

Study of the Best Day to Assign Homework and the Use of Different
Extrinsic Rewards to Motivate Students to Complete Homework

By

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Introduction

This research first examines if there is clearly a best day during the week to give homework to students. Secondly, it explores some different methods to help increase student homework completion percentages. Homework is a vital part of the learning process especially in a mathematics classroom and understanding when to assign homework is a key component to giving the students a chance to succeed. Another issue facing teachers today is that even if the homework is assigned at the optimal time, some students will still not complete their homework.

I have been a teacher in a mathematics classroom for the past four years at both the middle and high school level. Over these four years, I have come to realize that my biggest frustration is when students simply do not work on a homework assignment that would have taken them ten to fifteen minutes. When a teacher examines the students' test grades and homework grades, there is an obvious positive correlation between the two. With this in mind, I have tried to come up with ways to encourage the students to do their homework because it just does not seem that doing it for a good grade is a motivator for most students. The more a person practices something, the better they become at the task they are working on. This same concept exists when it comes to learning a simple task like solving two-step algebraic equations. The more you practice through homework problems, then the easier it becomes to solve these types of equations.

My study focused first on whether there was a day that students were more apt to complete their homework. It then explored some different motivation techniques to help improve the students' homework completion percentage.

It is hypothesized that Monday is the best day to give homework to middle and high school mathematics students because they are fresh and ready to go after a restful weekend. Also, it is hypothesized that middle school mathematics students will complete homework more often if they have some extrinsic reward they may earn.

I tested the first hypothesis by simply keeping track through a spreadsheet of the days that students handed in their homework. This data was collected since the beginning of the year to ensure sufficient data to make a significant conclusion. A simple comparison of each day's completion percentage told us if one particular day of the week had a significant better homework completion percentage than the others. The second hypothesis was tested by offering three different extrinsic rewards and comparing the homework completion percentages for each as well as a baseline figure. In all three of these trials, the participants were 45 seventh-grade mathematics students from two different classes. The first extrinsic reward pitted the first class against the second class to see who would have the best group homework completion percentage. The winner at the end of the four-week trial received a pizza party. The second extrinsic reward trial was done over four weeks. During this trial, students received a ticket for every homework assignment completed. The tickets were drawn from a bucket at the end of the week and students received a prize. The final extrinsic reward trial was done over four weeks as well. Students once again received a ticket for every completed homework assignment but this time only one drawing was done at the end for a big prize.

In implementing these three different extrinsic reward systems, I was able to compare the results to the baseline figure to see if an increase in homework completion took place. Also, I compared the three different extrinsic reward systems to see which one was the most successful intervention technique. Finally, in examining the results from the study, I was able to give the reader some possible teaching implications to use in his/her own classroom. Next we examine what different researchers say on these two topics.

Literature Review

The purpose of this literature review is to analyze the existing research on the concept of mathematics homework at the middle and high school levels. There is an ongoing debate amongst parents, teachers, and students about whether homework should be given, how much homework should be assigned, and how often these assignments should be given.

The idea of assigning homework has stirred much debate for many years. Some researchers argue that whether to assign homework or not will depend on the subject matter, while others will argue that there still exist the same underlining issues of why homework is not completed no matter what the subject. Within the first section of the literature review these concepts will be discussed through four main areas: The importance of homework, reasons students struggle with homework, reasons for giving homework, and implementation strategies for homework completion. The second section addresses the question of which days are best to give homework. Although there is limited research available for this second section, the results of the available studies will be astounding.

Many teachers struggle with how they can motivate their students to complete homework assignments. One of the motivation techniques that many teachers employ is the extrinsic reward system. The 1990's ushered in a huge debate of the intrinsic vs. extrinsic reward systems and their effectiveness. Although there is not much present-day research on the topic, it still remains as an important tool for teachers to use in their classroom. Therefore, section three of this literature review will focus on the intrinsic vs. extrinsic reward systems. The third section will also discuss the effects that extrinsic reward systems have on the motivation of students to complete their homework.

Every student will react differently to the process which they must complete in order to receive a reward as well as to the reward itself. That is why as sometimes it could take years for teachers to figure out which reward system works best for them and their students. Based on the student diversity in a given classroom, one system might work one year but not the next. Understanding which extrinsic reward systems are most effective and how to implement them can be very useful to a teacher. The analysis of these extrinsic rewards will comprise the final section of this literature review focusing on the research that has been done in many classrooms across the nation.

Homework Debate

The concept of giving homework to students started centuries ago. One state, California, passed an act in 1901 that abolished homework from kindergarten through eighth grade. In today's society, the impression is that children are getting more and more homework every year and that assigning so much homework needs to stop. Teachers are also beginning to notice a trend that students are completing less homework assignments each year (Cluck & Hess, 2003; Davis, 1984; Fraser, Malleck, & Watland, 1999). We will explore this idea of homework through the following four areas: Importance of homework, reasons students struggle with homework, reasons for giving homework, and implementation strategies for homework completion.

Importance of Homework

The importance of homework in today's school system is debated among many, including authors, researchers, and professionals alike. There are some who believe that homework is acceptable in its present form (Dawson, 2009) while others believe in the validity of homework but think some important changes need to occur (Kohn, 2007; Lacina-Gifford & Gifford, 2004). A statistical study done by (Reddick & Peach, 1993) can support both of these claims in their results.

Why do teachers even give homework in the first place? Kohn (2007) states that teachers are losing the true meaning behind assigning homework. They simply assign homework because it is the norm in most schools. Giving homework would seem to make more sense if the assigned homework is beneficial to the students, but this is usually not the case (Kohn, 2007). Kohn does bring up a great point: homework needs to serve a purpose besides just another grade in the grade book. Teachers also need to understand that homework needs to be meaningful to the students. Repeating the same type of mathematical problem thirty times gets monotonous and boring for students.

Society cannot lose touch with the fact that homework does serve as a good way to practice the things students learned during the school day. We have all heard the good old saying that practice makes perfect. Homework does serve as a tool for trying to perfect the skill they are learning, especially in a mathematics setting. Without this practice, potential achievement is lost causing the need for more re-teaching in order for the student to attain mastery status on the topic (Lacina-Gifford & Gifford, 2004). Teachers do need to realize the stress that homework can cause within the household, especially in the higher grade levels. If parents do not know how to help their children with their homework then there is a chance that

this will have a negative impact on the students' learning. "What is needed is a different approach to homework which provides social interaction for family and peers while providing meaningful learning beyond the classroom" (Lacina & Gifford, 2007, p. 279).

Researchers do believe that homework is important to enhance the students' learning. They also all agree that teachers need to re-evaluate the homework they give in order to make sure that it is relevant and beneficial, reasonable in terms of time and work required to complete, and that it is understandable to the parents at home whenever possible (Reddick & Peach, 1993). In order for teachers to make a change in their homework policy and the way homework is assigned, they need to understand some of the reasons students struggle with their homework in order to better serve the students.

Reasons Students Struggle With Homework

A student hears the word HOMEWORK and his/her whole body goes into a tailspin of emotions. How often are students happy when they have to go home and do work, so why must teachers torture these kids? It appears that every year more and more students struggle to do their homework. Many researchers have been searching for an answer to why students struggle to get their homework done (Ackerman, Hughs, & Wilder, 1997; Cluck & Hess, 2003; Davis, 1984; Fraser, Mallek, Sigourney, & Watland, 1999). They have each obtained their information in different ways but their results are strikingly similar. A study done by Hannaway, Chaplin, & Urban (2000), provides some insight to why city kids might struggle to get homework done as well.

In looking at fifth grade students, Ackerman, Hughs, & Wilder (1997) collected data on the student academic and social responsibilities in a middle-class school district in Illinois. The

data were collected through academic assessments, teacher observations, and student self-assessments. They found that students are not motivated to want to learn, which affected the student academic responsibility of getting homework completed. Similar results were found in the action research that was completed by Cluck & Hess (2003) where they studied sixth grade students in a rural setting and second, fourth, and fifth grade level students in an ESL program in an urban school district. This lack of motivation is affecting the students' homework completion, test scores, and interest in the subject matter being taught. It is suggested that teachers rotate through different teaching styles in order to increase the motivation of the students. This can be done through multiple intelligences and cooperative learning techniques (Cluck & Hess, 2003).

Parental involvement is another key factor for students completing their homework. Unfortunately, for many students, unless there is an adult standing over them, chances are the homework will not be completed. Fraser, Malleck, Sigourney, & Watland (1999) support this claim in their action research project where they targeted a student population of Midwest schools consisting of students from the 3rd, 4th, 9th, and 10th grade classrooms. Through pre-intervention and post-intervention surveys they found that students believed the most effective intervention was the teaching of organizational and homework skills combined with parental involvement. Davis (1984) states that parental involvement plays a huge role in the completion of homework. She goes on to discuss the other reasons why students may struggle to complete homework. These include: peer pressure, disinterest in class, socioeconomic problems, fear of trying something, and trouble with the teacher (Davis, 1984). These issues can be explained in the survey completed by Hannaway & Chaplin (2000). The survey was distributed to 6th grade students in more than 160 schools across the District of Columbia. With over 3,400 surveys

collected, the results were that a significant number of students spent their time after school playing video games and watching television, a significant amount of students were home alone without any adult supervision until sometimes as late as 8:00pm, and that students felt that if they completed their homework that they would be labeled as nerds and therefore be bullied (Hannaway & Chaplin, 2000).

The study conducted by Hannaway & Chaplin shows some very intriguing realizations of the compounding variables that students have in completing their homework. In knowing that many roadblocks exist for students to complete homework, it almost seems that educators are setting students up for failure. Therefore we should take a look at some of the good reasons for teachers to assign homework to see if the benefits outweigh the negatives.

Reasons for Giving Homework

The debate over homework seems to center around the fact that the primary reason it is given is for a grade in a class. Although it does serve the purpose of evaluating a student's progress throughout the school year, the grade for doing the homework assignment is not the only reason teachers give homework, and in fact, this should be the last reason to give homework. Researchers would agree that there need to be more reasons to give homework than just for a grade in a class (Brock, Lapp, Flood, Fisher, & Han, 2007; Doyle, Barber, & National Education Association, 1990; Kohn, 2007; Young, 2002).

One of the major opponents of giving homework is Alfie Kohn. He argues that it is a policy in most schools to simply assign homework because that is what is supposed to happen in school (Kohn, 2007). He suggests that homework should not be given just because a teacher needs a grade, but that it should be for educational purposes. This is like a mathematics teacher

assigning the same thirty procedural math problems to students. They will either get it or not by the fifth or sixth problem. We turn these students into robots at times, especially when it comes to mathematics. Kohn proposes that teachers should re-evaluate their homework practices to make sure that the quality and quantity is sufficient. He also states that homework should serve as a skill-building technique to what was previously taught (Kohn, 2007). If the homework is not relevant to what the students have learned that day, then students will become disinterested and therefore not complete the assignment (Brock, Lapp, Flood, Fisher, & Han, 2007).

Homework also serves as a way to communicate with the home. It should be informative enough that parents will be able to help their children with their homework. As Doyle & Barber state, homework also needs to serve as a way to instill some responsibility and independence in these young adults we are preparing for the real world (Doyle & Barber, 1990).

Now that we have justified the importance of homework for the students, reasons for why students struggle with getting homework done, and the reasons why teachers should give homework, we need to examine how we as educators can help these students complete their homework. By considering different implementation strategies, teachers might be able to increase their students' homework completion rates.

Implementation Strategies for Homework Completion

Many teachers wonder why we should reward or encourage students to complete their homework because it is what they are supposed to do. Unfortunately times have changed and teachers need to change their way of thinking. We now live in a society that is breeding a generation that needs to be rewarded or complimented on every little thing they do. So what are some strategies that teachers can implement in their classroom to increase the homework

completion percentage? Many different researchers and authors have been working on an answer for some time and their results can be very helpful and useful to the general classroom teacher (Anliker, Aydt, Kellams, & Rothlisberger, 1997; Bryan & Burstein, 2004; Epstein & Pinkow, 1988; Fraser, Malleck, Sigourney, & Watland, 1999; Grode, 2010; Ostach, 1990; Salend & Gajria, 1995).

In an action research project done in a mid-western high school algebra and biology class, Anliker, Aydt, Kellams, & Rothlisberger (1997) found that teaching the students good organizational skills was the number one way to increase student homework completion. If students were organized to write down their assignments and have a place to put homework assignments then they were more apt to remember and do their homework. Also, they found that if students had consistent knowledge of what their grade was in the class and also received pink slips for incomplete homework, then the students took a more active role in their education causing them to complete more homework assignments (Anliker, Aydt, Kellams, & Rothlisberger, 1997).

This idea of teaching organizational skills is also seen in the special education setting (Bryan & Burstein, 2004). The use of homework planners is a simple way to get these students organized. Bryan & Burstein (2004) also state that a lack of motivation exists among the students. Using a simple reward system, whether done extrinsically or intrinsically, can increase students motivation. Another key factor is parental involvement with the children at home. When teachers are able to communicate expectations, assignments, and goals to parents for their children, this helps get the parents involved in helping the students complete their homework assignments (Bryan & Burstein, 2004).

When teachers implement some different strategies throughout the school year with their students we can see an increase in the homework completion percentage. Although using different strategies does not work for every child, we see that as a whole group the process has a positive effect. Combining these strategies with an understanding of the timing and right days to give homework, we as teachers can help our students succeed.

Timing Homework Assignments

By giving the students' homework at the wrong time or on too many consecutive days in a row, can set the students up for failure. A teacher, you needs to remember that the students have lives outside of school and they too dislike having to do work outside of school just as any other person who has to bring home work from their job. Researchers suggest that understanding the appropriate days of the week to assign homework and its frequency can help balance the students' frame of mind about wanting to complete the assigned homework (Amerine, Pender, & Schuler, 2009; Amoco Corporation, 1991; Busch, Uebelacker, Kalibatseva, & Miller, 2010; DiFatta, Garcia, & Gorman, 2009; Garner, 1991; Little, Akin-Little, & Newman-Eig, 2010).

Although there has been not much research on the best day of the week to give homework, Busch, Uebelacker, Kalibatseva, & Miller (2010) state that Friday is the worst day to give homework to students because they either forget it at home or they forget that they have it. Hardly any students are going to run home on a Friday and do their homework. Some people might even say that by giving students homework on the weekend, we are teaching them to be procrastinators. The other issue at hand is how often to give homework throughout the week. Are students more apt to complete homework for teachers who assign it once a week or for teachers who assign homework five times a week? There are too many factors that can affect the

answer to this question. In a survey done in a middle school located in central Florida, 47% of the parents believed that their child should receive homework every night in their mathematics class (Garner, 1991).

There are many factors that can help determine the timing of homework within a classroom setting. Mathematics teachers can at least see that parents in central Florida believe their students should get homework. Whether students are given homework daily or every once in awhile, there will be students who will complete it for intrinsic reasons while there will be students that will need an extrinsic reward in order to complete the homework assignment. Therefore we should explore some of the ideas and concepts associated with these two different motivation strategies.

Intrinsic vs. Extrinsic Rewards

The interesting thing about society is that all individuals are extrinsically rewarded to some extent whether it is through a paycheck or receiving something else for a deed completed. Young people see that adults are rewarded for their deeds and they want the same thing, which has caused a long debate over whether to intrinsically motivate or extrinsically motivate students to complete the desired tasks assigned to them. Some researchers would say that extrinsic rewards destroy the intrinsic motivation within students and therefore intrinsic motivation is best (Chance, 1993; Eisele, 1996; Horn, 1991), while others would say that extrinsic rewards have no effect on one's inner motivation but actually improve a student's work ethic (Akin-Little, Eckert, Lovett & Little, 2004; Fryer, 2010; Gauld, 1996). There are even some researchers who would claim that it depends on the individual student to whether an intrinsic reward or an extrinsic reward would be better (Levin, 1984; Rancifer, 1993).

There are many people who feel by rewarding students extrinsically we are destroying their intrinsic feelings about completing tasks on their own. Intrinsic motivation is interpreted as receiving nothing for completing a task. A student should simply have the desire to complete the task that is asked of them to do. By constantly motivating students with prizes, cash, etc., Horn (1991) thinks that teachers are losing sight of how to find better teaching techniques to accomplish the goal of students being intrinsically motivated. She feels that if teachers would use different classroom structures, in combination with new innovative teaching strategies, then students would be less likely to rely on prizes for accomplishing work.

Some proponents of Horn state that very little detrimental effect has occurred in students who have been given extrinsic reinforcement (Akin-Little, Eckert, Lovett, & Little, 2004). Through many meta-analytic studies they were able to come up with these findings. In one of the most recent studies completed, Fryer (2010) compiled data from four major urban cities (Dallas, New York City, Chicago, and Washington D.C) over the course of a school year where he paid students based on performance in different categories among different grade levels. Millions of dollars were paid to over 38,000 students across 260 different public schools. At the completion of his study he found that no evidence existed that incentives decreased the intrinsic motivation in students. Gauld (1996) agrees that the extrinsic reward system does not effect the intrinsic motivation in students. It only adds to the reward of completing the task. He goes on to state that as long as the extrinsic reward is meaningful to the student, then the extrinsic reward system has merit. It does seem that students in today's classroom do seem to rely on receiving something tangible for doing the work that is required. This occurs as early as the elementary level so when they do get to the middle/high school grades they are expecting something in

return for doing work besides a grade. Therefore it would be important to investigate some of the most effective reward systems that work in today's classroom.

Most Effective Extrinsic Reward Systems

We have seen that students struggle to complete homework and that rewarding them in some way can help motivate students to increase their homework completion percentage. Researchers have compiled some of the best techniques to use within a teacher's classroom and have come up with some guidelines for implementing these strategies (Amerine, Pender, & Schuler, 2009; Chance, 1993; Moore & Waguespack, 1994; Radhakrishnan, Lam, & Ho, 2009).

Some of the best extrinsic rewards that work for the students are the simplest and smallest things. Giving students praise can work wonders in motivating students (Chance, 1993). Chance continues to note that depending on the school district one is teaching in, there is a good chance that children do not get praise at home, so hearing words like "good job", "correct", "well done", "excellent", etc... can go a long way in motivating the students and making them feel appreciated. Another form of extrinsic reward that has been used with a high success rate is the Mystery Motivator (Moore, 1994). Although using the mystery motivator can take on many forms and be used for behavioral as well as task completion, the basic idea behind the mystery motivator is that students work towards earning some unknown reward that they can receive when a specified goal is obtained.

A third option for an extrinsic reward that can be used within the classroom is the homework ticket. Students dislike doing homework because it is additional work that they have to do at home when they could be watching TV, playing video games, or playing outside. Although some teachers frown upon this reward system, Amerine, Pender, & Schuler (2009)

found it to be the most effective system to increase homework completion during their action research project. Teachers can always fall back on simply handing out candy, money, or other small trinkets but coming up with a different strategy than other teachers can prove very useful in getting ones students to achieve the goals the teacher have put in place for them.

Not only is it important to use some form of extrinsic reward system in one's classroom, but even more important is the ability to understand how it needs to work in order to get the best success out of ones students. Chance (1993) gives the reader six guidelines to follow when trying to develop and implement an extrinsic reward system in a teacher's classroom. He suggests that teachers should;

- 1) Use the weakest reward required to strengthen a behavior. Don't use money if a piece of candy will do; don't use candy if praise will do.
- 2) When possible, avoid using rewards as incentives. For example, don't say, "If you do X, I'll give you Y." Rewards work best if they are pleasant surprises.
- 3) Reward at a high rate in the early stages of learning, and reduce the frequency of rewards as learning progresses.
- 4) Reward only the behavior you want repeated. If you provide gold stars only for the three best papers in the class, you are rewarding competition and you should not be surprised if students do not cooperate with one another.
- 5) Remember that what is an effective reward for one student may not work well with another.
- 6) Reward success, and set standards so that success is within the student's grasp.
(Chance, 1993, p. 44)

If teachers can follow these simple guidelines when using some extrinsic reward system then they can find their system working much better within their classroom. Simply look how most children are raised, the idea of extrinsic rewards is instilled in children at a very young age. Most parents at some time have told their child one of the following: "you can't have dessert until you finish your dinner", "if you use the potty you will get a sticker", or even "if you stop crying/whining/kicking the back of my seat then when we get to grandma's house I will give you something special." These are all examples of extrinsic rewards and kids grow up with

them from a very young age. Since children are accustomed to these extrinsic rewards and we know that they work, then why not use them in the classroom? Some of the best reward systems have pitted students against each other in a competition between classes to get the desired assignment done. This allows students to remind one another to get their work done in order to win. Now this can have a detrimental effect if one class is winning by a lot in the beginning because then students might not do their homework. That is why having individual awards that students can obtain by completing their work might be better. Both of these systems are popular today among classroom teachers so why not take a look at both systems and see which produces the better results.

In examining the idea of homework completion, implementing one of these reward systems should increase the homework completion percentage of the students in a classroom. Understanding how much work a student completes without rewards is the first necessary step to understanding if the chosen extrinsic reward was effective. As we have seen, students will react to different rewards in different ways so implementing a few different types of rewards can help understand which is more effective. At the end of this entire process we will also be able to answer the question of which day is the best day to give homework. A more detailed explanation of this process is discussed in the next section.

Experimental Design and Data Collection

This experiment was designed to test the dual hypothesis that there is a better day to give homework other than on Monday and that students are more apt to complete homework assignments if they are offered an extrinsic reward. Data were collected to compare which day had the best homework completion percentage starting from the beginning of the school year. The rest of the study took place over a twelve week time frame starting in the middle of October. Three different reward systems were implemented during these twelve weeks. The first reward system pitted one class versus another to see which had the better homework completion percentage with the winner receiving a pizza party, the second experimental reward system was small weekly prizes to the student whose name was chosen randomly from a container, and the third reward system consisted of one big prize handed out to the student whose name was chosen randomly from the container.

Subjects

This study was conducted at the Brocton Central School District in Brocton, New York. The school is located in Western New York along Lake Erie, half way between Erie, Pennsylvania and Buffalo, New York. The town of Brocton has a population of about 1,500 people with about 95% of these residents being Caucasian. This rural school district had approximately 675 students enrolled in grades K-12. The participants of this study were all students who attended the Brocton Middle/High School. The students meet every day for mathematics class for a forty-minute time period.

The study consisted of 78 students across five different grade levels. Refer to Figure 1 for the breakdown of these students by gender, race, and grade level. These 78 students were broken into four different classes each lasting a forty minute period. The four classes consisted

of a Pre-Algebra section for the eleven ninth graders, an applied mathematics class for all of the tenth, eleventh, and twelfth graders, and two sections of seventh grade mathematics with class sizes of nineteen and twenty-five.

Figure 1. Demographic Data For Students

Gender	# of students		Grade Level	# of students
Male	48		7 th	44
Female	30		9 th	11
			10 th	10
Race			11 th	2
Caucasian	69		12 th	11
African American	5			
Hispanic	4			

The background of the participants in the study is varied due to the different classes that were used in the study. The seventh grade classes consisted of all the seventh grade students at Brocton Central School. This means that among these forty-four students, there were many different ability levels ranging from students who received a score of one on the previous New York State 6th Grade Mathematics Examination to students who received a four. They were heterogeneously mixed between the two classes except for the five students who had an IEP/504 plan. A teaching aid was present during class for these five students. The second period class met from 8:52-9:32 and included 19 students with a teaching aid. The third period class met from 9:35-10:15 and consisted of 25 students.

The Pre-Algebra class was set up as the first of two years that the students are learning the required material to take the Integrated Algebra Regents Exam in New York State. This is traditionally taught as a one year class so therefore the students within the Pre-Algebra class have had a history of poor achievement in mathematics. The class met during first period every day from 8:09-8:49. There were four students in this class who had IEP/504 plans resulting in

the requirement of an instructional aid in the classroom. The students were assigned a permanently certified special education teacher for grades K-12 as well as a permanently certified general education teacher for grades PreK-6. Having this additional certified teacher in the classroom has resulted in some wonderful co-teaching opportunities.

The applied mathematics class covered mathematics topics that deal with the real world mathematics that students use in everyday life. It was a non-Regents based mathematics class that met every day during fourth period from 10:18-10:58. The class consisted of tenth graders who barely passed their Integrated Algebra class or failed the course during the school year and passed it in summer school. Also, four of the ten tenth graders had not yet passed the Integrated Algebra Regents' exam. The rest of the students in the applied mathematics class had either failed the Integrated Geometry Class, Integrated Algebra II/Trig Class or they had taken a year off and needed to get their third mathematics credit in order to graduate. No matter what the situation was, the students who were in this class had struggled with mathematics for many years. Out of the 24 students, there were 8 with an IEP/504 plan but none of them required an instructional assistant in the classroom environment. Next we discuss the design of the study.

Design

This experiment was conducted as two separate studies. During both studies the students were given homework on a daily basis. The first study focused on the best day to give homework and took place from the beginning of school year (September 8th) to the end of the third extrinsic reward experiment (March 18th). Throughout both of these studies a homework assignment was considered complete if it was turned in on the following day at the beginning of class. Students who were absent were required to turn the homework in upon their return to school in order for it to be considered complete. Any students who were absent while homework

was assigned were given up to three days to complete their work in order for it to count as complete, which was the school’s policy for making up work for an excused absence.

The second study took place over a five-month time period, starting in mid-October, which roughly breaks down to eighty school days. These eighty days were divided into three twenty-five day experiments, in which a different incentive took place. The incentives were used only with the two seventh-grade sections. Figure 2 offers a nice visual of how the experiment was conducted.

Figure 2. Design of experiments

	Best Day To Give Homework (Sept. 8 to Mar. 18th)	Pizza Party (Oct. 25 th to Dec. 3rd)	Weekly Rewards (Jan. 10 th to Feb. 11th)	Big Reward (Feb. 14 th to Mar. 18th)
Pre-Algebra Class Period 1 11 Students	Participated	XXX	XXX	XXX
7 th Grade Math Class Period 2 19 Students	Participated	Participated	Participated	Participated
7 th Grade Math Class Period 3 25 Students	Participated	Participated	Participated	Participated
Applied Math Class Period 4 23 Students	Participated	XXX	XXX	XXX

The first incentive that was implemented was the pizza party. In this incentive, the two sections of seventh graders competed against each other to determine which section had a higher overall homework completion rate. Since the two classes had different class sizes, then the homework completion percentage was compared to determine who won the competition.

The second incentive consisted of different one-week rewards given to the students. If a student completed their homework on time then they received a homework ticket on which they would write their name and placed the ticket in the box. A name was drawn from the box on the

following Monday in front of the entire seventh grade during homeroom time. There were four different weekly prizes that consisted of gift cards, which were generously donated by the Green Arch Restaurant in Brocton, NY, the Bread Box Restaurant in Brocton, NY, Walmart, and Country Fair.

The third incentive was one big reward (a \$50 gift card to Walmart) given out at the end of the twenty-five days. Similarly to the one week rewards, students received a ticket for every homework assignment they completed on time. At the end of the twenty-five days, a student's name was drawn to determine the winner.

Data Collection

The data for this study was collected and compiled using Microsoft Excel Spreadsheets that tracked the daily performance of each student throughout the two different studies. Additionally, a survey was given to the participants at the end of the experiments in order to get their opinions on the different studies that took place. Collecting the data was easily done since I used my own classroom. The first thing that needed to be collected was the baseline data for each student and class so the data from the experiments could be compared to it. The same data that was collected for the best day to give homework was also used to calculate the baseline information. Since the only variable that was monitored was the homework completion, a simple color coded spreadsheet was used based on whether the homework was completed or not. See appendix A for a sample copy of the spreadsheet. The following guidelines were implemented in collecting the data of homework completion:

- 1) The homework had to be turned in or checked at the beginning of the period on the following day.
- 2) No late homework assignments were accepted as complete during this experiment.
- 3) Since most of the homework assignments were practice of new material previously taught that day, it was considered complete based on effort and not completeness.

- 4) If a student was absent on the day a homework assignment was due then they had to turn it in upon their return to school for it to be counted as complete.
- 5) If a student was absent the day homework was assigned then they had up to three days to complete the assignment, school policy, in order for it to be considered complete.

Although the data showed great results results from the experiments, we need to remember that there were certain factors that affected the results of the data. This is why I administered a survey to each of the students to get their own opinion on the experiments. Figure 3 shows a sample of the questions the students were asked within the survey.

Figure 3. Survey questions

Name: _____	Period: _____
<p>Post Experimental Survey</p> <ol style="list-style-type: none"> 1) On which day do you feel that you are most apt to complete homework? 2) Which reward did you like competing for the most? 3) Are you more likely to complete your homework if there is a prize that you could win? 4) Do you feel that homework is important for learning the new material? Explain your answer. 5) For what other type of prizes would you be willing to complete your homework for? 	

Methods of Data Analysis

This study was mainly quantitative in nature since it compared the percentages of homework completion through three different experiments. Average scores for each student and class were computed for baseline data as well as for each experiment conducted, which allowed for many different comparisons among the individual results and the class results. Another form of quantitative data that was collected was the information pertaining to the best day to give homework. Based on the results collected, both inferential and descriptive statistics were calculated and discussed. The survey that the students completed was the one instrument that was used that dealt with the qualitative data.

Analysis of the Best Day to Give Homework

This experiment was simply done by keeping a daily log of who completed their homework from the night before and who did not. The data was collected throughout most of the school year to ensure that a valid conclusion could be drawn based on the population of students in the study. Guidelines for absent students were discussed in the experimental design section. The data was compared as a percentage for the individual classes as well as the whole group ($n = 78$) for each individual day. The results were compiled in a table for comparison as well as in graphical form which allowed for a comparison of the different days based on class and day of the week. The results from the experiment warranted the use of some inferential statistical tests to be run. An ANOVA test as well as the Tukey Method was used which allowed us to draw a conclusion about the first part of the hypothesis statement.

Survey Analysis

The first three questions on the survey are quantitative in nature so therefore the results were presented in a discussion of the tables that display the answers that were given. In particular, the data from question one was compared with the results from the data collected during the experiment to see how similar the opinions of the students are to the data compiled on the first hypothesis of whether or not Monday is the best day to give homework in regards to student completion. The remaining two questions are qualitative in nature so the results from the survey are displayed in bulleted fashion with a discussion of the answers to follow. Some of the answers from these questions are used to discuss some issues in the implications for teachers section of this research paper.

Analysis of the Data For Extrinsic Experiments

The three different extrinsic reward experiments that were done were compared and discussed in a quantitative manner. For each individual experiment the results were calculated as a percentage and compared to the baseline data to determine if the extrinsic reward increased the homework completion. This comparison was done on a whole group level ($n = 44$), an individual class level ($n = 19$, $n = 25$) and on an individual basis. The information is presented in table format as well as graphically with detailed descriptions and discussions.

The data was also compared across the different extrinsic rewards to see which reward system had better results. This was done through tables and graphs as well. Although not enough data exists to make an accurate conclusion, it allowed us to draw some inferences on whether we might think a group reward is better to use over individual rewards. After comparing the data, it was apparent that no inferential statistics needed to be tested.

Results

After collecting and analyzing the data from this study, we are able to reject both parts of the hypothesis, which means that Monday was not the best day to give homework and that students' did not complete homework more often when an extrinsic reward was being offered.

The following five results emerged from the data analysis:

- Monday night turned out to be the worst night to assign homework with a completion percentage of 70% as compared to Tuesday, Wednesday, and Thursday with completion percentages of 78%, 81%, and 76% respectively. The results allowed us to reject the original hypothesis with a p-value of 0.000 and see that Tuesday, Wednesday, or Thursday night is a better night to give students homework.
- The survey results confirmed that Monday night was not popular among the seventh graders when 38 of the 42 students responded that they prefer to have homework on Tuesday, Wednesday, or Thursday night.
- From the collected data, it is evident that over the four-week trial periods for the three different rewards, students preferred to complete homework for the big reward with a homework completion percentage of 80% versus the pizza party or individual weekly rewards each with a homework completion percentage of 73% and 76% respectively.
- There is not a significant difference between the baseline data and the extrinsic reward data to conclude that students are more willing to complete their homework for an extrinsic reward. The baseline data showed that 79% of the students completed their homework without a reward whereas 76% completed their homework when a reward was available.
- Survey results showed that a majority of the students, 28 of the 42, believed that they should receive a reward for completing their homework and that the reward needs to be appropriate in order for them to want to complete the desired task.

Result 1: Monday night turned out to be the worst night to assign homework with a completion percentage of 70% as compared to Tuesday, Wednesday, and Thursday with completion percentages of 78%, 81%, and 76% respectively. The results allowed us to reject the original hypothesis with a p-value of 0.000 and see that Tuesday, Wednesday, or Thursday night is a better night to give students homework.

A substantial difference within the data exists in order for us to reject the hypothesis that Monday is the best day to give homework because students are fresh and rested from the

weekend. Appendix B shows the data that was collected from September to March for each period as well as the periods compiled together. From appendix B you can see that the overall data shows that Monday did have the worst completion percentage (70%) as compared to Tuesday (78%), Wednesday (81%), and Thursday (76%). If you compare each individual class, then you will see that Monday is the worst night to assign homework to each of those four classes as well. This same result can also be seen for each individual class as well with different percentages. Figure 4 and 5 shows the comparison of the data from appendix B in a visual format.

Figure 4. Comparison of days within a period

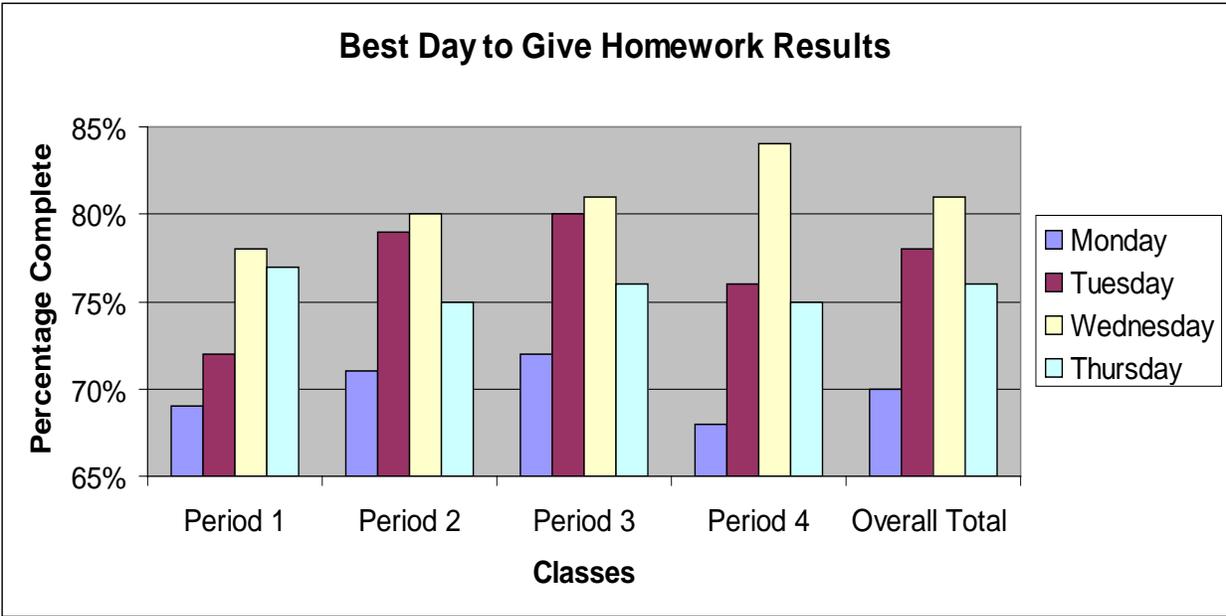
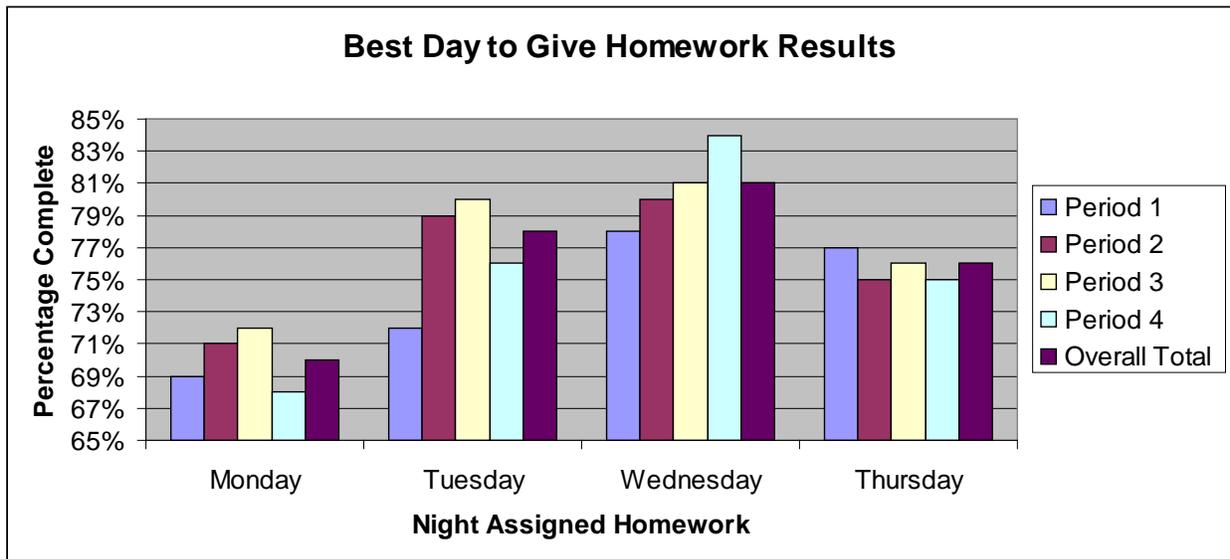


Figure 5: Comparison of periods within the days



Now that we have seen that the percentages are different and that Monday does have the worst homework completion percentage, the question becomes: Is the difference significant enough between Monday and the other days to conclude that Monday is the worst day to assign homework. In order to do this we set our null hypothesis and alternative hypothesis to be as follows:

$$H_o : \mu_M = \mu_T = \mu_W = \mu_{TH}$$

$$H_A : \text{something else is happening}$$

where M = Monday, T = Tuesday, W = Wednesday, and TH = Thursday

An ANOVA test was run rejecting the null hypothesis which gave us p-value of 0.000 (see appendix C). With a p-value of 0.000 we can reject the null hypothesis and adopt the alternative hypothesis that something else is happening. We saw from figure 5 that Monday had the worst homework completion percentage so therefore we can hypothesize that Tuesday, Wednesday, or Thursday is a better day to assign homework. In order to confirm this new hypothesis we can run a Tukey method test to see if the different days of the week have enough significant

difference to separate them in order from worst to best. The results of this test can be seen in figure 6 below.

Figure 6. Tukey Method Test Comparing the days of the week to homework completion percentages

Grouping Information Using Tukey Method and 95.0% Confidence

day	N	Mean	Grouping
Wednesday	74	80.5	A
Tuesday	66	76.8	A
Thursday	65	76.0	A
Monday	64	70.1	B

Means that do not share a letter are significantly different.

The Tukey method shows us that Monday is significantly different than the other three days but that there is not enough difference between Tuesday, Wednesday, and Thursday to make a conclusion that one of those days is better than the other to give homework. Therefore, we can say with certainty that the data shows that Monday is the worst day to assign homework and that Tuesday, Wednesday, and Thursday are better days to give assignments to students. This idea will be discussed further in the implications for teaching section.

Result #2: The survey results confirmed that Monday night was not popular among the seventh graders when 38 of the 42 students responded that they prefer to have homework on Tuesday, Wednesday, or Thursday night.

The survey that was given to the students after all the experiments were completed really helped confirm some of the conclusions drawn from the data. One of the questions that the students had to answer was, “On which day do you feel that you are most apt to complete homework?”. The results from this question are shown in figure 7 on the next page.

Figure 7. Results for survey question #1 (n = 42)

	Monday	Tuesday	Wednesday	Thursday
Period 2	1	6	5	6
Period 3	3	5	9	7
Total	4	11	14	13

The student responses confirm the conclusions drawn previously that the best night to assign homework is in the middle of the week. The table also points out that even the students could not agree on which night they preferred to do homework when it came to Tuesday, Wednesday, or Thursday but it is apparent that they do not like to do homework on Monday nights.

Result #3: From the collected data, it is evident that over the four-week trial periods for the three different rewards, students preferred to complete homework for the big reward with a homework completion percentage of 80% versus the pizza party or individual weekly rewards each with a homework completion percentage of 73% and 76% respectively.

When using extrinsic rewards in ones classroom it is always good to know what the students are willing to work for. Using the smallest reward as possible is the best idea for not only monetary reasons but for future prizes that might need to supersede the previous tangible item they were motivated to work for. For instance, if a student were willing to be rewarded with a sticker for completing a task then why offer something of more value like a homework pass or money. Having the three different rewards for the students to work towards in my study gave me an idea of what the students might be willing to work towards in a seventh grade mathematics classroom. The performance for the students was better for the big reward (\$50 gift card) than for the small weekly rewards or the pizza party. Figure 8, on the next page, shows that as an overall seventh grade class, the students were 7% more likely to complete homework for the big reward versus the pizza party and 4% more likely to complete homework for the big reward versus the small weekly rewards.

Figure 8. Results from the extrinsic reward experiments

	Pizza Party		Weekly Rewards		Big Reward	
	October 25th to December 3rd	Percent Complete	January 10th to February 11th	Percent Complete	February 14th to March 18th	Percent Complete
Period 2	270 out of 361	75%	224 out of 304	74%	226 out of 285	79%
Period 3	339 out of 475	71%	308 out of 400	77%	303 out of 375	81%
Total	609 out of 836	73%	532 out of 704	76%	529 out of 660	80%

The results might not seem to have a big difference between them but in examining the survey results from the question on which reward the students liked to compete for, we can realize that the bigger reward motivated the students more. Figure 9 shows that students liked competing more for the big reward rather than for the pizza party or for the weekly rewards. When we combine the survey results and the compiled results from the experiment, one can conclude that the students liked competing for the big reward over the others.

Figure 9. Results for survey question #2 (n = 42)

	Pizza Party	Weekly Rewards	Big Reward	None
Period 2	3	2	7	6
Period 3	4	1	11	8
Total	7	3	18	14

Result #4: *There is not enough of a difference between the baseline data and the extrinsic reward data to conclude that students are more willing to complete their homework for an extrinsic reward. The baseline data showed that 79% of the students completed their homework without a reward whereas 76% completed their homework when a reward was available.*

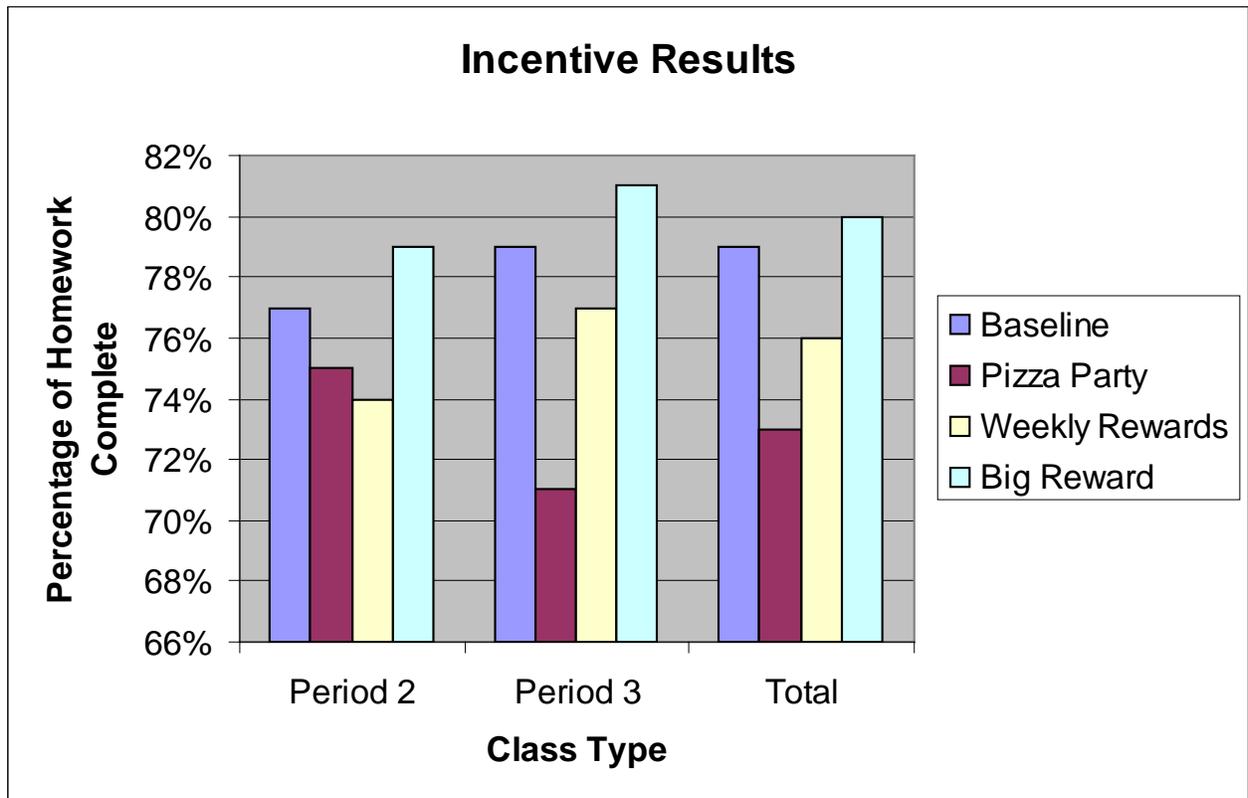
Upon analyzing the data collected, the second hypothesis to this study has to be rejected.

There is not enough of a difference between the baseline data and the extrinsic reward data to

conclude that students are more willing to complete their homework for an extrinsic reward.

Appendix D and figure 10, a graph of the data collected in appendix D, allows us to see this.

Figure 10. A comparison of the extrinsic reward data and baseline data collected



From close examination of figure 10, one can see that the only extrinsic reward that was associated with a higher student completion percentage than the baseline data was the big reward and there was only a one percent difference when comparing the whole seventh grade class.

Does this mean that the extrinsic rewards had no effect on motivating students to complete their homework? It simply means that the data cannot support the fact that the extrinsic rewards increased the students' homework completion percentage.

Many confounding variables play a role in trying to compare the data that was collected. It is very possible that the students would have had a lower completion percentage if no reward

was offered. Also, another factor is the time of year during which the data was collected. The baseline data was collected from the beginning of the year to the middle of October. The material taught during that time was a little easier since some of it is a review from the previous year. Also, students tend to be more fresh and willing to do their homework in the beginning of the year (which I suspect could be another study in itself). There are some other ways in which the data could have been collected to possibly come to better conclusions. These will be explored in the implications for teaching section.

Result #5: Survey results showed that a majority of the students, 28 of the 42, believed that they should receive a reward for completing their homework and that the reward needs to be appropriate in order for them to want to complete the desired task.

Another survey question that the students responded to upon completion of the three different extrinsic reward experiments was, “Are you more likely to complete your homework if there is a prize that you could win?”

Figure 11. Results for survey question #3 (n = 42)

	Yes	No
Period 2	13	5
Period 3	15	9
Total	28	14

A lot of the responses to this question were simple ‘yes’ and ‘no’ answers, as indicated in figure 11, but some students did provide more detail to their response for this question. These answers included students writing:

1. “I don’t believe that we should be offered anything to do our homework since it is something that we are required to do.”
2. “Homework is for a grade....not to get something for.”
3. “If I could get something for what I do then I would as long as I like it.”
4. “I don’t care about grades cause I will pass anyways. Getting a reward would make me do the work more as long as it was something good.”
5. “As long as it is something good.”

So by a 2 to 1 margin, students felt that they should receive something for completing their homework. Therefore we can conclude that the majority of the seventh graders are extrinsically motivated and that from the written responses, it is important for the reward that is offered to be something that students are willing to work for.

Implications for Teaching

Although both of the original hypotheses were rejected, the conclusions drawn from the data analysis allow for three compelling implications for teachers to use across any grade level or subject area. Obviously depending on the age of the students, different rewards will work better within the extrinsic reward system. Another issue that teachers need to keep in mind is that what worked one year may not work for the same age group next year because the make up of the student body is different, which also hold can true for the best day to assign homework.

- With the knowledge that students are more apt to complete homework during the middle of the week, teachers can assign homework and tests accordingly.
- Although it is difficult to satisfy every student's desires, offering rewards will motivate a portion of them so it is a good idea to have something in place in a classroom.
- It is important to find the right reward that will work for students because if not then the reward system could have a negative effect on their willingness to complete tasks for a teacher.

Implication #1: With the knowledge that students are more apt to complete homework during the middle of the week, teachers can assign homework and tests accordingly.

We saw in the results section that Monday turned out to be the worst night to assign homework. Although no data was collected for Friday, past teaching experience has shown me that students do not turn in homework assigned over the weekend. With this information in hand, teachers can now create their lesson plans to include the bulk of the assignments to occur during the middle of the week. Whether the assignments are daily homework, projects, or tests, a teacher can have these in the middle of the week in order to increase the chances that students will complete the work or study for a test. This information is useful to teachers who teach at any grade level or subject area. Allowing the opportunity for our students to be the most

successful is what we should be looking for as teachers and the knowledge of knowing when students are more apt to do their assignments can help them achieve the success.

Implication #2: Although it is difficult to satisfy every student's desires, offering rewards will motivate a portion of them so it is a good idea to have something in place in a classroom.

Upon examining the results of the survey questions, we notice that students feel motivated to complete their homework more often if they can receive a reward for doing it. Although there was not enough evidence to show that students did better when an extrinsic reward was offered, we have no way on knowing what their performance would have been if no reward was offered, which allows one to assume that the rewards had some affect on their performance. Some students did believe that people should complete their homework for no reward but enough students are willing to do work for a reward that it is a good idea to have something in place in one's classroom. As a teacher, one should know that teaching material to students' needs to be done using different teaching methods because students learn in different ways, which allows us to apply a similar process to the extrinsic/intrinsic motivation within one's classroom. Teachers need to have different methods in place that allow students to both feel intrinsically motivated as well as extrinsically motivated.

Implication #3: It is important to find the right reward that will work for students because if not then the reward system could have a negative effect on their willingness to complete tasks for a teacher.

If students are not willing to work for a reward then it could have a negative effect on student motivation. Students will not think it is fair that some students are earning rewards they like when they do not have an opportunity to get something that they like. It is always hard to please everyone. When the students were asked which reward they liked competing for, 14 of

the 42 said none of them because they never won anything. When students feel that they are doing work and not winning, they will tend to not see the point of doing it. If a teacher has a conversation with the students at the beginning of the year then it might help a teacher understand better what students are willing to work for. Some of the best suggestions that I have gotten for rewards and ways to earn them are in the class discussions that I have had. A majority of the students believed they should receive something for completing work other than just a grade as seen in result section. Although a teacher may not agree with this, our ultimate goal is to try to find a way to get students to be successful. If setting up a reward system within a classroom achieves this goal then it might be worth trying to see what results occur. Always remember that what worked one year might not work the next so having that conversation at the beginning of each year is great.

The last question on my survey for the students was, “For what other type of prizes would you be willing to complete your homework for?” Some of the suggestions the seventh graders made can be found in Figure 12.

Figure 12. Survey question #5 answers

Answer	# of students with same answer
Money	5
Candy/Food	7
I don't care	6
Party	2
Free Day	1
I-Pod	3
Anything	6

Answer	# of students with same answer
Concert Tickets	1
I-Tunes Gift Card	2
Video Games	2
Homework Pass	2

Suggestions for Future Research

As I completed this study I felt that only one of my two questions was answered and I feel that if things were done a little differently that maybe the question of how rewards affect student achievement could have been answered. Although some of the suggestions could be used for most studies done in such a short period of time, they are valid. To further strengthen the results I found for which day is the best day to give homework, the following suggestions come to mind of things to include or do differently:

- 1) Include more teachers across different subject areas to increase sample size. This will allow us to make a generalization for all education teachers.
- 2) Collect data over a few years because student population will change year to year allowing for a more accurate sample.
- 3) Try to get different schools involved allowing for different demographics, socio-economic status, and ethnicity.

If these suggestions are implemented then maybe an accurate conclusion can be drawn for the best day to assign homework in general as well as by subject area. When it comes to answering the question of how extrinsic rewards affect student achievement, more confounding variables come into play that you need to account for. To try and eliminate all of the confounding

variables can be difficult; following some of the suggestions below may help to come to a more accurate conclusion.

- 1) Increase the sample size will help the validity of conclusions being drawn. This will entail including more teachers or working in a larger school district.
- 2) Have the two different periods compete for one of the three rewards at different times would allow for a comparison within their data based on the material being taught and time of year the reward was offered.
- 3) All of the baseline data was collected in the beginning of the year; why not see how students do with a reward system from day 1 and then towards the middle of the year collect the baseline data.
- 4) Another possible way to take the time of year into account is rotating a reward and baseline data every four weeks.

Concluding Remarks

Ultimately it is hard to take into account all the factors in such a short period of time. In any experimental study, time and sample size play a factor in trying to draw significant conclusions based on the data collected. In designing and implementing this study, I set out to understand my student population a little better. I have been able to come up with new teaching methods and have allowed myself to become a better teacher based on this process. Although the data did not prove that students are more apt to complete their work if a reward was offered, I did learn that students feel they should receive something for the work they do and that the reward the students are offered needs to be appropriate. Sometimes it is hard to step out of the role of a teacher and step into the shoes of these young teenagers to understand what they are willing to do and how they think. If you are able to do this as a teacher you will be very successful because you will be able to adapt your teaching to the best way that it suits your students' learning.

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Appendix A
Data Collection Spreadsheet

	Mon 9/27	Tues 9/28	Wed 9/29	Thurs 9/30	Fri 10/1	Mon 10/4	Tues 10/5	Wed 10/6	Thurs 10/7	Fri 10/8
Student 1	Yellow	White	White	Yellow	Red	White	White	Red	Yellow	Red
Student 2	White	White	White	White	Red	White	White	Red	White	Red
Student 3	Yellow	White	White	Yellow	Red	White	Yellow	Red	Yellow	Red
Student 4	White	White	White	White	Red	White	White	Red	White	Red
Student 5	White	White	White	White	Red	White	White	Red	White	Red
Student 6	White	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Red	Yellow	Red
Student 7	White	Yellow	White	Yellow	Red	White	White	Red	White	Red
Student 8	White	White	Yellow	White	Red	White	White	Red	Yellow	Red
Student 9	Yellow	White	Yellow	White	Red	Yellow	Yellow	Red	Yellow	Red
Student 10	Yellow	Yellow	Yellow	White	Red	White	White	Red	White	Red
Student 11	Yellow	White	Yellow	Yellow	Red	White	White	Red	Yellow	Red
Student 12	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Red	White	Red
Student 13	White	White	White	White	Red	White	White	Red	White	Red
Student 14	White	White	Yellow	Yellow	Red	Yellow	White	Red	White	Red
Student 15	White	White	White	White	Red	White	White	Red	White	Red
Student 16	White	White	White	White	Red	White	White	Red	White	Red
Student 17	White	White	White	White	Red	White	White	Red	White	Red
Student 18	White	White	White	White	Red	White	White	Red	White	Red
Student 19	White	White	Yellow	White	Red	Yellow	Yellow	Red	Yellow	Red
Student 20	White	White	White	White	Red	White	White	Red	White	Red
Student 21	White	White	Yellow	White	Red	White	White	Red	White	Red
Student 22	Yellow	White	White	Yellow	Red	White	White	Red	Yellow	Red
Student 23	Yellow	White	White	White	Red	White	White	Red	Yellow	Red
Student 24	White	White	White	White	Red	White	White	Red	White	Red
Student 25	White	White	White	White	Red	White	White	Red	Yellow	Red

 means the student did not complete the assignment

 means there was no homework assigned

 means the student completed the assignment

	e	d	e	d	e	d	e	d
September 6th to March 18th	883	1257	1000	1290	1166	1443	962	1269
Percentage Complete	70%		78%		81%		76%	

Appendix C

Results from the ANOVA testing the hypothesis that
Monday is the best day to assign homework.

General Linear Model: percent complete versus day, period

Analysis of Variance for percent complete, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
day	3	3753.3	3932.3	1310.8	7.97	0.000
period	3	374.3	366.8	122.3	0.74	0.527
day*period	9	734.5	734.5	81.6	0.50	0.877
Error	253	41620.5	41620.5	164.5		
Total	268	46482.6				

S = 12.8261 R-Sq = 10.46% R-Sq(adj) = 5.15%

Appendix D
 Compiled Data for Extrinsic Reward Experiments

	Baseline		Pizza Party		Weekly Rewards		Big Reward	
	Sept. 6th- Oct. 22nd	Percent Complete	Oct. 25th- Dec. 3rd	Percent Complete	Jan. 10th - Feb. 11th	Percent Complete	Feb 14th- Mar. 18th	Percent Complete
Period 2	447 of 570	77%	270 of 361	75%	224 of 304	74%	226 of 285	79%
Period 3	592 of 750	79%	339 of 475	71%	308 of 400	77%	303 of 375	81%
Total	1039 of 1320	79%	609 of 836	73%	532 of 704	76%	529 of 660	80%

Appendix F
7th Grade Parent Memo

TO: Parents/Guardians of Students in 7th Grade Math
FROM: Nicholas Williams
DATE:
RE: Consent Form

Purpose, Procedure, and Benefits

- The purpose of this research based study is to determine if there is a better day of the week to assign homework to students as well as determine how students respond to different extrinsic rewards for homework completion.
- The study will take place over sixty school days sometime between February and May. During these sixty school days, students will be assigned homework as normal and the results of whether they completed it will be recorded the next day. Also, these sixty days will be broken into three twenty day experiments. During these experiments, students will be offered the opportunity to win prizes based on their homework performance. The more they do their homework the more of a chance they have to win something.
- The goal of this study is to get a better understanding of what teachers can do to help students increase homework completion through best practices of when to assign the work as well as being able to understand some possible motivation strategies to use to increase student performance.

General Information

- Your student has been asked to participate in this study because he or she is a member of Mr. Williams' 7th Grade Mathematics class.
- Your son's or daughter's confidentiality will stay in place throughout the collection of data, analysis of data, and write up of data. Neither your son's or daughter's name nor yours will be used in any way during this study. Any information containing any names of participants within this study will be secured in a locked location.
- There is no cost or any compensation to the participants or parents/guardians in this study.
- Please be advised that participation in this study is completely voluntary. If a student wishes to withdrawal at any time during the study they may. Your son's or daughter's participation in this study does not affect their grade in any way. Please bear in mind that your child will still be required to do their homework (whether they participate or not) since it is a part of the regular instruction that takes place in Mr. Williams' classroom. Declining to participate will only prevent your student's data from being used within the study.

- This study does not require your son or daughter to complete any more work than what already is required for math class. Due to this, there are minimal risks (if any) that are anticipated to the students. If students need to speak with someone other than Mr. Williams, the principal has been informed of the study and can speak with the student.
- The potential benefit to you and your child is an increased understanding of the possible techniques that can be used to increase student homework completion at Brocton Central School.
- Please read over and discuss the information with your child to make sure everyone is fully aware of everything involved with this study.
- If you have any questions about this form or the study that is taking place, please feel free to contact Mr. Williams at the Brocton Central School in one of the following ways:
Phone: 716-792-2181
e-mail: nwilliams@broc.wnyric.org
- You may also contact Mr. Williams' faculty sponsor, Dr. Keary Howard, for this study at SUNY Fredonia in one of the following ways:
Phone: 716-673-3873
e-mail: keary.howard@fredonia.edu
- You may also contact the Human Subjects Administrator and Director, Maggie Bryan-Peterson, at SUNY Fredonia in one of the following ways:
Phone: 716-673-3528
e-mail: petersmb@fredonia.edu

Thank you for your time and consideration in letting your son or daughter participate in this important study. Please complete the attached consent form and return it with your child as soon as possible. This form is authorizing the use of data from your student's homework completion for purposes of research for the completion of my thesis.

Appendix G
High School Parent Memo

TO: Parents/Guardians of Students in Pre-Algebra and Applied Mathematics
FROM: Nicholas Williams
DATE:
RE: Consent Form

Purpose, Procedure, and Benefits

- The purpose of this research based study is to determine if there is a better day of the week to assign homework to students.
- The study will take place over sixty school days sometime between February and May. During these sixty school days, students will be assigned homework as normal and the results of whether they completed it will be recorded the next day in a Microsoft Excel Spreadsheet.
- The goal of this study is to get a better understanding of what teachers can do to help students increase homework completion through best practices of when to assign the work as well as being able to understand some possible motivation strategies to use to increase student performance.

General Information

- Your student has been asked to participate in this study because he or she is a member of Mr. Williams' Pre-Algebra or Applied Mathematics classes.
- Your son's or daughter's confidentiality will stay in place throughout the collection of data, analysis of data, and write up of data. Neither your son's or daughter's name nor yours will be used in any way during this study. Any information containing any names of participants within this study will be secured in a locked location.
- There is no cost or any compensation to the participants or parents/guardians in this study.
- Please be advised that participation in this study is completely voluntary. If a student wishes to withdrawal at any time during the study they may. Your son's or daughter's participation in this study does not affect their grade in any way. Please bear in mind that your child will still be required to do their homework (whether they participate or not) since it is a part of the regular instruction that takes place in Mr. Williams' classroom. Declining to participate will only prevent your student's data from being used within the study.
- This study does not require your son or daughter to complete any more work then what already is required for math class. Due to this, there are minimal risks (if any) that are anticipated to the students. If students need to speak with someone other than Mr. Williams, the principal has been informed of the study and can speak with the student.

- The potential benefit to you and your child is an increased understanding of the possible techniques that can be used to increase student homework completion at Brocton Central School.
- Please read over and discuss the information with your child to make sure everyone is fully aware of everything involved with this study.
- If you have any questions about this form or the study that is taking place, please feel free to contact Mr. Williams at the Brocton Central School in one of the following ways:
Phone: 716-792-2181
e-mail: nwilliams@broc.wnyric.org
- You may also contact Mr. Williams' faculty sponsor, Dr. Keary Howard, for this study at SUNY Fredonia in one of the following ways:
Phone: 716-673-3873
e-mail: keary.howard@fredonia.edu
- You may also contact the Human Subjects Administrator and Director, Maggie Bryan-Peterson, at SUNY Fredonia in one of the following ways:
Phone: 716-673-3528
e-mail: petersmb@fredonia.edu

Thank you for your time and consideration in letting your son or daughter participate in this important study. Please complete the attached consent form and return it with your child as soon as possible. This form is authorizing the use of data from your student's homework completion for purposes of research for the completion of my thesis.

Appendix H
Parental Consent Form

Parental Consent Form
SUNY Fredonia

Your participation in this important research based study is greatly appreciated. Please fill in the information below that indicates your agreement to the voluntary consent. Feel free to make a copy of this information for your records. This consent form will be kept in a locked filing cabinet thus assuring your confidentiality. Please be advised that your consent authorizes the use of your son's or daughter's homework progress for simple data analysis and that your child's confidentiality will never be compromised.

Voluntary Consent:

I have read this memo and have been given enough information to allow my child to participate in the research study that is being completed by Nicholas Williams during the 2010-2011 school year. My signature indicates that I agree to allow my son or daughter to participate in this study. If anytime my child wishes to withdraw from the study or declines to participate, I am aware that there is no penalty assessed to them. I understand that my child's confidentiality will be maintained throughout this study. I understand that if I have any questions about the study that I may contact any of the people mentioned on the memo that I received.

Student's Name (please print) _____

Parent/Guardian Name (please print) _____

Parent/Guardian Signature: _____

Date of Signature: _____

Appendix I
7th Grade Student Memo

TO: Students in 7th Grade Math
FROM: Mr. Williams
DATE:
RE: Consent Form

- You are being asked to participate in a research study during normal class time. All you need to do to participate is simply show up to class and do your work as you normally would.
- You will not be required to do any additional work if you participate in this study.
- By signing this consent form, you are allowing Mr. Williams to use the data collected within his study. If you do not wish to participate, you will still be required to do the work that is assigned since it is a requirement for the completion of your mathematics class.
- This study will take place over a sixty day time period some time during the months of February to May.
- This study solely focuses on your homework completion of assigned work from the previous day and how different motivators can be used to increase or decrease your homework completion.
- Your name will never be used in any way. Only your data will be used within the study.
- The risks involved to you by participating in this study are very small. If there is a problem at any time throughout this study and you wish to talk with someone other than Mr. Williams, the principal, social worker, and school psychologist will be available.
- There is no penalty for not signing this consent form. Your grade for this class will not be affected in any way based on your participation in this study.
- You will not be compensated in any monetary way or be given extra credit to improve your grade by participating in this study.
- Please discuss this with your parents and if you have any questions please ask.
- Sign the consent form with your parents present and return to me as soon as possible.

Appendix J
High School Student Memo

TO: Students in Pre-Algebra and Applied Mathematics

FROM: Mr. Williams

DATE:

RE: Consent Form

- You are being asked to participate in a research study during normal class time. All you need to do to participate is simply show up to class and do your work as you normally would.
- You will not be required to do any additional work if you participate in this study.
- By signing this consent form, you are allowing Mr. Williams to use the data collected within his study. If you do not wish to participate, you will still be required to do the work that is assigned since it is a requirement for the completion of your mathematics class.
- This study will take place over a sixty day time period some time during the months of February to May.
- This study solely focuses on your homework completion of assigned work from the previous day.
- Your name will never be used in any way. Only your data will be used within the study.
- The risks involved to you by participating in this study are very small. If there is a problem at any time throughout this study and you wish to talk with someone other than Mr. Williams, the principal, social worker, and school psychologist will be available.
- There is no penalty for not signing this consent form. Your grade for this class will not be affected in any way based on your participation in this study.
- You will not be compensated in any way for participating in this study.
- Please discuss this with your parents and if you have any questions please ask.
- Sign the consent form with your parents present and return to me as soon as possible.

Appendix K
Student Consent Form

Student Consent Form
SUNY Fredonia

Thank you for being a part of this research based study. Please fill in the appropriate lines below that show you are agreeing to the voluntary consent statement. Remember that by signing this form you are giving permission to Mr. Williams to use your data within the study. All students must participate in class whether they sign this form or not.

Voluntary Consent:

I have read this memo and I am fully aware of all that this study involves. My signature indicates that I agree to participate in this study. If anytime I wish to withdraw from the study or decline to participate, I am aware that there is no penalty assessed to me. I understand that my confidentiality will be maintained throughout this study. I understand that if I have any questions about the study that I may talk with Mr. Williams about it

Please return this completed consent form as soon as possible. Thank you for your cooperation.

Student name (please print): _____

Student Signature: _____

Date of Student Signature: _____

Parent/Guardian Signature (Witness): _____

Date of Witness: _____