

Self Determination in the Classroom

A Masters Action Research Thesis submitted

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Abstract

The purpose of this action research project was to answer the following question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math? The idea of self-determination is based upon a belief that giving people more control over something will in turn increase their performance in that activity. Hence, I worked within the realm of my math class, choosing to teach the students about their own learning styles, let them use those learning styles while learning math, and see if their self-efficacy, motivation, and academic achievement around that subject increased.

The results of my study demonstrated an overall increase in self-efficacy, motivation, and academic achievement in math for all students. When I looked more closely at the data, however, I discovered that some students already possess relatively high self-efficacy and motivation. These students might have benefited from an additional or alternative program to provide them more beneficial self-determination opportunities for their needs. For those students who demonstrated an average level of self-efficacy and motivation, the learning styles strategy benefited them greatly. They were able to learn the material, embrace it, and report higher self-efficacy, motivation, and academic achievement. Finally, there were the students who had low self-efficacy, motivation, and academic achievement. These students demonstrated the greatest gains, but this improvement was temporary. These students may benefit from a program that can support their self-efficacy and motivation on a permanent basis, or provide them with an alternative program before learning styles are taught.

Dedications

To all children ~ may I inspire them to believe that anything is possible

To the people at New England College who supported me beyond my wildest expectations and showed me through example what it means to be a truly great teacher:

Carlton Fitzgerald, Kevin Johnson, and Debra Nitschke-Shaw

Lastly, to Mike, for never questioning my dreams, for loving me as unconditionally as a person can, and for being the unfaltering wind beneath my wings

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Chapter One: Introduction

Introduction

The ultimate goal of my action research project was to successfully teach and implement the concepts of self-determination in my class of 15 fourth graders in Western New Hampshire. I was hoping when I compared data taken both before and after the implementation of the self-determination strategies, I would discover that my students demonstrated an increase in personal motivation and self-efficacy while also reflecting an academic rise in math achievement. I believed that incorporating the Self Determination Theory as espoused by Drs. Richard Ryan and Edward Deci at the University of Rochester, would create these positive changes in my students.

Deci & Ryan (1985) and Deci, Vallerand, Pelletier & Ryan (1991) define self-determination as "...the need to experience choice and control in what we do and how we do it. It is the desire to have our own wishes, rather than external rewards or pressures, determine our actions" (in Woolfolk, 2001, p. 390). It was not clear if my study would certainly prove that self-determination strategies would increase student academic achievement (due to the limited length of the study), but it was my hope the students would still demonstrate an increased understanding of their own strengths and weaknesses (self-efficacy) and be more motivated to learn, evidenced through increased risk-taking and confidence in the classroom environment.

Key Terms

The definitions of key terms used in the report of this study are as follows:

Self-determination: Deci & Ryan (1985) and Deci, Vallerand, Pelletier, & Ryan (1991) define it as: "...the need to experience choice and control in what we do and how we do it. It is the desire to have our own wishes, rather than external rewards or pressures, determine our actions" (in Woolfolk, 2001, p. 390).

Learning styles: “How people are most comfortable learning and most receptive to learning” (in Peterson & Hittie, 2003, p. 182).

Self-efficacy: Albert Bandura (1994, 1997, 2000) defines it as: “The belief that one can master a situation and produce positive outcomes” (in Santrock, 2003, p. 412).

IEP: (Individualized Education Program): “Annually revised program for an exceptional student, detailing present achievement level, goals, and strategies, drawn up by teacher, parents, specialists, and (if possible), student” (Woolfolk, 2001, p. 130).

Emotional intelligence: Salovey & Mayer (1990) define it as: “A form of social intelligence that involves the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and action” (in Santrock, 2003, p. 133).

Choice Theory: A concept developed by William Glasser that states: “...all we do is behave, that almost all behavior is chosen, and that we are driven by our genes to satisfy five basic needs: survival, love and belonging, power, freedom and fun” (“Choice Theory,” 2007, ¶ 1).

Academic choice: “A strategy for...increasing students’ motivation and academic skills as well as for building community in the classroom” (Denton, 2005, p. 1).

Responsive Classroom: From Responsive Classroom’s Level I Workbook: “...this approach consists of practical strategies for bringing together social and academic learning throughout the school day” (2003, p. 1).

IDEA 2004 (Individuals with Disabilities Education Act): A United States Federal Act that states in §1400(d)(1)(A)(B) its purpose:

...to ensure that all children with disabilities have available to them a free appropriate public education that emphasizes special education and related services designed to meet

their unique needs and prepare them for further education, employment and independent living [and] to ensure that the rights of children with disabilities and parents of such children are protected... (in Wright, 2006, p. 20).

Quick-write: Informal, in class writing that is designed to give students opportunities to get their thoughts or knowledge down on paper (Chadwell, p. 3).

Theoretical Framework of the Researcher

As the researcher in this study, I am a teacher who ascribes to two educational philosophies. The first is perennialism. There are universal truths in our world today that are unchanging and to which we as a global society must be familiar and connected with in order to successfully function in our world as we know it. I believe it is these universal truths that bind us together into a community – a community that must remember to recognize that collectively we all have the same essential needs, desires, tendencies and cares. It is these commonalities across borders and cultures that bring us together and make each of our equally diverse and unique lives essential to the whole. There are vast concepts of knowledge that have been passed down throughout the centuries that enable us to live today. It is this strong foundation of knowledge that must be given to each generation in order to proceed and continually grow into our future and prevent regression into the past.

The second philosophy I identify with is progressivism. Other than the fundamental basic truths the perennialist embraces, the world is essentially a continuously revolving and rotating process of change. I believe our own ideas, interests, values, and visions are just a few aspects of what makes each human unique. These perspectives are constantly in the process of changing and being reevaluated. It is the assurance of this change that is reality for progressives, understanding that what is considered pertinent information at one point might be considered just

as irrelevant in the next. As a result of this continuous change, it is essential that we as educators allow children to bring into the classroom what they deem interesting and engaging. If we in turn take their interests and incorporate them into the concepts we are required to teach, children and youth would acquire knowledge more efficiently and the odds of retention would also increase. I prefer to use the textbook as a guideline for instruction and supplement that foundation of knowledge with creative activities and topics for the students to explore. If curiosity were brought out in students through creative experiences and thoughtful discussions led and guided by the teacher, the ultimate object of receiving an education would be an inspired experience, creating a new kind of student who is an independent, confident thinker and a future asset to the world community.

While I agree there are universal truths that hold us together as a human race upon this Earth, there are ideas and perspectives that are constantly changing and being reexamined. In the classroom we must remember to teach the universal truths and values while simultaneously being receptive to the new emerging approaches that are considered better than the present approaches, for in each and every idea that is shared, there is value that can be taken from it. I am a teacher who stands firmly on a foundation of old and reliable universal truths while keeping my eyes and mind open to the powerful potential of the new.

Background Information

Most adults would probably agree that the more control they have over their lives and the more successful they are in their lives, the happier they are. This is evident when we see many adults dreading Monday morning when what time to get up, get going, and where to go is no longer an option.

This same reaction to a loss of choice is seen in children as well. It is all too soon when children have no choice but to attend school and within 3 years, having a snow day, a vacation, or the summers off is preferable to the school year. Is it because of the work? Probably to a degree, but going to school is not a choice for most children, and this is not empowering for them. They would rather be “free” to do as they choose – just like adults! Young and old alike seem to yearn for the weekends.

It was after taking a life empowering class and learning how to make my life my own and how much joy can come from that approach when I considered this empowering concept for children. In fact, the young people who were in my life-empowering class were better at empowering themselves than the adults. From that day on, I never forgot just how powerful children can be and how much credit I may be able to give a child for their thoughts and opinions.

As with all thoughts that enter the mind upon experiencing or learning something new, what put me on the path to the place I am today regarding this research project seemed at the time, insignificant. One March afternoon I walked into the resource room in our school to discover the special education teacher mulling over what she should discuss with her fifth graders before they graduate and move into middle school. As I passed through the room, she shared with me she hoped to call the parents of her students with IEPs and get permission from them to discuss the content of the IEPs privately with each student. She said she thought the kids should be able to know what goals are set for them and what accommodations are available to them. This, she believed, would help ease the transition into middle school, empowering the students to advocate for their needs should the new teaching staff service the children differently than they expected. As I left her room, I was puzzled by her remarks. Is it true that children do

not have access to their own IEPs? Can it be that a teacher needs to seek permission from the parents before the child can even look at his/her IEP? According to IDEA 2004, the Federal Individuals with Disabilities Education Act, one person who is part of the Individualized Education Program Team is “whenever appropriate, the child with a disability” (20 U.S.C. §1414(d)(B)(vii)). In the 2004 IDEA’s Analysis of Comments and Changes (Commentary), published and released by the Education Department in the Federal Register (2006) on page 46671, the following remarks are made regarding the attendance of a child to his/her own IEP meeting:

Until the child reaches the age of majority under State law, unless the rights of the parent to act for the child are extinguished or otherwise limited, only the parent has the authority to make educational decisions for the child under Part B of the Act, including whether the child should attend an IEP Team meeting.

Discovering that the parent is the primary authority OVER the child shocked me. But after much consideration and examination, I discovered that the law does not specifically preclude student participation in his/her own IEP process, it simply states that the parent is responsible for the child’s education and if the child should/can attend IEP meetings. Dedicated to help empower the student, I began to search for ways to teach children how to more actively participate and advocate for themselves. I reasoned that with resources, schools could teach students how to be reflective about their own learning process. Then, with the parents’ permission, more students could participate and play a more active role in their IEP planning and revision. Curious to discover how to teach children to self-advocate, I researched and learned about the Self-Determination Theory. Self-determination is a theory that claims with intentional empowerment of students, motivation will increase, in turn raising grades. After exploring self-

determination more thoroughly, I realized I could introduce self-determination into my own classroom, helping all of my students take control of their academic learning, increasing both their motivation to learn and their self-efficacy. With improvement in those areas, students' grades should also improve. It is often said by many instructors that strategies implemented initially for children with special learning needs can in fact be used with all children, making a more effective classroom. If I could successfully raise my students' motivation and self-efficacy, then they would be able to use these new strategies throughout their educational career and into adulthood. It was this realization of the potential power of self-determination that brought me to this action research project, with hopes that my students at the conclusion of this study would be better both academically and personally.

Key Theoretical Theorists

The researchers who have done extensive work on self-determination are two members of the University of Rochester faculty, Dr. Edward L. Deci and Dr. Richard M. Ryan. Drs. Ryan & Deci (2000) believe that people have three psychological needs:

- Need for competence, or the ability to function effectively in the environment
- Need for relatedness, or having the feeling of connectedness to others
- Need for autonomy, or the ability to change the environment when necessary

(in Eggen and Kauchak, 2004, p. 371).

With these three needs fulfilled a person is intrinsically motivated, self-regulated, curious and proactive (Poulsen, Rodger, and Ziviani, 2006, p. 78). Within the realm of education, Ryan & Grolnick (1986) and Williams, Wiener, Markakis, Reeve, & Deci (1993) believe that classroom environments that encourage student self-determination are classrooms that show "...greater

student interest, sense of competence, creativity, conceptual learning, and preference for challenge” (in Woolfolk, 2001, p. 390).

Albert Bandura, another theorist whose ideas align with the concepts of the self-determination theory, is the author of self-efficacy. Self-efficacy is the belief a person has about his/her ability to perform a behavior that will lead to an expected outcome (Weiten, 2001, p. 502). It is one’s perceptions or predictions of him/herself concerning a given behavior that is his/her self-efficacy. If a student believes s/he can successfully complete a task and is successful, her/his self-efficacy is healthy. A student who doesn’t try a task that s/he is capable of doing because s/he believes it’s not possible, has low self-efficacy.

It is easy to see how self-efficacy ties in with self-determination. In order to accurately make choices and have a greater sense of competence, a student must have healthy self-efficacy. Self-determination seeks to provide the student with more choice and power around her/his education, but if the student’s self-efficacy is unhealthy, s/he will not be able to make choices that are appropriate to her/his abilities. The student may consistently over or underestimate his/her ability to complete tasks. The problem of unhealthy self-efficacy would hinder the student from reaping the benefits of a self-determination program.

Daniel Goleman explored Salovey & Mayer’s concept called emotional intelligence. This is another belief within the psychological field that aligns with the idea of self-determination. Salovey & Mayer (1990) define emotional intelligence as the ability for one to monitor his/her own as well as others’ feelings and emotions, ultimately using this knowledge to guide his/her thinking and actions (in Woolfolk, 2001, p. 112). Goleman argues that people need to first develop self-awareness about their emotions; this leads to an ability to be able to understand the root of emotions in life’s various situations. Once a person understands the

presence and reason for the emotion, the action or task that follows the emotion can be made with minimal influence from the emotion. For example, when driving, a person may experience road rage at another driver. But if the person with road rage has emotional intelligence, s/he can realize the rage is stemming from something else altogether – an argument with a spouse that morning, being fired from work, or simply running late. With emotional intelligence a person can then stop him/herself, accurately assess why he/she feels angry, and can then thereby potentially prevent any consequence from the road rage. Emotional intelligence can also affect the level of success at performing a certain task, in particular tasks that carry risk, such as taking a driving test or interviewing for a job. Within the field of education, I believe children who have poor emotional intelligence can jeopardize the success of a task because of the power of his/her unfettered emotions. Developing emotional intelligence can help a student experience emotion, be aware of and understand that emotion, manage it, and respond more powerfully in the situation from where the emotion derived. I believe this ability keeps emotions from controlling the decisions and actions of the person feeling the emotions.

Emotional intelligence is vital to a person who is practicing self-determination. It allows the person to look at the situation with a clear and level head and make wise choices, regardless of any emotions present. I believe emotional intelligence supports a student's ability to make much more accurate and smart academic choices for him/herself.

Finally, William Glasser's Choice Theory is one that also aligns with the concepts of self-determination. Choice Theory argues that nothing controls our behavior but ourselves. Once it is understood that all actions and choices are made intrinsically and not extrinsically, then the blame that people normally lay upon others would cease and empowerment, making choices because it is a conscious decision of self, would result. From that point on all choices

and decisions can be made because the person chooses it. In education, children with a clear understanding of Choice Theory would not spend time blaming others but would look at what is before them as an opportunity to choose for themselves how and what to learn. Self-Determination together with Choice Theory offer students the motivation and self-efficacy to tackle appropriate tasks and the knowledge that the choices made are in the hands of the learner.

Assumptions

I was aware I was making a variety of assumptions regarding the positive academic and personal impact of the self-determination theory upon my students. First and foremost, I was assuming with the implementation of a self-determination approach, the students would be receptive to the idea of learning about themselves as learners and using their knowledge to positively impact their ability to learn successfully. For without student cooperation, I could not assess the impact of self-determination in my classroom accurately. Secondly, I was assuming that the self-determination theory would indisputably positively impact my students' self-efficacy and their response to learning and grades. Finally, I assumed the fourth graders I worked with during my research would be able to be reflective about themselves and their learning. The ability to accurately reflect upon their own learning strengths and weaknesses, as well as to make reasonable goals and take risks, would impact the influence of self-determination upon their learning.

Methodology

The objective of this action research project was to answer the following question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math? A variety of data collection tools were developed in order to gather valid, reliable, and

comprehensive information about the impact of the self-determination action research project upon the students in my fourth grade classroom. Within the boundaries of my overarching action research question as stated above, I developed four specific questions that each individually pinpointed a particular aspect of my overarching research question. Furthermore, up to three different data sources for each of the four specific questions were gathered. This provided research data that was valid, reliable, and comprehensive. The four questions along with the data sources are listed in the matrix below. I will explain the data sources at more length following the matrix.

Table 1

Data Collection Tools Matrix

Research Questions	Data Source 1	Data Source 2	Data Source 3
<i>Have the students' grades gone up?</i>	Before and after, give written assessment to determine knowledge of math skill (multiplication facts)	Record overall starting and finishing math grades	
<i>Has student self-efficacy gone up (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess how they FEEL as math students	Shadowing students during class (other than instructor) with behavior checklist during group activities
<i>Has student motivation around their learning increased (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess their motivation levels	Shadowing students during class (other than instructor) with behavior checklist during group activity
<i>Are the students understanding and practicing self-determination strategies?</i>	Regular quick-writes about self-determination strategies taught that week	Teacher observations of students during class – are the strategies evident?	Questionnaire/survey to assess level of understanding and practicing of self-determination strategies after study is complete

Have the Student's Grades Gone Up?

A written multiplication facts assessment was given both before and after the study and compared in order to see if the students were able to answer more problems correctly after the self-determination study compared to before. Multiplication facts are taught in fourth grade and while a number score was derived from this assessment, additional data was also gathered through observation of student behavior during the assessment.

Recording overall starting and finishing math grades allowed for me as the teacher to obtain a grade average of each student both before and after the study. This average grade included all of the math work the students completed throughout the study.

Has student self-efficacy gone up (in reference to themselves as math students)?

Observing student behaviors with a predefined checklist enabled me as a teacher to see how confident the students were at tackling a task. If their self-efficacy had risen over the course of the study, then the students should have demonstrated an increase of confidence and assuredness while taking the test as compared to the pre-study test.

The self-efficacy questionnaire the students completed both pre and post study prior to taking the math assessment determined how the students felt they were as math students.

Shadowing students during class while they were engaged in a math activity with others allowed an outside observer the opportunity to look for evidence of self-efficacy through the use of a predefined checklist. When evidence was shown, the observer documented its presence on the checklist.

Has student motivation around their learning increased?

Similar to the observations done when looking for evidence of self-efficacy, a pre-defined checklist was used to look for evidence of increased motivation while taking the math assessment.

A motivation questionnaire was also used both pre and post study to determine how the students felt they were as math students.

Again, the shadowing of the students during a math activity by an outside observer served as a time to note levels of motivation along with self-efficacy.

Are the students understanding and practicing self-determination strategies?

The first source of data came from regular quick-writes that were written by the students about the self-determination strategies taught over the course of the study. This allowed me to see if the students were grasping and applying the concepts.

Teacher observations of the students during class were recorded immediately after the presence of the self-determination strategy as seen in the students. A quick recording of the date, time, activity, and who was performing the strategy was done.

The final source of data ensuring the students grasped the self-determination material was a questionnaire and survey that assessed the level of their understanding and practicing of the concepts after the study. This showed me if the self-determination strategies were absorbed and inculcated into the classroom environment.

Research Question

Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math?

Objectives of the Study

The objectives of this study were to:

- increase motivation of students in my fourth grade classroom
- raise my students' self-efficacy
- increase my students' understanding of how they are as learners
- raise my students' academic achievement
- improve the accuracy of my students' academic choices

Contributions of the Study

I sincerely hope my study will confirm the positive impact of self-determination strategies on student learning and encourage other teachers to incorporate this teaching approach into their curriculum. I believe my study was successful and will prove to teachers as well as support staff that self-determination may indeed:

- increase student motivation
- raise student self-efficacy
- raise student expectations of themselves
- raise student academic achievement
- improve student choices and goals

Although the study was for a limited time and only in my particular class of 15 fourth graders in Western New Hampshire, the message of hope, empowerment, and optimism that it could send to all teachers, parents, and students is immense. For if self-determination does indeed empower students to accurately and confidently take control of their learning then the classroom will be filled with powerful learners who will be able to take their self-determination strategies through their school career and into the world beyond.

Chapter Two: Literature Review

Overview of Key Literature

The literature used to inform and direct my research addressed and explained the concept of self-determination. Deci & Ryan (1985) and Deci, Vallerand, Pelletier & Ryan (1991) define self-determination as "...the need to experience choice and control in what we do and how we do it. It is the desire to have our own wishes, rather than external rewards or pressures, determine our actions" (in Woolfolk, 2001, p. 390).

Ryan and Deci state their Self-Determination Theory (2000b) is based upon the premise that the satisfaction that accompanies being able to make choices and control one's goals, etc. will lead to personal growth and fulfillment. Because people naturally strive intrinsically for fulfillment in their lives, the self-determination approach drives people to want to achieve more in order to obtain fulfillment, rather than for an external reward (in Poulsen, Rodger, and Ziviani, 2006, p. 78). Therefore, in order to be fulfilled, people will strive to self-determine their own choices and goals.

Poulsen, Rodger, and Ziviani, (2006, p. 78) noted that Ryan and Deci's Self Determination Theory, or SDT, expands upon R.W. White's model of motivation (1959). Ryan and Deci (2000) believe that people have three psychological needs:

- Need for competence, or the ability to function affectively in the environment
- Need for relatedness, or having the feeling of connectedness to others
- Need for autonomy, or the ability to change the environment when necessary

With these three needs fulfilled, a person is intrinsically motivated, self-regulated, curious and proactive (in Poulsen, Rodger, and Ziviani, 2006, p. 78).

The first innate psychological need defined by Deci & Ryan (2000), is the need for competence. It is the need for human beings to feel that they can successfully interact in his/her environment and perform tasks in that environment. If a person experiences this, then they can be motivated to continue these activities. We see this often in people's career choices; they choose jobs that they are inherently good at and are motivated to continue in that field. Failure and repeated failure at a task(s) can lead to discouragement and giving up (in Poulsen, Rodger, and Ziviani, 2006, p. 79).

The need for relatedness is the desire people have to be connected to others and feel love and acceptance. Feeling love and acceptance in an environment creates a safer place in which to be more motivated to take risks (Eggen & Kauchak, 2004, p. 374). This need is very similar to Abraham Maslow's Hierarchy of Needs, which includes the "belongingness and love" all human beings require in order to ultimately feel fulfilled and achieve one's potential in life (Weiten, 2001, p. 505-506).

The need for autonomy is the innate urge people have to control themselves and alter their environment (Eggen & Kauchak, 2004, p. 373). This might explain why people find it hard to return to work after some time off, because they are not in control of their schedule and are obligated to be at their place of work at a certain time. The more control one has over his/her choices in life, the more motivated he/she is while making those choices. Lepper and Hodell state that being in control is intrinsically motivating (Eggen & Kauchak, 2004, p. 373).

Self-Determination in the Classroom

When considering self-determination within the academic setting, studies have found students who have more control over their academic choices and goals will more likely reach those goals ("Increasing Student Success..." 2007, ¶ 2). Self-determination has been used for

children with special learning needs as well as general education students. The reports have been positive. Self-determination has also been used to assist children in participating in their IEP meetings, calling these particular IEPs self-directed (Arndt, Konrad, and Test, 2006, p. 194), person-centered (Keyes & Owens-Johnson, 2003, p. 145), or student-led (Myers & Eisenman, 2005, p. 52). It is important to mention, however, that **students do need instruction in self-determination in order to fully take advantage of its benefits.**

When self-determination is incorporated in the classroom, students appear more interested, have a greater sense of competence, creativity, conceptual learning, and are more receptive to challenge (Woolfolk, 2001, p. 390). Deci & Ryan (1987) claim when students perceive in the classroom that their understanding and skills are improving, their perception of competence increases resulting in greater self-determination. Students' perceptions of their competence are affected by the following in the classroom:

- Attributional statements: comments teachers make about the why behind a student's performance
- Praise and criticism
- Emotional displays: the emotional reactions teachers give in response to learners' successes or failures
- Offers of help: offering unsolicited help may impact a student's sense of competence negatively (in Eggen & Kauchak, 2004, p. 372).

Self-determination also demonstrates that in order for students to experience control in the classroom, the second of the three innate psychological needs, teachers need to offer students choices. Offering choices can be incorporated in a variety of ways, ranging from students being given a choice about how to learn a concept, helping create classroom rules, taking assessments

that emphasize learning and feedback, or participating in learning activities (Eggen & Kauchak, 2004, p. 373).

A heightened sense of relatedness, the third psychological need from the self-determination theory, also benefits children's learning and motivation when present in the classroom. Teachers who empathize, understand, and are available to students are creating a classroom where relatedness is easier to achieve. When students feel supported by their teacher and develop a personal relationship with their teacher, relatedness increases and creates a classroom where more motivation is a possibility (Eggen & Kauchak, 2004, p. 374).

The psychological motivational concept of self-determination is based upon two different types of theoretical approaches to motivation: cognitive and humanistic (Eggen & Kauchak, 2004, p. 371).

Two Theoretical Approaches

Cognition as defined by Wayne Weiten: "Cognition refers to the mental processes involved in acquiring knowledge" (2001, p. 13). Weiten also defines cognitive psychology as focusing on "higher" mental processes, such as memory, reasoning, information processing, language, problem solving, decision making, and creativity" (2001, p. 20). Cognitive psychology advocates studying what occurs in a person's mind and considers those findings to be the way to understand and explain behaviors. It is the mind that is the central of all functions for people and understanding humans requires the examination of how people acquire and process information. The cognitive approach emerged in the 1950's and 1960's with Jean Piaget who focused upon children's cognitive development along with Noam Chomsky who sought to cognitively explain the acquisition of language (Weiten, 2001, p. 13).

Humanism also began in the 1950's, but with a different psychological focus.

Humanistic psychology concentrates upon the uniqueness of each human, in particular the human ability to be free and experience personal growth (Weiten, 2001, p. 10). A leading researcher of humanistic psychology was Carl Rogers, who developed the idea of self-concept, a group of beliefs that each person has about his/her own self (nature, qualities, behavior, etc.) (Weiten, 2001, p. 504). Abraham Maslow is also another well-recognized humanist who developed the Hierarchy of Needs, that, when realized, brings a person to self-actualization. Self-actualization is obtained when a person fulfills his/her potential (Weiten, 2001, p. 506).

In order to understand from where self-determination developed, I researched cognitive as well as humanistic theorists whose research explored motivation, for it is in altering the levels of motivation that makes self-determination a possibility.

Albert Bandura - Self-Efficacy. From the halls of cognitive psychology, I closely examined the work of Albert Bandura. Albert Bandura began early in his career initially touting his Social Learning Theory that claims learning is done through observation and modeling of someone else's behavior, attitudes, and emotional reactions. He has since renamed his theory Social Cognitive Theory. This new adapted theory claims that in addition to observation (the environment) both a person's own psychological motivation and self-regulation will contribute to a person's behavior ("Albert Bandura," 2007, ¶2).

In an interview on May 8, 1988 with David Goleman for the New York Times, Bandura said:

People's beliefs about their abilities have a profound effect on those abilities.

Ability is not a fixed property; there is a huge variability in how you perform.

People who have a sense of self-efficacy bounce back from failures; they approach

things in terms of how to handle them rather than worrying about what can go wrong. (Goleman, 1995, p. 90)

It is this concept of self-efficacy that contributes to the success of self-determination. Self-efficacy is the belief a person has about his/her ability to perform a behavior that will lead to an expected outcome (Weiten, 2001, p. 502). It is one's perceptions of him/herself concerning a given behavior that is impacted by his/her self-efficacy.

A person who has high self-efficacy generally feels confident, puts forth greater effort, is more resilient in the face of defeat, sets higher expectations, is less afraid of failure, and any failures that do occur are attributed to simply not trying hard enough (Woolfolk, 2001, p. 388). This approach towards life would seem to support and even increase motivation. In contrast, someone with low self-efficacy tends to worry that his/her response to a task will in fact result in failure. This person may even go so far as to avoid tasks or give up easily, attributing failure to a lack of ability (Woolfolk, 2001, p. 388). This response to failure is the complete opposite of someone with high self-efficacy.

According to Bandura (1986), there are four factors that influence self-efficacy (in Eggen & Kauchak, 2004, p. 362 and in Woolfolk, 2001, p. 388):

1. Mastery/Past performance: recalling our own personal experiences
2. Vicarious experiences/Modeling: observing others performing the same task
3. Social/Verbal persuasion: comments from others
4. Psychological state: how a person is feeling at the time: anxious, tired, hungry

Albert Bandura's theory of self-efficacy in summary states that how a person thinks s/he will do on a particular task will indeed effect the level of success that person has performing that task.

Daniel Goleman – Emotional Intelligence. In the humanistic field of psychology there are two theorists whose works contribute to the concept of self-determination. The first is Daniel Goleman, who has studied and written a book about emotional intelligence.

Emotional intelligence as defined by Salovey & Mayer (1990) is the ability for one to monitor his/her own as well as others' feelings and emotions, ultimately using this knowledge to guide his/her thinking and actions (in Woolfolk, 2001, p. 112).

In his book entitled Emotional Intelligence (1995), Daniel Goleman expanded upon the research of Salovey and Mayer, stating that we have two minds, one that thinks and the other that feels. They interact to comprise our mental life. The rational mind is the mode of comprehension we are aware of – reflective, thoughtful, etc. (1995, p. 8). The emotional mind is quicker than the rational; actions that come from an emotional mind are simplified and sometimes don't make sense to the rational mind (1995, p. 292).

Goleman continues to say that how we do in life (successful or not) at various tasks is impacted by both the rational and emotional mind. While IQ, the traditional Intelligence Quotient is a measure of our rational mind, EQ, Emotional Intelligence, is a measure of our emotional mind. Goleman believes that people need emotional intelligence to work at their best (1995, p.28). Emotional intelligence can impact one's ability to motivate oneself, to persist despite frustrations, to control one's impulses and regulate one's moods, and to hope (Goleman, 1995, p.34).

There are five aspects of Goleman's EQ (emotional intelligence) theory that together impact a person's emotional intelligence. Three are intrapersonal, while the final two are interpersonal. The first three are:

1. Emotional self-awareness: Being able to effectively recognize, name, and understand one's emotions.
2. Managing your emotions: Being able to tolerate and manage frustration and anger, ultimately resulting in less aggressive or self-destructive behavior, feeling better about oneself, etc.
3. Harnessing emotions productively: Being more responsible and focused on the task at hand, less impulsive, and better test scores.

The last two are interpersonal:

4. Empathy: Being able to read emotions in others.
5. Handling relationships: Being able to better analyze and understand relationships, have an increased ability to negotiate and resolve conflict, and be overall more popular, outgoing, concerned, and considerate (Goleman, 1995, p. 283-4).

The first three intrapersonal aspects of this theory in particular can directly impact the theory of self-determination. These three facets prompt an increased level of "self-awareness," a term by Goleman that is like Socrates' quote to "Know thyself" – awareness of one's own feelings as they occur (Goleman, 1995, p. 46).

Goleman's consideration and inclusion of a person's emotional state as a contributor to the overall wellbeing of oneself emphasizes the need to nurture this in people. For with an increased emotional intelligence, one can more effectively understand his/herself, ultimately making better choices in life. This directly affects the concept of self-determination, for if a

person is able to understand that his/her emotions are impacting his/her ability to think clearly about a situation or task, that person can then control the impact of those emotions upon the decision-making process. Once the emotions are understood and managed, a decision or task can be achieved without the potential negative impact of an emotion.

William Glasser – Choice Theory. Another humanistic psychologist, William Glasser, has developed a theory called Choice Theory, an idea that also aligns with the concepts of self-determination significantly.

Choice Theory seeks to explain motivation in a unique way. It is multifaceted, first claiming that all we do is internally motivated, not externally motivated, as Bandura believed. Choice Theory also claims we have certain basic needs that must be fulfilled as a basis for all motivation; this part of the theory echoes Maslow's Hierarchy of Needs. The relevant aspect of Choice Theory with regards to my study is that Glasser claims people have the ultimate choice in their behavior. Absolutely nothing controls our behavior but ourselves. Once a person learns the elements of Choice Theory as seen in the 10 axioms of the theory listed following, then s/he can more powerfully self-evaluate options in her/his life and consciously make the best choice.

Ten Axioms of Choice Theory

1. The only person whose behavior we can control is our own.
2. All we can give another person is information.
3. All long-lasting psychological problems are relationship problems.
4. The problem relationship is always part of our present life.
5. What happened in the past has everything to do with what we are today, but we can only satisfy our basic needs right now and plan to continue satisfying them in the future.
6. We can only satisfy our needs by satisfying the pictures in our Quality World.

7. All we do is behave.
8. All behavior is Total Behavior and is made up of four components: acting, thinking, feeling and physiology.
9. All Total Behavior is chosen, but we only have direct control over the acting and thinking components. We can only control our feeling and physiology indirectly through how we choose to act and think.
10. All Total Behavior is designated by verbs and names by the part that is the most recognizable. (“Choice Theory,” 2007, ¶ 1)

William Glasser’s Choice Theory, which believes that all of our actions are simply a choice we have made, is a powerful concept that would greatly impact the self-determination theory. If we are clear that our actions are entirely in our control, then the ability to self-determine our future is more powerful and fulfilling.

Conclusion

These three very different but influential theories each contribute in their own powerful way to the overall concept and idea of self-determination. Self-determination is defined by Deci & Ryan as “The need to experience choice and control in what we do and how we do it” (Woolfolk, 2004, p. 390). In order for one to effectively experience choice and control in his/her life, then that person must also possess characteristics of Bandura’s high self-efficacy, for this will enable him/her to accurately consider what goals can be obtained and then strive to obtain them. Positively experiencing choice and control in one’s life also requires that one is able to practice the intrapersonal skills that Goleman emphasizes, thereby raising his/her emotional intelligence. Increased ability to monitor, manage, and then harness one’s emotions will result in beneficial and effective action for that person. Finally, when a person who hopes to utilize self-

determination, after he/she has established a high self-efficacy and learned how to understand and utilize his/her own emotions, the skill of making powerful choices must be honed. This is where William Glasser's choice theory steps in to guide and direct this now powerful self-reflective person to making choices that are optimally potent and triumphant for that person.

Therefore believing with these knowledgeable theorists as my foundation that it is possible to teach students to have higher self-efficacy, to understand, manage, and harness their emotions, and finally to make powerful choices, I seek to do just that by incorporating the self-determination approach into my classroom. I believe that with effective instruction in self-determination my students will be empowered to make stronger choices about how they want to learn both in practice and in effort. I believe that this change in approach to their understanding of themselves, their learning, and their effort will raise their grades. That is why I plan to seek an answer to the following question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math?

My job is to teach children. Equipping them with tools to help them first better understand themselves and secondly make wise academic choices will empower them to take control of their learning. This motivating approach will lead to better academics.

Chapter 3: Methodology

Overview

As a public education teacher, my colleagues surround me, our purpose in the education field a united one: we all want to successfully teach children. But as all teachers know, there are many different kinds of students that come into our lives and need to learn in ways that are so varied and unique from one another. Regardless of all the books published that teach us about what the “average” child is learning and how, there are still a tremendous amount of nuances and idiosyncrasies that each child presents to us, and we are left to decipher what we encounter and then independently, in most cases, determine how to successfully reach each child. Teaching is not a job for the faint of heart.

In the special education field, this struggle is compounded further, with the children receiving services possessing IEPs (Individualized Education Programs), a program designed in order to cater the experience of education to each child’s needs. These IEPs are developed by the adults that are invested in that child’s public education: parents, teachers, support staff, and any other adults who impact the child’s learning experience. The goals and objectives in IEPs are generated by these same adults, and steps to obtain those goals are directed and carried out by these adults as well. This group of adults, the IEP Team, is faced with the same challenge as a classroom educator: decipher what we encounter in a child, and try to successfully determine how to reach - and teach - the child.

What I learned last March in our resource room at my elementary school hit home with me and ties in directly to what is so challenging about teaching children. Children are not privy to their IEP content unless the parent deems it appropriate (sometimes with the advice of the teaching staff as well). Bluntly, it appears children are not involved in planning their own

education. This realization sent me reeling. How can we be working with live, receptive, communicating little human beings and not involve them in the planning of their own learning process? I thought about my own classroom as well – do my students have any say over their education? Well, yes, to some degree, but what if I could do more? What if I could find a way to teach children to be reflective about how they learn and as a result let them be more empowered around their learning? Wouldn't this increase in choice (provided they can harness it) result in an increase in successful learning? These thoughts also extended into the special education field. If children with IEPs were carefully taught how to be more reflective about their learning, wouldn't their contributions to their IEP planning and revision be valuable, welcomed, and ultimately more effective?

Because I and many others know what it is like to be in the teaching profession, desperately wanting to reach all of our students but knowing that the effort is incredibly complex and at times daunting, I sought to discover new ways to optimize learning across the board for all my students. If I could develop or discover a teaching approach or program that addressed how to empower children in both understanding their own learning process and making smart choices about their learning, then maybe the effort to reach all of my students would be more obtainable, for the children would be reaching for their own goals. Not only would I be seeking to understand how to help the child, the child would be on board with me, and together we could work on what ways to learn would be best for him or her. This idea, for me, made so much more sense than trying to tackle teaching a child without the child's input.

The realization that I can more efficiently empower my students in my classroom and that may indeed help them to more effectively acquire knowledge drove me to learn about the Self-Determination Theory and this action research project. This research is essential because of all I

shared above about my colleagues and the personnel that work so hard in special education. If we can find a way to allow our students to play a powerful role in their own education, then they will both learn more and grow in understanding of themselves, understandings that can positively affect their lives for a lifetime. Since the purpose of an educator above all else is to strive to successfully teach all of our students, then this research into the success of self-determination concepts in my classroom have the potential to impact any teacher in all facets of education, everywhere.

Focus of Inquiry

My study was designed to answer the following question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math?

This question helped me determine if self-determination positively impacted the learning of the 9-11 year old students in my class in the subject of math. I chose math because of the brevity of the study and the need for concrete data in order to measure the results successfully. If I discovered that self-determination indeed complemented the classroom efforts of both teacher and student in the process of learning, then my study would undoubtedly convince me that incorporating self-determination into my curriculum would make learning a more obtainable and motivating enterprise for all my students.

Action research is ideal for my study because of the overall purpose of action research. Action research within the realm of education is the idea that we as teachers functioning within the role of action researcher are looking at what we ourselves are or should be doing in our classrooms/schools. As stated clearly in Richard Sagor's book entitled How to Conduct Collaborative Action Research: "Action researchers in education often focus on three related

stages of action: Initiating action....monitoring and adjusting action....[and] evaluating action” (1992). Sagor explains that as action researchers, educators seek out a strategy that may work in the classroom, try it out while monitoring its affects and making necessary adjustments, and ending with an evaluation of the effort made (Sagor, 1992, p.8). This “action” paired with extensive “research” carried out by teachers empowers them to discover, analyze, and ultimately make powerful changes in their classrooms that make education a better experience for students.

I continuously approach my classroom as a place where I strive to grow more effectively as a teacher and regularly acquire new ideas and approaches that are promoted by others who also seek to improve the classroom experience. What action research has enabled me to do is reflect upon how I might want to improve my own classroom, guiding me through the process of carrying out the action and research to assess if those changes will indeed be effective. Since the research will be developed, delivered, and assessed by me in my own classroom, the action research will impact my students and me directly.

Action research, when carried out through the use of a five step process as advocated by Richard Sagor, helped me as the action researcher to first determine exactly what I was striving to discover or confirm in education. This was done in the first step, problem formulation, where I sat with colleagues and brainstormed about what question I may ask to answer my problem (Sagor, 1992, p. 13). This led me to develop my overarching action research question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math? Between wanting to empower students with IEPs around their own education and learning how to improve my classroom environment so that it encourages better learning, I discovered the self-determination approach.

Sagor (1992) then recommends the action researcher consider adequate data collection tools that help the researcher achieve a triangulation of data that is both reliable and valid (p. 30 & 43). I succeeded in developing four specific questions accompanied by data collection tools that allow me as researcher to glean the results of the study from a variety of perspectives. The data collection tools matrix is below:

Table 2

Data Collection Tools Matrix

Research Questions	Data Source 1	Data Source 2	Data Source 3
<i>Have the students' grades gone up?</i>	Before and after, give written assessment to determine knowledge of math skill (multiplication facts?)	Record overall starting and finishing math grades	
<i>Has student self-efficacy gone up (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess how they FEEL as math students	Shadowing students during class (other than instructor) with behavior checklist during group activities
<i>Has student motivation around their learning increased (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess their motivation levels	Shadowing students during class (other than instructor) with behavior checklist during group activity
<i>Are the students understanding and practicing self-determination strategies?</i>	Regular quick-writes about self-determination strategies taught that week	Teacher observations of students during class – are the strategies evident?	Questionnaire/survey to assess level of understanding and practicing of self-determination strategies after study is complete

It is this triangulation of data, the act of obtaining data about one question from a variety of angles, that provides the action researcher with a well rounded view of the study and data that is both valid and reliable. This is essential to a successful action research project.

Setting and Participants

The location of my action research study was in my own general education fourth grade classroom. I teach in a public elementary school in Western New Hampshire. The school is comprised of approximately 60 students, with the classes being divided up as follows: 1st grade, 2nd and 3rd grade, 4th grade, and 5th grade. The school year runs from late August through mid June.

The classroom itself is almost entirely carpeted, the children sitting in three groups of four or five. There are dry erase boards in the front of the classroom and one dry erase board at the back. There is a sink as well as a “cool out corner” for those children who need to “take a break”. There are seven windows in the room, two exits (one leading outside to the playground), and a library area where the class meets to have morning meeting. The room itself is rectangular shaped with the front of the classroom being one of the long sides of the room. The teacher’s desk is to the front left side of the classroom, facing one of the short sides of the room. There are three round tables scattered throughout the room that are centers and work areas for the children to use. The four bulletin boards are bright and colorful, a good percentage of them have been left available for student work.

The participants were my own general education fourth grade class. The class was comprised of 15 students, 7 boys and 8 girls. Their ages ranged from 9-11 years old. All children were Caucasian. There were two children in the class (one male and one female) who have been characterized as having ADHD but were not identified. There was another male

learner who required extra time to grasp and understand academic material. There was an aide who came in daily to assist one child during math time. There was only the teacher, myself, working with the students in the classroom during the rest of the day.

There was minimal risk involved for the participants. There was a risk that a child would not fully embrace the idea of learning about him/herself as a learner, impacting the possibility of an improvement in motivation and grades. But the potential benefit of the students becoming more self-reflective and being able to understand enough about him/herself to more powerfully learn in the classroom for years to come was phenomenal. For the ability to reflect upon oneself is a skill that can be used for a lifetime, beyond the academic years. The information I would gather about the students would be kept strictly confidential, only viewed by me, the researcher.

Phases of Inquiry

Within my overarching action research question, I sought the answer to the following four questions:

Have the students' grades gone up?

The purpose of this question was to assure in a concrete way that the students' grades within the subject of math were rising as the concepts of self-determination were taught and adopted by the students. If the grades rose, it would be compelling evidence that self-determination strategies when adopted by teachers and students would positively impact academic achievement.

Has student self-efficacy gone up (in reference to themselves as math students)?

Self-efficacy is the ability of a person to know with reasonableness whether or not s/he will be successful at a task before attempting the task. People with high self-efficacy more often than not consider the odds of them attempting and successfully completing a task more likely

than those who possess low self-efficacy. Through the self-determination approach, the students' levels of self-efficacy should have risen, as they developed a better understanding of themselves as learners. The conclusion of the study should have shown a rise in self-efficacy among the students if my thesis is correct.

Has student motivation around their learning increased (in reference to themselves as math students)?

Along with self-efficacy, student motivation should have also begun to rise with the integration of the self-determination approach. The motivation of the students was impacted by a variety of factors. From three theories that under gird the concepts of self-determination, three things impacted student motivation: self-efficacy, emotional intelligence, and the ability to make wise choices surrounding student learning. If student self-efficacy was higher, they would more accurately know what they are capable of within the subject of math and consequently have felt more comfortable and safe about taking risks, resulting in a rise in motivation. Their motivation was also impacted by their emotional intelligence; a strategy that helps people not let emotions dictate their decision-making process or perception of how they will do at a task. The ability to make wise choices as espoused by William Glasser's Choice Theory also played a role in the students' level of motivation. Learning how to make wise choices (being given choices at all) should increase student motivation.

Are the students understanding and practicing self-determination strategies?

This question is essential to discerning if the self-determination strategies are affecting the learning in the classroom. Checking in with the students, making sure they understood what they were learning about enabled me as a researcher to accept the results of the study more

readily and credit the self-determination theory as the reason behind the changes in the classroom experience.

The phases of my action research are listed below with explanations of these phases explained thoroughly following.

<u>Phases</u>	<u>Appendices</u>
1. Seek permission to do study from principal	Appendix A
2. Seek permission to do study from parents and students	Appendix B
3. Student self-efficacy survey	Appendix C
4. Student motivation survey	Appendix D
5. Pre and post-study written math assessment	Appendix E
6. Ongoing quick-writes about learning styles	Appendix F
7. Ongoing teacher and outside personnel observations	Appendix G
8. Student learning styles survey	Appendix H
9. Just my style worksheet	Appendix I

Seeking Permission (Appendix A & B)

As is expected of an action research project, I sought permission from my principal (Appendix A) and the children's parents (Appendix B) prior to beginning this research. Every year at my school we have Parent/Teacher Conferences in the fall. I explained in person to each parent the purpose of the study and that his/her permission for their child to participate would be appreciated and potentially extremely beneficial to their child. This approach helped the parents better understand where I was coming from and the true benign effects of the study. The letter of consent was delivered and signed by each parent. Once I received permission from those parties to perform my study, I began to implement my action research project.

Student Self-Efficacy and Motivation Surveys (Appendix C & D)

These surveys were designed to see how the students felt about their abilities as math students. Statements were chosen to determine student self-efficacy as well as motivation in the subject of math. Each survey had 18 statements that the students read and then responded to by circling the number of the answer that fit them best: Always Like Me, Like Me, Sometimes Like Me, Not Like Me, Never Like Me.

Pre-study Written Math Assessment (Appendix E)

The written math assessment was a test of the students' knowledge of 60 different multiplication facts from 0-5. The results of this test were used to compare to the post-written math assessment.

Learning Styles Curriculum

In order to assess if self-determination would indeed help my students earn higher grades, develop more motivation and higher self-efficacy, I developed lessons that taught the children about learning styles. Self-determination requires that the children experience more choice and control in their education. In order for them as fourth graders to be able to handle additional choice and control, they would need to have a better understanding of how they are as learners.

Learning styles are related to "...how people are most comfortable learning and most receptive to learning" (Peterson & Hittie, 2003, p. 182). Learning styles are different from the multiple intelligences in that multiple intelligences describe in what ways people are smart, not how they prefer to learn (Peterson & Hittie, 2003, p. 182). The Dunn & Dunn Learning Style Model created by Drs. Rita and Ken Dunn identifies 21 elements that impact concentration levels when someone is trying to gain academic knowledge. These 21 elements are divided into 5 different categories, 3 of which I taught my students to identify. The three categories are:

- Environmental: Sound, light, temperature, design of the surroundings

- Sociological: Working alone, with a partner, in groups, or with an adult
- Physiological: Visual, auditory, or kinesthetic (touch/movement); eating and drinking while learning; time of day; level of mobility (Brand, Dunn, & Greb, 2002, p. 270).

Throughout my lessons, I introduced each category to the students and we tried variations of each element within each category, the purpose being that the students would learn through experience the way they learn best. It was expected that initially the students would gravitate to the elements that they found most “fun” at first, but over time their true preferences would become their natural pattern of behavior (Woolfolk, 2001, p. 129).

Ongoing Quick-writes About Learning Styles (Appendix F)

Throughout the instruction of the learning styles, I asked the students to do quick-writes about the subject matter being taught. The purpose of the quick-writes was to ensure that the students understood the material and effectively implemented the knowledge into their learning.

Ongoing Teacher and Outside Personnel Observations (Appendix G)

Both the teacher and outside personnel observations were looking for indicators of self-efficacy or motivation levels amongst the students. The outside personnel was the lead teacher of the school, a teacher the students know and are comfortable with in their classroom. There were two sets of predefined checklists that the teacher and outside observer used to indicate the presence and over time increased levels of self-efficacy and motivation. Both the teacher and outside observer discussed the definition of self-efficacy and motivation in order to ensure that their impressions of the student behaviors correlated as much as possible. Discussions about what was observed also occurred in order for the teacher (researcher) to ensure correlation of the data.

Student Self-Efficacy and Motivation Surveys (Appendix C & D)

Using the same surveys that were given at the beginning of the study, these surveys reflected any change in each student's self-efficacy and motivation in regards to being a student as well as, in particular, a student of math. These surveys were also compared with each student's survey that was completed at the beginning of the study. Any patterns and conclusions were derived from the comparison.

Post-Study Written Math Assessment (Appendix E)

As was done at the beginning of the study, the same timed written math assessment was given. This was done in order to see if the students performed better academically on the multiplication test since the beginning of the study. The scores from the first assessments were compared with these assessments to see if any patterns or conclusions could be drawn.

Student Learning Styles Survey (Appendix H)

This survey was given only once at the conclusion of the study. Its purpose was to ensure that understanding and implementation of the learning styles was occurring. When the data from this survey along with the writings were compared, it was evident if the material was grasped and utilized by each student.

Just My Style Worksheet (Appendix I)

The purpose of this worksheet was to provide a place for the students to put their discoveries about themselves as learners as they made their way through the learning styles curriculum. The worksheet also helped them keep the different learning styles clearly defined.

Record Current Math Grades

I took any current math grades that accrued throughout the marking period prior to the beginning of the study and filed them as a record of where the students were academically before any self-determination strategies were instituted.

A final documenting of the overall math grade for each student was taken and compared with the math scores as recorded from before the study. If my efforts to increase self-determination were a success, then the math scores for the students should have increased.

Analyzing the Data

Once all data has been gathered, the action researcher moves into step three, data analysis. By systematically analyzing all the information that has been obtained and looking for any emerging patterns or trends, the action researcher can then draw valuable conclusions from the data (Sagor, 1992, p. 11).

Following the recommendations of Richard Sagor, I began creating bins for each category of data that were listed in my data collection tools matrix. Therefore, there were four bins, each labeled with one of the following questions:

- Have the students' grades gone up?
- Has student self-efficacy gone up (in reference to them as math students)?
- Has student motivation around their learning increased (in reference to themselves as math students)?
- Are the students understanding and practicing self-determination strategies?

Each bin was then designated a certain color. This enabled me as researcher to quickly determine which data addressed a particular question. This was especially useful as some of the data addressed more than one question.

Once reading and highlighting was concluded, I as researcher then typed onto separate documents all of the data that concerned each question so that all of the information was in one place. It was essential that each piece of data was marked with where it came from, for once the data was collected in one place, it would have been hard to determine the source of the data.

Summarizing of the data occurred next, preparing the information to be analyzed for patterns or conclusions. Then conclusions were drawn, patterns detected, and meaning also drawn from them (Sagor, 1992, p. 53).

I am confident the data I took from this study did answer whether my students' motivation, self-efficacy, and consequently math grades rose over the course of the study. This was a relatively assured possibility as the data I gathered during the study was triangulated as well as comprised of a combination of both qualitative and quantitative data collection tools. Triangulation of data, or the act of obtaining data about one question from a variety of angles, provides the action researcher with a well rounded view of the study and data that is both valid and reliable (Sagor, 1992, p. 43). In addition, the data collection tools themselves were also triangulated, ensuring that the information gleaned from the survey, observations, and assessments reflected accurate data of the experience in the classroom. Because the data collection tools in relation to each other as well as how they were constructed had been carefully and intentionally done with regard for triangulation, there was very little open for misinterpretation.

Quantitative data collection tools gather information that can be assessed through the gathering and comparing of numbers such as test scores. Qualitative data collection tools obtain information that is not based on numbers but more about the "story" of the study, gathered through tools such as observations and journal entries. A good action research project will have a variety of data collection tools that are a combination of both qualitative and quantitative in nature. For the purpose of my study, I had the following qualitative and quantitative data collection tools:

Quantitative

Written math assessment

Cumulative math grades

Student surveys

Qualitative

Teacher observations

Outside personnel observations

Student quick-writes

While I had to find patterns and draw conclusions from those patterns found within the data, the data collection tools triangulation in relation to each other, triangulation in their design, and the fact that some tools were quantitative while others were qualitative quite conclusively showed clear and accurate evidence of this study's impact upon the students' self-efficacy, motivation, and math scores.

Following data analysis are steps four and five. Step four is the reporting of results, which can be done in a variety of ways. This step is essential, as all of the valuable research that has been done and conclusions drawn are not effective if they are not shared with the general field of education. Action research should be reported in the form of a written report, which is what I will be doing at the conclusion of my data collection and analysis. Once the report has been generated, it is essential that the findings are shared with others either through meetings, presentations, or even publishing (Sagor, 1992, p. 63).

Step five, action planning, is the final and most relevant point of action research. Step five is the act of taking action, of using your newly found information to benefit the field of education directly around you. This aspect of action research is extremely beneficial to teachers, as all of the conclusions that have just been drawn can now be owned and incorporated into the classroom, immediately impacting children's learning. It is exciting to research something that I as a teacher and action researcher am so passionate about and then be able to take the findings and incorporate them into my own classroom for personal change. It is that moment that

educators as action researchers look forward to: finding a new effective way to successfully teach children.

Summary

As is evident through the review of my methodology and the overall format of an action research project, much effort and attention to detail is involved in designing, carrying out, and evaluating an action research project. It is an extremely powerful tool for teachers, as it makes it possible to improve the classroom environment based upon solid research. As changes are incorporated into the classroom experience, the teacher can see how those changes impact the students and can then further fine-tune those changes into a final product that is effective and beneficial to the field of education. The final powerful step is to then share those new discoveries with other teachers throughout the country so that they and their students may be empowered by the newly discovered approach to teaching and learning.

Chapter Four: Results

Overview

Most adults would probably agree that the more control they have over their lives and the more successful they are in their lives, the happier they are. This is evident when we see many adults dreading Monday morning when what time to get up, get going, and where to go is no longer an option.

This same reaction to a loss of choice is seen in children as well. It is all too soon when children have no choice but to attend school and within 3 years, having a snow day, a vacation, or the summers off is preferable to the school year. Is it because of the work? Probably to a degree, but going to school is not a choice for most children, and this is not empowering for them. They would rather be “free” to do as they choose – just like adults! Young and old alike seem to yearn for the weekends.

It was after taking a life empowering class and learning how to make my life my own and how much joy can come from that approach when I considered this empowering concept for children. In fact, the young people who were in my life-empowering class were better at empowering themselves than the adults. From that day on, I never forgot just how powerful children can be and how much credit I may be able to give a child for their thoughts and opinions. A decade later and walking through our resource room at the school where I teach, I learned that children with IEPs could not see their IEPs without parental consent. This went against what I had thought was just for these youth. I could not believe children had no “control” over their own IEP and had to defer to an adult for information. This led me to research and discover a concept called “self-determination” that is used to advocate for children’s participation and input in IEP meetings. Self-determination validated my belief that

children, with support, can contribute to their own education and that this additional control could lead to stronger academic performance. It was this belief in the empowerment of children and whether it would truly lead to higher academic performance that drove me to this action research project.

The theory of self-determination as espoused by University of Rochester's Deci and Ryan and other theorists such as Maslow and Glasser led me to the following thesis question: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently attain better academic achievement in math? In order to create a self-determining environment, I chose to teach the students about different learning styles and to use them to learn math content. A comparison of pre and post study student self-efficacy, motivation, and academic achievement was completed after teaching the learning styles to the students.

Setting and Participants

The location of my action research study is in my own general education fourth grade classroom. I teach in a public elementary school in Western New Hampshire. The school is comprised of approximately 60 students, with the classes being divided up as follows: 1st grade, 2nd and 3rd grade, 4th grade, and 5th grade. The school year runs from late August through mid June.

The classroom itself is almost entirely carpeted, the children sitting in three groups of four or five. There are dry erase boards in the front of the classroom and one dry erase board at the back. There is a sink as well as a "cool out corner" for those children who need to "take a break". There are seven windows in the room, two exits (one leading outside to the playground), and a library area where the class meets to have morning meeting. The room itself is rectangular

shaped with the front of the classroom being one of the long sides of the room. The teacher's desk is to the front left side of the classroom, facing one of the short sides of the room. There are three round tables scattered throughout the room that are centers and work areas for the children to use. The four bulletin boards are bright and colorful, a good percentage of them have been left available for student work.

The participants are my own general education fourth grade class. The class is comprised of 15 students, 7 boys and 8 girls. Their ages range from 9-11 years old. All children are Caucasian. There are two children in the class (one male and one female) who have been characterized as having ADHD but are not identified. There is another male learner who requires extra time to grasp and understand academic material. There is an aide who comes in daily to assist one child during math time. There is only the teacher, myself, working with the students in the classroom during the rest of the day.

Methodology

Prior to beginning the study, I first recorded the students' academic grades. I then told the students that I would be teaching them some new things in the classroom for them to try out in order to learn more about themselves as learners.

Once my introduction was complete, I distributed to the students a Self-Efficacy Survey and a Motivation Survey (Appendix C & D). I read the entire survey to the class, asking them to circle the answer that most closely fits how they feel about themselves as math learners. Once I carried out the pre-study self-efficacy and motivation surveys, I distributed a pre-study multiplication math facts quiz with 60 random math facts (Appendix E).

Once all of the pre-study data was gathered, I began my 8 lessons which introduced the students to different learning styles, giving them an opportunity to try different learning styles,

and then actually assess themselves to discover what learning styles they personally preferred. I taught the students 13 different ways to learn information, which was broken down into three categories: environmental, sociological, and physiological.

The first lesson was an introduction to the concept of learning styles. Learning styles are “how people are most comfortable learning and most receptive to learning” (Peterson & Hittie, 2003, p. 182). Dr. Rita Dunn and Dr. Kenneth Dunn have designed the learning styles model used in this study. Dr. Rita Dunn is a professor at St. John’s University in New York, while her husband Dr. Kenneth Dunn is a professor at the City University of New York at Queens College. The learning styles model is below, although I only used a portion of these learning styles for my study. The chart is broken down into stimuli with the elements that apply to each stimuli listed below. The elements and accompanying stimuli I used in my study are italicized and found in Table 3.

Table 3

Learning Styles Presented To Students (in italics)

Stimuli	<i>Environmental</i>	Emotional	<i>Sociological</i>	<i>Physiological</i>	Psychological
Elements	<i>sound</i>	motivation	<i>self</i>	<i>perceptual</i>	global/analytic
	<i>light</i>	persistence	<i>pair</i>	<i>intake</i>	hemisphericity
	<i>temperature</i>	responsibility	peers	<i>time</i>	impulsive/reflective
	<i>design</i>	structure	<i>Team</i>	<i>mobility</i>	
			<i>Adult</i>		
			varied		

* Adapted from Brand, Dunn, and Greb, 2002, p. 271

Environmental learning styles are preferred variations of the environment one is in when trying to learn something. Is there any noise or music in the learning space? How much lighting is used, the temperature in the room, and whether the learners are seated at a desk or reclined in a wingback chair or on a futon are also environmental learning style differences. Sociological learning styles are different ways to learn based on whether the learner is alone, with a partner, in

a group, or with an adult. The final set of learning styles I used was physiological in nature. These learning styles involve using the internal body differently while learning. Perceptual is preferring learning better through visual, auditory, or tactile strategies. Intake is whether snacking or not snacking while learning helps. Time is about the time of day best to learn and mobility addresses moving or sitting still to learn.

My first lesson's goal was to define "learning styles" and introduce the three learning style categories I would be teaching: environmental, physiological, and sociological. I presented the purpose of the lessons and learning styles on an entertaining PowerPoint that grabbed the students' attention. I also distributed a blank Kidspiration concept web of the learning styles to be completed as they gathered information throughout the lessons. As a class we brainstormed what the students knew about themselves as learners and completed a KWL chart about their preferences. I then distributed the definition of learning styles while they viewed it on the overhead. We filled in the learning styles categories on our webs.

My second lesson introduced and practiced 2 of the 4 environmental learning styles (sound and light). I distributed a "Just My Style" worksheet that provides a place for students to document their personal learning style preferences throughout the unit. I began the lesson asking the students to answer the question "What are learning styles?" Once these quick-writes were gathered we reviewed learning styles and the three categories introduced the day before. We then filled in "sound" and "light" onto our learning styles webs. The first activity required the students to put together complete fraction circles on their own in silence and then with background music. After the activity I asked the students to reflect upon the silent versus background music activity and notice which environment helped them focus more clearly on the task of completing fraction circles.

Continuing on with this lesson, I distributed two fiction stories to the students while at their desks. For the first story, I asked the students to read the story and complete the five accompanying questions in bright classroom lighting. For the second story, I dimmed the classroom lights by turning off one set of florescent lights and asked the students to read a second story and complete the five accompanying questions.

For the third lesson, I introduced the two remaining environmental learning styles to the students: temperature and design. To begin the lesson I first reviewed the first two environmental learning styles from the prior lesson and connected it with today's lesson. For temperature, the students practiced math facts for three minutes with a classmate in first a warm classroom. Then with their classmate they were quizzed based on how many math facts they knew out of the 13 facts. I recorded their scores. For the second part of the activity, I opened all the windows and the doors and asked the students to practice a new set of math facts with their partner in the cooler air for another three minutes. Again after that period of time I asked the students to quiz each other and report to me their scores. The math fact sets were sets that they had not yet learned in both activities.

The second half of the third lesson focused on design, or what kind of furniture to use while learning. For both activities the students had five pennies and they had 3 minutes to learn the dates of the pennies before being asked to write them down from memory. For the first part, the students stayed seated at their desks, while for the second part they received a new set of pennies and were able to lie down on floor cushions, sit in a wingback or cushioned chair, or lie down on the futon. The teacher in a random fashion predetermined the areas of comfortable seating. The students documented on their "Just My Style" worksheets their results and personal preferences for both the temperature and design activities.

My fourth lesson introduced the students to the first of six physiological learning styles: visual, auditory, and tactile. I began the lesson by again reviewing what we had learned thus far. We pulled out our concept webs and filled in the newest learning styles we would be learning. I then began the activities. I used three different math word problems to carry out this activity. The first math word problem was written only on the overhead and the students had to calculate their answer in their heads and write their answer down on a piece of paper. This assessed their preference for visual information. For the second part of the activity I evaluated their preference for auditory information by reading to them out loud twice a word problem that they had to solve in their heads and record their answer on paper. For the third and final activity I placed a final word problem on the overhead and read it aloud and permitted the students to solve the problem with cubes or with paper and pencil. I again recorded their scores at the conclusion of this activity.

For my fifth lesson I introduced the children to the last three physiological learning styles: intake, mobility, and time of day. Each of these learning styles required its' own student activity. The first was intake, or checking to see if eating a snack while working or not eating while working helps the students learn better. The students sat at their desks for both parts, reading a different non-fiction piece for the snack and no-snack activity. The students were given a choice of plain potato chips, pretzels, or both. For the mobility activity, the students practiced the capitals of three countries both seated and walking around, followed by a quick quiz after each. For the third part of the physiological activities, time of day, I read two different excerpts from the book Sign of the Beaver by Jean Craighead George. I read one excerpt at 9AM and the second at 1:15PM. Prior to reading the excerpts, I asked the students to listen for details in the text that could be identified by the five senses. For example, if in the story there was a

“crackling fire” then the students could write down the word fire under see, hear, and smell.

They were asked to write down anything in the story that fell under any of the five senses next to the correct sense.

My sixth lesson introduced the four types of sociological learning styles: working alone, with a partner, in a group, or with an adult. I began the lesson by asking the students to recall in a quick-write what learning styles we discussed the prior day. I asked the students to write a two sentence quick-write answering the question: What are physiological learning styles? I provided the students with a word splash in order to assist them in the quick-write. We then reviewed the four types of environmental learning styles and then filled out our concept web, filling in the sociological learning styles. In order to carry out this activity, we used the five regions of the United States that we’ve been practicing as part of a social studies unit. Because the students are more familiar with their own region, I chose to use this region first for the individual activity and randomly use the other regions for the remaining sociological activities. The students spent five minutes with Northeast region puzzle pieces, putting them together and practicing the states and capitals. They did this independently for five minutes. Once the five minutes passed, I distributed a blank Northeast map where they had to supply each capital and state.

For both the partner and group practice and assessment, the class was divided into random pairings and groups and worked with each other to put together a map of a particular region of the United States. The regions were distributed randomly to the pairs and groups and were put together and practiced for 5 minutes. After each practice, the students were again asked to complete a blank map of the region that they had just practiced.

For the final part of this activity, the students worked one on one with an adult for five minutes before logging onto a website that stated the state capital and the student had to push on the correct state with the mouse.

For the final lesson, lesson seven, we reviewed all of the learning styles as a class and recalled which one each of us preferred. The students then took silhouettes of their own heads and in their head they labeled what types of learning styles they preferred best. I then distributed duplicate blank copies of the math assessment, the self-efficacy survey, and the motivation survey to the students to complete now that the study had ended. I carried them out in exactly the same way they had been done prior to the beginning of the study in order to preserve reliability. I then distributed a post study questionnaire and survey to complete. The purpose of this survey was to first ascertain if the students understood the different learning styles and could identify what they preferred and how that made them feel. Secondly, the survey sought to determine what the students did not prefer and why, as well as how they feel overall about understanding what learning styles they need to know to learn. Lastly, I documented the students' overall academic math grades.

With the introduction of different learning styles, the students were able to explore their personal preferences and then could learn the material using those preferences. Through self-understanding and self-determination while learning, I hoped the students would increase student self-efficacy, motivation, and math achievement.

Results

Pre-Study Math Grades

Any current math grades that had accrued throughout the marking period prior to the beginning of the study were averaged and recorded as documentation of where the students were

academically before any self-determination strategies were instituted. This provides as a base score to compare to with post-study math grades. The lowest math score prior to the beginning of the study was 75% while the highest was 95%. The class average pre-study was 79.26%. The pre-study math grades are contained in Table 4.

Table 4

Pre-Study Math Grades

Students	Pre-Study Averages	Summary
Student One	83%	Average: 79.26%
Student Two	86%	Range: 75%-95%
Student Three	85%	
Student Four	78%	
Student Five	95%	
Student Six	75%	
Student Seven	91%	
Student Eight	81%	
Student Nine	84%	
Student Ten	76%	
Student Eleven	79%	
Student Twelve	77%	
Student Thirteen	92%	
Student Fourteen	90%	
Student Fifteen	87%	

Student Self-Efficacy and Motivation Surveys (Appendix C & D)

These surveys were designed to see how the students felt about their abilities as math students. Statements were chosen to determine student motivation as well as self-efficacy around school in general as well as in the subject of math. The survey has 18 statements that the students read and then responded to by circling the number of the answer that fit them best: Always Like Me, Like Me, Sometimes Like Me, Not Like Me, Never Like Me. The survey was given before any other part of the study was instituted so the results could be as authentic as possible.

The highest possible score on each survey was a 60/60. The high score indicated high self-efficacy or motivation, depending upon the survey scored. Prior to the start of the study, the lowest self-efficacy survey score was 12/60 and the highest self-efficacy score was 58/60. The class average was 44.66/60 or 74.4 %. For the motivation survey the pre-study lowest score was 16/60 while the highest was 56/60. The class average prior to the study was 45.6/60 or 75.9%. The results for the self-efficacy survey can be seen in Table 5. The results for the motivation survey can be seen in Table 6.

Table 5

Pre-Study Self-Efficacy Survey

Students	Pre-Study Scores	Summary
Student One	56	Average: 44.66 points
Student Two	43	Range: 12-58
Student Three	47	
Student Four	12	
Student Five	44	
Student Six	29	
Student Seven	58	
Student Eight	50	
Student Nine	49	
Student Ten	56	
Student Eleven	41	
Student Twelve	48	
Student Thirteen	56	
Student Fourteen	39	
Student Fifteen	42	

Table 6

Pre-Study Motivation Surveys

Students	Pre-Study Scores	Summary
Student One	52	Average: 45.6 points
Student Two	48	Range: 16-56
Student Three	51	
Student Four	36	
Student Five	44	
Student Six	16	
Student Seven	51	
Student Eight	46	
Student Nine	45	
Student Ten	52	
Student Eleven	45	
Student Twelve	47	
Student Thirteen	56	
Student Fourteen	46	
Student Fifteen	49	

Pre-study Written Math Assessment (Appendix E)

The written math assessment was a test of the students' knowledge of 60 different multiplication facts from 0-5. Since the focus of the study was to see how well self-determining strategies affected math knowledge, it was essential to establish how the students were performing prior to the beginning of the study. The test was scored and recorded for each student and then averaged as a class. I asked the students to do their best work and the class took the quiz simultaneously. The lowest score pre-study was 11/60 while the highest was 58/60.

The class average was 30.86 or 51.4%. The data can be seen in Table 7.

Table 7

Pre-Study Written Math Assessment

Students	Pre-Study Math Assessment Scores	Summary
Student One	12	Average: 30.86
Student Two	11	Range: 11-58
Student Three	24	
Student Four	19	
Student Five	29	
Student Six	12	
Student Seven	38	
Student Eight	42	
Student Nine	14	
Student Ten	27	
Student Eleven	29	
Student Twelve	58	
Student Thirteen	53	
Student Fourteen	46	
Student Fifteen	26	

Lesson One

In lesson one, the students were introduced to the definition of learning styles and the categories of learning styles through the use of overheads, a PowerPoint presentation, and a Kidspiration outline. No data was collected at this time.

Lesson Two

The purpose of this lesson was to determine if the students understood the concept of learning styles through a quick-write and then to attempt a task using fraction circles with different background noises (none versus a recognizable song) and answering questions to fiction stories in both a bright and dimly lit room. In order to achieve a “dimly lit” room, one set of the florescent overhead lights were turned out and the students were asked to move their desks out from underneath the florescent lights still lit.

For the quick-write, the students answered the question: “What are learning styles?” All students responded with the following results: 40% of the responses mentioned specific characteristics of learning styles such as dark/light, quiet/background noise, etc. 47% of the

responses repeated the definition of learning styles, although two of the students did refer to their learning style paperwork to complete their quick-write. Without those two students, 33% wrote the definition without referring to a resource. Finally, 27% of the responses did not know what learning styles were based upon their responses. This final set of responses demonstrated the term “learning styles” was not fully understood by those students at that date. Overall, 77% of the class was able to either cite different learning styles or recall the definition of a learning style.

For the first activity assessing productivity and learning during silence and background noise, the students were asked to put together fraction circles as quickly as they could. The following results occurred: In silence, the fastest student put together a fraction circle in 28 seconds while the longest took 1 minute 32 seconds. With a recognizable song playing in the background the second time, the fastest student put together a fraction circle in 32 seconds while the longest took 1 minute 45 seconds.

For the second activity that evaluated academic success in a bright versus dimly lit room, the students at their desks read a short fiction story and answered questions about that story in both settings. The results are as follows: for the activity done in full lighting, the class total correct was 61/75, for an average score of 81.3%. For the activity done in dim lighting, the class total correct was 62/75, for an average was 82.6%. The results of the bright versus dimly lit room can be seen in Table 8.

Table 8

Bright Lighting versus Dim Lighting

Students	Brightly Lit Room	Dimly Lit Room
	Average: 81.3% Range: 40%-100%	Average: 82.6% Range: 60%-100%
Student One	100%	100%
Student Two	80%	100%
Student Three	100%	100%
Student Four	60%	60%
Student Five	100%	100%
Student Six	80%	60%
Student Seven	60%	100%
Student Eight	80%	60%
Student Nine	80%	60%
Student Ten	80%	80%
Student Eleven	40%	80%
Student Twelve	40%	80%
Student Thirteen	100%	80%
Student Fourteen	100%	80%
Student Fifteen	100%	100%

Interpretation. The quick-write indicated to me that the majority of the class after only a couple of days had some reasonable understanding of learning styles. This was encouraging and allowed me to keep an eye on those students who were still unclear in order to support their learning throughout the following lessons.

During the silence/background noise activity with fraction circles, the class was more productive working in silence. This is evident by the times taken that demonstrate the task was completed more quickly in silence. As an observer, I noticed students “bopping” in their seats while working with the recognizable music playing in the background. This showed me that the music was a distraction, however minimal, and it slowed some of the students down.

For the lighting activity, the students scored slightly better in a more dimly lit room, scoring 1.3% higher with less lighting than with full florescent lighting. This activity concludes that dimmer lighting may either improve or not impact learning at all for the class as a whole.

Lesson Three

Lesson three addressed the two remaining environmental learning styles: temperature and design. For the temperature activity, the students first practiced and then were assessed on their knowledge of sets of multiplication facts in both a warm and cool classroom. The results show that in the warm environment, 143 out of 182 math facts were answered correctly, or 78.5%. In the cool environment, 135 out of 182 were answered correctly or 74.1%. The warm versus cool graph can be seen in Table 9.

Table 9

Warm and Cool Environment Scores

Students	Warm Environment Scores	Cool Environment Scores
	Average: 78.55% Range: 46.1% – 100%	Average: 74.15% Range: 46.1% - 100%
Student One	46.1%	69.2%
Student Two	84.6%	61.5%
Student Three	69.2%	69.2%
Student Four	69.2%	46.1%
Student Five	92.3%	53.8%
Student Six	84.6%	69.2%
Student Seven	100%	100%
Student Eight	92.3%	92.3%
Student Nine	53.8%	38.4%
Student Ten	46.1%	76.9%
Student Eleven	61.5%	76.9%
Student Twelve	ABSENT	ABSENT
Student Thirteen	100%	92.3%
Student Fourteen	100%	92.3%
Student Fifteen	100%	100%

For the design activity, I asked the children to study five pennies first at their desk and then in a comfortable spot to see where they could learn the dates of the two sets of pennies better. Sitting at desks the students scored as a class 66/75 or 88% while in comfortable spots the students scored 71/75 or 94.6%. The design activity results can be seen in Table 10.

Table 10

Desk and Reclined Scores

Students	Desk Scores	Reclined Scores
	Average: 88.5% Range: 60%-100%	Average: 94.6% Range: 60%-100%
Student One	80%	100%
Student Two	100%	100%
Student Three	100%	100%
Student Four	100%	80%
Student Five	100%	80%
Student Six	100%	100%
Student Seven	100%	100%
Student Eight	100%	100%
Student Nine	60%	100%
Student Ten	100%	100%
Student Eleven	20%	60%
Student Twelve	60%	100%
Student Thirteen	100%	100%
Student Fourteen	100%	100%
Student Fifteen	100%	100%

Interpretation. According to these activities, the students performed better in the warmer environment. There was an increase of 4.4% of inaccurate responses from the warmer to the cooler room. Regarding the design activity, the results demonstrate that a more comfortable seating arrangement may benefit the learners in my classroom. The percent of accuracy jumped significantly from 88-94.6%, or 6.6 percentage points. In conclusion, the students performed better in a warm and comfortable environment over a cooler more regimented seating environment.

Lesson Four

For this activity the students practiced the first three of six physiological learning styles: visual, auditory, and tactile. I could only record how many correct answers versus how many incorrect, as the students gave me different answers. For the visual word problem, 8/15 or 53.3% answered correctly. 14/15 or 93.3% answered the auditory problem correctly. For the tactile problem, 11/15 or 73.3% answered the problem correctly.

Interpretation. From this activity we can conclude that auditorally, the class fared the best while visually and with tactile instruments the students did not do as well. Visual interpretation alone was the lowest score, indicating that for my class, the instances in which we assess or teach children using only visual aids, they are at the greatest disadvantage.

Lesson Five

Lesson five addressed the last three physiological learning styles: intake, mobility, and time of day. To assess intake, the students read two non-fiction pieces of writing and answered accompanying questions both while eating and not eating a snack. For the intake or snack/no snack activity, the students as a class with a snack scored 54/75 or 72%. Without a snack, the students scored 55/75 or 73%. The intake results can be seen below in Table 11.

Table 11

Intake (Snack and No Snack Scores)

Students	Snack Scores	No Snack Scores
	Average: 72% Range: 0%-100%	Average: 79.26% Range: 40%-100%
Student One	60%	80%
Student Two	40%	60%
Student Three	100%	40%
Student Four	80%	60%
Student Five	100%	80%
Student Six	ABSENT	ABSENT
Student Seven	60%	100%
Student Eight	40%	80%
Student Nine	80%	80%
Student Ten	100%	60%
Student Eleven	40%	60%
Student Twelve	0%	40%
Student Thirteen	100%	100%
Student Fourteen	100%	100%
Student Fifteen	80%	60%

For the mobility activity, the students scored 39.5/42 or 94% when they were sitting still. While they were moving, they scored 38/42 or 90%. For the final activity of listening for the five senses in the story in both the morning and the afternoon, the students as a class documented 133 accurate details in the morning and documented 144 accurate details in the afternoon. The mobility activity results can be seen in Table 12 below.

Table 12

Sitting Still and Moving Scores

Students	Sitting Still Scores	Moving Scores
	Average: 94% Range: 50%-100%	Average: 90% Range: 33%-100%
Student One	100%	83.3%
Student Two	100%	33%
Student Three	100%	100%
Student Four	100%	100%
Student Five	100%	100%
Student Six	ABSENT	ABSENT
Student Seven	100%	100%
Student Eight	83.3%	83.3%
Student Nine	83.3%	66.6%
Student Ten	100%	100%
Student Eleven	100%	100%
Student Twelve	50%	100%
Student Thirteen	100%	100%
Student Fourteen	100%	100%
Student Fifteen	100%	100%

Interpretation. When the students had an opportunity to see if having a snack or not impacts their learning, their scores as a class were a virtual tie, although without a snack, the students scored one percentage point higher. For the mobility activity, the students clearly scored better sitting still, for as a class they scored four percentage points higher. In the final activity that assessed whether the students could function better in the morning or in the afternoon, the students were able to document 11 more details referencing the five senses in the afternoon than in the morning. Another activity that reflects what we generally do with students might be in fact, the wrong approach.

Lesson Six

The sixth lesson began with a quick-write that assessed whether the students understood the physiological learning styles that were taught in lesson four and five. The students responded to the following question: “What are physiological learning styles?” Of the 13 students that responded, nine, or 69% of the responses were correct or mentioned some of the physiological learning styles. The remaining 4 or 31% either mentioned learning styles that were not

physiological or lacking adequate information. For the four sociological activities, the results are following. Eleven states were included in the Northeast map and when studying individually, the students as a class scored 108.5/143, or 75.8% correct. In partners, the class average of correct answers was 75.5% while class's group average was 61.16%. With an adult the amount correct among all the students was 655/700, or 93.5%. The results of the sociological activities can be seen below in Table 13.

Table 13

Sociological Activity Scores

Students	Alone	Pairs	Group	w/Adult
Averages & Ranges in %	Average: 75.8% Range: 36%-100%	Average: 75.5% Range: 8.3%-100%	Avg: 67.2% Range:17-100%	Avg: 93.5% Range: 82-100
Student One	59%	25%	95%	94%
Student Two	100%	100%	ABSENT	98%
Student Three	91%	100%	17%	90%
Student Four	ABSENT	8.3%	82%	92%
Student Five	100%	100%	100%	96%
Student Six	55%	50%	21%	92%
Student Seven	100%	100%	67%	100%
Student Eight	100%	100%	67%	94%
Student Nine	36%	50%	8.3%	84%
Student Ten	100%	100%	83%	92%
Student Eleven	ABSENT	ABSENT	ABSENT	ABSENT
Student Twelve	45%	100%	50%	82%
Student Thirteen	100%	100%	91%	98%
Student Fourteen	73%	100%	100%	98%
Student Fifteen	27%	33%	100%	100%

Interpretation. Again, the quick-write reflects that the majority of the students understood the material being introduced and practiced. Those who were unclear in their written explanation were watched throughout the rest of the lessons.

With regards to the three sociological activities, it is clear that between alone, pairs, or groups, alone or in pairs is much better than in groups. It would appear that groups may still

serve a purpose in the classroom, but not in a situation where studying and retention of detailed information is required. When comparing this score to the other scores taken from individual, pair, and group work, clearly working with an adult provides the students with the best scores. One on one work with an adult provides the most learning, followed by individual or pair work. Group work is least effective.

Lesson Seven

The final lesson was designed to be a review of the learning styles practiced and a time for the students to record what learning styles they prefer best. The lesson began with a three sentence quick-write to finish the following: “I learned that when I need to learn something, I need...” Once the quick-writes were finished, the students made silhouettes of their preferred learning styles. They also took a self-efficacy and motivation survey, a math facts quiz, and a final post study questionnaire and survey. I also documented the student’s overall math grades.

For the quick-write, 100% of the students were able to report at least one learning style they knew to work for them while trying to learn. 67% of the students reported between one and six learning styles while 33% referenced seven to twelve learning styles they preferred.

The math grades that had accrued throughout the marking period up to the end of the study were averaged and recorded as documentation of where the students were academically after the self-determination strategies were taught and practiced. The lowest math score after the study was 65% while the highest was 95%. The class average post-study was 85.53%. The results of the post-study grades can be seen below in Table 14.

Table 14

Post-Study Math Grade Averages

Students	Post-Study Math Grade Averages	Summary
Student One	86%	Average: 85.53%
Student Two	90%	Range: 65%-95%
Student Three	87%	
Student Four	77%	
Student Five	95%	
Student Six	78%	
Student Seven	92%	
Student Eight	83%	
Student Nine	88%	
Student Ten	84%	
Student Eleven	82%	
Student Twelve	65%	
Student Thirteen	95%	
Student Fourteen	92%	
Student Fifteen	89%	

The student self-efficacy and motivation surveys were given post-study. The highest possible score on each survey was a 60/60. The high score indicated high self-efficacy or motivation, depending upon the survey. After the study, the lowest self-efficacy survey score was 38/60 and the highest was 58/60. The class average was 49.13/60 or 81.8 %. For the motivation survey the post-study lowest score was 41/60 while the highest was 56/60. The class average after the study was 48/60 or 79.9%. The post-study self-efficacy and survey results can be seen below in Table 15. Post-study motivation survey results can be seen below in Table 16.

Table 15

Post-Study Self-Efficacy Survey Results

Students	Post-Study Scores	Summary
Student One	56	Average: 49.13 points
Student Two	40	Range: 38-58
Student Three	50	
Student Four	48	
Student Five	51	
Student Six	48	
Student Seven	48	
Student Eight	45	
Student Nine	53	
Student Ten	54	
Student Eleven	38	
Student Twelve	51	
Student Thirteen	58	
Student Fourteen	51	
Student Fifteen	46	

Table 16

Post-Study Motivation Surveys

Students	Post-Study Scores	Summary
Student One	50	Average: 79.9 points
Student Two	44	Range: 41-56
Student Three	53	
Student Four	56	
Student Five	43	
Student Six	46	
Student Seven	47	
Student Eight	43	
Student Nine	48	
Student Ten	50	
Student Eleven	43	
Student Twelve	41	
Student Thirteen	56	
Student Fourteen	51	
Student Fifteen	50	

The post-study questionnaire and survey reported that the students as a class scored 83% correct when asked to identify the environmental learning styles, 95% correct when asked to identify the sociological learning styles, and 89% correct when asked to identify the

physiological learning styles. All of the students were able to identify the learning styles they did and did not prefer and why. When asked questions about how they feel about learning styles and if knowing about them makes them happier and better students, class averages ranged from 4.2-4.8 out of 5, or 84-96% positive responses.

The post-study written math assessment was a test of the students' knowledge of 60 different multiplication facts from 0-5. The test was scored and recorded for each student and then averaged as a class. The lowest score post-study was 17/60 while the highest was 59/60. The class average was 42.73/60 or 71.2%. The post-study written math assessment scores are written below in Table 17.

Table 17

Post-Study Written Math Assessment

Students	Post-Study Written Math Assessment	Summary
Student One	35	Average: 71.2%
Student Two	31	Range: 17-59 / 60 correct
Student Three	40	
Student Four	17	
Student Five	27	
Student Six	22	
Student Seven	57	
Student Eight	56	
Student Nine	52	
Student Ten	47	
Student Eleven	59	
Student Twelve	50	
Student Thirteen	49	
Student Fourteen	55	
Student Fifteen	44	

Interpretation. Considering the quick-write, it is apparent that the students have learned about the different learning styles over the course of the study. This confirms the students understood the material being taught.

Analysis

When these post-study overall math grades are compared to the pre-study grades, there is an increase of 3.1 points or a rise in 6.27%. This evidence proves that the effort made to instruct the students about learning styles was a success academically in the field of math.

When one compares the pre-study self-efficacy survey with the post-survey, there is a class average rise of 4.47 points, or a 7.4% increase student self-efficacy. The class average comparison between the pre and post motivation surveys was a rise in 2.4 points, or 4%. In both instances the students' self-efficacy and motivation rose as a result of the learning styles taught in this study.

The scores for the post-survey and questionnaire indicate the students were able to understand about learning styles, which learning styles work for them, and how they feel about themselves as learners as a result of learning about learning styles. Their comments demonstrate a positive correlation between utilizing learning styles and self-efficacy and motivation in math.

The final assessment given to the students was the post-study timed math assessment in order to see how well the students knew their math facts. There was an 11.86 point or 19.8% rise in scores when comparing the pre-study math facts scores to the post-study scores. These numbers clearly indicate that the students are more knowledgeable about their math facts as a result of the learning styles curriculum and their utilization of those learning styles to learn the math material.

Some data was collected throughout the study that was not done simply within one lesson or on one day. Those data collection tools and results are discussed following:

Student Observations/Shadowing (Appendix G)

It was my intention to have time to observe the students at work while using their learning styles. I anticipated being able to watch the students functioning during math and look for evidence of self-efficacy, motivation, and what learning styles were preferred from each student. Random observations were made during the pre-study math quiz as well as during the learning style lessons that followed. These observations were done so it was not only student surveys that reported upon the evidence or level of self-efficacy and motivation in the classroom. A total of four observation checklists (two sets) were created for this task, designed to spot visual evidence or lack of evidence of self-efficacy and motivation in individual student behavior. This task, however, proved to be difficult to do while simultaneously instructing the class. Therefore observations were not consistently reported nor very detailed.

In addition to the observations, an outsider known to the students but not the instructor was asked to attend class throughout the study and look for evidence of self-efficacy and motivation, using the same checklists. This task was also difficult to have consistently as many times the observer was required to help the students as they worked rather than simply observe. Therefore these observations were also not consistently performed nor detailed.

Answering the Questions

The method I employed in order for me to both teach the students self-determination strategies and to evaluate student progress and overall response was coordinated through a multi-step process. This multi-step process required me to first develop an overall question for my study. My question was: Will teaching my fourth grade general education students self-determination strategies help them develop higher self-efficacy, motivation, and consequently better academic achievement in math?

Once I established my overall question, the task was then to develop four specific research questions each with their own data collection tools to help triangulate my data for a more reliable study. The matrix illustrates what specific questions I asked in order to answer my overall action research question about self-determination, motivation, and academic achievement in my classroom during math. The matrix also shows what data collection tools were used for each of my specific questions. The six different data collection tools helped me to gather a wide range of information from a variety of perspectives. These data collection tools served various purposes, from assessing self-efficacy to verifying the students were learning the learning styles. These data resources ultimately resulted in conclusive findings regarding my overarching research question.

Table 18

Data Collection Tools Matrix

Research Questions	Data Source 1	Data Source 2	Data Source 3
<i>Have the students' grades gone up?</i>	Before and after, give written assessment to determine knowledge of math skill (multiplication facts?)	Record overall starting and finishing math grades	
<i>Has student self-efficacy gone up (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess how they FEEL as math students	Shadowing students during class (other than instructor) with behavior checklist during group activities
<i>Has student motivation around their learning increased (in reference to themselves as math students)?</i>	Observe student behaviors during both the before and after math assessment	Students complete questionnaire before both math assessments to assess their motivation levels	Shadowing students during class (other than instructor) with behavior checklist during group activity
<i>Are the students understanding and practicing self-determination strategies?</i>	Regular quick-writes about self-determination strategies taught that week	Teacher observations of students during class – are the strategies evident?	Questionnaire/survey to assess level of understanding and practicing of self-determination strategies after study is complete

In order to answer my large overarching question about self-determination in the classroom, I first answered the four specific questions that contributed to the findings of the initial research question. The results for each question are as follows.

Question One: Have the students' grades gone up? I utilized two data sources in order to answer this question. The first is the pre and post-study student academic grades I gathered from each student in the participating class. As it has been reported already in the section under Lesson seven on page 67, it is apparent academic achievement in math did rise over the course of this study. The second data source I gathered with regards to the students' grades was the

written math assessment (Appendix E). This test was comprised of 60 different multiplication facts from 0-5. Since the focus of the study was to see how well self-determining strategies affected math knowledge, it was essential to establish how the students were performing prior to the beginning of the study as well as after. The test was scored and recorded for each student and then averaged as a class. As is reported under Lesson Seven on page 67, the student math assessment scores also rose. These scores indicate that after the study the students were able to perform better with regards to their multiplication facts.

Both sets of data, the general math grades as well as the multiplication facts quizzes reflect an increase in student grades. As a class the scores rose substantially and seem to indicate that the study positively impacted the students.

Question Two: Has student self-efficacy gone up (in reference to themselves as math students?) In order to evaluate student self-efficacy over the course of the study, I intended to utilize teacher observations, school personnel shadowing, and student completed pre and post-study self-efficacy surveys.

Unfortunately, I was unable to consistently observe or engage outside personnel in shadowing the students during math. I did, however, carry out the pre and post self-efficacy surveys. As is mentioned under Lesson Seven on page 67, these surveys demonstrated that student self-efficacy rose over the course of the study.

Question Three: Has student motivation around their learning increased (in reference to themselves as math students)? In order to evaluate student motivation over the course of the study, I intended to utilize teacher observations, school personnel shadowing, and student completed pre and post-study motivation surveys.

Unfortunately, I was unable to consistently observe or engage outside personnel in shadowing the students during math. I did, however, carry out the pre and post motivation surveys. As is mentioned under Lesson Seven on page 67, these surveys demonstrated that student motivation rose over the course of the study.

Question Four: Are the students understanding and practicing self-determination strategies? This question was broached in order to ascertain if the students were understanding and incorporating the material being taught into their learning. In order to confirm this was occurring, three data sources were put in place. The first was frequent quick-writes that asked questions about self-determination strategies taught throughout the lessons. The second data source was teacher observations while the third data source was a questionnaire/survey at the end of the study.

For each of the three quick-writes, the majority of the students were able to reflect an understanding of the material being taught. For quick-write one in lesson two, 77% of the quick-write responses contained accurate information about learning styles. Quick-write two in lesson six also reflected an understanding of the knowledge being taught. 69% of those responses contained accurate information. 100% of the final quick-writes contained at least one accurate fact about the learning styles that were taught. The quick-writes most certainly confirmed that the material was being learned. For the teacher observations, I was unable to consistently make recorded comments while the students were using the learning styles due to lack of time and many interruptions. The questionnaire/survey at the end of the study reported a low of 83% and a high of 95% when the students were asked to identify the different learning styles as well as what learning styles they personally preferred. These results most certainly show that the self-determination strategies taught through different learning styles were acquired.

Limitations and Challenges

I learned a great many things while carrying out this study. In fact, as I went through each lesson of the study, I found I needed to make alterations to my original plan. I often did this as long as my results were not going to be skewed as a result of the change. In fact, most of my last minute changes turned out to be better ideas than the original plan. I've learned that despite preparation, there will be times in the midst of an activity when a better way to carry out the exercise will become evident.

One hardship I did not anticipate was the unavailability of other adults to come into my room and assist me so I could sit undisturbed and observe the students while they were working on a project in the room. I had asked in the summer before the study if some personnel would be available. I was assured they would be, but when it came time to have someone available to assist me, this was not the case. I was able to secure help for one learning style lesson that required extra adults so the outcome of the study was not affected significantly. I was simply not able to make my own observations while the students were working nor was someone else available to observe the students while I worked with them.

In retrospect, there are some aspects of the study I could have done differently in order to ensure even more reliability. The first observation I made was immediately after the pre-study self-efficacy and motivation surveys were given. It was apparent from the pre-study surveys that, based upon self-efficacy and motivation, there were three different categories of students in my room. The groups were: the already high self-efficacy and motivation students, the average level self-efficacy and motivation students, and those students who demonstrated low self-efficacy and motivation. This study impacted each group differently and demonstrated that these different groups may require different approaches when examining whether self-efficacy and

motivation will indeed impact academic achievement. Many of my students already had high self-efficacy and motivation, for five of the 15 participants scored over a 50/60, or 83%, on both the pre-study self-efficacy and motivation surveys. These same students, when it came to taking the post-study self-efficacy and motivation surveys had nowhere to go but score either the same or drop. This threatened the results of my study as these students already reported high self-efficacy and motivation in the area of math. It is these same students who also raise another issue with teaching students learning styles. Since these students already possess high self-efficacy and motivation, an alternative form of personal growth could have been provided for them rather than learning styles. Maybe lessons that help with test taking strategies, or how to study for a test, or how to effectively communicate with adults would have been more helpful for these already high achieving students. Their already high pre-study scores demonstrate that an alternative form of enrichment may have benefited them more than just learning styles.

For the students who had average levels of self-efficacy and motivation, they embraced the new ideas around learning styles and felt more confident in themselves as learners in math as a result of the lessons. They were excited to try and learn the new material, using it frequently. These students were prime candidates to participate in this study, as they had room to grow with regards to their self-efficacy, motivation, and academic math achievement.

It was the students who demonstrated very low self-efficacy and motivation that also might have benefited from an alternate program. While their post-study self-efficacy and motivation surveys soared and their academic achievement in math rose significantly after learning about their own learning styles, the rise was temporary. If I were to draw a conclusion around this observation, I would say that while these students demonstrated growth throughout the course of the study, the root of their issue around learning runs deeper than just

understanding their own learning styles. While they were able to embrace the lessons and respond to the success that resulted from them, the success was temporary, indicating that these students may require additional and continuous support in order to maintain higher levels of self-efficacy and to demonstrate that confidence academically.

What is also interesting to note is when I asked the students individually why they made certain choices on the self-efficacy and motivation surveys, one response I received from more than one student was that their self-efficacy and motivation can be influenced simply by the difficulty of the lesson being taught. If the subject matter was easy, then motivation and self-efficacy was high. Therefore, more difficult subject matter produces lower motivation and self-efficacy. Simply possessing knowledge of learning styles is not the sole influence upon motivation and self-efficacy. If the content being learned was something the students already knew or were familiar with, then self-efficacy and motivation rose automatically.

For all of the students, learning styles is just one of many different types of ways to teach these children how to empower themselves around their learning. Some of the already high self-efficacy students could make use of something a little different while the very low self-efficacy students need constant support in order to develop and maintain the benefits of the learning styles tools. The complexity of each student became evident after the study had been conducted. What is universal among all the students is the fact they all need to be equipped to make smart academic choices for themselves before being given the opportunity to do so.

Regarding the activities themselves, I would have liked to replicate the study once more but flipped the sequence of the activities. For example, instead of having the activities that enabled the students to work in dim lighting, in comfortable seating, and while moving around be done SECOND after the first activity was conducted, have those activities be done first. That

way, I could tell if the second time through each activity wasn't scored higher simply because it was the second time the activity was conducted by the students and was therefore more familiar to them.

Finally, in lesson four, instead of posing open-ended word problems without multiple choices for answers, offer the students options – then the scoring would be more accurate and typical mistakes in calculations could be pinpointed, allowing for more powerful conclusions to be drawn. The current results only allowed me to see who was able to answer the word problem accurately and for those who answered incorrectly, I could not understand what went wrong with their calculations.

Summary

I gained many new and detailed insights from this study. The findings shed light on just how complex learning is for each student – no one child is the same. If it were possible, it would be ideal if each student could have their own customized education format in order to learn the way they need to learn best. My study illustrated this through the results that were obtained from the different types of students in my class. Some students in my study already had relatively high self-efficacy and motivation in math prior to the study while others grew from learning about their own learning styles, while yet another group need more support in order to sustain a higher self-efficacy and motivation around their learning.

Overall, from the beginning of the study to the end, the scores in academic achievement, self-efficacy, and motivation rose across the board. For those students who already possess high self-efficacy and motivation, an alternative form of program might be advised, for they already understand rather well how they learn and what they are good at academically, resulting in high academic confidence. For those students who possess more average self-efficacy and

motivation, their self-efficacy, motivation, and academic scores in math also rose, but they were also able to benefit greatly from learning about themselves as learners; even more so than the already high self-efficacy and motivation students. In short, the learning styles program was a good fit for them. Finally, for the students who lack self-efficacy and motivation, they demonstrated a need for further support before or while learning styles was being introduced to them. It appears that although they embraced the learning styles curriculum, their trouble succeeding actually stems from something deeper than just learning styles, for the gains they made were temporary. They simply seemed ill equipped to harness the power of learning styles for an extended amount of time.

Another relevant discovery made about the self-efficacy and motivation survey scores was gathered after the study was completed. After discovering some slight drops in the scoring of some of the questions for some students, I asked these students what exactly affected their self-efficacy and motivation in math for those particular questions. The responses I received indicated to me that it is not just a case of learning more about oneself or how one chooses to learn that solely impacts self-efficacy and motivation while learning. I asked one student the following question: “Why when you took the motivation survey and the question was “when I have math homework I do it right away” before the study you answered “very much like me” and after the study you answered “sometimes like me”?” The student then responded “It depends upon what we’re learning.” This same student also gave the same reason as far as why his motivation score dropped pre to post-study when he answered this question: “When it’s math time in class I am excited to get started.” Another student also responded similarly when I drew her aside to explain similar survey results. The conclusion that can be drawn from these responses by the students is that self-efficacy and motivation will fluctuate regardless of how

prepared the student is to learn. Offering tools for the learner to adopt while learning will not always consistently provide raised academic achievement, self-efficacy, or motivation. The subject matter itself will change how the student approaches the work. So although my study proved that learning styles and incorporating self-determination into learning will raise self-efficacy, motivation, and academic achievement, the content matter will also impact self-efficacy and motivation.

As a teacher moving forward, I anticipate taking time out each year in my classroom to talk to the children about learning styles and letting the students practice each to determine which they prefer for themselves. I also plan on allowing the students, when appropriate during instruction, to self-determine their own learning style in the classroom. Two essential concepts are required in order to enable children to truly feel empowered and successful in the classroom. They are: incorporating the concept of self-determination through the instruction of learning styles and permitting the students to make choices around their learning. I also hope to find other concepts to introduce students to that will further empower themselves in their learning, ultimately leading to students who possess higher self-efficacy, motivation, and academic achievement. I truly believe that if choices are expanded for students, their learning will increase.

I hope to condense my findings into an easy to read format that can be distributed to my own and other districts across the United States. If teachers could simply be introduced to the concept of self-determination and given simple approaches to incorporating it into their classroom environment, then students will grow up more confident in their learning and achieve more both academically in school and beyond in their personal lives. Making it a standard part of the curriculum in schools would also be a great achievement for the United States Education

System. Every student, regardless of his or her own academic ability, would blossom from a program that provided such benefits.

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Appendix A

Lauren E. Simpson
12 Block Ave #49
Claremont, NH 03743

Home: 603-543-0420
Work: 603-826-3986

Fall 2007

Dear Mrs. Paula Southard-Stevens,

I am asking if my fourth grade class at North Charlestown Community School may participate in a research study conducted by me, a masters of education candidate in the New England College Master of Education program in Henniker, NH. This research involves the study of teaching children to better understand the ways they personally learn best and if this will help them improve their grades. It is part of my New England College course work. The class has been selected for this study because I work with them throughout the year, and if the study is successful, the results could benefit my students' learning for the duration of their academic career.

I have learned about a theory called self-determination that claims people who are given more opportunities to choose and set their own goals are more motivated and will, as a result, be more successful. Since I want to make my classroom the best it can be for my students, I thought I could try to teach children how to better understand themselves as learners and then let them have more choices in the classroom about how they want to learn and what goals they should set for themselves. If the self-determination theory is correct, then my students will be more motivated in the class and consequently do better academically.

The information provided will be kept strictly confidential. A different name can be used in the final draft for any quotes that may be included. You will also have the opportunity to remove any quotations when I contact you to review the results. In addition, all related research materials will be kept secure and destroyed five years after the completion of the study. The results from this study will be incorporated into my final masters thesis and oral presentations and may be submitted to a professional journal, presented at conferences, or published in a text at a later date.

Please be assured the safety and well being of the students in my class are of the utmost concern to me. Every attempt will be made to guarantee the comfort of the students. If necessary, you may ask that a student be withdrawn from this study at any time without negative consequences. Should a student withdraw, his/her data will be eliminated from the study.

There is not financial remuneration for participating in this study.

You will receive a copy of the summary of the results and an appointment can be made with you at your convenience to discuss the results. Do you have any questions about any aspect of this study or your involvement?

Two copies of this informed consent form have been provided. If you permit the carrying out of this study with my fourth grade class, please sign below, indicating you have read, understand, and agreed the research may be conducted. Return one to me, the researcher, and keep the other for your files.

Sincerely,

Lauren E. Simpson

Name of principal (please print)

Signature of principal

Date

Director of Teacher Education
Carlton Fitzgerald, Ed.D.
New England College,
Education Department
Center for Educational Innovation
Box
Henniker, NH 03242

Phone: 603-428-2215

Appendix B

Lauren E. Simpson
12 Block Ave #49
Claremont, NH 03743

Home: 603-543-0420
Work: 603-826-3986

Fall 2007

Dear

Your child has been selected to participate in a research study conducted by me, a masters of education candidate in the New England College Master of Education program in Henniker, New Hampshire. This research involves the study of teaching children to better understand the ways they personally learn best and if this will help them improve their grades. It is part of my New England College course work. Your child has been selected for this study because you are part of my fourth grade class and if successful, the results would benefit your child's learning for the duration of his/her academic career.

Because your child is in my class, I want to inform you about the study and what it involves. I have learned about a theory called self-determination that claims people who are given more opportunities to choose and set their own goals are more motivated and will, as a result, be more successful. Since I want to make my classroom the best it can be for my students, I thought I could try to teach children how to better understand themselves as learners and then let them have more choices in the classroom about how they want to learn and what goals they should set for themselves. If the self-determination theory is correct, then my students will be more motivated in the class and consequently do better academically.

Over a three week period I will teach the children how to be reflective about how they learn and what they are capable of as learners. I will then slowly provide them with more academic choices, such as how they want to complete a project, how they want to practice their math facts, whether they want to work in a group or independently, etc. As I teach them how to understand themselves better and take control of their education, Lisa Chamberlain and I will be observing how the students respond to the changes, looking to see if these changes in the classroom experience are helping the students be more motivated about their learning. I will also look to see if their math grades rise during the course of the study overall as well as giving them an assessment both before and after the study to compare any changes. I will also ask them to write in their journals frequently to see how they are feeling about themselves and if they understand how to be reflective learners. Finally, I will ask the students to complete a survey both before and after the study that tells me how they feel about themselves as math students. Some of these materials will need to be kept by me to illustrate the changes as seen in the study. All identification will be removed from the documents prior to use.

The information I gather about your child will be kept strictly confidential, only viewed by me and, if you wish, a different name can be used in the final draft for any reference to your child.

The results from these observations and other data will be incorporated into my final masters thesis and oral presentation and may be submitted to a professional journal, presented at conferences, or published in a text at a later date.

Please be assured that the safety and well being of the students in my class and yourself are prime concerns of mine. Every attempt will be made to guarantee the comfort and safety of my students to minimize any distractions this study may cause. The risks to your child are minimal. There is a risk that your child will not fully embrace the idea of learning about him/herself as a learner, impacting the possibility of an improvement in motivation and grades. But the benefit of your child becoming more self-reflective and being able to understand enough about him/herself to more powerfully learn in the classroom for years to come is phenomenal. For the ability to reflect upon oneself is a skill that can be used for a lifetime, beyond the academic years. Should your child or you have questions, please contact me at the phone number listed above. Participation in this study is voluntary; you may withdraw your permission for your child to participate in this study at any time without prejudice or negative consequences. Should you withdraw the data gathered with reference to your child will be eliminated from the study.

Two copies of this informed consent form have been provided. If you choose to allow your child to participate in the study, please sign both, indicating you have read, understand, and agreed to allow your child to participate in this research. Return one to me in the self-addressed envelope and keep the other for your files.

Sincerely,

Lauren E. Simpson

Name of student participant (please print)

Name of student legal guardian (please print)

Signature of legal guardian

Date

If you would like to receive a copy of the summary of results upon completion of the study, please include your address and a phone number at which I might reach you.

Name:

Address:

Telephone Number:

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Appendix C
Self-Efficacy Survey

Name: _____	Date: _____	Very Much Like Me	Like Me	Sometimes Like Me	Not Like Me	Never Like Me
1. When I get ready to take a math test, I am excited because I know I'll do well.		5	4	3	2	1
2. During a math test I usually feel happy because I feel I'm going to do well.		5	4	3	2	1
3. I know I am a smart math student.		5	4	3	2	1
4. During math test I usually think I am going to do badly.		1	2	3	4	5
5. During math, I enjoy doing schoolwork.		5	4	3	2	1
6. When I get ready for a math test, I don't study because I don't think I'll do well.		1	2	3	4	5
7. I know I'm not a very smart math student.		1	2	3	4	5
8. When I get ready to take a math test, I am nervous because I don't think I'll do well.		1	2	3	4	5
9. During math, I don't like doing schoolwork.		1	2	3	4	5
10. When I get ready for a math test, I don't study because I know I'll do well.		5	4	3	2	1
11. During a math test I usually think I am going to do well.		5	4	3	2	1
12. During a math test I usually feel nervous because I feel like I'm going to do badly.		1	2	3	4	5

Appendix D
Motivation Survey

Name: _____ Date: _____

Very Much Like Me Like Me Sometimes Like Me Not Like Me Never Like Me

13. When I get ready to take a math test, I study because I want to do well.	5	4	3	2	1
14. When I'm working on a tough math problem, I try it once and forget it.	1	2	3	4	5
15. When I have math homework I do it right away.	5	4	3	2	1
16. Between math and reading, I like to do my reading homework first.	1	2	3	4	5
17. When I'm working on a tough math problem, I take my time to work it out.	5	4	3	2	1
18. When I have math homework, I wait until the last minute to do it.	1	2	3	4	5
19. During a math test I wait a while before I start.	1	2	3	4	5
20. When it's math time in class I am excited to get started.	5	4	3	2	1
21. When I get ready to take a math test, I don't study because I don't care how I do.	1	2	3	4	5
22. During a math test I get started right away.	5	4	3	2	1
23. Between math and reading, I like to do my math homework first.	5	4	3	2	1
24. When it's time for math, I'm not excited.	1	2	3	4	5

Appendix E

Pre-study Written Math Assessment

Name: _____ Date: _____ Score: _____/60

$7 \times 9 =$

$7 \times 9 =$

$3 \times 9 =$

$6 \times 7 =$

$7 \times 6 =$

$4 \times 7 =$

$8 \times 2 =$

$6 \times 7 =$

$8 \times 3 =$

$4 \times 10 =$

$4 \times 7 =$

$6 \times 3 =$

$7 \times 3 =$

$8 \times 2 =$

$7 \times 4 =$

$6 \times 7 =$

$4 \times 6 =$

$7 \times 5 =$

$7 \times 8 =$

$7 \times 6 =$

$8 \times 6 =$

$8 \times 4 =$

$9 \times 8 =$

$9 \times 8 =$

$9 \times 7 =$

$4 \times 7 =$

$9 \times 8 =$

$3 \times 8 =$

$7 \times 6 =$

$8 \times 9 =$

$9 \times 4 =$

$6 \times 2 =$

$7 \times 8 =$

$9 \times 8 =$

$8 \times 3 =$

$6 \times 7 =$

$8 \times 4 =$

$3 \times 5 =$

$8 \times 6 =$

$5 \times 3 =$

$7 \times 9 =$

$7 \times 4 =$

$8 \times 9 =$

$6 \times 7 =$

$4 \times 7 =$

$4 \times 8 =$

$9 \times 5 =$

$3 \times 8 =$

$8 \times 7 =$

$6 \times 5 =$

$8 \times 4 =$

$4 \times 7 =$

$7 \times 6 =$

$4 \times 9 =$

$3 \times 6 =$

$8 \times 7 =$

$3 \times 8 =$

$8 \times 8 =$

$8 \times 2 =$

$9 \times 2 =$

Appendix F

Ongoing Quick-writes About Learning Styles

1. What are learning styles?
2. What are physiological learning styles?
3. Write three sentences for this quick-write. Your first sentence should start like this: I learned that when I learn something, I need.....

Appendix G

Student's Name: _____
 Date: _____ Time: _____

Activity: _____

Self-Efficacy Predetermined Checklist

Self-Efficacy: Beliefs about personal competence in a particular situation.

	Clearly Present		Somewhat Present		Not Present
Disposition: confident, optimistic					
Before Task: Accepts challenge, eager, begins promptly					
During Task: Persistent, takes risks, answers questions readily					
Takes Leader Role					

Motivation Predetermined Checklist

Motivation: An internal state that arouses, directs, and maintains behavior.

	Clearly Present		Somewhat Present		Not Present
General disposition: Eager, motivated					
Before Task: begins immediately, jumps right into task					
During Task: engaged, focused, diligent, emotionally invested					

General Comments/Observations: _____

Student's Name: _____

Activity: _____

Date: _____ Time: _____

Self-Efficacy Predetermined Checklist

Self-Efficacy: Beliefs about personal competence in a particular situation.

Clearly Present	Somewhat Present			Not Present	
Disposition: unsure, reserved					
Before Task: Stalls, resistant, listless					
During Task: Gives up easily, easily frustrated, little effort					
Lets others take over					

Motivation Predetermined Checklist

Motivation: An internal state that arouses, directs, and maintains behavior.

	Clearly Present	Somewhat Present			Not Present
General disposition: negative attitude, dissatisfied					
Before Task: slow to begin, avoids task					
During Task: poor attitude, easily distracted, inconsolable					

General Comments/Observations: _____

Appendix H

Post Study Survey

Name: _____

Date: _____

For the past few weeks, we have been spending time as a class learning more about how we each like to learn and what helps us learn best. Below is a survey about these different learning styles and what you learned about them.

1. Circle the 4 learning elements that we talked about that are environmental:

sound food light temperature partners design

2. Circle the 4 learning elements that we talked about that are sociological:

alone in the morning with a partner in a group with an adult

3. Circle the 6 learning elements that we talked about that are physiological:

visual kinesthetic auditory temperature mobility

food intake couch time of day alone with an adult

4. Below, in complete sentences, tell me how you know you learn best. Make sure to include all of the styles that you remember! All of us learn best in different ways – what are your favorite ways?

5. How does it make you feel knowing you understand how to learn best? Why?

6. Pick one of the learning styles you don't like for yourself and tell us why you don't learn well with that learning style.

Below, circle the number of the answer that most fits you:

Very Much Like Me Like Me Sometimes Like Me Not Like Me Never Like Me

7. I am happy because I know my learning styles and now I can learn better. 5 4 3 2 1

8. I don't know my learning styles and I don't see how they help me. 5 4 3 2 1

9. I think I can be a better student now that I know more about how I learn. 5 4 3 2 1

“Just My Style!” Worksheet

Learning styles are the ways we are each are most comfortable and open to learning. How do you think you learn best? What’s your style? Let’s try some strategies and see what works best!

Environmental Styles

DO YOU LEARN BEST:

Sound: in a room that is quiet or do you need some music in the background?

Light: in a room that is brightly lit or dim around you?

Temperature: in a warm and cozy room or one that is cool?

Design: sitting at a table/desk or lying down on a sofa or the floor?

Circle your favorite:

Sound:	background noise	quiet
Light:	bright	dim
Temperature:	warm	cool
Design:	sitting at desk	lying down

Sociological Styles

DO YOU LEARN BEST:

Alone: when you are by yourself?

Partner: when working with another person?

Group: when working with more than one other person?

Adult: when an adult is working with you?

Circle the one that works for you best:	alone	partner	group	adult
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Physiological Styles

DO YOU LEARN BEST:

Visual: when you see it?

Auditory: when you hear it?

Tactile: when you can use your hands?

Intake: when you are having a snack?

Time: in the morning or the afternoon?

Mobility: when you’re sitting still or moving around?

Circle your favorite(s):	visual	auditory	tactile
	snack		no snack?
	morning		afternoon
	sitting still		moving around