1997). Student motivation is also affected by the types of class activities provided for students in science class as asserted by Chen and Howard (2010). Peer affiliations and family supports have also been noted to have an effect on student motivation (Williams & Anthony, 2013).

CHAPTER III

THEORETICAL FRAMEWORK

The theoretical framework for this study focuses on the independent variables which include student-teacher relationships, student preference of instructional delivery, student-peer relationships, teacher expectations, and teacher demographics, and how they may be related to the dependent variables of student motivation and achievement in the eighth grade middle school science classroom. The assumption is that knowing the factors that motivate students to learn in the eight grade middle school science classroom will generate discussion among educators on how to meet their students' needs. The overarching goal is to enhance educational outcomes for all students. The two theories used as the framework in this study include McClelland's Achievement Theory (1961) and Maslow's Motivation Theory (1954).

This study draws attention to the factors that impact student motivation and achievement in the middle school science classroom. Student motivation varies from person to person. Eccles et al. (1993) asserted that there are several factors that affect student motivation including self-concepts of ability and self-esteem, interest in school, and intrinsic motivation.

Theory of the Variables

According to Cherry (2015), motivation guides, initiates, and maintains goal-oriented actions; it causes individuals to take action and can be social, biological,

cognitive, or emotional in nature. Motivation can be defined as needs, forces, drives, or other mechanisms within us that create voluntary activity which is directed toward the achievement of personal goals (Skemp-Arlt & Toupencc, 2007). It is important for the environment in which one finds himself to have the intensity and direction of individual drives since individual behavior is directed by something specific (Skemp-Arlt & Toupencc, 2007).

David McClelland's (1961) achievement motivation theory is the first theory that aligns with this research study. The achievement motivation theory includes the belief of one's hope of success and/or the fear of failure or success for oneself (Miner, 2005). According to Miner, motives of power and affiliation are also considered to be part of this theory. All motives are learned and arranged in a hierarchy influencing behavior that varies from person to person. Achievement is directed toward the top of the motive hierarchy and can be activated by minimal achievement cues.

Student motivation and student achievement in the middle school science classroom can be affected by several factors. It is important to understand and discuss student motivation in relation to the hierarchy of needs in order to determine how to create classrooms in which students have high levels of motivation and are able to achieve academic success.

Maslow's motivation theory is the second framework to guide this study. Maslow's theory views motivation as a hierarchy of needs (Skemp-Arlt & Toupencc, 2007). Maslow's theory states that an individual's basic needs must be met before one can fulfill higher needs (Francis, 2010). The premise of this theory is that higher needs are only satisfied once lower needs are sufficiently gratified (Skemp-Arlt & Toupencc,

2007). Maslow's (1954) Hierarchy of Needs is structured from lowest to highest and there are five levels of Maslow's theory: physiological, safety, social affiliation, esteem, and self-actualization. The lowest levels of the pyramid consist of basic needs and the top of the pyramid consists of the more complex needs as shown in Figure 1.



Figure 1. Maslow's Hierarchy of Needs.

Research Variables

Dependent Variables

- Student motivation is one dependent variable of this study. Student motivation is defined as a student's effort in assignments, submission of assignments, interest in subject (chemistry and physics), and class attentiveness.
- The second dependent variable is student achievement which is defined as the class average in science as determined by the district assessment.

Independent Variables

The independent variables in this study include Student Perception of Teacher Expectations, Student-Teacher Relationships, Student Preference of Instructional Delivery, Student-Peer Relationships, Teacher Expectations, and Teacher Demographics. These variables are defined as follows:

- **Student perception of teacher expectations** is defined as students' perceptions of how they believe their teachers expect them to perform in their science classes.
- **Student-Teacher relationship** is defined as the extent to which students get along with their teachers and if they like their science teacher, including how students and teachers build relationships in the classroom. This may be perceived by the student as positive or negative based on the teachers' negative or positive reinforcements.
- **Student preference of instructional delivery** is the extent to which students prefer lab work or lectures in the science classroom.
- **Student-Peer relationship** is the extent to which students form relationships with their peers outside of the classroom based on similar interest in a range of activities.
- **Teacher expectations** are defined as the extent to which the teacher has expectations on student academic performance and behavior based on what they know about the student. These can be objective or subjective.

- **Teacher demographics** include the number of years the teacher has worked at their current school, the teacher professional experience overall, the teacher qualifications, and teacher age range.

Theoretical Framework

Figure 2 shows the theoretical framework of the study.

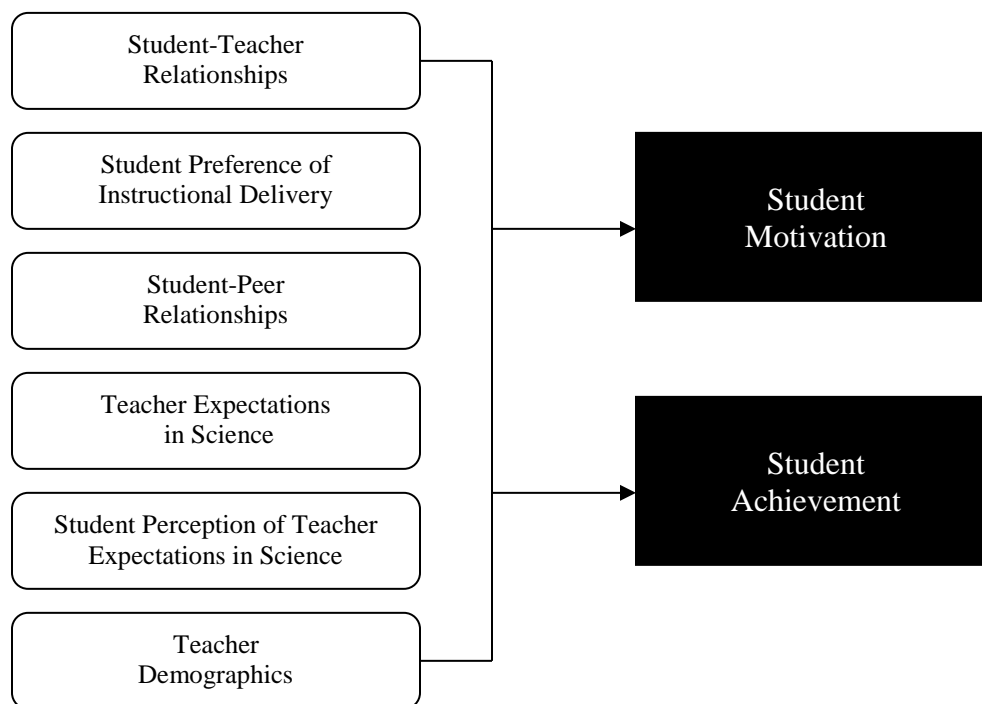


Figure 2. Theoretical framework of the study.

Relationship among the Variables

Teacher Demographics

According to *Merriam Webster's collegiate dictionary* (2015b), physiological means the processes and activities that keep living things alive. In this study, students' physiological needs can be met with having access to well equipped, knowledgeable, and

highly qualified teachers in their classrooms. At the basic level of needs, students deserve teachers who are competent, caring, experienced, and trained in the pedagogy of educational standards. Understanding teacher demographics in the middle school science classroom may help one understand if teacher qualifications affect a child's motivation to learn academic content throughout the course of a day.

Teacher Expectations

Safety and security needs are on the second level of Maslow's Hierarchy of Needs. A person will seek to find safety, including safe environments, before they attempt to meet higher needs ((Thepeakperformancecenter.com, 2015). Safety and security needs can be met in the classroom by teachers setting expectations for students as they relate to learning science and their belief that students can be successful in their class. Safety needs can include both mental and physical needs.

Student-Peer Relationships and Student-Teacher Relationships

Once physiological and safety needs have been met, the next level of needs is social affiliation. People try to overcome feelings of loneliness and alienation, and desire receiving love and the sense of belonging (Jerome, 2013). Social affiliation and belongingness can be met when students experience positive student and peer relationships which will allow them to find their niche in the school community and experience acceptance. Student and teacher relationships will also meet the need of belongingness as students and teachers create bonds and appreciation for one another throughout the school year. Understanding how student-to-student and student-to-teacher

relationships meet the need for social affiliation may bring insight to what motivates students in the middle school science classroom.

Student Preference of Instructional Delivery

Jerome (2013) asserted that people have a specific need to have a high level of self-respect as well as respect from others. In the middle school science classroom, the need for esteem can be met when students are allowed to choose which type of activity they can complete from a range of lectures to scientific investigations. This information can be used to identify which instructional strategies and delivery methods indicate the highest levels of student motivation and their relationship to academic achievement.

Students' Perceptions of Teacher Expectations in Science

The highest level of Maslow's hierarchy is self-actualization and can only be activated when all lower levels have been satisfied (Jerome, 2013.) As students contemplate their own perceptions of what teachers expect of them in science, they will reach and meet the level of self-actualization and fulfillment.

Maslow's levels and scientific activities in instructional delivery may be used to compare how motivation might work. The science standards encourage integration and practical activities which should increase motivation of students and perhaps increase student academic achievement. Self-actualization also comes from instructional strategies that allow students autonomy in selecting and carrying out science projects and project based learning.

Maslow's motivation theory is a respected framework for exploring student needs and academic motivation. This study aligns with the Hierarchy of Needs and can help to

establish and study specific reasons why a student may or may not be motivated in the middle school classroom setting.

Justification of Variables

Today's classrooms have a vastly, diverse population including English language learners, gifted students, students with disabilities, culturally diverse students, as well as the general education population (Voltz, Sims, & Nelson, 2015). Meece (2003) asserted that middle schools provides less opportunities for choice for students and teachers are more controlling and focus more on discipline at a time when students need more autonomy and opportunities to build relationships.

Teacher expectations have been found to have a positive effect on students which could, in turn, increase student motivation in the science classroom. Students have expressed the desire to do their "best" work for teachers who they felt cared for them. (Keifer et al., 2014). Wentzel (1997) noted students' perceptions about caring from teachers as a factor to motivate students.

Martin and Marsh (2005) found that girls scored significantly higher than boys on mastery orientation and study management, while boys scored significantly higher on academic resilience. This opens the discussion of student demographics, specifically gender, on student motivation and student achievement in the middle school science classroom. There are several external factors to be considered related to student motivation. Peer influences, as well as parental educational level and occupations, affect student motivation and career choices (Williams & Anthony, 2013; Ginerva, Nota, & Ferrari, 2015).

CHAPTER IV

RESEARCH METHODOLOGY

This chapter gives some background information of the local school used to examine the relationship between student motivation and teacher expectations in science, student-teacher relationships, student perception of teacher expectations, student preferences for instructional delivery, student-peer relationships, and teacher demographics. These factors were examined to determine if any of the variables were significant to student achievement in the eighth-grade middle school science classroom.

Research Design

The researcher conducted a quantitative research design to interpret how student motivation and select variables affect student academic achievement for students in the eighth-grade middle school science classroom. The study used a quantitative approach to gather and analyze information about the classroom from eighth grade science teachers and students about student motivation and student achievement.

Description of the Setting

The study was conducted in a sixth through eighth grade middle school in a large urban public school system in the state of Georgia. The research site was established in 1982. Currently, there are approximately 1,800 students and the student population

includes approximately the following: 72% African American, 13% Hispanic, and 9% Caucasian students. As noted in Table 4, this is not a very diverse school. It is a Title I school with about 75% of its student population receiving free or reduced lunches. Students are served in the following programs: 1% ESOL, 12% gifted, and 14% special education. The school currently offers three high-school-level courses including Spanish I, coordinate algebra, and physical science. The faculty includes 105 teachers (65 Caucasian, 35 black, 2 Hispanic, 1 Asian, and 3 multicultural), 1-parent center coordinator, 1 instructional coach, 3 counselors, and 6 assistant principals.

Table 4

Student Enrollment Demographics

School Year	2011-2012	2012- 2013	2013-2014	2014-2015
Enrollment	1,671	1,793	1,864	1,844
African American	71%	72%	71%	70%
Hispanic or Latino	13%	13%	14%	16%
Caucasian	10%	9%	8%	7%
Free/Reduced Lunch	71%	75%	73%	75%
Special Education	15%	15%	14%	14%

There is one principal and six assistant principals at the local school. There is a large range of teaching experience among the 115 certified personnel as shown in Figure 3. The school has parent observation days in which parents are invited to shadow their child throughout the school day at least 6 times a school year.

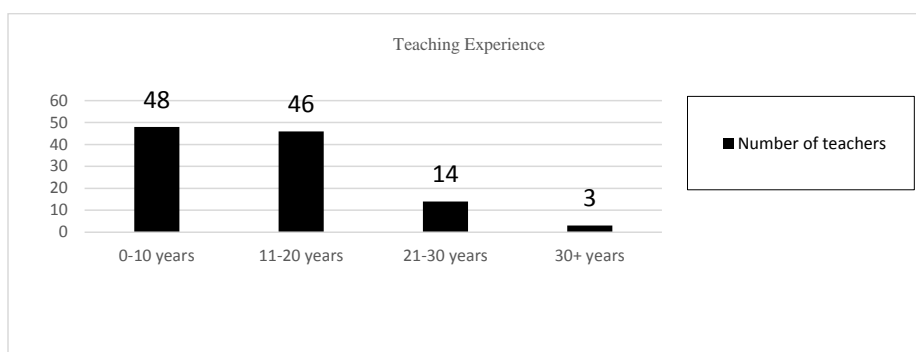


Figure 3. Teachers' years of experience (2014-2015).

Families participated in the following events during the 2015-2016 school year: Title I planning meetings, Parent Advisory Council meetings, Science, Technology, Engineering, Art, and Math (STEAM) Night, Global Citizenship Night, parent writing workshops, spring testing prep, family skate nights, and Zaxby's family nights.

Participants

The sample selection for this study included four of the five eighth grade Science teachers and their students. Approximately 600 students were selected for the study; however, 25% or 156 students participated/returned parent consent forms. All teachers hold their 4–8 science teaching certificate and are fully credentialed to teach middle school science. Teacher A has taught at the local school for four years and teaches 150 students; Teacher B has taught at the school for three years and teaches 120 students; Teacher C has taught at the local school for two years and teaches 150 students; Teacher D has taught at the school for four years and teaches 20 students. The surveys were conducted at the local school and all responses were anonymous and mentioned only in reference to a summary of all respondents. Parents of the students completed a consent

form and were made aware of confidentiality, and teachers received a letter of informed consent and were informed of confidentiality.

Sampling Procedures

Prior to participating in the study, the researcher obtained permission and approval from students and teachers. The sample chosen was purposeful sampling. The sample population for the study was selected from eighth-grade students and their science teachers. The researcher printed the student surveys on different colors of paper to align academic achievement records with the correct group of students; however, the researcher was unable to identify individual responses since the survey was anonymous.

Instrumentation

Several instruments were used for this research. A survey instrument was developed by the researcher that included questions related to student preference of instruction delivery, teacher-student relationships, student perceptions of teacher expectations, and student-peer relationships. Table 5 and Table 6 show the alignment of variables and survey questions. Teachers also completed a survey to measure teacher expectations and teacher demographic details. The researcher also conducted a document review for data on student achievement using the district's assessment to find a correlation between student motivation and academic achievement using class averages.

Table 5

Alignment of Variables and Student Survey Items

Variables	Research Question	Survey Questions
Dependent Variables		
<i>Student Achievement</i>		
<i>Student Motivation</i>		1-7
Independent Variables	RQ1: Is there a significant relationship between	8-11
<i>Student perception of teacher expectations</i>	student motivation and student perceptions of teacher expectations in science?	
<i>Student-teacher relationship</i>	RQ2: Is there a significant relationship between student motivation and student-teacher relationships?	12-15
<i>Student preference of instructional delivery</i>	RQ3: Is there a significant relationship between student motivation and student preference for instructional delivery in science?	16-18
<i>Student-peer relationships</i>	RQ4: Is there a significant relationship between student motivation and peer affiliations?	19-20
<i>Demographic information</i>		21-23
	RQ7: Is there a significant relationship between student motivation and student achievement?	Document Review 1-7

Table 6

Alignment of Variables and Teacher Survey Items

Independent Variables	Research Questions	Survey Questions
<i>Teacher expectations</i>	RQ5: Is there a significant relationship between student motivation and teacher expectations in science?	5-15
<i>Teacher demographics</i>	RQ6: Is there a significant relationship between student motivation and teacher demographics?	1-4

Data Collection Procedures

The following lists the procedures for this study:

1. The researcher obtained approval from the Institutional Review Board (IRB) at Clark Atlanta University.
2. The researcher obtained approval from the local school district to complete research at the local research site.
3. Teachers received the informed consent letter (see Appendix A) and completed the survey instrument (see Appendix B) that measured teacher demographics and teacher expectations in the science classroom. Teachers also were asked to provide the class averages of the district assessments.

4. Students received the letter of parental consent (see Appendix C) and returned the signed consent form to their Science teachers. Next, teachers administered the surveys to students who returned the signed consent form that measured student perception of instructional delivery, teacher-student relationships, student perception of teacher expectations, and student-peer relationships.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data collected during this study including Pearson correlations, ANOVA, construct validity, and regression tests. The researcher analyzed the data to identify any significant relationships between the dependent and independent variables.

Limitations of the Study

The sample chosen was purposeful sampling and considered a convenience case. Limitations existed that may have had an impact on the findings of this research study. Approximately 450 eighth graders were invited to participate but were only permitted to participate if they returned the signed parent consent document. There were five eighth grade science teachers; however, only four science teachers participated. One classroom had a long-term substitute because the original teacher resigned after the first month of the school year. Another limitation was that the researcher is a supervisor of the teachers.

Summary

This chapter outlined and explained the research framework for this study. Through conducting a survey and analyzing the relationship between student motivation

and student achievement, this research was designed as a quantitative investigation.

Using this data, the investigator examined which variables emerged as having the greatest impact on student motivation and student achievement.

CHAPTER V

ANALYSIS OF THE DATA

The purpose of this study was to examine possible factors that affect student motivation and achievement in the middle school eighth grade science classroom in a metropolitan Atlanta school. The researcher employed a quantitative methodology to provide an understanding of this study. The data sources were used to deliver answers to the research questions and context for the relationships among the variables. Paper and pencil surveys were administered to students and teachers to identify relationships between student motivation and achievement.

Overview of Data Collection and Analysis

Data sources included student surveys and teacher surveys. Teachers at the research site were administered a survey which determined teacher expectations and demographics including years taught at local school, highest level of education, and age. Student surveys were administered to the students of four eighth grade science teachers who teach physical science at the research site. The student survey instrument assessed student perception of teacher expectations, student-teacher relationships, student preference of instructional delivery, and demographics. This study also included a document review of the class averages on the district mid-term assessment of each science teacher to determine student achievement.

Survey Participants

Four eighth-grade teachers and their students participated in this research study. Figure 4 discloses the experience level of the eighth grade teachers as it relates to how long they have taught at the research site. From the figure it can be seen that three of the teachers have been at the current school for 2-5 years.

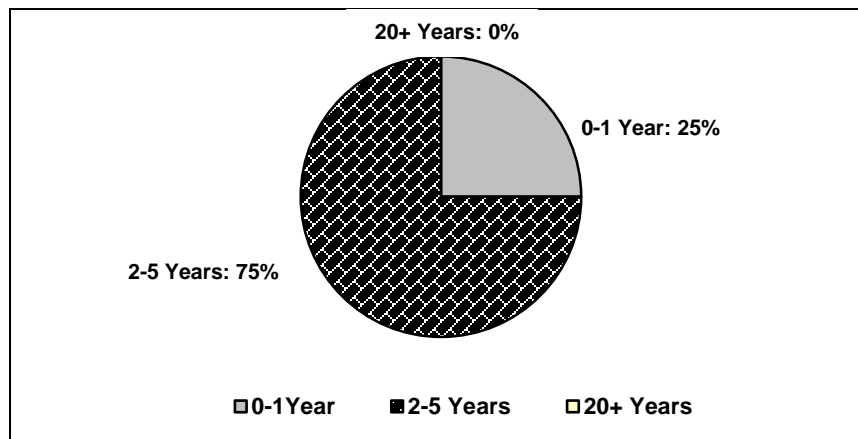


Figure 4. Teachers' years of experience at research site, 2015-2016.

Figure 5 indicates that three teachers have 11-20 years of total teaching experience and one teacher has 20 or more total years of teaching experience.

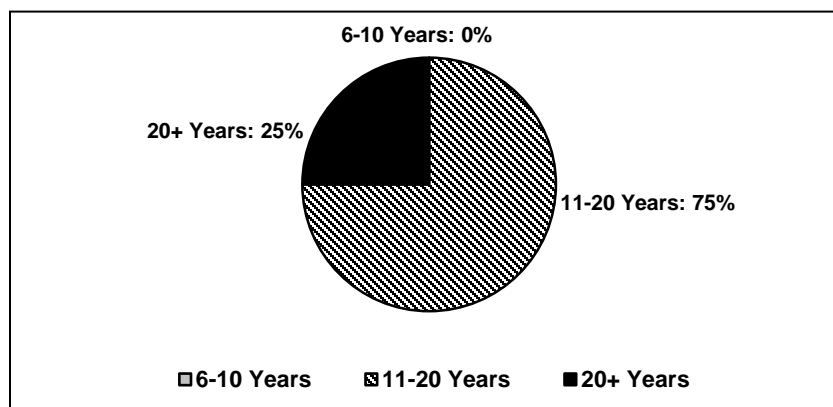


Figure 5. Teachers' total years of teaching experience.

Figure 6 shows that two teachers have a master's degree, one has a specialist degree and one has a doctoral degree.

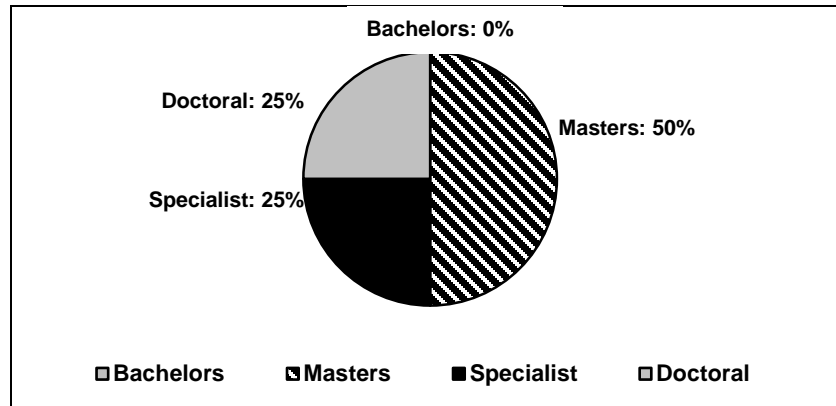


Figure 6. Teachers' highest level of education.

A total of 156 eighth grade students participated in the research study. Figure 7 displays that of the 144 participants who disclosed their free/reduced lunch status, 66% or 95 students receive free/reduced lunch, while 34% or 49 students do not receive free or reduced lunch.

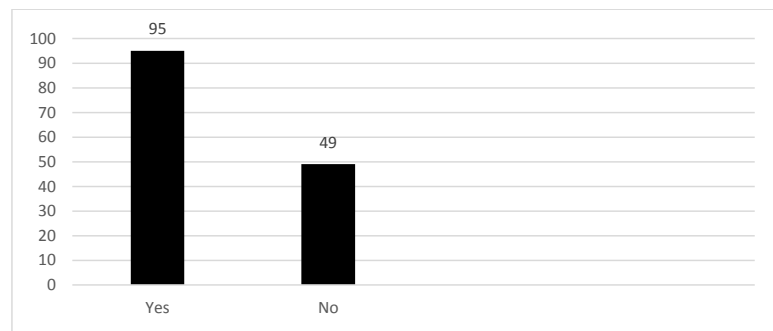


Figure 7. Students' free/reduced lunch status.

Figure 8 indicates that of the 153 students who provided their age on the survey, 117 or 76% of the students are 13 years old.

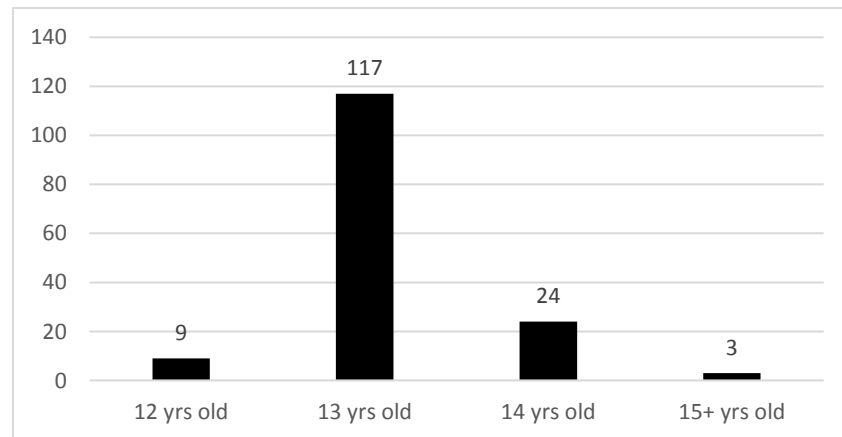


Figure 8. Students' age range.

Data in Response to the Research Questions

The data are now displayed to answer the research questions.

RQ1: Is there a significant relationship between student motivation and student perceptions of teacher expectations in science?

According to the correlations test, student motivation and student perceptions of teacher expectations have a correlation of .221 and a significance of .009; therefore, there is a significant relationship (see Table 7).

Table 7

Student Survey Correlation: Students' Perceptions of Teacher Expectations in Science

		StudPerce TeachExpect
Student Motivation	Pearson Correlation	.221**
	Sig. (2-tailed)	.009
	N	139

RQ2: Is there a significant relationship between student motivation and student-teacher relationships?

According to the correlations test, student motivation and student-teacher relationships have a correlation of $-.134$ and a significance of $.116$; therefore, there is no significant relationship (see Table 8).

Table 8

Student Survey Correlation: Student-Teacher Relationships

		StudTeachRel
Student Motivation	Pearson Correlation	$-.134$
	Sig. (2-tailed)	$.116$
	N	140

RQ3: Is there a significant relationship between student motivation and student preference for instructional delivery in science?

According to the correlations test, student motivation and student preference for instructional delivery in science have a correlation of $.068$ and a significance of $.429$; therefore, there is no significant relationship (see Table 9).

Table 9

Student Survey Correlation: Students' Preference for Instructional Delivery

		StudPrefInstrDel
Student Motivation	Pearson Correlation	$.068$
	Sig. (2-tailed)	$.429$
	N	136

RQ4: Is there a significant relationship between student motivation and peer affiliations?

Student motivation and peer affiliations have a correlation of $-.098$ and a significance of $.253$; therefore, there is no significant relationship (see Table 10).

Table 10

Student Survey Correlation: Peer Affiliations

		PeerRel
Student Motivation	Pearson Correlation	-.082
	Sig. (2-tailed)	.342
	N	138

RQ5: Is there a significant relationship between student motivation and teacher expectations in science?

Student motivation and teacher expectations have a correlation of $-.180$ and a significance of $.033$; therefore, there is a significant relationship (see Table 11).

Table 11

Teacher Survey Correlation: Teacher Expectations

		StudMot	TExpect
StudMot	Pearson Correlation	1	-.180*
	Sig. (2-tailed)		.033
	N	141	141

RQ6: Is there a significant relationship between student motivation and teacher demographics?

Student motivation and teacher age have a correlation of $-.261$ and a significance of $.002$, while student motivation and teachers' highest level of education have a correlation of $.300$ and a significance of $.000$; therefore, there is a significant relationship (see Table 12).

Table 12

Teacher Survey Correlation: Teacher Demographics

		StudMot	TeachAge	LevelEduc
StudMot	Pearson Correlation	1	$-.261^{**}$	$.300^{**}$
	Sig. (2-tailed)		$.002$	$.000$
	N	141	141	141

RQ7: Is there a significant relationship between student motivation and student achievement?

Student motivation and student achievement have a correlation of $.346$ and a significance of $.000$; therefore, there is a significant relationship (see Table 13).

Table 13

Teacher Survey Correlation: Student Achievement

		StudAch	StudMot	StudPerce	
				TeachExpect	StudTeachRel
Student Achievement	Pearson Correlation	1	$.346^{**}$	$.148$	$.031$
	Sig. (2-tailed)		$.000$	$.072$	$.709$
	N	152	141	149	150
		StudPrefInstrDel	PeerRel	Age	FreeRedLun
Student Achievement	Pearson Correlation	$.125$	$.096$	$-.196^*$	$.216^{**}$
	Sig. (2-tailed)	$.131$	$.242$	$.016$	$.009$
	N	147	149	150	145

RQ8: Which of the independent variables seems to have the greatest impact on student achievement?

According to a regression analysis, student motivation and student age had the greatest influence on the dependent variable, student achievement (see Table 14).

Data Analysis

The purpose of this study was to investigate how student motivation and student achievement in the middle school eighth grade science classroom are influenced by the following independent variables: student perception of teacher expectations, student-teacher relationships, student preference of instructional delivery, student-peer relationships, teacher expectations and teacher demographics.

Table 14

Regression Analysis

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.363 ^a	.132	.125	4.59263	.132	19.081	1	126	.000
2	.412 ^b	.170	.157	4.50799	.038	5.776	1	125	.018

a. Predictors: (Constant), StudMot

b. Predictors: (Constant), StudMot, Age21

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	50.653	2.284		22.182	.000
	StudMot	.484	.111	.363	4.368	.000
2	(Constant)	55.064	2.897		19.006	.000
	StudMot	.467	.109	.350	4.290	.000
	Age21	-1.919	.798	-.196	-2.403	.018

a. Dependent Variable: StudAch

The results of the Pearson Correlation and other analysis are presented in relationship to the above independent variables. Data analysis revealed that there is a significant relationship between student motivation and whether or not a student received free or reduced lunch (.055) and the student perception of teacher expectations (.009) as displayed in Table 15.

Table 15

Student Survey Correlation: Student Motivation

		StudMot	StudPerce TeachExpect	StudTeaRel	StudPrefInstrDel
Student	Pearson Correlation	1	.221**	-.134	.068
Motivation	Sig. (2-tailed)		.009	.116	.429
	N	141	139	140	136
			PeerRel	Age	FreeRedLun
Student	Pearson Correlation		-.098	-.043	.165
Motivation	Sig. (2-tailed)		.253	.611	.055
	N		138	140	136

An independent t-test was run on the data with 95% confidence interval for the mean difference between students who received free/reduced lunch. Table 16 reveals $t(100.082) = -1.983, p = 0.05$.

Table 16

Independent Sample Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Stud	Equal variances assumed	.004	.953	-1.937	134	.055	-1.26130	.65103	-2.54891	.02632
Mot	Equal variances not assumed			-1.983	100.082	.050	-1.26130	.63601	-2.52312	.00053

Table 17 indicates that those who do not receive free or reduced lunch have a higher mean score as noted as Yes (19.8876) and No (21.1489). This suggests that students who come from homes with higher income levels have higher student motivation in the Science classroom.

Table 17

Free/Reduced Lunch

		Free or Reduced Lunch	N	Mean	Std. Deviation	Std. Error Mean
Student	Yes		89	19.8876	3.70024	.39222
Motivation	No		47	21.1489	3.43245	.50067

Further Data Analysis

An Analysis of Variance (ANOVA) was conducted to determine the significance each age group had on student motivation and student achievement. Table 18 identifies that there is no statistically significant difference ($p=.775$) between age groups and student motivation.

Table 18

ANOVA: Student Motivation

StudMot	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.107	3	5.036	.370	.775
Within Groups	1852.578	136	13.622		
Total	1867.686	139			

Table 19 identifies that there is a statistically significant difference between age groups with a significance value of .037, which is below 0.05, and therefore, a statistically significant difference. The one-way ANOVA $F(3, 147)=2.898$, $p=.037$ indicated there was a statistically difference between age groups.

Table 19

ANOVA: Student Achievement by Age

StudAch	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	206.922	3	68.974	2.898	.037
Within Groups	3475.368	146	23.804		
Total	3682.290	149			

A Tukey post hoc test (see Table 20) revealed there was a statistical significance of 0.41 between 13 year olds compared to the 14 year olds in relationship to student achievement.

Table 20

Tukey Post Hoc Test: Multiple Comparisons

Tukey HSD: StudAch						
(I) Age21	(J) Age21	Mean Difference			95% Confidence Interval	
		(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
12	13	-.66058	1.78296	.983	-5.2942	3.9731
	14	2.31902	2.00261	.654	-2.8855	7.5235
	15	4.11250	3.85713	.711	-5.9117	14.1367
13	12	.66058	1.78296	.983	-3.9731	5.2942
	14	2.97960*	1.11284	.041	.0875	5.8717
	15	4.77308	3.47928	.519	-4.2691	13.8153
14	12	-2.31902	2.00261	.654	-7.5235	2.8855
	13	-2.97960*	1.11284	.041	-5.8717	-.0875
	15	1.79348	3.59679	.959	-7.5541	11.1411
15	12	-4.11250	3.85713	.711	-14.1367	5.9117
	13	-4.77308	3.47928	.519	-13.8153	4.2691
	14	-1.79348	3.59679	.959	-11.1411	7.5541

*. The mean difference is significant at the 0.05 level.

The mean score for student achievement reveals that the 13 year olds scored (61.0231) at a higher achievement level than the 14 year olds (58.0435) as noted on Table 21.

Table 21

Mean Score for Student Achievement

Tukey HSD ^{a,b} : StidAch		
Age 21	N	Subset for alpha = 0.05
		1
15	2	56.2500
14	23	58.0435
12	8	60.3625
13	117	61.0231
Sig.		.337

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.908

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Summary

A Title I middle school from the metropolitan Atlanta area participated in this research study. There were several modes of data collection including: a document review of the district assessment results, a teacher survey, and student survey.

Data analysis revealed that student motivation correlates with student achievement. The independent variables which had a significant relationship with student motivation included student perception of teacher expectations, actual teacher expectations, teachers' age, teachers' highest level of education, and teacher demographics, specifically teacher age and highest level of education. The variables which had a significant relationship with student achievement included the student's age and student motivation.

CHAPTER VI

FINDINGS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Purpose of the Study

The purpose of this study was to examine factors that affect student motivation and achievement in the middle school Science classroom including student-teacher relationships, student-peer relationships, teacher expectations in science, student preference of instructional delivery (labs vs. lecture), teacher demographics (experience at local school, professional experience, qualifications, age range), and students' perceptions of teacher expectations. A student survey was created as well as a teacher survey with conjunction of a review of student achievement for each teacher in regards to the science benchmark exam.

Research Methods

This research study employed a quantitative method. The research focused on the relationships between student motivation and student achievement with students' perceptions of teacher expectations, student-teacher relationships, instructional delivery, student-peer relationships, teacher expectations, and teacher demographics. To identify significant relationships the research required the use of the correlation, ANOVA, and regression to test the research questions.

Significant Findings

There were two dependent variables, student motivation and student achievement. Data analysis revealed that there is a significant relationship between student motivation and student achievement. It was found that student motivation and student age had the greatest influence on student achievement. The findings at the research location also revealed that there is a significant relationship between student motivation and student perceptions of teacher expectations, actual teacher expectations, teacher age, teachers' highest level of education, and whether or not a student received free or reduced lunch.

Implications

The intention of this study was to identify which factors affected student motivation and achievement in the middle school eighth grade science classroom. Several implications have been exposed as a result of this research study. Research has shown that successful middle schools have teachers who challenge their students with high expectations (Keifer et al., 2014). Findings from this study suggest that teacher expectations matter. Student motivation was statistically significant to both student perceptions of teacher expectations and actual teacher expectations. The data analysis suggests that student motivation increased with higher perceptual and actual teacher expectations. The implication is that students will be more highly motivated to perform better in their science class if they believe that their teachers believe they can do the work and expect them to do well.

Research has also shown a relationship between student motivation and student achievement. The study conducted in the Redwood City School District found that

students with higher motivation achieved at higher levels (Borsato & Stobel, 2013).

Findings from this study bring to light that student motivation and student achievement have a significant relationship as the significance was found to be .000, well below the standard of correlation being significant at the .05 level. The implication is that students who are more highly motivated will have greater academic achievement.

Limitations of the Study

There were several limitations to this study; the study may not have addressed all factors that impact student motivation and student achievement in the middle school eighth grade science classroom. Although the surveys were confidential and anonymous, the participants may not have fully disclosed all aspects of the survey as the researcher is a supervisor at the research site. The sample size was limited as the number of surveys distributed was limited to only those who provided signed parent consent forms in order to participate. Although there were about 600 students in the eighth grade at the research site, consents were given to only about 450 students since one classroom had a long-term substitute at the time the research was conducted. Another limitation was that the sample only included responses from one grade level in one school. The student achievement scores were based on the sample of four sets of class averages, and the student demographics (including SES status) were self-reported.

Recommendations

In an era of high accountability for teachers, it is imperative that administrators understand and implement strategies that foster an environment in which students are motivated, engaged, and can achieve high levels of success. Findings from this study

suggest there is room for improvement in these areas and there are several recommendations to consider.

Recommendations for District Leaders

- District leaders should provide training for all teachers and staff on how teacher expectations impact student motivation and achievement, as well as how a student's age impacts motivation at the middle school level.
- School districts should provide adequate funding for resources for student use in the middle school classroom, including manipulatives and science lab experiments.

Recommendations for Educational Leaders

- As local schools implement a new teacher induction program for new hires, training should be provided on how factors such as teacher expectations, students' perceptions of teacher expectations, students' age, and students' socioeconomic status affect student motivation and, therefore, impacts student achievement.
- Professional development should be provided throughout the year for all teachers helping teachers to identify effective strategies that correlate with high teacher expectations which foster environments with high levels of student motivation.
- Leaders must provide feedback to teachers when conducting walkthroughs and observations on how teachers can effectively communicate their expectations to students.

Recommendations for Classroom Teachers

- Teachers should seek opportunities to build relationships with students to ensure students understand how genuine the teachers' expectations really are.
- Teachers should effectively communicate expectations on a consistent basis to ensure students have a clear understanding.
- Teachers should have high expectations for all students regardless of student achievement levels, socioeconomic status, past history, or age.
- Teachers should provide differentiation for students based on age of students to increase motivation for older students found in the classroom.

Recommendations for Future Researchers

- Future researchers can begin with conducting qualitative research using the same variables to better understand student and teacher responses to dig deeper into what specific teacher expectations have the greatest impact on student motivation and achievement.
- A larger study should be conducted to include additional middle schools and all grade levels to explore any differences and/or similarities between sixth, seventh, and eighth graders.
- Future researchers should also examine the effect of motivation of students who have been retained and the role that the teacher plays in regards to student academic achievement.

Summary

The aim of this study was to examine factors that affect student motivation and student academic achievement with a focus on variables including students' perceptions of teacher expectations, student-teacher relationships, students' preferences for instructional delivery, peer affiliations, teacher expectations, and teacher demographics. The study uncovered through the use of the correlation, ANOVA, and regression analysis the factors that affect student motivation and student achievement. The researcher determined that the following variables had a significant relationship to student motivation: students' perceptions of teacher expectations, actual teacher expectations, teachers' age, teachers' highest level of education, and additionally whether or not a student receives free or reduced lunch. The researcher has provided recommendations for educational leaders, classroom teachers, and future researchers.

APPENDIX A

Teachers' Letter of Informed Consent

Dear Teacher:

I am a graduate student at Clark Atlanta University conducting research to investigate the factors affecting student motivation and achievement in the middle school science classroom at your current school. This study may further the understanding of factors that affect student achievement. I believe that this information will help educational leaders throughout the district.

Information obtained in this study will not be shared with other teachers, administrators, parents, or district leaders. There are no known risk factors with your participation in this investigation.

Your participation is voluntary in this study, your perspective and accounts are valued.

If you have any questions or concerns, please feel free to call me at 678-570-4870. If you prefer to email me, you can reach me at nbullock46@live.com.

Thank you for your participation.

Naomi Bullock, Ed.S.
Clark Atlanta University
Doctoral Candidate

APPENDIX B

Teacher Survey

All responses will be kept confidential

Teacher demographics:

1. Number of years at Current School:

____ 0-1 ____ 2-5 ____ 6-10 ____ 11-20 ____ 20+

2. Number of years teaching (TOTAL):

____ 0-1 ____ 2-5 ____ 6-10 ____ 11-20 ____ 20+

3. Age:

____ 20-29 ____ 30-39 ____ 40-49 ____ 50-59 ____ 60+

4. Highest level of education:

____ Bachelors Degree ____ Masters Degree

____ Specialist Degree ____ Doctoral Degree

Student Data:

Please provide the class averages of the district Science assessments:

	1st	2nd	3rd	4th	5th
Class segment	Academic	Academic	Academic	Academic	Academic

Class average

Over-→

Teacher Expectations:

Please respond to each of the following statements by placing a checkmark in the blank underneath the response that represents your answer:

Strongly Agree, Agree, Disagree, Strongly Disagree

	Strongly			Strongly
	Agree	Agree	Disagree	Disagree
5. Students should be active participants in class a majority of the time.				
6. Students should be given multiple attempts to learn the Science curriculum.				
7. My students know that I expect them to do their best on their assignments.				
8. I expect all students to learn at their own highest level.				
9. I am satisfied if students attempt the laboratory experiments even if they do not complete them.				
10. I make allowances for students who fail to follow along with the lesson on a daily basis.				
11. I am satisfied if students attempt to answer questions even if their answers are not correct.				
12. I expect students to answer questions in complete sentences.				
13. I expect students to write answers that use scientific vocabulary terms correctly.				
14. Expectations for behavior are clearly communicated to my students.				
15. I expect that my students will follow the school-wide rules.				

Thanks for your participation!

APPENDIX C

Letter of Parental Consent

Dear Parent/Guardian:

Your child is being asked to participate in a research study conducted by Naomi Bullock from Clark Atlanta University. The purpose of this study is to examine factors that may affect student motivation and achievement in the middle school science classroom. This study will contribute to the researcher's completion of her doctoral degree.

This study consists of a student survey that will be administered to individual participants at your current school. Your child will be asked to provide answers to a series of questions related to student motivation and achievement in the science classroom.

The investigator does not perceive more than minimal risks from your child's involvement in this study (that is, no risks beyond the risks associated with everyday life). The survey will be anonymous and will be confidential. A copy of the survey has been attached for your review.

Giving of Consent

I have read this consent form and I understand what is being requested of my child as a participant in this study. I freely consent for my child to participate.

I give consent for my child to complete the Student Survey for this research study.

Name of Child (Printed)

Name of Parent/Guardian (Printed)

Name of Parent/Guardian (Signed)

Date

Should you have any questions, please contact the researcher: Naomi Bullock at nbullock46@live.com and/or the Research Committee Chair: Dr. Trevor Turner at TTurner@cau.edu, Department of Educational Leadership, Clark Atlanta University.

APPENDIX D

Student Survey

All responses will be kept confidential

	Strongly			Strongly
	Agree	Agree	Disagree	Disagree
1. I find assignments in Science to be difficult most times.				
2. If I can't get through my Science assignment, I usually put it to the side to try later.				
3. I am often late in submitting my Science assignments				
4. I prefer subjects like Literature & History over subjects like Chemistry and Physics.				
5. I find it difficult to be interested in Chemistry and Physics.				
6. I find Science class boring.				
7. Teachers have to work hard to make science class interesting.				
8. My Science teacher doesn't mind if I turn in homework late.				
9. My teacher checks to see if I complete all of my assignments in Science class.				
10. My teacher frequently tells us that we have to do better than other students in Science.				
11. My Science teacher doesn't care if I don't do very good work all the time.				

	Strongly Agree	Agree	Disagree	Strongly Disagree
12. My Science teacher constantly shows us how what we learn in Science is related to practical things in life.				
13. I enjoy coming to my teacher's classroom.				
14. I am able to ask for assistance without fear of rejection or embarrassment.				
15. My teacher focuses on stopping unwanted behavior for the majority of the class period.				
16. I prefer lectures to learn the science curriculum.				
17. I prefer completing laboratory experiments to learn the science curriculum.				
18. I prefer to have choices as it relates to how I learn science.				
19. I like to hang out with students who are interested in science outside of school.				
20. My friends are more interested in video games and sports than in school work.				

Student demographics - Please complete the following:

21. Age: ____ 12 ____ 13 ____ 14 ____ 15+
22. Do you receive free or reduced lunch? ____ YES ____ NO
23. How many discipline referrals did you receive this school year?
 ____ 0 ____ 1-2 ____ 3 ____ 4 ____ 5+

Thanks for your participation!

REFERENCES

- Banilower, E., Smith, P., Weiss, I., Malzahn, K., Campbell, K., & Weis, A. (2013). *Report of the 2012 National Survey of Science and Mathematics Education*. Horizon Research, Inc. Retrieved from <http://www.horizon-research.com/2012nssme/research-products/reports/technical-report/>
- Borsato, G., & Stobel, K. (2013). *Academic demands and student achievement: A view from middle school classrooms in Redwood City, CA* (1st ed., pp. 1-10). Retrieved from <http://gardnercenter.stanford.edu/resources/publications/RCSDSurveyIssueBriefFinal11413.pdf>
- Burton, B. (2016). Ethics of care: Ethics and philosophy. *Encyclopedia Britannica*. Retrieved from <http://www.britannica.com/topic/ethics-of-care>
- Chen, C. H., & Howard, B. (2010). Effect of live simulation on middle school students' attitudes and learning toward science. *Educational Technology & Society, 13*(1), 133-139.
- Cherry, K. (2015). 5 Key theories of motivation. Retrieved from <http://psychology.about.com/od/psychologytopics/tp/theories-of-motivation.hem>
- Chopra, R., & Gupta, R. (2011). Impact of constructivist approach on science achievement of 8th standard students. *International Journal of Education and Applied Sciences, 3*(2), 11-16.

- Eccles, J., Wigfield, A., Midgley, C., Reuman, D., Iver, D., & Feldlaufer, H. (1993). Negative effects of traditional middle schools on students' motivation. *The Elementary School Journal*, 93(5), 553-574. doi:10.1086/461740
- Francis, M. (2010). Fulfillment of a higher order: Placing information literacy within Maslow's hierarchy of needs. *College and Research News*, 71(3), 140.
- Georgia Milestones Assessment System. (2016). *Georgia milestones statewide scores*. Retrieved from <https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Georgia-Milestones-Statewide-Scores.aspx>
- Ginevra, M., Nota, L., & Ferrari, L. (2015). Parental support in adolescents' career development: Parents' and children's perceptions. *The Career Development Quarterly*, 63(1), 2-15. doi:10.1002/j.2161-0045.2015.00091.x
- Good, T. (2008). *21st century education: A reference handbook*. Los Angeles, CA: Sage Publications.
- Guo, Y., Connor, C., Yang, Y., Roehrig, A., & Morrison, F. (2012). The effects of teacher qualification, teacher self-efficacy, and classroom practices on fifth graders' literacy outcomes. *The Elementary School Journal*, 113(1), 3-24. doi:10.1086/665816
- Heller, R., Calderon, S., & Medrich, E. (2003). Academic achievement in the middle grades: What does research tell us? *High Schools That Work*. Retrieved from http://publications.sreb.org/2002/02V47_AchievementReview.pdf

- Jerome, N. (2013). Application of the Maslow's hierarchy of need theory: Impacts and implications on organizational culture, human resource and employee's performance. *International Journal of Business and Management Invention*, 2(3), 39-45.
- Kiefer, S. M., Ellerbrock, C., & Alley, K. (2014). The role of responsive teacher practices in supporting academic motivation at the middle level. *Research in Middle Level Education Online*, 38(1), 1-16.
- Lumsden, L. (1994). Student motivation to learn. *Eric Digest*, 93, 1-7. Retrieved from <http://eric.ed.gov/?id=ED370200>
- Martin, A., & Marsh, H. (2005). Motivating boys and motivating girls: Does teacher gender really make a difference? *Australian Journal of Education*, 49(3), 320-334. doi:10.1177/000494410504900308
- Maslow, A. H. (1954) *Motivation and personality*. New York: Harper & Row.
- Meece, J. (2003). Applying learner-centered principles to middle school education. *Theory Into Practice*, 42(2), 109-116. doi:10.1353/tip.2003.0018
- McClelland, D. C. (1961). *The Achieving Society*. Princeton, NJ: D. Van Nostrand.
- Miner, J. (2005). *Organizational behavior 1: Essential theories of motivation and leadership*. New York: Routledge.
- Motivation. (n.d.). In *Merriam-Webster's collegiate dictionary* (11th ed.). Retrieved from <http://www.merriam-webster.com/dictionary/motivation>
- National Assessment of Educational Progress (NAEP). (2016a). *2015 science assessment*. Retrieved from https://www.nationsreportcard.gov/science_2015/#?grade=4

- National Assessment of Educational Progress (NAEP). (2016b). *NAEP science 2015 state snapshot reports*. (2016). Retrieved from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2016157>
- National Center for Education Statistics. (2012). *The nation's report card: Science 2011*. Washington, DC: Institute of Education, U. S. Department of Education.
- National Center for Education Statistics. (2015). 2011 trends in international mathematics and science study (TIMSS) test. Washington, DC: Institute of Education, U. S. Department of Education.
- North Dakota Lead Center. (2009). *ISLLC Standards: Overview*. *Ndlead.org*. Retrieved 16 April 2016, from <http://www.ndlead.org/domain/190>
- Organization for Economic Cooperation and Development (OECD). (2015). *PISA 2012 Results - OECD*. Retrieved from <http://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>
- Physiological. (n.d.). *Merriam-Webster's collegiate dictionary* (11th ed.). Retrieved from <http://www.merriam-webster.com/dictionary/physiological>
- Ormond, J. (2008). *Development of peer relationships and interpersonal understandings*. Retrieved from <http://www.education.com/reference/article/development-peer-relationships/>
- Rimm-Kaufman, S., & Sandilos, L. (2015). *Improving students' relationships with teachers to provide essential supports for learning*. *Apa.org*. Retrieved 4 November 2015, from <http://www.apa.org/education/k12/relationships.aspx>

- Rockoff, J., & Lockwood, B. (2010). Stuck in the middle: How and why middle schools harm student achievement. *Education Next*, 10(4), 68-75.
- Roth, M. (2011). Why does U.S. fail in science education? *Pittsburgh Post-Gazette*. Retrieved from <http://www.post-gazette.com/news/nation/2011/03/20/Why-does-U-S-fail-in-science-education/stories/201103200240>
- Self-Determination Theory. (2015). Retrieved from <http://www.selfdeterminationtheory.org/theory/>
- Skemp-Arlt, K., & Toupence, R. (2007). The administrator's role in employee motivation. *Coach and Athletic Director*, 76(7), 28.
- Skinner, E., & Belmont, M. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, 85(4), 571-581. <http://dx.doi.org/10.1037/0022-0663.85.4.571>
- Thepeakperformancecenter.com. (2015). *Maslow's hierarchy of needs: Physiological, safety, social*. Retrieved from <http://thepeakperformancecenter.com/educational-learning/learning/principles-of-learning/maslows-hierarchy-needs/>
- Trends in International Mathematics and Science Study-(TIMSS)-2011 Results*. (2015). Retrieved from <https://nces.ed.gov/TIMSS/results11.asp>
- Voltz, D., Sims, M., & Nelson, B. (2015). Introduction: Teaching in diverse, standards-based classrooms. Retrieved from http://www.ascd.org/publications/books/109011/chapters/Introduction@_Teaching_in_Diverse,_Standards-Based_Classrooms.aspx

Walker, K. (2016). *LDRS 591 organizational behavior and development resource* (1st ed.). Retrieved from <http://keithdwalker.ca/wp-content/summaries/d-f/Ethical%20Decision%20Making.Shapiro%20et%20al.EBS.pdf>

Wentzel, K. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, 89(3), 411-419.
doi:10.1037//0022-0663.89.3.411

Williams, L., & Anthony, E. (2013). A model of positive family and peer relationships on adolescent functioning. *Journal of Child and Family Studies*, 24(3), 658-667.
doi:10.1007/s10826-013-9876-1