

**THE EFFECTS OF HOMEWORK DERBY ON THE COMPLETION AND ACCURACY
OF MATHEMATICS HOMEWORK OF 1st GRADE STUDENTS**

by

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MATHEMATICS HOMEWORK OF 1st GRADE STUDENTS***

ABSTRACT

The purpose of this study will be to examine the effects of a relatively new and under-researched, team-based intervention called Homework Derby – an intra-class team competition program – on the homework completion and accuracy rates in mathematics of 1st grade students. Homework Derby (HD) infuses powerful components derived from the Class Wide Peer Tutoring Model (e.g., weekly team competition, daily posting of student scores, and contingent rewards) and applies them to daily homework completion and accuracy rates. This investigation will answer the following questions: (a) what effect will homework derby have on 1st graders' daily math completion rates, and (b) what effects will it have on their daily math homework accuracy? When the intervention was implemented, the percentage of students completing math homework increased from 73% to 95% in the final intervention stage. Homework accuracy also improved using homework derby as an intervention. The class' overall homework average before the intervention was put into place was failing, with a mean of only 52% and rose to 72% during the final intervention phase. Findings of the present study will be reviewed in detail and practical implications of the study will be discussed.

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1. Homework Derby
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The purpose of this study will be to examine the effects of a relatively new and under-researched, team-based intervention called Homework Derby – an intra-class team competition program – on the homework completion and accuracy rates in mathematics of 1st grade students. Homework Derby (HD) infuses powerful components derived from the Class Wide Peer Tutoring Model (e.g., weekly team competition, daily posting of student scores, and contingent rewards) and applies them to daily homework completion and accuracy rates. This investigation will answer the following questions: (a) what effect will homework derby have on 1st graders' daily math completion rates, and (b) what effects will it have on their daily math homework accuracy? When the intervention was implemented, the percentage of students completing math homework increased from 73% to 95% in the final intervention stage. Homework accuracy also improved using homework derby as an intervention. The class' overall homework average before the intervention was put into place was failing, with a mean of only 52% and rose to 72% during the final intervention phase. Findings of the present study will be reviewed in detail and practical implications of the study will be discussed.

Chapter 1 – Introduction

Homework and its effectiveness for promoting academic achievement have been cited in many research articles, however, not everyone is a proponent of homework. There are many articles and blogs in today's popular media sources that question the effectiveness of homework assignments and display peoples' negative opinions on the topic. Shumaker (2016) argued that homework should be reserved for high school aged children and does not have positive effects on academic performance in elementary school aged children. Shumaker also pointed out that homework causes family conflict because parents have to remind, nag, and force their children to complete homework assignments. Dell'Antonia (2015) shared these views claiming that homework increases stress and tension among family members, especially when parents felt they were unable to help with the assignment. Children are under stress at school and homework adds to that pressure. This pressure and stress, which are felt by both parents and children alike, can cause arguments among family members. Dell'Antonia also stated that children, especially in primary grades, are doing more homework than recommended for what is developmentally appropriate. According to Feiler (2014), "The first backlash began in the early 20th century as repetitive drilling came under attack, and by the '40s, homework had lost favor. The launch of Sputnik in 1957 generated hysteria that we were losing ground to the Soviet Union, and more homework was one response, but the practice again waned in the 1960s. Homework came roaring back after 'A Nation at Risk' in the 1980s as Americans again feared their children were falling behind" (p. ST2) This type of argument continues today with some people arguing that play is more important, while others chime in that other nations are ahead of us in academics and we need to catch up. So why do teachers assign homework when people are making cases against its validity?

While these bloggers and other media authors try to dispel the efficacy of homework assignments, there are proponents of homework as well. Educational research has shown time and time again the importance of effectively using homework assignments. The research also illustrates that low homework completion and accuracy rates can negatively impact a student's academic performance. Hughes, Ruhl, Schumaker and Deshler (2002) wrote: "Since the early days of formal education, teachers have provided students with extended practice by assigning academic tasks called 'homework' to be completed outside the formal school setting" (p. 4). According to Gajria & Salend (1995), homework can improve students' attitudes towards school, promote good study habits, can facilitate understanding and retention of lesson material, and can involve parents in the educational process. Teachers can use homework to review skills, individualize instruction, increase time on task, and provide additional practice for students. Hughes et al., noted, for example, that, "Proponents of homework suggest that homework is a vital part of the academic experience because it increases the number of opportunities students have to practice new skills and learn new content, and, as a result improves students' academic achievement. They also argue that it enhances student attitude towards education, bolsters self-discipline and good study habits, and encourages students to learn during leisure time" (p. 1). Lynch, Theodore, Bray, & Kehle (2009) add that in addition to skill enhancement, homework also promotes nonacademic benefits such as learning how to work independently. The authors also point out that homework noncompliance can negatively impact academic performance as well as increase the number of referrals made for special education.

While teachers and many parents understand the importance of homework, many students do not share this view. As a result, many students simply do not complete homework assignments. Bryan and Burstein (2004) noted, for example, that, "Fifty-six percent of students

with learning disabilities and 28% percent of students who have not been identified as learning disabled have problems completing homework assignments. Many causes have been suggested to explain homework completion difficulties, ranging from lack of motivation and poor attitudes to cultural differences in homework style” (p. 1). According to interviews done by Gajria et al., (1995), students in grades 6 through 8 often forgot what homework was actually assigned, forgot to bring home the materials necessary for homework completion, misunderstood assignments, procrastinated, did not follow a homework schedule, and came up with excuses for not finishing assignments. Many students also viewed extracurricular activities and being with friends as being more important than doing homework. Even as young as 1st grade, there is a noticeable difference in the academic achievement between students who complete their homework accurately versus students who have a low accuracy rate or do not complete the homework at all. It is also challenging to find an incentive that will modify a behavior (i.e. completing homework assignments) for an entire class of children as opposed to modifying a behavior of one or two students.

In a study with students with learning disabilities (LD), Hughes et al., (2002), taught students to use strategies such as recording assignments, analyzing assignments in terms of time and effort needed, and devising a plan for completion. Their study showed that young people with LD can learn, apply and maintain their use of the strategy in order to complete their homework assignments. With the increase in homework completion, so to came improvements in the students’ quarterly grades. These skills, more often than not, are especially important for students with disabilities. Given the evidence that homework can be a useful tool in promoting academic skills, Gajria & Salend (1995) point out that homework can be used to individualize instruction, increase time on task, and provide necessary practice that students with LD often

need. Gajria & Salend (1995) also make reference to a study done in 1989 investigating the effects of homework on the acquisition of fluency of basic skills in LD students. The study indicated that homework assignments were most effective when completed accurately, however, students with LD appeared to have problems maintaining focus and attention to their homework assignment, thus not always completing the assignments. Lynch et al. (2009) noted similarly that students with LD tend to delay starting their homework and need several prompts to complete the assignments. These findings indicate that teachers need to use a variety of strategies in order for students to be motivated to complete homework assignments and do so accurately.

It is not clear whether homework problems result from personal deficits, work that is too difficult, normal reluctance, home circumstances, or other reasons. However, because homework has been associated with positive effects on academic achievement, most educators believe that an increase in homework completion and accuracy is an important instructional goal (Bryan & Burstein, 1998). According to Olympia, Sheridan, Jenson, and Andrews (1994), homework will not fulfill any purposes if students do not complete assignments. Therefore, homework completion and accuracy are logical targets for behavior change. Other researchers have also found that students who complete homework assignments have better grades and test scores than do students that do not complete homework (Epstein & Van Voorhis, 2001).

To date, a number of strategies have been tried to increase student homework completion and accuracy. Many studies, such as one examined by Bryan et al. (1998), make use of teams. In this case, students were grouped into teams of four and would meet for approximately 10 minutes to discuss assignments. Each day, a different team member was in charge of grading the team members' homework and reporting the grades to the teacher. Other researchers (Gajria et

al., 1995) suggest establishing regular homework routines, teaching study and organizational skills, monitoring homework progress, and involving parents in the homework process. Bryan, et al. (2004) remarked: “Teachers are willing to try methods or materials they consider feasible, cost effective, and valuable...” These strategies have all shown positive effects on student performance.

Between the growing diversity among students and the high academic standards that have been put into place, it is increasingly difficult to be an educator in today’s classroom. One area specifically where many teachers, such as myself, struggle is homework completion; especially the accuracy rate with which homework is completed. Evidence shows that students who have higher homework completion and accuracy rates perform at a higher rate academically than students who exhibit lower homework completion and accuracy rates.

The purpose of this study will be to examine the effects of a relatively new and under-researched, team-based intervention called Homework Derby – an intra-class team competition program – on the homework completion and accuracy rates in mathematics of 1st grade students. Homework Derby (HD) infuses powerful components derived from the Class Wide Peer Tutoring Model (e.g., weekly team competition, daily posting of student scores, and contingent rewards) and applies them to daily homework completion and accuracy rates. Each week, the class will be randomly assigned to two competing teams. The teams will then compete for the higher number of points each week. The number of team points will be based on students’ daily homework grades. The team with the higher average for the day will be designated the “winner” and will receive a star to post next to the team name on that day. At the end of the week, the team with the most individual stars will be deemed the “Winning Team of the Week”. The winning team will be allowed to select individual rewards from a class Reward Menu that will

consist of a variety of items (e.g., edible, tangible, activity-based, novel rewards) that were suggested earlier by class members. Typical rewards might include lunch with the teacher, free ice cream, additional free time, and coupons. This investigation will answer the following questions: (a) what effect will the intervention have on 1st graders' daily math completion rates, and (b) what effects will it have on their daily math homework accuracy? In the next chapter, I will provide an illustrative review of the literature relevant to this inquiry.

Chapter 2 – Review of the Literature

As outlined in chapter 1, homework can play an important role in improving students' academic achievement. Epstein & Voorhis (2001) indicate that homework is recognized as one indicator of successful students, therefore, the implication is that if teachers assigned more homework, students would learn more. However, this prescription is too simple. "Just assigning 'more' homework is a mechanical response to a set of more complex issues" (p.181). The purposes of homework are varied and student achievement is complex, therefore the design of the homework assignments is important to increase student motivation (Epstein & Voorhis, 2001). There are a wide variety of strategies that educators can implement in order to motivate their students thus increasing the completion and accuracy rates of homework assignments. Homework derby is one such strategy; it infuses the main components of classwide peer tutoring, such as weekly team competition, posting of student scores, and reward contingencies. In the following chapter, I will review the literature related to classwide peer tutoring and homework derby.

Classwide Peer Tutoring

Classwide Peer Tutoring (CWPT) refers to a class of instructional strategies in which students are taught by peers who are trained and supervised by the classroom teacher" (Maheady & Gard, 2010; p.72). In one such study, which examined the effects of Classwide Student Tutoring teams (CWSTT), Maheady, Sacca, and Harper (1987) set out to evaluate the impact on academic performance within three 9th and 10th grade math classes. The classes consisted of 28 mildly handicapped students and 63 nondisabled students with ages ranging from 13 years to 19 years. In this investigation, the classroom teacher provided direct instruction at the beginning of the week for one to two days. Over the following two days, students were put into the CWSTT

to practice their weekly content. Each team was given one practice sheet and a deck of cards. One student on each team would begin by selecting the top card. The number on the card indicated which problem on the practice sheet would be presented. The student across from the card selector acted as the tutor and would read the selected problem to his or her teammates. Each member of the team (with the exception of the tutor) was required to write out the problem and the solution. For every correct response, the tutor received 3 points. For every incorrect response, the tutor provided the correct response/procedure, required the teammate to complete the problem correctly 3 times, and was awarded 2 points for error correction. No points were given if teammates failed or refused to correct their responses. This procedure was repeated until the 30 minute CWSTT session was complete. The more items completed on the practice sheet, the more points each team earned. After CWSTT sessions were complete, the classroom teacher administered weekly quizzes to the individual students. Students were told that, for each correct answer, their team could earn 5 points. After the quizzes were scored, team point totals were calculated and the winning team was announced. The implementation of the CWSTT strategy lead to an average increase on weekly math exams by 20 percentage points (p. 114). The results of this study clearly indicated that: “(a) Classwide student tutoring teams (CSTT) procedures resulted in immediate and systematic increases in the weekly math test performance of mildly handicapped and nondisabled 9th and 10th graders, and (b) the intervention substantially increased the percentage of students earning A’s, while virtually eliminating failing grades” (Maheady et al., 1987; p.118). A second investigation, also utilizing peer tutoring teams, again showed in improvement in academic achievement. Harper and Mallette (1993) studied two classrooms totaling 52 second graders, with an average age of 7 years, on the effects of using CWSTT in an effort to teach a generalizable problem solving strategy to solve word problems in mathematics.

The investigators integrated direct instruction from the classroom teacher with peer mediated instruction. Problem solving protocols were taught using direct instruction for five problem types: addition and subtraction with key words, big-number problems, classification problems, and mixed types. Students were divided into teams to practice the strategies taught through direct instruction and problem solving. Teams competed for the most points, which were given to teams for using the correct protocol and generating correct answers. “The 52 second graders showed an average 30% improvement in problem solving and protocol use. Short term retention average over 90% for solutions and 80% for protocol use, long term retention average 83% and 61% respectively” (Harper & Mallette, 1993; p.115)

In an attempt to improve fluency of multiplication facts, a fifth grade classroom teacher implemented CWPT. Similar to the previous investigations utilizing peer tutoring teams, academic achievement improved while the intervention was in place. Hawkins, Musti-Rao, Hughes, Berry, and McGuire (2009) discussed the effects of CWPT in this fifth grade classroom, which consisted of 26 students, ranging in age from 10 to 12 years, on the fluency of multiplication facts. During this investigation, each tutoring session was 10 minutes long and was followed by testing. Tutors showed multiplication fact cards to their tutee, when the tutee answered correctly they were given praise; when they answered incorrectly, they were asked to try again. After 5 minutes, the tutor and the tutee switched rolls and followed the same procedure. After the tutoring session, students tested each other on their multiplication facts. The number of correct responses was recorded on a log sheet. Following testing, the teacher implemented a randomized interdependent group contingency. After each session, the teacher randomly selected one of two target behaviors: displaying appropriate tutoring behavior or answering all 12 target problems correctly during testing. After the target behavior was selected,

the teacher randomly selected a number between 15 and 26. The number she selected was the number of students who had to have met the target behavior. If all criteria was met, each student in the class earned a reward. Implementing the CWPT model significantly increased the students' fluency of multiplication facts and the class was able to earn a reward in 77.27% of tutoring sessions (p. 315). "The current study adds further support to the extent of research base documenting the positive effects of classwide peer tutoring procedures on math performance...The results of the study are consistent with previous research findings that classwide peer tutoring procedures including a classwide interdependent group contingency can effectively improve academic performance" (Hawkins et al., 2009; p. 313). While Hawkins et al. (2009) examined the effects of CWPT in the subject of mathematics, Maheady and Gard (2010) outline what a typical CWPT session looks like in the subject of spelling. Students worked in pairs and acted as both tutor and tutee, switching roles after 10 minutes. The tutors present each spelling word and provide immediate feedback based on tutees responses. The tutees, in return, are required to spell each word both orally and in writing. Tutors are awarded 2 points for each word spelled correctly by their tutee. If a word is misspelled, the tutee must write the word correctly three times. If errors were corrected appropriately, the tutor was awarded 1 point. The more items they complete, the more points their team receives. Students could also earn bonus points for displaying appropriate behaviors. After each session, point values were totaled and then publicly displayed on a scoreboard in the front of the classroom. At the end of each week, students were assessed individually using existing assessment procedures. For each word the students spelled correctly, they were given 5 additional points for their team. Point totals were calculated and the winning team members were presented with team-of-the-week

certificates. The results of this session were not discussed by the authors, but it is presumed that CWPT improved students' spelling scores.

Madrid, Canas, and Ortega-Medina (2007) utilize CWPT in the subject of spelling in a third grade classroom with Hispanic and bilingual students. In this investigation, the researchers compared three procedures “(a) competitive team peer tutoring, during which team members worked to accumulate points for their team; (b) cooperative team peer tutoring, during which team members worked to accumulate points for all participants (across teams); and (c) standard teacher-led instruction, during which each student worked to accumulate his or her own individual points” (p. 157). Every Friday, the teacher would introduce 10 new spelling words, the following week the students would work as tutor and tutee to practice the spelling words. In the competitive team peer tutoring group, students worked to earn points for their team in an attempt to earn more points than other teams. In the cooperative team peer tutoring, students worked to strictly learn new spelling words. The teams that scored more points, gave some points away so that each team ended with the same number of points. For the standard teacher-led instruction, students worked to earn points for themselves as individuals. Their findings showed that with the competitive peer tutoring, correct responses jumped from 13% up to 80.2%. In the cooperative peer tutoring session, correct responses climbed from 12% to 92.8%. The teacher-led procedure was the least successful going from 14% to 36.2%. This study provides further evidence to the efficacy of CWPT; “the size of the gains made by students in the team tutoring conditions compared favorably with those obtained in prior studies of peer tutoring” (p. 158). “CWPT is an effective procedure that enables the classroom teacher to implement instructional processes known to accelerate and maintain the academic learning of students with and without disabilities...As a procedure, it has much to offer teachers and students looking for

flexible, adaptable, motivating, and cost- and time-effective approaches to increasing active student responding and positive academic outcomes” (Arreaga-Mayer, 1998; 94). CWPT has powerful features that allow classroom teachers to provide a time-effective intervention on academic performance that has been proven effective time and time again. These components can also be applied to homework.

Homework Derby

To my knowledge, only two studies have been done using Homework Derby (HD) as an intervention to improve homework completion and accuracy. In two separate investigations, one completed over 20 years ago in a 6th grade middle school class (Ferro, 1986) and the second completed six years ago in a 5th grade elementary class (Friedman, 2010), the classwide peer tutoring method was implemented to improve daily homework completion and accuracy rates in the area of mathematics. In both investigations, classes were divided into two teams. After the teacher had given direct instruction in the area of mathematics, students were given time to meet with their teams and discuss the homework assignment due the following day and talk about the best way to solve each problem. Each day, the homework turned in before math began, it was corrected, and individual scores were posted publically on one of two scoreboards at the front of the classroom. The individual scores would be added together for each team on a daily basis. At the end of the week, team scores would be calculated and the team with the most points received a reward. Both of these studies yielded similar results to the previous studies discussed, showing significant increases in the completion and accuracy rates of math homework and also an improvement of assessment scores. Both of these studies highlight the fact that the essential components of CWPT can be effectively applied to homework assignments for the purpose of increasing completion and accuracy rates.

Conclusions

In conclusion, this literature review illustrates that while there a number of strategies to improve academic achievement, the CWPT model is highly effective. While there have not been many investigations studying the effects of CWPT on homework specifically, the research does suggest that it is successful not only to improve test scores, but it can also be applied to homework in order to improve completion and accuracy rates as well. This study will examine the effects Homework Derby and provide more research proving that the components of CWPT are an effective means for improving homework completion and accuracy. Furthermore, the purpose of this study will be to examine the homework completion and accuracy rates in mathematics of 1st grade students. Homework Derby (HD) infuses powerful components derived from the Class Wide Peer Tutoring Model (e.g., weekly team competition, daily posting of student scores, and contingent rewards) and applies them to daily homework completion and accuracy rates. The primary research questions are: (a) what effect will the intervention have on 1st graders' daily math completion rates, and (b) what effects will it have on their daily math homework accuracy? In the following chapter, I will detail the methods used to carry out my investigation.

Chapter 3 – Methodology

Research Frameworks

In order to answer the research questions outlined in Chapter 2, I am implementing a quantitative research design plan using a team-based intervention that combines important aspects of Class Wide Peer Tutoring (CWPT). To my knowledge, only two formal research studies (previously reviewed in Chapter 2) were conducted on the use of the Homework Derby (HD) strategy. The first study was completed over 20 years ago in a 6th grade middle school class (Ferro, 1986) and the second was completed 6 years ago in a 5th grade elementary class (Friedman, 2010). HD consists of four primary components: (a) weekly competing teams, (b) in class homework correction, (c) public posting of individual and team homework scores, and (d) contingent rewards for the team with the highest point value at the end of each week. I made the decision to carry out this research methodology after considering a wide variety of methods that offer the promise of improving homework accuracy and completion. In this chapter, I will detail the methods of Homework Derby.

Subjects and Settings

The participants in this study included 18 students (7M, 11F) enrolled in a 1st grade general education class in a public school in a rural area of Western New York. The students in this class were demonstrating homework scores in the area of mathematics that were lower than grade level expectation. All of the students were Caucasian, ranging in age from 6 to 7 years old. Among the students, three of them had Individualized Education Plans (IEPs) and one had a 504 plan. There were approximately 2,900 students in the school district, consisting of 97.53% Caucasian, 1.18% Native American, .52% African-American, and .76% Hispanic (New York State Education Department Report Card, 2008). The percentage of students receiving free or

reduced-price lunch in the school was reported as 39% (New York State Education Department Report Card, 2005).

The classroom was technologically equipped with a SMARTBoard and 4 computers for student use. Student desks were grouped into sets of 4 with one grouping being a set of 5; each desk was placed so that every student could easily see the front of the room. The teacher/researcher was a Caucasian female in her first year as a 1st grade teacher. Student and parent consent was obtained according to the University Institutional Review Board policies and procedures (see Appendix D). The project was conducted during regularly scheduled math classes and all homework assignments were standardized for length, difficulty, and format.

Dependent Variables

This investigation contained two primary dependent variables: (a) daily percentage of math homework completed and accuracy rates, and (b) consumer satisfaction ratings of the HD intervention. Math homework was assigned daily and incorporated knowledge and skills taught by the classroom teacher/researcher throughout the day. The majority of the homework assignments were math worksheets (see Appendix A for examples). The teacher-researcher expected homework to be turned in every morning before class began.

Homework data was recorded in two ways: first, the investigator calculated the percentage of students who were in attendance and turned in their homework on time. Second, each homework assignment was collected, graded for accuracy (i.e., percentage correct), and recorded by the investigator. To ensure that homework data were being collected reliably, inter-rater reliability checks were conducted. Another teacher, who was blind to the study's purpose, was asked to independently grade students' homework during 20% of the sessions. Both teachers' independent scorings were then compared on an item-by-item basis. If both raters

scored an item the same (i.e., both correct or both incorrect), then the item was scored as an agreement. If raters scored an item differently (i.e., one correct, one incorrect), then the item was rated as a disagreement. Inter-rater reliability was then calculated as the number of agreements divided by the number of agreements plus disagreements, multiplied by 100.

The next dependent variable was derived from students' responses to a 13-item Consumer Satisfaction Survey (see Appendix B). Students completed this survey independently and anonymously immediately after the culmination of the study. This survey asked students to rate how they felt about the HD intervention using a 3-point, Likert-type scale along three dimensions: (a) importance of intervention goals, (b) acceptability of intervention procedures, and (c) satisfaction with intervention outcomes. Student responses were aggregated and mean ratings by item were calculated and reported.

Independent Variable

The Homework Derby (HD) strategy was used as the independent variable. HD consists of a number of basic components that were derived initially from the CWPT model. These components include: (a) weekly competing teams, (b) daily homework correction, (c) public posting of individual and team homework scores, and (d) contingent rewards for the winning team of the week. HD is a game in which students are divided into two teams. After all homework is graded, the homework scores from each team member are added together to obtain a daily team score. Each day, the new team score is added to the previous day's score. The two team scores, along with individual scores, are posted at the front of the room so that students can track their team's progress along with their own personal progress. At the end of the week, the team that has the most points earns a reward (e.g., edible, tangible, activity based, novel rewards).

To ensure that HD is implemented with a high-level of accuracy, a 13-step fidelity checklist was created (see Appendix C). The fidelity checklist consisted of all the major steps involved in implementing HD as well as spaces for noting whether each step was present or absent. The checklist was used to train students initially in the use of HD, and then was used by a second teacher, who was blind to the study's purpose, to determine the position of each checkmark on each item on the checklist that had been completed the interviewer. The fidelity of implementation was calculated by dividing the number of steps completed by the total number of steps completed and omitted multiplied by 100.

Experimental Design and Procedures

An A-B-A-B design was used to study the effects of the HD on homework completion and accuracy rates. This particular design is capable of establishing cause and effect relationships by showing that pupil performances (i.e., homework accuracy and completion rates) change, when and only when, HD is implemented and withdrawn (Kennedy, 2005). During the baseline stage, math homework was collected every morning as the students entered the classroom. After all homework was collected, the teacher-investigator graded it using an answer key while students completed their morning work. The scores were recorded and the homework was returned so that students could make corrections. These baseline data were collected until stable response rates had been established.

During the intervention phase, HD was introduced into the classroom. The students' parents or guardians were given the parent consent forms to complete and return to school (see Appendix D). Another teacher in the building, who was not teaching 1st graders explained the study to the students using the attached script (see Appendix E). Students were told that (a) their participation in the study was completely voluntary; (b) that they could stop participating at any

time; and (c) that their decisions to not participate would in no way affect their grades in math class. Students were also told that the HD would be used with the entire class and that their permission was required for the purpose of using their data (i.e., all students would be participating in the activity and their scores would only be used if given permission). The guest teacher then passed out Child Consent Forms (see Appendix F) to students whose parents already signed and returned the parental consent form. She then read the consent form to the students and answered any questions they had the day prior to formal data collection began for the intervention phase.

In a typical HD session, students were first divided into two heterogeneous teams. Teams were assigned by having the students pull a colored piece of paper from a covered box. Students continued to turn in homework every morning as they entered the classroom then completed morning work while the teacher/researcher graded the homework. Once the teacher/researcher had the homework graded, the scores were recorded for each student. The team members' scores were then added together to get an overall team score for each day. At the end of the day, before any new homework was assigned, the teacher posted the teams' scores, along with individual team member scores, at the front of the room on a designated bulletin board (individual scores were posted by student number, no names were used). The new team scores were announced out loud. Once the scores were posted, new homework assignments were passed out. Once students had their new homework assignments, they were given 10 minutes to meet with their team members. They were to use these 10 minutes to discuss homework questions that they thought might be challenging and to discuss strategies to improve their scores. At the end of the 10 minutes, students put their homework immediately into their mailboxes. Students went through

this process each day. At the end of the week, the team with the highest score earned a reward. This intervention was carried out on a daily basis for three weeks.

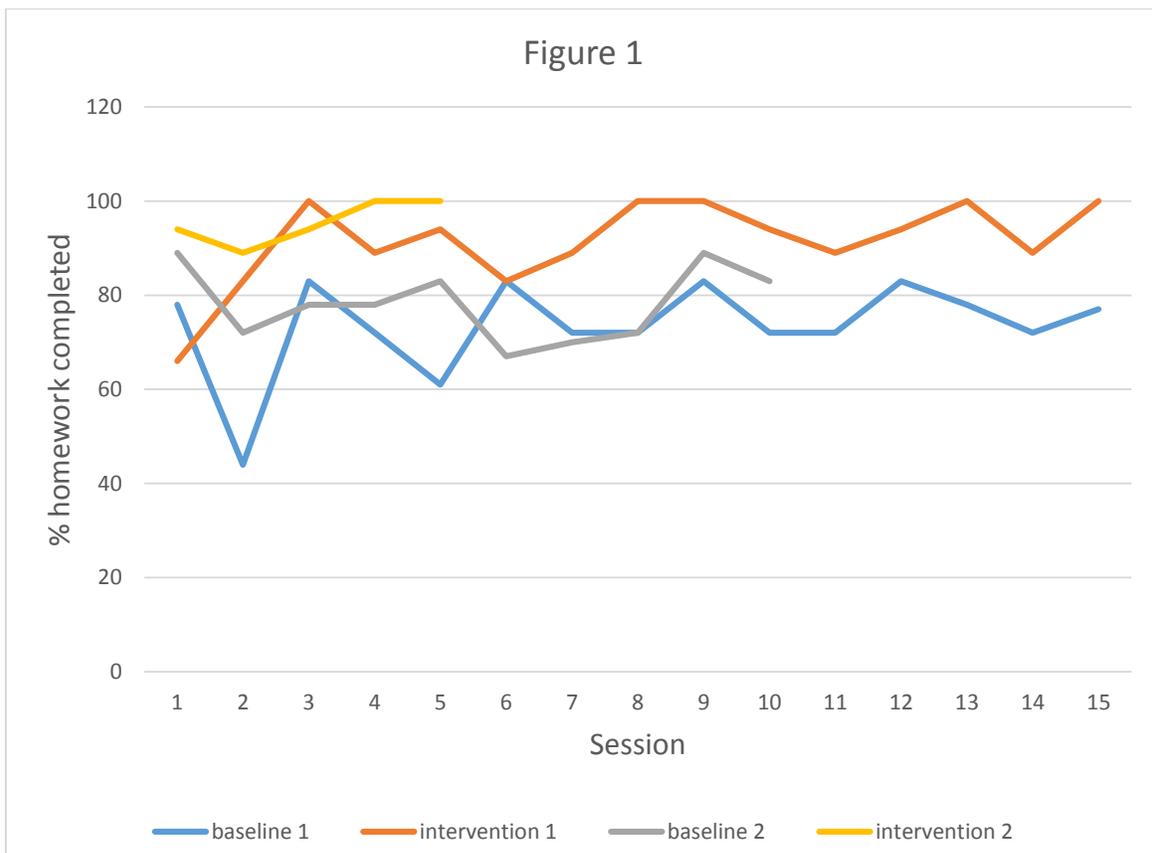
When the three weeks of the intervention implementation was finished, the intervention was taken away and the class followed the baseline routine. After the second baseline had been followed for two weeks, Homework Derby was once again introduced. In the following chapter, I will discuss the significance of the findings.

Chapter 4 – Results

I set out to study the effects that the Homework Derby (HD) intervention would play on the completion and accuracy rates of math homework in a 1st grade class using the methods outlined in the previous chapter. The following chapter will discuss the results of the intervention.

Homework Completion

The effects of the HD intervention on the class' homework completion rates can be seen in Figure 1 below.



During the initial baseline phase, on average, a quarter of the class did not turn in any homework assignments; in contrast, 73% of students turned in their homework assignments on a regular basis. This ranged from a low of 44% to a high of 83%. Only two students (11%) turned in

homework during all 15 baseline sessions. One student only completed four of the 15 assignments, which equates to 26% of assignments completed.

When the HD intervention was implemented, there was almost an immediate improvement in the class' homework completion rates. The first two sessions of the intervention were still relatively low and some students claimed that they "forgot" the intervention was in place. By the third session of the intervention being put into effect, there was a noticeable jump in completion rates. In fact, the mean completion rate increased from 73% to 91% with 100% completion rates in five of the fifteen sessions. Of the remaining sessions, three sessions yielded a 94% completion rate, four sessions 89%, two sessions 83%, and one (the initial session) yielded a 66%. Nine students during the intervention stage completed all homework assignments in the fifteen sessions; this was an increase from 11% to 50%.

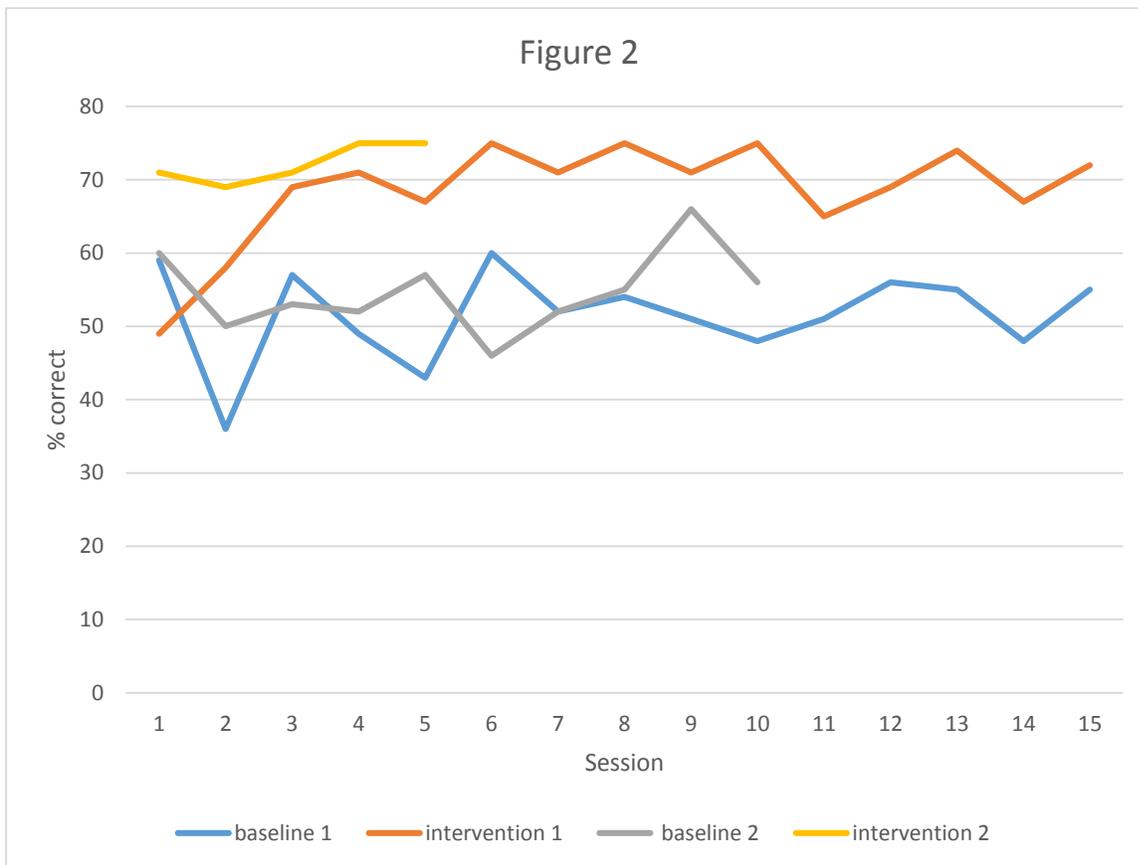
When the intervention was taken away, and the second baseline phase began, student completion rates began to decline again. The second baseline stage consisted of ten sessions, during which the mean completion rate was 78% with a low of 67% and a high of 89%. Five students (28%) turned in homework assignments with a 100% completion rate during this phase of the investigation. While the percentage of students completing all assignments was greater now than during the initial baseline sessions, it was 22% lower than when homework derby was utilized. The lowest completion rate of the second baseline was 50%.

When the HD intervention was reintroduced, there was another immediate and noticeable increase in the class' homework completion performance. Over the course of five sessions, an average of 95% of homework assignments were turned in, higher than that of the initial intervention phase. Of the five sessions that HD was in effect for the second phase of intervention, two of them had a mean of 100% completion rates, two had 94% completion rates,

and one session had 89% homework completion. During this stage of the study, 14 students (78%) completed all homework assignments. The number of students who completed all of the assignments was 67% higher than it was during the initial baseline sessions, and was 28% higher than that during the initial intervention sessions.

Homework Accuracy

The influence of the HD intervention on the class' homework accuracy rates can be seen in Figure 2 below.



As is evident from the chart, the class' daily homework average was fairly low, with a mean of 52%. The average accuracy rates during the initial baseline phase ranged from a low of 36% to a high of only 60%. The low averages were anticipated given that 0 grades were given when

homework was not turned in. Seven students (39%) had a passing homework average during initial baseline.

When the HD intervention was introduced, there was a similar pattern to that of the completion rates; there was a noticeable increase in the class' daily homework scores. The mean class average during the initial intervention increased to 69%. This signified a 17% increase in the class average and there were no overlapping data points across the first two experimental conditions. While HD was in place, 13 sessions had a passing mean score, with the highest being 75% and the lowest being 65%. Two of the sessions (the first and second) had failing homework averages with means of 49% and 58% respectively. Ten students (56%) throughout this phase had a passing homework grade, which is a 17% increase from the initial baseline. One student (.05%) had extremely low accuracy rates with a mean score of 29%.

When the intervention was withdrawn, the class' homework averages dropped quickly to a mean of 55% ranging from a low of 46% to a high of 66% across ten sessions. During the second baseline, eight students (44%) had passing homework averages. When HD was put back into place, the class' math homework average increased again, with a mean accuracy rate of 72%. During all five intervention sessions, the class maintained passing homework averages, with a low of 69% and high of 75%. Throughout this stage of the investigation, 12 students (67%) maintained a passing homework average. Again, one student (.05%) had an extremely low average of 23%. Overall, during the second phase of using HD, the class' mean score rose by 20% from the initial baseline sessions and 3% from the initial introduction of the intervention. There were no overlapping data points during this investigation.

Consumer Satisfaction

Upon completion of the intervention, the students rated their satisfaction of HD. In the area of instructional goals, the overall mean was 2.2 (3-point Likert scale). In the area of acceptability of instructional procedures, the mean was 2.6 (3-point Likert scale), and in the area of strategy outcomes, the mean score was 2.8 (3-point Likert scale). These scores indicate that the students enjoyed the intervention.

Inter-rater Reliability and Fidelity of Implementation

During the course of this investigation, 20% of the sessions utilized an inter-rater reliability check. Only one homework problem had a disagreement between the investigator and the second rater, causing a score of 98%. A teacher blind to the study also assisted with implementing a fidelity checklist. The fidelity of implementation was calculated and yielded a score of 100%.

Conclusions

In summary, this investigation quickly resulted in a noticeable improvement in the completion rates of the class' homework assignments. The investigation also yielded similar results in the accuracy to which the class completed these assignments. In the following chapter, I will summarize these results and provide an evaluation of the implications that have emerged from this inquiry.

Chapter 5 – Discussion

In the previous chapter, I reviewed the findings and data that were derived from implementing the Homework Derby (HD) strategy as an intervention aimed at improving homework completion and accuracy rates. In the following chapter, I will interpret the implications of these findings and disclose the limitations that arose while conducting this investigation. At the end of the chapter, I will explore avenues for possible further investigation.

Implications

The intent of this study was to address whether HD would have a positive impact on homework completion and accuracy rates. The present findings showed that the strategy created significant improvements in a 1st grade math class' homework completion and accuracy rates. When the intervention was implemented, the percentage of students completing math homework increased from 73% to 95%, with 78% of students completing all homework assignments in the final intervention stage. Another aspect that increased, while the intervention was in place, was the students' accuracy rates. While these increases were not quite as immediate or drastic as the completion rates, there was a significant and noticeable difference in the accuracy with which the students completed their homework. The class' overall homework average before the intervention was put into place was failing, with a mean of only 52% accuracy and only 7 students carrying a passing homework grade. When HD was in effect, the overall mean rate of accuracy rose to 72% with 12 students maintaining a passing grade. Certainly, these results demonstrate the efficacy of the intervention. These results are consistent with previous research that has shown when the components of Classwide Peer Tutoring (CWPT) are applied to homework, the completion rates of homework assignments rise and the accuracy to which those

assignments are done also rises (Friedman, 2010; Ferro, 1986). Current findings extend the validity of the HD strategy to a new, younger, student population – 1st grade students.

Present findings also indicate that there is a practical and predictable relationship between the use of HD and the students' homework completion and accuracy. When the intervention was in place, more students completed homework assignments and did so with greater accuracy. When the intervention was removed, completion and accuracy rates dropped. These findings are rather important for the reason that the main components of CWPT (e.g., weekly team competition, daily posting of student scores, and contingent rewards) are infused into HD. This study furthers the validity of previous investigations utilizing CWPT (e.g., Arreaga-Mayer, 1998; Ayvazo & Aljadeff-Abergel, 2014; Harper & Mallette, 1993; Hawkins, et al., 2009; Madrid, Canas, & Ortega-Medina, 2007; Maheady & Gard, 2010; Maheady, Sacca, Harper, 2001). These contingencies seem to have a powerful effect on motivating students because individual performance is important for the betterment of their team in order to earn a reward, necessitating each team member to do their best.

Influences

The purpose of the present study was to extend the scope and application of using HD in order to improve homework completion and accuracy. This is only the third study to utilize HD and provides further support reinforcing the practical and effective use of HD. In addition to its practicality, the intervention was easy to implement and was well liked by the students. HD was easy to use and did not take significant time away from the class; it was motivating and effective. An important take-away from this study is that the use of HD can quickly enhance student motivation to improve upon their homework completion and accuracy. Once the students were told about the weekly team competitions, they worked harder in the hope that their team would

win. The results of this investigation also suggest that the academic performance shown through baseline data was due to a motivational deficit rather than a deficit of skills. It should also be noted that, while no data was officially taken, the investigator observed higher scores on assessments as homework accuracy and completion rates were higher.

Limitations

Although present findings were positive and hopeful, there were some limitations to consider when interpreting the result of the investigation. First, the study was conducted in one classroom of one group of students (N=18); moreover, three students in the class did not participate in the study. The addition of their homework scores could have potentially changed the outcomes. It should also be noted that one student had extremely low homework accuracy scores; taking this outlier data out of the equation could increase the overall mean scores for homework accuracy. Also, the investigation was only conducted in one geographical location, and in only one aspect of curriculum – math homework. An additional limitation comes into play with the short duration of time that the intervention was used for the second time with the class. Because of time constraints, the intervention was only reintroduced for 5 sessions, whereas the first introduction of the intervention lasted for 15 sessions. Further limitations are present because the investigator served as the primary data collector and evaluator. Although procedures were put into place to monitor fidelity of implementation and inter-rater reliability, one cannot rule out the possibility of investigator bias.

Future Research

Future research should include longer durations of the intervention and when possible, the investigator should not serve as the primary data collector and evaluator to avoid bias. As noted in the previous paragraph, while no official data was recorded, improvements in

assessment scores rose while the intervention was in use. Therefore, it would be beneficial for future research to include a measure for examining possible spillover effects (e.g. quiz and test grades). Obviously, more research must be done on the effects of homework derby. First, there needs to be additional replications. Can the intervention be used effectively in other subject areas and at different grade levels? Will students ever get tired of using homework derby? These questions among many others challenge future practitioners and researchers

Conclusion

In short, the current study provides evidence of the effectiveness that the homework derby strategy has on improving homework completion and accuracy rates in the area of mathematics. Targeting first grade students, the procedures used resulted in significant improvements in the completion and accuracy of homework assignments for students with and without disabilities. These improvements were made with minimal effort from the investigator and had high levels of student satisfaction.

Homework Derby offers flexibility and adaptability, is time-effective, and is highly motivating; turning this intervention into an excellent teacher friendly strategy to raise homework scores. In an era that requires curriculum be driven by evidence-based practices, educators need classroom interventions that are powerful and motivating enough to improve all students' performance while simultaneously providing an ease to which even primary age children can utilize. Epstein and Voorhis (2001) commented that, "Homework is a daily activity for most students for at least 12 years of schooling. Every assignment takes the time, energy, and emotions of teachers, students, and families. Given these investments, it is important to ask: How can homework be an effective teaching tool, a useful communication strategy, and a

beneficial learning experience” (p. 191)? Homework Derby is an effective strategy that provides an answer these questions and can maximize the investment of homework for all involved.

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Appendices

Appendix A

Name _____

Missing Addends

Directions: Fill in each addition number sentence with the correct missing addend. Missing addends are in the small boxes below.

$2 + \square = 10$	$1 + \square = 1$
$4 + \square = 5$	$11 + \square = 16$
$6 + \square = 9$	$9 + \square = 14$
$3 + \square = 10$	$7 + \square = 13$
$10 + \square = 15$	$8 + \square = 10$
$5 + \square = 9$	$12 + \square = 16$

4	5	4	2	7	5	3	6	1	0	5	8
---	---	---	---	---	---	---	---	---	---	---	---

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Appendix B
Homework Derby Consumer Satisfaction Survey*
Adapted from Friedman (2010)

Please read each item aloud to your students and ask them to **circle the number** that best represents their feelings about that particular item. Emphasize the importance of completing the rating *individually and privately*. Thanks!

I. Importance of Instructional Goals

1. How important is it for **YOU** to do well on your math homework?

1	2	3
not at all	somewhat important	very important

2. How important is it for **OTHER STUDENTS** in your class to do well in math?

1	2	3
not at all	somewhat important	very important

3. How important is it for students to **GET ALONG WELL** with one another in class?

1	2	3
not at all	somewhat important	very important

II. Acceptability of Instructional Procedures

4. How much did you like **being on a team** for your math homework?

1	2	3
not at all	a little	a lot

5. How much did you like **having your individual homework grades posted** in the classroom?

1	2	3
not at all	a little	a lot

6. How much did you like **having your teams points posted** in the classroom?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

7. How much did you like **switching teams each week** ?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

8. How much did you like **EARNING POINTS** to receive prizes?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

9. How much did you like **EARNING TEAM OF THE WEEK CERTIFICATES**?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

III. Satisfaction with Strategy Outcomes

10. Are you happy with how well you did in math?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

11. Did you try your best to help your team earn points each week?

<u>1</u>	<u>2</u>	<u>3</u>
not at all	a little	a lot

12. Did the **Homework Derby** help you remember to bring in your homework?

1	2	3
not at all	a little	a lot

13. Did **Homework Derby** make you want to do your homework?

1	2	3
not at all	a little	a lot

14. Does the **Homework Derby** seem like something that should be done in school?

1	2	3
not at all	a little	a lot

15. Could the **Homework Derby** be *harmful or hurtful* to other students?

1	2	3
Yes, definitely	maybe	no, not at all

16. Overall, what did you think about the Homework Derby?

1	2	3
Didn't like it at all	kind of liked it	like it a lot

17. Which would you rather do, the Homework Derby or just hand homework in?

1	2	3
No Homework Derby	doesn't matter	Use Homework Derby

Additional Comments:

**Appendix C
Homework Derby
Fidelity Implementation Checklist*
Adapted from Friedman (2010)**

Teacher _____

Date _____

Observer _____

D.O. = Didn't Observe

	<u>Yes</u>	<u>No</u>	<u>D.O.</u>
1. Students are assigned an individual number	___	___	___
2. Students are assigned to teams.	___	___	___
3. Students sit in their desks	___	___	___
4. Team Point Charts posted	___	___	___
5. Teacher corrects homework	___	___	___
6. Teacher computes and records averages	___	___	___
7. Teacher announces team scores out loud	___	___	___
8. Teacher gives new homework assignment	___	___	___
9. Students given 10 min. to meet with team members	___	___	___
10. Teacher assists students when needed	___	___	___
11. Teacher commends winning team	___	___	___
12. Teacher encourages losing team	___	___	___
13. Teacher posts points for each team	___	___	___

Totals: /13 * 100= %

APPENDIX D

Parent Consent Form

Mrs. Katie Dryndas, a graduate student at SUNY Fredonia, would like to conduct a research study in your child's 1st grade math class as part of her on-going research. The goal of her investigation is to improve homework completion and accuracy. Each day, every student will be assigned math problems to complete at home. The students' math homework will be corrected each day their individual homework score will be added to a team score. The class will be divided into two teams each week and the team with the highest point value at the end of the week will earn a reward (e.g., edible, tangible, activity-based, novel rewards). The class will have the opportunity to submit reward ideas to the researcher, for example, lunch with the teacher. At the end of the study, the students will be asked to fill out a satisfaction survey to see if they liked the intervention. Student information will remain anonymous.

This study may benefit your student by encouraging him or her to accurately complete all homework for meaningful rewards. Whenever group contingencies are used, there is a possibility that undue peer pressure may arise. The teacher will minimize this possibility by posting individual grades by student number rather than names and monitoring ongoing pupil interactions while the intervention is in effect. If any pupils display inappropriate behaviors (e.g., negative verbal comments, bullying, etc.) toward others, then the teacher will intervene immediately. There are no other physical, psychological, social, and/or legal risks in this study.

Additionally, the research will not take away from the students' instructional time. The researcher will observe academic achievement and collect data. Both the school and the students will remain anonymous and all data will be confidential. The study will conclude in May. At the end of the study, students will be asked to fill out a consumer satisfaction survey. At any point during this investigation, you have the right to withdraw your child from the study. Because the research is part of Mrs. Katie Dryndas' graduate work, the consent form must adhere to specific guidelines. The language used below is designed to meet these guidelines.

I have been fully informed of the nature of the research and any uses of information concerning my child that may be disclosed. I understand that, during the course of this study, my child's responses will be kept strictly confidential and that none of the data released in this investigation will identify my child by name or any other identifiable data, descriptions, or characterizations. I am aware that my child's information will, in no way, be used by any individual for the purposes of making a decision about academic performance, and that I have a right to examine the overall results of the research and any conclusions drawn from the results. Furthermore, I understand that my child may discontinue his/her participation in this research at any time. I am aware that my child's decision not to participate will not result in any adverse consequences or unequal treatment due to that decision. Finally, I recognize that I am giving consent to have data collected on my child, but understand that all students, regardless of consent for data collection, will participate in the described activities.

After reading this document completely, I sign below, providing consent for my child to participate freely, without coercion.

Please check one of the following:

I am willing

I am not willing

for my child to participate in the research study described above.

School: Arcade Elementary School, Mrs. Dryndas' 1st grade class

Student name (printed) _____

Parent name (printed) _____ Date _____

Parent or Guardian (signature) _____ Date _____

Further information about this research may be obtained by contacting:

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Katie Dryndas

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feld3596@fredonia.edu

Human Subjects Administrator

Dr. Judith Horowitz

Office: (716) 673-3335

judith.horowitz@fredonia.edu

Faculty Sponsor

Dr. Robert Dahlgren

Office: (716) 673-3701

Robert.Dahlgren@fredonia.edu

Appendix E
Script explaining Homework Derby study*
Adapted from Friedman (2010)

Good morning class! How many of you think that completing your homework is important? How many of you think that doing your homework the right way is important? As you know, your teachers think homework is very important. Mrs. Dryndas is going to be doing research to see if an activity called Homework Derby will help motivate you to do your homework the best that you can. This means, she wants to see if playing a game called Homework Derby will make you want to do your homework, and want to do it right! You will participate in Homework Derby in Mrs. Dryndas' class during math.

The Homework Derby is a fun way to make sure we do our homework and bring it back to school the next day.

For the activity, you each will randomly be put into a team for a weekly game. It is called the Homework Derby. That means you will not pick your team. You will just pick a color out of a hat and that color will be your team. Once you pick your color, that will be your team for the whole week. Each Monday we will choose colors again and you will be put on a new team with new friends. Almost each night in Mrs. Dryndas' room you will get math homework. Your job is to complete your homework the best you can and make sure you bring your homework back the next day. Each day Mrs. Dryndas will correct your homework. The goal is to earn as many points as you can. The way to earn the most points is by making sure you bring your homework in and also making sure you do your best work! The team with the most points at the end of the week will be called the "winning team of the week" and will earn a special surprise. We will be choosing our prizes later.

We will be playing the Homework Derby with everyone in class, however, Mrs. Dryndas needs your permission to use any information about how you do on your math homework in the study. Being part of her study is a choice so if you don't want Mrs. Dryndas to use your scores, then just say so. You can also decide to stop participating at any time. If you decide to not participate it will not hurt your grades in class. All you have to do is tell one of your teachers, the principal, or the nurse. Are there any questions?

Appendix F Student Consent Form

Mrs. Dryndas' 1st grade class will be asked to participate in a research study. Mrs. Dryndas is doing this study to help improve her students' learning in math and it might help you improve your homework grades, this means make them better!.

Each day your math homework will be corrected by Mrs. Dryndas and your homework score will be added to your team score. At the end of the week, the team that has the most points will be the winners and they will get to choose a prize. As a class, you will have a chance to choose the prizes you would like to win. You will not have to do anything extra for this study, you will just be doing your normal work.

Sometimes, when we do group activities like this, kids might feel like they are being peer pressured. Mrs. Dryndas will make sure all student are following the class rules and are being good sports. If any student has inappropriate behaviors, for example saying mean things to others, then Mrs. Dryndas will stop them immediately.

When you play Homework Derby, you will be given a number to use instead of your name so none of your friends will know which homework grade is yours. If you choose not to participate in Mrs. Dryndas' study, your grades will not be affected. This means, nothing bad will happen if you choose not to participate; she just won't use your information. If you do participate, you will be helping other teachers and classes become better learners.

Participating in this study is a choice. By choosing to participate, you allow Mrs. Dryndas to use your grades in her research. If you decide you do not want her to use your grades, you do not have to participate in the study. However, you will still participate in the activities. This study will be over in May. At the end of the study, Mrs. Dryndas will ask you some questions about what you thought of Homework Derby. If you do choose to participate but change your mind, you can tell your teachers, the principal, or the nurse at any time without any consequences.

I want to be part of the research on the effects of homework derby on the accuracy and completion of mathematics homework. By signing below, I allow Mrs. Dryndas to use my homework grades.

Student Name

Student Signature

Date

Further information about this research may be obtained by contacting:

Researcher

Katie Dryndas

Cell: (716) 777-2346

feld3596@fredonia.edu

Human Subjects Administrator

Dr. Judith Horowitz

Office: (716) 673-3335

judith.horowitz@fredonia.edu

Faculty Sponsor

Dr. Robert Dahlgren

Office: (716) 673-3701

Robert.Dahlgren@fredonia.edu

Appendix G

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COURSEWORK REQUIREMENTS REPORT*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:**  katherine feldmann (ID: 741637)
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Unit:** Education
- **Phone:** 982-8519

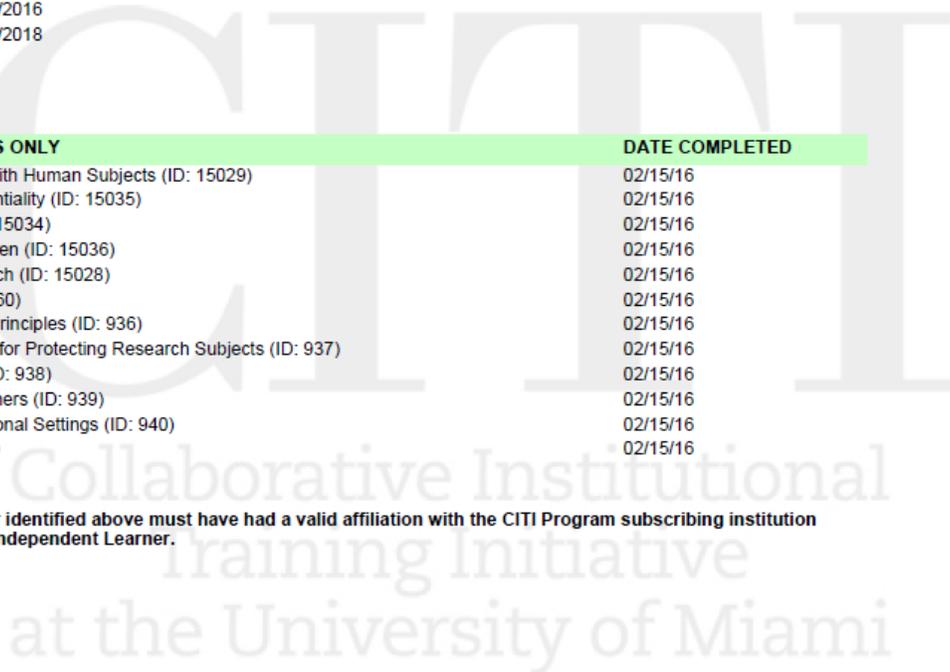
- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1.
- **Stage:** Stage 3 - Refresher Course

- **Report ID:** 13226456
- **Completion Date:** 02/15/2016
- **Expiration Date:** 02/14/2018
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED
SBE Refresher 1 – Defining Research with Human Subjects (ID: 15029)	02/15/16
SBE Refresher 1 – Privacy and Confidentiality (ID: 15035)	02/15/16
SBE Refresher 1 – Assessing Risk (ID: 15034)	02/15/16
SBE Refresher 1 – Research with Children (ID: 15036)	02/15/16
SBE Refresher 1 – International Research (ID: 15028)	02/15/16
Biomed Refresher 1 - Instructions (ID: 960)	02/15/16
SBE Refresher 1 – History and Ethical Principles (ID: 936)	02/15/16
SBE Refresher 1 – Federal Regulations for Protecting Research Subjects (ID: 937)	02/15/16
SBE Refresher 1 – Informed Consent (ID: 938)	02/15/16
SBE Refresher 1 – Research with Prisoners (ID: 939)	02/15/16
SBE Refresher 1 – Research in Educational Settings (ID: 940)	02/15/16
SBE Refresher 1 – Instructions (ID: 943)	02/15/16

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program
 Email: citisupport@miami.edu
 Phone: 305-243-7970
 Web: <https://www.citiprogram.org>



Appendix H



Application for Human Subjects

Review

Complete both Part I and Part II of this application. Return to Human Subjects Review Committee, SUNY Fredonia, E 230 Thompson Hall. Phone: 716 673-3569; FAX 716 673-3802.

Part I

Project Name: The Effects of Homework Derby on the Completion and Accuracy of Mathematics Homework of 1st Grade Students

Principal Investigator #1: Katherine Dryndas

Check one of the following: Faculty/Staff Principal Investigator
[X] Student Principal Investigator

Signature of Principal Investigator #1
Department: Curriculum & Instruction Phone Number: 716)777-2346
Campus Address:
Email Address: feld3596@fredonia.edu

Principal Investigator #2:

Check one of the following: Faculty/Staff Principal Investigator
Student Principal Investigator

Signature of Principal Investigator #2
Department: Phone Number:
Campus Address:
Email Address:

(Additional Principal Investigators' information should be in the same format on an attached sheet.)

STUDENT PRINCIPAL INVESTIGATORS MUST LIST THE SUPERVISING FACULTY MEMBER AND HAVE THE FACULTY SPONSOR SIGN THE FACULTY VERIFICATION THAT APPEARS BELOW.

Faculty Sponsor: Drs. Janeil Rey/Dr. Robert Dahlgren

Faculty Verification: I have read this student's Application for Human Subjects (Part I and Part II). I accept responsibility for the manner in which this study will be carried out. I am convinced that benefits from this research outweigh any risks.

Number of Subjects: 21
Signature of Faculty Sponsor Date

Type of Subjects: 8 Male 13 Female

Committee Use Only

Type of Review: ___ Exempt ___ Expedited ___ Full Committee ___ Emergency

Approval Date _____ Closure date: _____

Memorandum received:

Starting Research: ___ Yes ___ No
Ended Research: ___ Yes ___ No

Application for the Use of Human Subjects - Part II

Please address each numbered item in the order given. **Incomplete applications will be returned to the principal investigator.** If there are sections that are not applicable to your research, please explain why. Use the following as your guide:

1. Name the principal investigator. Describe his/her qualifications and any relevant experiences; ***attach a copy of the vitae of the principal investigator and faculty sponsor, if appropriate.*** If a student has been identified as the principal investigator, the role of the faculty sponsor(s) in guaranteeing compliance with the procedures outlined in this application as well as compliance with the regulations governing the use of human subjects must be mentioned.

Faculty sponsors should meet with student researchers to review human subjects protection and to monitor data collection.

Mrs. Katherine Dryndas will be the principal investigator in the proposed study. Currently she is in her 3rd year (1st year as a first grade teacher) at Arcade Elementary School in a mid-size, rural school district in Western New York. Katherine is enrolled in the MSED program in Curriculum and Instruction. She has successfully completed two educational research courses (EDU 570 and 660) and is presently enrolled in EDU 691, Conducting Educational Research, with Dr. Robert Dahlgren. Additional information regarding the investigator is available on her resume (see Appendix A).

Dr. Janeil Rey directed the completion of the initial IRB proposal and Dr. Robert Dahlgren will assist with study implementation.

2. Explain the procedures involved to carry out your study ***in detail.*** What is the overall goal of your study and what are your specific objectives? What will you do? What will the subjects do? A list of the steps in your study is often helpful. It is important that you describe your research protocol in enough detail that an uninformed reader can understand what is involved in your research project.

“Since the early days of formal education, teachers have provided students with extended practice by assigning academic tasks called ‘homework’ to be completed outside the formal school setting” (Hughes, Ruhl, Schumaker & Deshler, 2002, p.4).

According to Gajria & Salend (1995), homework can (a) improve students' attitudes towards school, (b) promote good study habits, (c) facilitate understanding and retention of lesson material, and (d) involve parents in the educational process. Teachers can use homework to review skills, individualize instruction, increase time on task, and provide additional practice for students. This is, more often than not, especially important for students with disabilities. Hughes et al. (2002) noted, for example, that, homework is a vital part of the academic experience because it increases the number of opportunities students have to practice new skills and learn new content, and, as a result improve their academic achievement.

While teachers and many parents understand the importance of homework, many students do not share this view. As a result, many students simply do not complete homework assignments or they complete them inaccurately. Bryan and Burstein (2004) noted, for example, that there are many possible causes to explain homework completion and difficulties among students with special needs (e.g., lack of motivation, academic skill deficits, poor attitudes, and cultural differences) and the consequences (i.e., short- and long-term) can be quite damaging (e.g., failing grades, grade retention, referral for remedial and special assistance, and dropping out of school).

Homework completion and accuracy problems described in the literature are also apparent in Mrs. Dryndas' 1st grade classroom. A number of students either failed to complete and turn in homework on time *or* performed poorly on those assignments that were completed. The primary purpose of this study, therefore, is to improve the homework completion and accuracy rates of 1st grade students in the area of mathematics. To do so, I will be using an intervention known as Homework Derby.

To my knowledge, only two formal research studies were conducted on the use of Homework Derby. The first study was completed over 20 years ago in a 6th grade middle school class (Ferro, 1986) and the second was completed two years ago in a 5th grade elementary class (Friedman, 2010). Homework Derby consists of four primary components: (a) weekly competing teams, (b) in class homework correction, (c) public posting of individual and team homework scores, and (d) contingent rewards for the team with the highest point value at the end of each week. The intervention works as follows:

Each week, the class will be randomly assigned to two competing teams by having students pick different colored pieces of paper out of a hat or covered box. Students will then be assigned to either the yellow or blue teams. The teams will remain the same for one week. The following Monday, new teams will be formed. The two teams will then compete for the higher number of points each week. The number of team points will be based on students' daily homework grades. At the beginning of each class, Mrs. Dryndas will correct the homework and record the grades. When homework is graded, individual scores will be recorded and team averages will be calculated each day and posted on a class scoreboard. No student names will be posted, rather, each student will be assigned a number for anonymity and their corresponding grade will be posted by their individual number. The team with the higher average for the day will be

designated the “winner” and will receive a star to post next to the team name on that day. If teams tie, then they will both earn stars for the day. At the end of the week, the team with the most individual stars will be deemed the “Winning Team of the Week”. The winning team will applaud the other team for their strong efforts and will be allowed to select individual rewards from a class Reward Menu that will consist of a variety of items (e.g., edible, tangible, activity-based, novel rewards) that were suggested earlier by class members. Typical rewards might include lunch with the teacher, free ice cream, additional free time, and coupons.

To ensure that the Homework Derby is being implemented correctly, a fidelity of implementation checklist was developed (see Appendix B). This checklist consists of 13 procedural steps required to use Homework Derby as described as well as spaces to note the presence or absence of each step. This checklist will be used initially to explain and train students to use of Homework Derby during a 20-minute training session. In addition, the consultant teacher (Mrs. Jessica Wipij) will observe 25% of the intervention sessions across both experimental phases and note the presence or absence of each procedural step. Fidelity of implementation will then be calculated as the number of steps present divided by the number present and absent times 100%. It is anticipated that the Homework Derby will be implemented with at least 95% accuracy over the course of the investigation. Mrs. Dryndas will fill out the fidelity checklist and Mrs. Wipij will fill out the fidelity checklist for the sessions she observes.

3. Describe the individuals who will participate in your study, noting their age (or age ranges), gender, ethnic background, and health status (if known). Mention other characteristics that make your subjects identifiable (for example, “elderly males living in supervised living arrangements in rural Chautauqua County). There are protected classes of subjects (i.e., pregnant women, children under the age of 18 years, individuals with disabilities, prisoners, and any individual viewed as vulnerable). If your subject pool includes members of these protected classes or has the potential for inclusion of these protected classes, full Human Subjects Review Committee review will be necessary and the more complete your Request for Review, the more likely a timely approval will be issued.

Twenty one, 1st grade students (13F, 8M) enrolled in a mid-sized rural elementary school will serve as participants in this study. These students are between the ages of 6 and 7 years old. All of the students in the class are Caucasian. There are three students with IEP’s and one with a 504 plan. At the time of this investigation, the teacher was having some difficulty getting students to complete homework assignments on time, consistently, and with a high degree of accuracy. The investigator thought that this strategy would improve her class’ daily homework performance.

4. Identify the data you hope to collect and how you will collect those data. Mention all instruments you will use and attach a copy of these instruments to your application. Please note that if you are using a piece of equipment, you just need to describe that equipment. Describe how you will use the information you collect; that is, to further research on your topic, to further research, to

provide some form of treatment, to improve student performance, etc. Describe what will happen to the data/videotapes/audiotapes you collect upon the completion of the study.

Three types of data will be collected: (a) percentage of students who complete daily homework assignments, (b) percentage correct on daily homework assignments, and (c) mean consumer satisfaction ratings. Each day, the investigator will calculate the percentage of students *in the entire class* who completed and turned in their daily homework assignments. (Totals will be combined from each individual team). Students who are absent will *not* be included in daily totals. The percentage of homework assignments completed will be aggregated and plotted on simple line graphs across experimental phases to determine the impact of the Homework Derby. It is anticipated that the Homework Derby will produce an immediate and noticeable increase in the percentage of students who complete their daily homework assignments.

The second dependent variable will be the percentage correct on daily homework assignments. These totals will be derived and maintained for each pupil and team, as well as the entire class. Data for the entire class will be aggregated and plotted on line graphs across experimental phases. In addition, these data will be monitored *privately* to examine the impact of the Homework Derby on each pupil's performance.

To ensure that homework data are being collected reliably, inter-rater reliability checks will be conducted. Another teacher, who is blind to the study purpose, will be asked to grade *independently* students' homework during 20% of the sessions. Both teachers' independent scorings will then be compared on an *item-by-item* basis. If both raters score an item the same (i.e., both correct or both incorrect), then the item will be scored as an agreement (A). If raters score an item differently (i.e., one correct, one incorrect), then the item will be rated as a disagreement (D). Inter-rater reliability will then be calculated as the number of agreements divided by the number of agreements plus disagreements, multiplied by 100. It is anticipated that data will be collected with at least 95% accuracy.

The third dependent variable will be students' mean ratings on the Consumer Satisfaction Survey. Immediately after the last study session, the entire class will be asked to complete a 17-item consumer satisfaction survey *independently* and *anonymously* (see Appendix C). The survey will ask pupils to evaluate the Homework Derby in terms of: (a) importance of intervention *goals* (e.g., to increase homework completion and grades), (b) acceptability of intervention *procedures* (e.g., being assigned to teams, exchanging and grading homework assignments, and earning rewards), and (c) satisfaction with intervention *outcomes* (e.g., improved homework completion and accuracy rates, improved interpersonal relationships, and better grades in math). Pupils' ratings will be aggregated by item and will be presented in a tabular format. Higher scores will be indicative of more favorable pupil evaluations of Homework Derby procedures.

5. Describe how you will recruit subjects for your study and how you will handle obtaining their informed consent for participation. Informed consent is one of the most important components of

conducting research that involves living human subjects. State who will obtain consent and what information on your study will be provided to potential subjects. Federal regulations mandate that if a research study involves subjects under 18 years of age, consent must be obtained from the parent or legal guardian AND the minor child. You must have two separate forms when minor children are involved in your research: a parent form and a child consent form. Here at *Fredonia*, a child's consent form must be included in research protocol involving children ages 5 to 17 years. The language used in a minor child consent form must be appropriate to the age of the child. **You must attach a copy of all consent forms to your application.**

To ensure that your consent forms meet federal standards, please include

- a. a statement that this is research
- b. the purpose of your study
- c. a description of your procedures
- d. how long subjects will be involved in your study
- e. both the potential benefits and the risks and/or discomforts of participants
- f. any alternatives to the treatment you provide, if appropriate
- g. how confidentiality of subjects and their data will be maintained
- h. a statement that participation is voluntary and that the subjects can withdraw at any time without penalty; and
- i. the names and phone numbers of contact people for your study.

In this study, I will work to improve my 1st grade students' math homework completion and accuracy rates. This class has a few students who fail to complete homework regularly and others whose grades are not as good as they should be. The students' parents or guardians will be given the parent consent forms to complete and return to school (see Appendix F). Another teacher in the building, who is not teaching 1st graders (Mrs. Cheryl Galvin), will explain the study to the students using the attached script (see Appendix D). Students will be told that (a) their participation in the study is completely voluntary; (b) they can stop participating at any time; and (c) their decisions to not participate will in no way affect their grades in math class. Students will also be told that the Homework Derby will be used with the entire class and that their permission was required for the purpose of using their data (i.e all students will be participating in the activity and their scores will only be used if given permission). The guest teacher will then pass out Child Consent Forms (see Appendix E) to students whose parents already signed and returned the parental consent form. She will read the consent form to the students and answer any questions they may have.

6. This component contains four parts:
 - a. Identify any potential risks: physical, psychological, social, legal, or another type of risk. Mention the likelihood of these risks occurring and their seriousness. Describe alternative treatments that might be advantageous to the subjects.
 - b. Where appropriate, state how you will ensure that your subjects receive necessary medical or professional intervention if they have adverse effects to your treatment/research protocol.
 - c. Tell how you will maintain the safety of your subjects during your study.

- d. If there are risks in your study, tell how the risks are balanced by the benefits to be gained by the subjects from their participation in your study. Also mention the relationship of the risks to the knowledge that will be gained from your study.

Anytime one intervenes in a classroom there is a possibility that some students may not benefit from the proposed intervention or that others may actually perform more poorly while the Homework Derby is in effect. To minimize these possibilities, the investigator has selected an intervention whose primary components (i.e., between-group competition, interdependent group contingencies, and contingent rewards) have a solid evidence base in the empirical literature. Two empirical studies conducted locally also found Homework Derby to be effective in improving homework completion and accuracy of middle school students in math and social studies. It is anticipated that similar benefits will accrue to students in Mrs. Dryndas' classroom (i.e., improved homework completion and accuracy rates), therefore, there is no risk above that of normal classroom procedures. The investigator will be using *formative* assessment procedures which allow her to monitor the impact of the Homework Derby on the class and individual pupil's performances. If any pupils perform more poorly during intervention sessions, then the investigator will consult with the faculty sponsor to either adapt or terminate the intervention. Finally, whenever group contingencies are used, there is a possibility that undue peer pressure may arise. The teacher will minimize this possibility by posting individual grades by student number rather than names and monitoring ongoing pupil interactions while the intervention is in effect. If any pupils display inappropriate behaviors (e.g., negative verbal comments, bullying, etc.) toward others, then the teacher will intervene immediately. There are no other physical, psychological, social, and/or legal risks in this study.

7. If your study deals with a sensitive issue and/or the data you collect deals with criminal acts, sexual conduct and behavior, drug and alcohol use, sensitivity and awareness to potential risks, and/or liabilities to your subjects, you will need to clearly state the precautions taken to minimize risks or liabilities.

Not Applicable

8. Describe how you will prevent risks to violating the confidentiality of the subjects involved in your study.

No student names will appear on data collection forms or on the Homework Derby scoreboard. Line graphs will only display aggregated data. Pupil homework grades will be recorded electronically on the teacher's grade book but will remain secure through the use of a secret password. Any "hard" data forms will be maintained in a locked filing cabinet in my coworker's classroom. All data collected will be destroyed three years after completing my project.