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The Effects of Student Choice of Difficulty of Homework on Motivation and Homework Completion

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Abstract

Research suggests that students often fail to complete homework due to lack of motivation, partly due to the absence of student choice and a mismatch in assignment difficulty and student's ability level. This action research project examined the effect of student choice of homework difficulty on homework completion and motivation. The study included 68 eighth-grade students from a suburban middle school in Southeastern Wisconsin in the fall trimester of the 2014-2015 school year. Two classes were assigned as the experimental group and one class served as the control group. Both groups received the same classroom instruction, but the experimental group was allowed a choice on the difficulty of their homework and the control group was assigned a homework task to complete. Pre- and post-surveys were used and analyzed with a t-test. Results showed significant changes in motivation on two items from the survey. Homework completion percentages were also calculated, but did not show a change in homework completion for either of the groups.

Chapter One

Introduction

What motivates individuals to complete something? Why are we compelled to participate in certain tasks? There has to be some reason that drives people to accomplish things in life. In order for humans to be motivated to complete a task there has to be an inherit value in the task. Covington (2000) describes motivation as a drive, meaning that there is some internal state, need, or condition that impels individuals toward action. Whatever the reason or ultimate goal may be, there is always some sort of driving force behind why people are motivated to complete certain tasks.

The mindset a person has during the process of doing something can have implications for how the task is completed and even possibly on the quality of the finished product resulting from completing the task. In mathematics, there is a process for solving problems. For example, solving equations can involve a variety of different steps and it may be the job of the educator to help a student discover the most desired process for solving the problem. This same reasoning can be applied to motivation for completing a task. In accomplishing tasks, the mindset a person has may be as equally important as the result.

So, in general, not only is the desired outcome important when completing a task, but the motivation mindset is also important. In order to extend this to learning, Yoshida et al. (2008) states that individuals interact with the environment in order to feel competent and to achieve unique accomplishments. By creating and designing tasks in which students can feel competent when completing them, individuals can boost this motivation for accomplishment and thus boost homework completion. This action research project aims to use an intervention to boost student motivation to complete homework assignments for math.

Statement of Need

One goal of mathematics homework is to give students an opportunity to practice with material outside of the classroom. However, the perceptions that teachers may have for homework may differ from the perceptions that students have. One teacher perception is that by practicing skills, students will make strides towards mastery of the material being covered in math class. Pamela Warton (2001) states that adults can view homework as having multiple purposes such as to practice skills to foster personal development in the areas of responsibility and time-management, and to increase learning-task involvement. However, Warton (2001) says that students may view homework as dull, boring, and time-consuming, but continue to complete it because their parents want them to. Students are not in the correct mindset for completing homework if they are completing it to avoid punishment as opposed to completing it for personal intellectual gain.

Educators must also compete with today's technological distractions. Taneja, Fiore, and Fischer (2015) state that students today are more connected to the Internet and the world of information than ever before. Educators not only have to compete with students not wanting to do homework because it is boring, but also with more appealing activities other than homework.

Along with digital distractions, teachers also face other obstacles as well. Anderson (2007) presents modern classrooms as full of diverse students with different socioeconomic, ethnic, and intellectual backgrounds; and, educators need to have multiple methods to reach multiple students. Since not all students are the same type of learner, students will also require diverse ways in which they may present understanding of new content. According to Michael Nakkula (2013) students today need to take authentic ownership of their learning. By instilling a sense of ownership into student assignments, teachers can increase motivation for

accomplishment and address the multiple different needs of students. By allowing students to have an input in their assignment, there will be an increase in motivation for accomplishment because the students themselves are choosing to do the assignment as opposed to being told to do the assignment.

Usher and Kober (2013) state that motivation is central to a student's educational experience from preschool onward, but it hasn't received much attention from education reformers. This project aims to add to the research on student motivation. Taking into account the multiple distractions both inside and outside of the classroom, students today may need a different approach to homework. This action research project utilizes an intervention that provides students the opportunity to choose the difficulty level of their homework. By incorporating student choice and homework suited to ability level, students' motivation and behavior may improve.

Project Overview

This action research project consisted of 68 eighth-graders from a suburban city in Southeastern Wisconsin. The classes included males and females with the majority of them being Caucasian and the rest being African-American, Hispanic, or Asian. There was also a small sample of students who have learning disabilities which require the use of an instructional assistant in the classroom. All students were enrolled in a math class during the 2014-2015 school year.

The project ran from the beginning of September through the end of November. The project included three sections of regular eighth-grade math. This project consisted of presenting a pre-survey to the students to gain information about their beliefs and motivation for completing homework. A similar post-survey was also given to determine if beliefs or motivation for

completing homework changed after the experiment concluded. During the experiment interval, students were broken into two groups, the control group and the experimental group. The control group received a traditional textbook homework assignment while students in the experimental group chose the difficulty level of homework to complete. Students were allowed to choose between a variety of worksheets that were labeled A, B, C, or D depending on their difficulty. A was the easiest and D was the most difficult. Students repeated this process over the course of four chapters which summed to a total of thirty assignments. By examining this treatment, this action research project answered two main questions.

This action research project examined two questions: 1) does student choice have an effect on student motivation for completing homework and 2) does that student choice effect homework completion. The first question was answered by conducting a pre-survey and a post-survey to examine students' feeling and beliefs about the homework they received. Scores on the pre-survey and the post-survey were examined to see if there was a change in student motivation for completing homework.

The second of these questions is associated with changes in homework completion. To answer this question, homework completion percentages were calculated to determine if homework completion increased, decreased, or stayed the same during the project. Student homework completion percentages were calculated per chapter covered and then analyzed to see if there was a gain or decrease in homework completion. This study was conducted over chapters 1-4 of the current eighth-grade math curriculum. Percentages were then compared to determine if their existed a difference between the control group and the experimental group.

Even though this study may be intended for use by this particular school and school district, there are also implications for mathematics education. This research project adds to the

amount of research on student motivation in mathematics suggesting that student choice and a more precise match between learner ability and homework difficulty can lead to greater completion rates. This study benefits teachers, students, community members, parents, guardians, and other education professionals by providing a method to engage students in mathematics homework, which could have further implications for the design of homework in math or other subjects, the impact on student achievement in math classrooms, and motivation of students in general to complete tasks.

Chapter Two

Literature Review

The purpose of this project is to find a method for boosting student motivation to complete homework. The rationale for this project stems from a challenge where students are not completing homework due to multiple factors and thus are not getting practice outside of the classroom. This review frames the hypothesis of the investigation, which predicts that the use of student choice will boost motivation for accomplishment and thus increase student homework completion. This review of relevant literature begins by showing the importance of homework and why students need to complete it. However, students may not have much interest or motivation in completing homework. In order to get students to complete homework, students will need to have the motivational mindset that allows them to perceive homework as valuable or something that can be accomplished. This review discusses the ideas behind motivation and some of the key factors towards moving a student's mindset to a desired mindset where students see homework as valuable and accomplishable. After addressing concerns with student motivation and what factors play a role in motivation, this review will demonstrate the role of student choice in boosting motivation for homework completion. Ultimately the literature shows that by synthesizing motivation for accomplishment with student choice, student motivation for completing homework might be raised.

Student Success Dependent on Mastery of Content

In order to become proficient at a job, a person only may require a very small amount of training. However, to become a master at a profession or task, a person may require more extensive practice. In regards to math education, students can receive classroom instruction, but that may not be enough for students. In order to master mathematics content, some students may

require more time on task. One way that more students might achieve mastery in math is by designing tasks that promote student engagement and have some degree of differentiation.

Eric Toshalis and Michael Nakkula (2012) address student engagement stating that through student-centered learning, student mastery of material can be at a high level. In order to affect student engagement in the long term, techniques need to provide frequent experiences of competence, autonomy in learning, and positive social interactions (Toshalis & Nakkula, 2012). This means that students must have topics and lessons designed to engage them. By being an active participant in math class, students can be more engaged in the content being taught. However, this can be a difficult task as engagement techniques can vary between students and between various times of the day (Toshalis & Nakkula, 2012).

Another key factor in addressing mastery is the differentiation of the tasks assigned. Dettmers, Trautwein, Lüdtke, Kutner, and Baumert (2010) conducted a study on homework quality to examine whether homework quality predicts achievement in mathematics. They defined homework of high quality as appropriate tasks that are carefully selected to be interesting and challenging, but not overtaxing, that reinforces the content that was learned in the lesson. Homework of low quality consists of assignments that require students to merely recall information to complete. These researchers found that students who received high quality assignments had higher expectancy and value beliefs and with higher homework effort that they are effective for learning or mastery of content. However, creating these assignments can be difficult and time-consuming. It may also be challenging to incorporate some of the aspects of differentiation into a classroom lesson. The task is creating assignments that can balance both teacher time and student time along with being of high quality to both the teacher and student.

Some students may need some way to engage them in the material they are learning,

however, this could happen at various times in the day. Some students may need some sort of differentiation technique to help them achieve mastery, however, these can be difficult to implement in a classroom. Also, there may not be sufficient time in a normal class day to implement the differentiation techniques. Homework can be an option to incorporate or address the concerns that are associated with student engagement and with differentiation. Since homework is usually a task that a student needs to complete for the next class period, homework can address the problem of students engaging with material at various times of the day. Homework can be completed when the student chooses to complete it. Homework can also help with differentiation, for example, "one possibility may be to assign individualized homework tasks that challenge but do not overtax individual students" (Dettmers et al., 2010, p. 479). Homework appears to be a logical route for student achievement, but oftentimes students are disengaged when the thought of homework is presented. Students sometimes lack the motivation to complete or participate in math homework.

Oftentimes Motivation for Math is Low

There are certain factors that can lead to a reduction in motivation. In classrooms today, there are a multitude of different types of students and learners. There may be students who are academically talented in mathematics and there may be students who struggle with math content. There also may be students with disabilities and students with varying home situations. These students are typically mixed into one class. Just as each student is a different learner, each student also has a different trigger in what motivates them to complete a task. However, a common practice among educators is to assign one project or task for students to complete that is designed for the whole class. The task is rarely designed to meet the individual motivational and learning needs of each student. This process can lead to a reduction in student effort to complete

certain tasks. Anderson (2007) illustrates a fourth-grade classroom to discuss several important issues in student diversity. In this classroom she highlights 4 different students. The first student is Amanda who is very bright and inquisitive. The second students is Reno who lacks English-proficiency and this is his first time in an American school. The third student is Jacob who has a lot of energy and has spent a lot of time in the principal's office due to disruptive behaviors. The final student is Roger who has a single mother that is working two different jobs who rarely has an opportunity to attend school functions. Even when recognizing these differences, many children still perform daily on the "margins" of their classroom (Anderson, 2007). By illustrating how all of these multiple personalities are in one class, Anderson argues that meeting all of the needs of different students in one class can be a difficult task. Differentiated activities may reach some of the lower-achieving students but then higher-achieving students may find it not worthwhile. The lack of personalized learning is one aspect that can lead to a lower student motivation. These students are not getting the individualized attention they need in order to perform at their highest level which leads to a reduction in effort and motivation to complete school related tasks.

Differentiation is a topic that is not new to the world of education. Tomlinson (2008) states that the aim of differentiation is to help individual students maximize their learning on a given subject. In order to use differentiation effectively, Tomlinson (2008) sets aside some goals that should be achieved. The first goal of differentiation is student engagement. By rooting activities in material that is engaging for students, teachers can boost motivation for completing the activity (Tomlinson, 2008). Teachers also need to know what learning preferences their students possess, as it is virtually impossible to construct a differentiated lesson when there is a lack of information about the learners (Tomlinson, 2008). Further, Tomlinson (2008) used the

idea that teaching plans, lessons, and homework should be aligned to help students achieve goals on a cycle rather than in one instance for one day. This can be explained by Ollerton (2014) that all students learn and process things differently. The idea that every student will think the same way about a problem is not feasible (Ollerton, 2014). Not only does thinking vary, but the amount of time needed to do the thinking will also vary. As learners vary in the ways they think and the amount of time they need to process information, they will need different strategies and resources in the classroom. Therefore, oftentimes differentiated lessons can be constructed in a way that doesn't benefit a learner that has a set of particular needs.

Another factor for low homework motivation is academic time. Singh, Granville, and Dika (2002) conducted a study on motivation, engagement, attitude, and academic time. The most important factor of these was academic time spent on mathematics. The purpose of the study was to examine the relationship between school-related factors, mainly motivation, and school performance. This study showed that students with lower motivation responded that they were rarely engaged in school, forgot to bring books, had attendance issues, and put forth less effort into homework. However, students that where highly motivated and engaged in school reported more time spent academically, were always at school, spent a considerable amount of time on homework, and also were always prepared for their classes. The implications for this study look at the need for more academic time. However, with the issues of attendance and forgetting supplies, academic time can be decreased in a student's day thus not allowing ample time to complete homework. Therefore, by not having enough time to complete homework, students may tend to not have much motivation to complete something they feel they do not have time to accomplish.

Another reason for reduced effort in the classroom can be academic entitlement. Sparks

(2012) defines academic entitlement as receiving a grade just for showing up or by doing the work the teacher has assigned. Students may put forth little extra effort or may have little motivation to move beyond the basic concept. Students who feel academically entitled think that they should receive a high grade just for completing a list of tasks the teacher has set out for them. For example, Sparks (2012) states that academic entitlement can lead to a reduction in student effort. She claims that students with a high sense of entitlement can have a belief that knowledge is a right and that students will expect a high grade to come as a product of nonacademic aspects of education rather than mastery of the material. These nonacademic aspects include showing up to class every day and paying tuition for the class they are taking.

Student motivation in mathematics may also be low due to beliefs about ability and low expectations of success. A study conducted by Chouinard and Roy (2008) reveals that many high-school students appear less optimistic with respect to their chances to succeed in mathematics. They also find a significant decrease in the perception of value of mathematics (Chouinard & Roy, 2008). As students are progressing through middle school and high school, students are becoming less and less engaged in mathematics and also becoming less confident in their abilities to succeed in mathematics. Their attitudes toward mathematics are declining and are therefore affecting academic achievement (Chouinard & Roy, 2008). These authors also conclude that even though students may still consider mathematics an important subject, they may start to question its usefulness (Chouinard & Roy, 2008). This means that students are also lacking motivation to complete mathematics assignments because they do not see the value in doing them. The authors also seem to conclude that this decline is most prevalent during grades 9-11 (Chouinard & Roy, 2008).

Another factor for lack of motivation for students to complete mathematics homework is

student autonomy. Akioka and Glimore (2013) conducted a research study to try and boost student motivation by increasing student autonomy. This study showed that autonomy does not arise from simply offering students different choices, but by offering choices that were interesting and meaningful to the students. The study conducted by Akioka and Glimore (2013) included 104 students who were enrolled in a private boys' school in Brisbane, Australia. This study used two questionnaires, the Children's Attitude to Homework Questionnaire (CAHQ) to assess homework habits and attitudes to homework, and Dimensions of Mastery Questionnaire (DMQ) to rate motivation. The four classrooms of students were divided randomly into a control group and an experimental group. The study used a modified homework intervention as the experimental treatment and the regular school homework policy was used as the control treatment. Students were administered the two questionnaires at the beginning of the treatment and at the end of the treatment. The amount of time in-between the questionnaires was approximately 10 weeks. In the experimental treatment, students experienced autonomy by the introduction of more choice in their homework assignments. The students were allowed to choose from a standard assignment or a challenge assignment. The standard assignment consisted of standard drill and practice type problems and the challenge assignment consisted of more complex applied problems. There was different response mediums made available to students. These mediums included written, visual, or digital mediums. The results from the study indicated no significant difference between groups, with students in the experimental group having a mean difference of 15.49 and the control group having a difference of 15.00. Even though the intervention did not produce significant results, the authors discuss that students in the experimental group did not experience any negative changes. The attempt to discuss the reasons for changes for students in the experimental group was due to the fact they had more

intrinsic motivation for completing the homework than the control group. By intrinsic motivation, the researchers try to imply that students in the experimental group were more likely to do the homework because they wanted to do it and that there was less extrinsic factors influencing them to complete the homework. Extrinsic factors could include influences from parents, teachers, or other students. By bringing about an increase in autonomy in a student's homework, a teacher can make a difference in boosting overall motivation for completing homework. One key factor that the researchers discuss is the shift from extrinsic motivation to intrinsic motivation. This means a shift from outside factors influencing the students to do homework to students doing the homework for themselves. By making the idea of homework something the students wish to complete, the researchers found that student motivation was increased. Therefore, lack of student autonomy in homework or class related tasks can contribute to a lack of motivation for completing homework. When some students do not value homework, it may be hard to expect them to be motivated to complete it.

There are multiple factors that attribute to lack of motivation. Some of these factors are multiple different types of learners in a class, differentiation that doesn't fit, academic time, academic entitlement, homework difficulty, and the need for student autonomy. This presents a need for a study of motivation and what can be done to increase motivation. Having addressed the problem of lack of motivation, it is now important to examine the influential factors that change motivation. Research exists on what some of the factors are for changing motivation to complete a homework task.

Influential Factors for Motivation

This review and action research project is designed to examine student motivation to complete homework. This section of the literature review highlights some of the important

factors, such as value and competence that are critical for students to become more motivated with completing homework.

By considering these traits in instruction, students will have more motivation to complete tasks in class. In Michael Nakkula's "A Crooked Path to Success" (2013), Nakkula describes that there are some students that are already highly motivated and will succeed no matter what obstacles they may face. This could be due to home environment or the abundance of great extracurricular activities designed to foster academic success. However, Nakkula states that the students educators should be concerned about are students whose academic pathways might include early school failure or substantial underachievement. Nakkula does not say that these students are unmotivated or unsuccessful, but just that these students may have had a nonlinear pathway to success. These are students who have achieved success by their own means, but may have not been viewed as successful because of the people that are around them. Nakkula argues that strategies for motivating these students must have some instance of real world opportunity or experience in order to internal motivation to complete academic tasks (Nakkula, 2013). Motivation reflects students' attitudes and beliefs about particular tasks and goals (Nakkula, 2013), which means that just because students do not appear to be engaged in tasks does not mean they are incapable of success. The traits that Nakkula points out in his article are the need for students to achieve success by their own means and the need for students to have this experience of real world opportunity. This means that students need to feel in control of their learning. Once in control, students will find that internal motivation needed to complete the academic tasks in front of them.

There are many theories that exist on what motivates people to pursue certain endeavors. The theories this project is designed to use are theories that help increase motivation to complete

academic tasks. The academic task that will be investigated is completion of homework. Therefore, this section of the review presents theories about motivation for self-regulation and what can boost self-regulation. Covington (2000) presents a review on goal theory, motivation, and school achievement. Covington defines self-regulation as students being actively engaged in their own learning, including analyzing the demands of school assignments, planning for and mobilizing their resources to meet demands, and monitoring their progress toward completion of assignments (Covington, 2000). While Covington gives many theories on motivation, the theory most pertinent to this project is Covington's achievement goal theory which is mediated by motives and quality self-regulation. In achievement goal theory, there exist learning goals. Covington (2000) defines learning goals as goals for "increasing one's competency, understanding, and appreciation for what is being learned" (p. 174). These learning goals can be powerful motivators in what students will choose to do and what motivates them to actually complete the task at hand. By developing concrete learning goals, students will become more self-motivated to complete tasks not for something superficial as a grade, but for the sheer motivation of self-advancement. Cheng (2012) discusses that goal orientation theory suggests one's reasons to achieve. These learning goals refer to one's need to satisfy a personal goal set by themselves. By incorporating a sense of self into instruction, students can begin to continue to build a mindset where they are setting learning goals that will benefit their education.

Along with Covington (2000), Eccles and Wigfield (2002) released a publication on motivational beliefs, values, and goals. While Covington (2000) explains that achievement goal theory along with personalized learning goals links to self-regulation, Eccles and Wigfield (2002) argue that those goals also need to have value for the student to complete as well. Eccles and Wigfield (2002) discuss control theories. According to control theories, one should expect to

succeed to the extent that one feels in control of one's successes and failures. Eccles and Wigfield (2002) give a discussion on theories for a student to actually engage in the task, that students may also need to have the belief that the task is also accomplishable. This means that learning goals can be well constructed, but the goals need to have meaning and value for the student to complete them and also be possible to complete. Even if people are certain they can do the task, they may have no compelling reason to do it (Eccles and Wigfield, 2002).

Anderman, Anderman, Yough, and Gimbert (2010) present the idea of adding value to academic tasks. Even though teachers are striving for high-quality assignments, there is also the question of students finding value in the assignment. The value-added model examines students' performance longitudinally and addresses differences in student background (Anderman et al., 2010). This means that students should be concerned about how much knowledge they gained as opposed to what they can do in the moment. This ties in with student autonomy because instruction can then be focused to meet the student's individual growth needs. By incorporating student choice into the assignment, students can have this feeling of content improving their instruction. Student choice will allow for students to improve their own learning no matter what level of understanding they may be at. It also gives them the opportunity to work at their pace to come to mastery of the material on their own terms. It also gives students a sense of value in the assignment because students know it is helping them improve their understanding of a topic. Students are now expected to make growth within their own terms (Anderman et al., 2010). Along with setting quality learning goals, these goals also must have value and meaning for students to actually undertake them.

Along with providing value for assignments, Reeve, Jang, Hardre, and Omura (2002) have presented research that the best way to keep students motivated is to provide rationale in

their learning. Reeve, Jang, Hadre, and Omura (2002) introduce the idea that presenting potentially uninteresting material with a rationale and in an autonomy-supportive way, will have a positive impact on student motivation to willingly complete the assignment. Students will choose to complete the assignment, because they will eventually see the worth in doing it. Only when the rationale is accompanied by facilitating autonomy-supportive conditions can it be expected to increase self-determination and engagement (Reeve e. al, 2002). The idea of choice along with the idea of providing a solid rationale for the lesson will increase students' willingness to complete the uninteresting activity.

The setting of learning goals, setting of value, student autonomy and student beliefs on academic tasks all tie into student effort to complete the task. Trautwein, Lüdtke, Kastens, and Köller (2006) studied the homework efforts of students in grades 5, 7, and 9. They found that students in higher grade levels exhibited lower homework effort. Therefore, this study examined not only student time spent on homework, but the amount of motivation needed to complete the assignments. This study examined students' reasons for doing or not doing homework in order to gain insight on student motivation. The students were assigned to two groups based on their achievement and likely academic potential. The two outcome variables of this study were effort on math homework and time spent on math homework. This study showed that students are declining in time spent on homework as they get older and therefore having a reduced time spent on completing academic tasks. In conjunction with setting learning goals, setting student value, creating student autonomy and understanding student's motivational triggers, lessons and academic tasks can be assigned to increase student effort. These motivational ideas and theories have implications for education.

Student beliefs about competence can play a major factor in a student's engagement in

completing assignments and academic tasks. Tomlinson (2005) states that teachers need to redefine grading as not just giving a score, but also as a way to provide feedback for students. A key goal in differentiation is to maximize the learning of all students (Tomlinson, 2005). Tomlinson also reveals the characteristics of teachers who practice differentiation. Teachers who practice this strive to ensure that learning is challenging, routines involve a variety of large and small group settings, lesson goals are focused, and teachers use space and time wisely (Tomlinson, 2005). If these things are in place, a teacher will be able to get an accurate measure on student progress in learning and showing a student this process will help them become more invested in their learning.

Methods for Increasing Motivation

From the previous section, factors that influence motivation for completing homework include value, self-regulation, student choice, feedback and time. These factors can provide an element of personalization to homework which could increase student motivation for completing homework. After seeing the traits that can either increase or decrease motivation to complete academic tasks, the next piece that needs to be analyzed is what schools are doing to address this issue of student motivation or methods for increasing motivation for completing homework. Alexandra Usher and Nancy Kober (2013) state that motivation is central to a student's education from preschool onward, but it hasn't received any attention amongst education reforms and that most reforms are based primarily on standardized tests and teacher quality. Motivation is a crucial aspect to a child's success in school, but according to Usher and Kober, schools are not doing much about it. By analyzing what motivates students and incorporating that into instruction, teachers can create an environment where students are motivated to complete academic tasks. The remainder of this section discusses aspects of methods used, focusing on

how they helped to increase homework completion. The synthesis of some ideas that were successful has implications for increasing student homework completion.

One practice in particular that seemed highly effective was the high-p strategy utilized by Brooks Vostal (2011). High-p stands for high probability. This means that teachers can motivate students by designing problems and practice assignments by using problems that students have nearly a 100% chance of getting correct. The strategy utilizes students desire to complete preferred tasks to increase momentum into completing non-preferred tasks (Vostal, 2011). This strategy is highly effective with struggling students that have experienced substantial failure before. It is a method of interspersing problems that are preferred into an assignment along with problems that are not preferred (Vostal, 2011). For example, one could use three problems that a student will definitely succeed on (hence preferred) and then include a problem that a student might struggle with. The idea is to have students use momentum and motivation to persevere in the face of a difficult task even if they do not succeed immediately. This strategy is not designed to teach new tasks, but rather it was used to help students practice with skills they may need to perform more difficult tasks and to build motivation to attempt problems that may be more difficult (Vostal, 2011). However, this strategy can be more powerful if coupled with problems that are authentic with a real-life connection to a topic that is preferred by the student. Students need to have a feeling of success in order to be motivated to complete homework. If homework is too difficult, some students may feel that the homework is impossible and may not have the motivation to complete it.

Jang (2008) explains two types of models that students may undertake when presented with homework. These two models are the identified regulation model and the interest regulation model (Jang, 2008). The identified regulation model says that an individual finds or believes a

task to be beneficial to them, even though it may be uninteresting, and therefore this idea of benefit will help compel them to choose to complete the task with high quality. The other model is called the interest regulation model. This model is slightly different because now the individual feels that the task is inevitable (Jang, 2008). This means that the individual is forced to undertake the task and therefore will create motivating strategies in order to complete this inevitable task (Jang, 2008). Whether identified regulation or interest regulation, both models result in students making choices for completing tasks.

In connection with setting of learning goals and value of those goals, there still exists the need to address student autonomy. Pape, Bell, and Yetkin (2003) apply a theory on self-regulated learning that supports student autonomy. They explained, "self-regulated learners 'believe that academic learning is a proactive activity, requiring self-initiated motivational and behavioral processes as well as metacognitive ones' (Zimmerman, 1998, p. 1)" (as cited in Pape et al., 2003, p. 182). By becoming self-regulated, students can better monitor their own progress and progress towards mastery of content. They state that their goal is to develop students who actively engage in strategic behaviors and develop a sense of agency and skill in controlling their own learning (Pape et al., 2003). Upon analysis of this statement, these values should be instilled in students before any type of student-choice or autonomy can take place. Pape, Bell, and Yetkin (2003) state that teacher discourse and efforts should foster and "develop social and sociomathematical norms that support participation (McClain and Cobb, 2001)" (p. 181). This means in order to create a successful environment where students are self-regulating their learning, these skills need to be explicitly taught. In the conclusion of their article, the authors state that there are three tasks that foster self-regulation. These tasks are realistic and challenging problems, varieties of teaching methods, and classroom climates that foster positive dispositions toward learning

mathematics (Pape et al., 2003).

The issue with autonomy, however, is that it is difficult to know how much autonomy should be given to students. Reeve, Nix, and Hamm (2003) present an article on intrinsic motivation and student choice in which they examine the contributions of three elements of autonomy. The first element is perceived locus of causality (Reeve et al., 2003). The idea of perceived locus of causality is that a person's perception to complete a task is initiated by a personal (internal locus of causality) or an environmental (external locus of causality) (Reeve et al., 2003). The second element is volition. This is the idea of how free a person feels to complete a task (Reeve et al., 2003). In education how much freedom should the students be given? Are students required to complete the academic tasks set before them without any opinion on the academic tasks? The idea is to increase volition which means increase the thought that a person is freer to do the task at hand (Reeve et al., 2003). The last element is perceived choice. This is the measure on how much choice do participants really believe they have in order to complete a task. Reeve, Nix, and Hamm (2003) state that exposure to flexible interpersonal opportunities will facilitate perception of choice and therefore increase self-determination and intrinsic motivation.

A third factor is student interest versus student choice. Sometimes student choice and student interest do not align with completing homework. A study conducted by Skinner, Furrer, Marchand, and Kindermann (2008) reveals that students "were experiencing losses in engagement and increases in disaffection over the transition to middle school (Skinner et al., 2008, p. 777). For example, middle school offers students a chance to start picking courses that are suited to their interests in order to take control of their learning through some electives. Therefore, this autonomy may have a positive impact on their education. Jang, Reeve, and Deci

(2010) state that engaging students in learning activities must have autonomy support and structure. Autonomy support is defined as giving students choice on materials that are interesting to them versus the teacher choosing for them (Jang et al., 2010). Structure refers to the teacher's ability to establish high expectations and clear goals on the task at hand versus no expectations or goals (Jang et al., 2010). The implications for this mean that teachers should present material that supports a student's interest by providing material that is relevant. This is also accompanied with a high structured task that has clearly written goals so that the student can use the motivation they have with an interesting topic in order to complete the task at hand by following clear directions (Jang et al., 2010).

A fourth factor is providing value for assignments. Reeve, Jang, Hardre, and Omura (2002) have presented research that the best way to keep students motivated is to provide rationale in their learning. Reeve, Jang, Hadre, and Omura (2002) introduce the idea of presenting potentially uninteresting material with a rationale and by presenting it in an autonomy-supportive way, will have a positive impact on student motivation to willingly complete the assignment. Students will chose to complete the assignment, because they will eventually see the worth in doing it. Only when the rationale is accompanied by facilitating autonomy-supportive conditions can it be expected to increase self-determination and engagement (Reeve et al., 2002). This suggests the idea of choice along with the idea of providing a solid rationale for the lesson will increase students' willingness to complete the uninteresting task.

Synthesis

One goal in education is to have high levels of student success. One aspect of student success however, is student mastery of content presented to them. Therefore, in order for

students in math to be successful, students need to demonstrate mastery of the math content presented to them. Some factors that influence student mastery of the material include presenting tasks with high level of engagement (Toshalis & Nakkula, 2012) and differentiation (Dettmers et al., 2010). However, even though these factors can have influence on student mastery, there still exists the issue that students may be engaged at different times of the day and differentiation may be a difficult process to complete in one ordinary class period. In order to address these issues, homework can be a solution. Homework can be completed at various times of the day, thus addressing the concern of students being engaged at various times of the day and can also address the issue behind differentiation because there may be more time to personalize learning for students.

Homework may appear to be a solution to helping students achieve mastery, but oftentimes students may have a low motivation to complete or participate in math homework. Anderson (2007) presented a classroom that included learners of different types. Motivation for completing math homework may be low because the homework may not be addressing the needs of all students in the class, but rather may only be reaching a few students. Tomlinson (2008) and Ollerton (2014) report that students may not have ample time to complete mathematics homework if it is too difficult or over-taxing. Singh, Granville, and Dika (2002) also add that students may have other factors affecting their lives which also reduces academic time or time spent on mathematics. Therefore, students may fail to complete mathematics homework because they feel there isn't enough time to complete it. Sparks (2012) adds to the discussion on low motivation for completing mathematics homework due to student entitlement. Sparks (2012) says that some students may feel that learning is a right and that they should achieve or earn mastery of a course by completing non-academic tasks. This means that some students may be

completing tasks but they may not be the right tasks. Therefore some students may be finding value in completing tasks that do not enhance their learning but may be completing the task to earn a specific grade. This connects to a study by Chouinard and Roy (2008) that describes that students who do not value mathematics may have lower motivation for completing mathematics homework. Chouinard and Roy (2008) explain that some students may be less confident about their abilities and therefore do not complete homework due to its difficulty which ties to the study done by Vostal (2011) which incorporated homework problems that all students can complete in order to boost motivation for completing homework. Therefore, the physical construct of homework itself may be a factor leading to the decline in student motivation to complete mathematics homework. However, Akikora and Gilmore (2013) found that lack of student autonomy also leads to a decrease in motivation to complete math homework.

The problem lies in the fact that even though homework may be an avenue for students to achieve mastery, there is an issue involving students' lack of motivation for completing it. In this review, some factors that influence motivation were presented. Some of these factors include student choice (Nakkula, 2013), self-regulation (Covington, 2000), and value setting (Anderman et al., 2010). By allowing students to have a stake in the decision-making process involving their learning, student motivation to complete tasks may increase. By allowing students to have a choice, students may become more self-regulated and may see more value in the work they are completing.

This action research project aims to add to the knowledge base on student motivation for completing math homework, which Usher and Kober (2013) noted has not received much attention from school reformers. By applying aspects of student autonomy (Pape et al., 2003), e.g., student perception of being in-charge of their actions (Skinner et al., 2008), along with

differentiation (Dettmers et al., 2010) to engage perceived competence this project utilized an intervention to boost motivation for mathematics homework. The action research project used student choice on a worksheet differentiated to a student's ability level to increase student motivation for completing homework and to change a student's mindset to completing homework for mastery of the math content presented. The next section of this action research project presents the methods utilized to examine student motivation and student homework completion.

Chapter Three

Methods

The purpose of this project was to determine if an intervention involving student choice with assignments of varying difficulty achieved two outcomes: increased student motivation to complete homework and higher homework completion rates. An action research project was chosen to investigate this topic. A quantitative design was used in which student motivation data and homework completion rates were analyzed using quantitative methods. This project ran from September 3, 2014 to November 25, 2014. This constituted one trimester of instruction. This chapter includes the context of the project, information about the participants in the project, the main questions this project answered, the instruments for collection of data, and the procedures on how the project was implemented.

Context

This project was conducted in a middle school located in suburban city in Southeastern Wisconsin. Even though the size of the city is only 7500 people, the school district itself is composed of 92 square miles and includes parts of 5 other neighboring towns. The population consists of individuals that are 92.3% Caucasian. However, there is a small population of residents that are African-American (1.1%), Hispanic (4.4%), Asian (1.8%), or Native American (0.6%). The community has a wide variety of people from various socioeconomic backgrounds. The majority of the population is middle-upper class, however there are some residents that are middle-lower class, lower class, or upper class.

Participants

The participants for this study included 68 students whose ages range from 13 to 14 years old with 36 females and 32 males. All of the participants successfully completed seventh-grade

mathematics and were enrolled in eighth-grade mathematics. Class one included 24 students with 12 being male and 12 being female, class two included 24 students with 11 being male and 13 being female, and class three included 20 students with 9 being male and 11 being female. Each of the three classes was put into one of two groups, a control group and an experimental group (see Table 3.1). Classes one and three formed the experimental group and class two formed the control group. The main differences between the classes were the time of day the students received instruction for the day and the number of students in the classes as indicated in table 3.1.

Table 3.1

Distribution of Participants by Hour, Time of Day, and Gender

Class One (9:30 AM)		**Class Two (12:44 PM)**		**Class Three (1:37PM)**	
Experimental		**Control**		**Experimental**	
Male	*Female*	*Male*	*Female*	*Male*	*Female*
12	12	11	13	9	11

Questions

This action research project examined two questions: 1) does student choice have an effect on student motivation for completing homework and 2) does that student choice effect homework completion?

Instruments for Data Collection

The instruments used for data collection in this project included a series of worksheets differentiated by difficulty and assignments from a textbook (Larson, Boswell, Kanold, & Stiff, 2007), a pre-survey, and a post-survey. The pre-survey and post-survey addressed research question one and the differentiated worksheets and the assignments from the textbook were used

to address research question two.

Motivation questionnaires. The pre-survey and post-survey (see appendix A) were developed in order to help gauge the current level of student motivation for completing math homework. Students had 30 minutes to complete the survey. The survey consisted of 18 questions used to measure three facets of student motivation. The three facets were general motivation, motivation to complete homework, and choice on motivation to complete homework. Surveys were developed by consulting Donald Treadwell (2011) and Suzanne Watson (1998). Students answered questions using a Likert scale ranking their agreement with a statement about motivation. Student responses were scored on a scale of 1 to 5 with 1 equating to negative motivation and 5 equating positive motivation. Scoring for each question was dependent on student agreement or disagreement with the statement provided. Questions two, three, five, seven, nine, ten, thirteen, fourteen, fifteen, seventeen, and eighteen were scored with strongly agree as receiving a 5 and strongly disagree receiving a 1. Questions one, four, six, eight, eleven, twelve, and sixteen were reversed in which strongly disagree received a 5 and strongly agree received a 1. Each question was scored and values were calculated for each question. At the end of the study, there was an analysis of post results versus pre results to determine if a change exists between motivation at the beginning at the study and motivation at the end of the study for both the experimental and the control group.

Differentiated worksheets. The differentiated worksheets and the assignments derived from the textbook were developed by Larson, Boswell, Kanold, and Stiff (2007). The worksheets and assignments were designed to be an integral part of the curriculum for helping middle school students learn content in eighth-grade mathematics. The worksheets and assignments were used in order to address question two of this study which was associated with homework completion

percentages. Students received the assignments daily and had one day to complete the assignment. Depending on how many questions were assigned from the assignment, students received a score on each assignment. Percentages were calculated by taking the number of questions the student completed divided by the number of questions on the assignment. After all student percentages were calculated an average was generated for homework completion for the chapter of study.

Procedures

The first question examined was if student choice had an effect on student motivation to complete homework. The procedure for answering this question was the use of the aforementioned surveys (see appendix A). These surveys were administered at the beginning of the study and the end of the study (see Table 3.2). All classes in the study received the same survey and a motivation score was calculated in order to determine if there is a difference between classes that received the intervention and the class that did not.

The second question this study designed answered if student choice had an effect on student homework completion. The procedure to answer this question was the analysis of homework completion rates from each of the three classes. Students in the intervention group were given a choice on a differentiated worksheet. Students in the control group were given an assignment in which they were not given a choice on their homework but rather had a series of problems they were required to complete from the textbook. Data was collected from the first 4 chapters of content for the 8^{th} grade math course (see Table 3.2). The content of Chapters 1-3 was review of the previous course and the content of Chapter 4 was new material. Chapter 1 was associated with variables and equations, Chapter 2 was on integer operations, Chapter 3 reviewed solving equations and inequalities, and Chapter 4 introduced students to factors,

fractions, and exponents. Chapter 1 consisted of 7 homework assignments, Chapter 2 consisted of 8 homework assignments, Chapter 3 consisted of 7 homework assignments, and Chapter 4 consisted of 8 homework assignments. This generated a total of 30 homework assignments. Data was collected daily and was scored based on completion. Class homework completion percentages were calculated at the end of each chapter and then compared at the end of the intervention to determine if there was a change in homework completion between the two groups.

Table 3.2

Project Timeline

Dates	***Description***
Aug. 15	Prepared worksheets for study
Sept. 3 – Nov. 25	Implemented project with target classes
Sept. 3	Administered pre-survey on student motivation to complete homework
Sept. 3 – Sept. 19	Administered Chapter 1 with differentiated homework assignment and collected homework completion percentage rates
Sept. 4	Tagged student responses with a score from 1 to 5 via the motivational index
Sept. 20	Calculated class homework completion rates for Chapter 1
Sept. 22 – Oct. 10	Administered Chapter 2 with differentiated homework assignments and collected homework completion percentage rates
Oct. 11	Calculated class average homework completion rate for Chapter 2
Oct. 13 – Oct 31	Administered Chapter 3 with differentiated homework assignments and collected homework completion percentage rates

Nov. 1	Calculated class average homework completion rate for Chapter 3
Nov. 3 – Nov. 23	Administered Chapter 4 with differentiated homework assignments and collected homework completion percentage rates
Nov. 24	Calculated class average homework completion rate for Chapter 4
Nov. 25	Administered post-survey on student motivation to complete homework assignments
Nov. 26	Tagged student responses with a score from 1 to 5 via motivational index
May 5	Analyzed survey results
May 10	Analyzed homework completion percentages

Analysis

The data for this project was analyzed in a quantitative manner. Question one, which was associated with student motivation, was answered by examining student responses to determine if they showed agreement with a statement regarding motivation or disagreement with a statement regarding motivation. In both the pre-survey and the post-survey, student responses were scored on a scale from 1 to 5 with 1 equating to negative motivation and 5 equating to positive motivation. Each item on the survey was scored and averaged by class to determine a shift in general motivation, motivation for completing homework, and if student choice effects motivation to complete homework. The formula for calculating the average item score was the sum of the scores on each question divided by how many students in the class answered the question. By calculating these averages, a higher score equates to higher motivation and a lower score equates to lower motivation. The averages score for each item on the surveys was compared via subtraction to determine a difference between the pre-survey and the post-survey. The experimental group was compared to the control group to determine if there exists a change

in student motivation over the duration of the treatment. SPSS statistic software was used to conduct an independent-samples *t*-test ($p < .05$).

Question two, which was associated with homework completion rates, was answered by looking at homework completion via Infinite Campus. The data for this was collected and entered into a computer which calculated a rate for how many problems the student completed. For example, if an assignment had 10 questions and a student completed 9 of them, the student would receive a score of 0.9. Therefore the formula for calculating homework completion rate was the number of questions completed divided by the number of questions on the daily assignment. After each student was assigned a completion rate, a class completion average was calculated. The formula for calculating class completion average was the sum of the homework completion rates divided by the number of students in the class. Assignment completion averages were collected for each chapter for each class. These averages were then analyzed to determine if there was a difference in student homework completion. The experimental group was compared to the control group to determine if there was a difference in completion average.

Chapter 4

Observations and Results

After surveys were completed and homework was collected, data was recorded in attempt to answer the research questions of this project. The first question was aimed at determining a chance in student motivation over the course of the experiment. The second was question was answering if student choice had an impact on homework completion. As for question one, there were changes in motivation from pre-survey to post-survey. However, some of these changes were more meaningful than others. As for question two, there were minor differences in homework completion, possibly due to ceiling effects.

Survey Data Analysis

A series of Independent Samples *t*-tests were conducted in order to determine a change in motivation over the course of one trimester. The experimental group (E) was compromised of students that received the option of having a choice in their homework assignment and the control group (C) was the group that did not. Table 4.1 shows the mean differences between the post-survey and the pre-survey for each of the 18 questions in the survey and the associated t-values in order to determine if the results between groups was meaningful.

Table 4.1

Mean Difference Scores and t-values

Survey Items	***Group***	***n***	***M***	***SD***	***t***	***df***
1-My parents are my motivators for completing homework	E	44	.43	1.922	-.349	55.544
	C	24	.58	1.586		
2-I am self-motivated to complete my homework	E	44	.00	1.329	-.359	45.523
	C	24	.13	1.393		

3-I view homework as vital to my learning	E	44	.18	1.483	.230	40.381
	C	24	.08	1.792		
4-I feel homework is something I am forced to do	E	44	.30	1.692	2.530*	47.366
	C	24	-.79	1.693		
5-My homework is something that must be done daily	E	44	.16	1.509	1.407	43.524
	C	24	-.42	1.666		
6-Homework is something that must be done or I will get in trouble	E	44	.07	1.149	-1.426	34.543
	C	24	.63	1.715		
7-I want to complete homework that I can do well on	E	44	-.16	1.413	.023	54.196
	C	24	-.17	1.204		
8-I want to complete homework that is easy	E	44	.43	1.421	1.139	44.406
	C	24	.00	1.532		
9-I want to complete homework that is challenging	E	44	.16	1.697	.818	52.792
	C	24	-.17	1.494		
10-I want to complete homework that I will receive a high score on	E	44	-.20	1.112	-.122	42.185
	C	24	-.17	1.274		
11-I don’t want to complete homework that is difficult	E	44	.16	1.539	2.443*	57.748
	C	24	-.67	1.204		
12-I don’t want to complete homework that is time consuming	E	44	.09	1.789	1.721	45.982
	C	24	-.71	1.853		
13-I would prefer to have a choice on my homework assignment	E	44	.02	1.517	-.048	45.920
	C	24	.04	1.574		
14-I want homework that is at my level of difficulty	E	44	.18	1.618	2.153	65.867

	C	24	-.46	.833		
15-I would like to choose the difficulty level of my homework	E	44	.14	1.456	-.369	40.438
	C	24	.29	1.756		
16-I prefer to do homework out of the textbook	E	44	.86	1.984	1.806	54.425
	C	24	.04	1.681		
17-I prefer to do my homework on worksheets	E	44	.32	1.762	.990	54.194
	C	24	-.08	1.501		
18-If I had a choice, I would be more likely to complete my homework	E	44	.18	1.618	.638	58.767
	C	24	-.04	1.233		

Note: *p-value < 0.05

These results indicated that the changes between groups was not meaningful for 16 out of the 18 questions on the survey. However, questions four and eleven were found to be meaningfully different, and are discussed in the following paragraphs.

Question four measured if students felt homework was something they were forced to do. By agreeing with this statement, students felt homework was a forced activity and therefore have the wrong motivation mindset for working on the problem. By disagreeing with the statement, students would have a mindset for doing homework other than feeling forced to complete it. After revising the scoring score to ensure that higher scores represented increased motivation, the change for the experimental group was 0.3 and the change for the control group was -0.79, indicating that at the end of the experimental period the feelings of being ‘forced in’ students in the control group increased more than students in the experimental group.

Question eleven was stated “I don’t want to complete homework that is difficult” and measured students’ feelings on completing homework they felt was difficult. By agreeing with

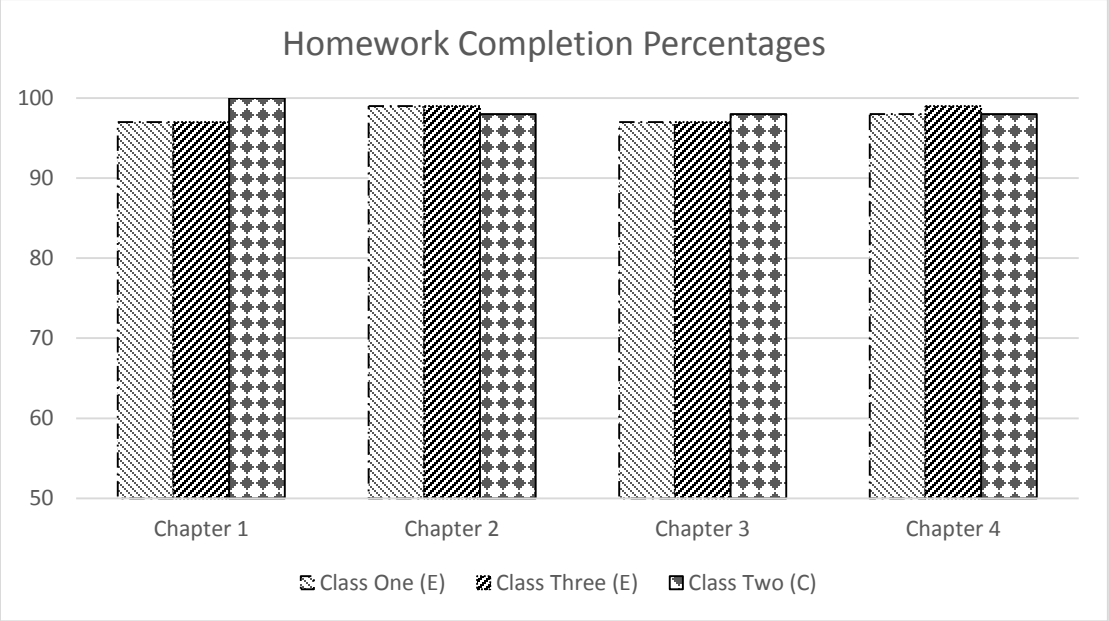
this statement, students feel that homework difficulty was an important factor in their decision to complete an assignment. By not wanting to complete homework that is difficult, students could be looking for an easier assignment because they could get it done quickly or that they may be more comfortable with doing an assignment they can do well on. By disagreeing with this statement, students indicated that homework difficulty may not be a major factor in their decision to complete homework, or they may like feeling challenged. Students that disagreed may have more confidence to try a more difficult assignment or they may see a more difficult assignment as beneficial to their learning. However, there also may be other factors that are more important to students that agreed with this statement other than difficulty such as time-consumption. Again, the results of this item were reversed-scored for consistency, and the changes from question eleven for the experimental group was 0.16 and the control group was -0.67. This suggests that control group became more adverse to difficult homework than the experimental group.

Homework Completion Percentages

Over the course of the trimester, percentages were collected on student homework completion for the four chapters of the eighth-grade math curriculum. Figure 4.3 shows the homework completion percentages for each class over the course of the four chapters.

Figure 4.2

Homework Completion Percentages



The data shows changes in homework completion percentages for all of the classes. Class one (E) completed 97% of the homework assignments in Chapter 1, 99% in Chapter 2, 97% in Chapter 3, and 98% in Chapter 4. Over the course of the experiment, class one experience an overall increase of 1% in homework completion. Class two (C) completed 100% of the homework assignments in Chapter 1 and 98% of the homework assignments in Chapters 2, 3, and 4. Overall, class two experienced a 2% decrease in homework completion. Class three (E) completed 97% of the homework assignments in Chapter 1, 99% of the assignments in Chapter 2, 97% of the assignments in Chapter 3, and 99% of the assignments in Chapter 4. This resulted in an overall positive change of 2% in homework completion over the course of the experiment. Since the data was collected as averages over the course of four chapters for each class instead of by group, there was no statistical test run on the data. However, there were positive changes for the classes in the experimental group and a negative change for the class in the control group. There was a change in homework completion between groups, however the change was not

meaningful. Since the change between groups was so small, the conclusion that the experimental group completed more homework than the control group cannot be drawn.

Chapter 5

Conclusions, Limitations, and Recommendations

The final section of this action research project includes conclusions that can be made regarding student motivation for completing homework. This section also includes the limitations of the study and recommendations for future work involving motivation of students.

Motivation Survey Conclusions

The majority of the motivational questions revealed no meaningful differences between the experimental and control groups. However, between group differences for questions four support the theories of student self-regulation reviewed by Covington (2000) and Eccles and Wigfield (2002). These authors present that students who are self-motivated set goals for themselves and are motivated to complete those goals. Also, inherit in these goals is the motivation to complete them because the goals themselves were generated by the person completing the goals. Since question four measures students' feelings towards homework as something they are forced to do, the meaningful changes could indicate that students in the experimental group felt some other factor influenced them to complete homework in contrast to the control group that felt homework as a forced task. The feeling of being controlled may undermine student feelings of autonomy and may effect intrinsic motivation for completing an assignment. By allowing a choice, students still may not enjoy an assignment, but it makes enjoyment more likely. This result leads to more questions behind the motivation of students to complete homework. If students no longer felt forced to do homework, there must exist a factor or other factors that influence a student to complete a homework task.

Question eleven indicated a similar result. Students in the experimental group tended to disagree with the statement "I don't want to complete homework that is difficult" more than

students in the control group. This indicated that students in the experimental group may be looking for something else in a homework assignment other than the easiness of the assignment or that difficulty had a lesser impact on their motivation to complete an assignment. This suggests that there may be other factors involved such as completing homework for learning or attempting homework that is challenging. Students in the control group may have agreed with this statement because they wanted easier homework or that difficulty was a more important factor in their motivation for completing homework. This indicated that students were completing homework due to the fact that it was easy and they could get it done quickly or that difficulty was more of a motivational factor than some of the other factors such as time. This ties in with the result from question four in which the control group felt forced to do homework. Students in the control group may prefer an easier assignment if they feel forced to do the assignment. Although not very many factors produced a meaningful result, this study suggests a need for more studies based on the individual factors of student motivation, which is further explained in the recommendations section of this study.

Homework Completion Percentages

The classes in the experimental group and the control group experienced no meaningful changes, as just about all students in both conditions completed their homework every week. However, since all students turned in homework, which was unusual, tests were limited in their ability to determine if the intervention was successful.

Limitations

There were some notable limitations with this study. The first of these limitations is associated with classes. The experimental group contained 44 students and the control group contained 24 students. If repeated, greater sample sizes in each group and larger sample sizes

may produce more meaningful results due to greater statistical power. The three classes also had class at different times of the day. Class one was a morning class, class two was immediately after lunch, and class three was the last class of the day. Since the classes met at different times of the day, students may have different physical, mental, and emotional needs that need to be met at different times. These needs could have an effect on student motivation. Also, the classes were not evenly distributed by gender. This study did not test for differences between genders, but there may be some validity to the results of the gender. These classes also represented only eight-grade students, which does not allow for extrapolation of the data to other groups.

The second of these limitations is associated with the homework assignments themselves. The fact that the control group received a textbook assignment and the experimental group received a worksheet could have made a difference in student motivation for completing homework. If repeated, more consistency between the medium in which students were working on the material could help gain more meaningful results. Students in the experimental group also may have chosen worksheets based on the number of questions needed to be completed as opposed to the difficulty as the worksheets did not contain the same amount of questions. Also, homework completion in both groups was unusually high. The fact that all students turned in homework made the detection of an effect impossible. However, a greater sample size, different classes, and a higher overall workload may allow for more variations in the data collected.

The last of the limitations for this study is associated with the survey. Student motivation scores may vary depending on student motivation to take the survey. More clarification of the directions and the survey items themselves may have helped give better results on the survey mean differences. An example could include explaining what the questions means. Also, an electronic version of this survey may assist with the data collection and would also allow

students to take the survey when they felt more motivated to complete it.

Recommendations for Future Study

This study raised more questions about student motivation. Despite the absence of many effects, the findings produced ideas for future studies. Using the items in the survey, produced avenues for future study within each of the factors of motivation. While this study was limited to student choice and differentiation, future studies can explore interventions that target self-motivation, parental influence, homework difficulty, and homework type within the mathematics curriculum. This study also would benefit from a more diverse group of students and also could be replicated with students of different age groups. Larger sample sizes may also help to produce results to determine if any of these factors play a major role in student motivation to complete homework.

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Appendix

Appendix A: Motivation Pre-Survey and Post-Survey

Appendix A

Motivation Pre-Survey and Post-Survey

Please answer the following questions to the best of your ability. Please be clear in all of your responses to the questions. Your answers will remain completely anonymous.

For questions 1-6, please indicate your agreement/disagreement with the statement by filling in the appropriate cell

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) My parents are my motivators for completing homework					
2) I am self-motivated to complete homework					
3) I view homework as vital to my learning					
4) I feel homework is something I am forced to do					
5) My homework is something that must be done daily					
6) Homework is something that must be done or I will get in trouble					

For questions 7-12, please indicate your agreement/disagreement with the statement by filling in the appropriate cell

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7) I want to complete homework that I will do well on					
8) I want to complete homework that is easy					
9) I want to complete homework that is challenging					
10) I want to complete homework that I will receive a high score on					
11) I don't want to complete homework that is difficult					
12) I don't want to complete homework that is time consuming					

For questions 13-18, please indicate your agreement/disagreement with the statement by filling in the appropriate cell

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13) I would prefer to have a choice on my homework assignment					
14) I want homework that is at my level of difficulty					
15) I would like to choose the difficulty level of my homework					
16) I prefer to do homework out of the textbook					
17) I prefer to do my homework on worksheets					
18) If I had a choice on my assignments, I would be more likely to complete my homework					