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The effects of using instructional games in the elementary classroom

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THE EFFECTS OF USING INSTRUCTIONAL GAMES IN THE ELEMENTARY CLASSROOM

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Abstract

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The purpose of this study was to answer the question, ""What happens when I use instructional games to teach or review math skills in a fourth grade classroom?" In this study, the students played five instructional games during a math unit on fractions. The instructional games ranged in type. The students completed a survey about the games at the beginning of the study, at the end of the study, and at the end of each instructional game. The data in this study suggests that instructional games are fun, help students to learn the material, and allow students opportunities to create positive relationships with their classmates. The data in this study also shows that there are several factors that affect how many students enjoy these games. These factors are reward, competition, and students' preferences. In this study, students seemed to better enjoy the games that were fun, encouraged learning, were played with classmates, and had some level of competition.

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Chapter One

Introduction

Mrs. Brown, a second grade regular education teacher, told the class to take out their whiteboards, dry erase markers, and erasers. She then told the class to show twenty-one tally marks on their whiteboard. Mrs. Brown reminded students to think, write, and show. Mrs. Brown said, "Show!" and all twenty-five students raised their whiteboards. Mrs. Brown checked all the answers and helped students to correct their answers. Once all students had the correct answer, Mrs. Brown told the students to erase their whiteboards.

This review continued for the students' first math test of the school year. Mrs. Brown asked a total of eight questions to the class that reviewed all of the topics that were going to be tested on their math test. The students wrote the answer to each question on the whiteboard and then raised the whiteboard when the teacher said "Show!" Mrs. Brown made sure that all students had the correct answers and helped students get the correct answer.

After students completed the review activity described above, Mrs. Brown handed each student a math study guide. Mrs. Brown told the students to put their name, date, and time on the top of the paper. She then told the class not to go ahead. Mrs. Brown then read the directions for the first question and gave the class time to complete the first question before reading the directions for the next question. Mrs. Brown continued to read the directions and give the students time to answer the question until the whole class was done with the worksheet. Mrs. Brown then collected and graded the worksheets.

Students who got more than two questions wrong on the worksheet were asked to come to the back table to review the topics and correct their answers.

Story of the question

While I was observing this review lesson in Mrs. Brown's class, I realized how this review lesson helped the students to review the material and helped the teacher to figure out which students need extra help before taking the math test. However, I was wondering if this lesson would be more valuable for the students if it was an instructional game. An instructional game would be more fun for the students and provide a chance for peer tutoring. Observing this lesson made me think about the benefits of instructional games and the best way to review for a test.

Using instructional games to review in the elementary education classroom has been an interest of mine starting in elementary school. Throughout my school career starting in elementary school, every teacher had a different way to review for a test. Some of these ways included the use of instructional games. As a student, I always enjoyed instructional games. I viewed instructional games as a fun way to review and learn new topics.

As a teacher candidate, I started to wonder about the value and benefits of instructional games in the classroom. During my education classes, I learn that instructional games could be a way to differentiate instruction and allow all students to learn and practice the material. During my field placements, I observed many review activities including instructional games. While observing review activities that included study guides, like the review activity I observed in Mrs. Brown's classroom, I pondered

over the benefits of using instructional games instead of just a study guide or another review activity.

My research question started as a look at the benefits of instructional games in the elementary education classroom. Once I started doing research on this topic, I realized that I should narrow down my topic. My research focus changed to a focus on how instructional games are used to teach or review math skills.

Purpose Statement

It is important for teachers to review skills taught before giving a test or moving on to the next skill. One effective way to review is by using instructional games. An instructional game is based on education objectives, has a set of rules, requires active participation, and can include elements of competition and cooperation (Klein & Freitag, 1991). Instructional games can be used in the classroom to effectively review or teach skills (Randel, Morris, Wetzel, & Whitehill, 1992). Instructional games also help students to retain the information learned (Bright, Harvey, & Wheeler, 1980).

This study explores an alternative way for teachers to review or teach material in a meaningful way. Instructional games may have additional benefits other than effectively reviewing or teaching skills. Most instructional games require students to actively engage or participate in learning (Klein & Freitag, 1991). Research has shown that most instructional games increase students' motivation (Paras & Bizzocchi, 2005). Studies have also shown that instructional games can encourage students to work together and encourage peer tutoring in the classroom (Devries & Edwards, 1973).

Statement of Research Question and Problem

The question of this research study is "What happens when I use instructional games to teach or review math skills in a fourth grade classroom?" The purpose of this study is to investigate the effects of using instructional games in the elementary education classroom.

This research study will also address two sub questions: How students interact when using instructional games? What does students learning look like when instructional games are used?

Significance of research

With the passing of No Child Left Behind in 2001, the focus of instruction in many of the nation's schools emphasized preparing students for standardized tests (Deubel, 2008). Today many schools continue to focus on preparing students for the standardized tests (Deubel, 2008). Therefore, teachers frequently have little time for meaningful student centered educational experiences like instructional games. This study will examine the value of instructional games and their potential in teaching and reviewing academic content.

Instructional games are also a way to differentiate instruction and allow all students to learn and practice the material. Instructional games can be adjusted to obtain any educational objective (Bruni & Silverman, 1975). Therefore, instructional games can teach any skill using any form of questions or thinking depending on the academic level of the students and the educational objective (Siegel, 1990). Instructional games can be adaptable to teach all levels of students, different educational objectives, and different subjects or skills including preparing students for standardized tests or classroom tests.

Limitations of study

A research study takes time and requires frequent observation, and data collection. However I will be student teaching while doing this research, so time may be a limitation of this study. Since I will be teaching the math curriculum in addition to conducting this study, some days there may not be enough time to complete the instructional game. This time limitation may led to a limited amount of data collected during this study.

The results may vary based on the students' previous experience with instructional games. The data collected in this study may be changed based on if the students are familiar with instructional games, if the students enjoy or dislike playing instructional games, and the type of instructional games that students are used to playing. Students' previous views on instructional games can affect their views and opinions of the instructional games used in this study. The survey given at the beginning of this study will ask questions about these topics to learn more about students' experiences with instructional games.

Organization of Thesis

Chapter two takes a more in-depth look at the related research on the use of instructional games in the elementary classroom. Chapter three discusses the context of the study and describes the research design and methodology. Chapters four and five discuss the results of this study and its implications for further research.

Chapter Two

Literature Review

It is important to review a subject or skill before either testing the students on that skill or moving on to the next skill. There are several ways that a teacher can review a subject or skill with students. One of these ways is by using instructional games. This literature review looks at how research that addresses instructional games can be used in an elementary education classroom to teach or review math skills.

The first section of this chapter explains the definition of instructional games. The second section describes important characteristics of instructional games. The third section illustrates how instructional games can be used to review or teach math skills in a meaningful way and can be used to help students retain information. The fourth section examines research on how instructional games can be used to encourage students to be actively engaged in learning. The fifth section looks at how instructional games can be used to increase students' motivation to learn. The sixth section portrays how instructional games can be used to promote cooperation and encourage peer tutoring. The seventh section discusses technology-based instructional games. The chapter ends with a summary of the research on instructional games and how this study adds to the research on instructional games.

What are instructional games?

Hays (2005) argues that "a game is an artificially constructed, competitive activity with a specific goal, a set of rules and constraints that is located in a specific context" (p. 15). In order for a game to be considered an instructional game, the game must follow four elements of instruction: 1) include educational objective, 2) provide a meaningful

way for students to interact with the educational material, 3) assess students learning in some way, and 4) provide immediate feedback on their performance (Hays, 2005).

As early as 1973, Devires and Edward (1973) argued that "learning games are activity structures in which players use a body of knowledge or set of skills as resources in their competition with other players" (p.308). An instructional game is based on educational objectives, has a set of rules, requires active participation, and can include elements of competition and cooperation (Klein & Freitag, 1991). Instructional games can be useful to engage students in learning and the educational objectives (Springfield). Instructional games can come in many forms, including computer games, board games, and simulation games, and can include elements of chance, setting, challenge, fantasy, and curiosity (Randel, Morris, Wetzel, & Whitehill, 1992).

Characteristics of instructional games

Instructional games can be adapted to teach or review a number of different education skills or objectives (Bruni & Silverman, 1975). When creating an instructional game it is important to make sure the game is reinforcing the skills that the students have learned. The instructional game should have students use the skills being reinforced in a way that could be transferred to the class work and possibly real life (Siegel, 1990). It is also important that the instructional game provide the students with an appropriate amount of practice of the skill (Siegel, 1990).

Other important characteristics of instructional games are the game format and procedures (Van Etten & Watson, 1976). It is important that the directions be simple, clear, and detailed. Instructional games must also provide feedback to the student about whether they applied the new skill correctly or wrongly (Siegel, 1990). The game should

include a way for students to check their answers. It is also important that instructional games be easily changed or modified based on the ability and needs of the students (Siegel, 1990). Further, when creating an instructional game, other cultures and points of views must be considered, so the game does not offend anyone (Siegel, 1990).

There are six characteristics that should be addressed in order to make games more enjoyable and engaging for the students (Gunter, Kenny, & Vick, 2008). The first characteristic is relevance, which means the games must relate to the learner's ability, needs, and learning style. The second characteristic is that the skill being reinforced or taught should be embedded in a fantasy story. The third and fourth characteristics are transfer and adaptation, which means the instructional game encourages the players to transfer and adapt their knowledge and skills from one situation to another (Gunter, Kenny, & Vick, 2008). The fifth characteristic is that the students should be fully immersed or engaged in the story of the game. The last characteristic is naturalization, which is where the students can apply the skill or knowledge in more different situations (Gunter, Kenny, & Vick, 2008). Instructional games are more motivating for students when elements of challenge, fantasy, and curiosity are used (Randel, Morris, Wetzel, & Whitehill, 1992).

Instructional games to review or teach instruction and increase retention

Several studies have been conducted that look at the effectiveness of using instructional games to review instruction. As early as 1992, Randel, Morris, Wetzel, & Whitehill (1992) reviewed sixty eight studies spanning from 1963 to 1991 about instructional games. Of the sixty eight studies, thirty eight studies or fifty-six percent found no difference between the effectiveness of instructional games and conventional

instruction (Randel, Morris, Wetzel, & Whitehill, 1992). Twenty two studies or thirty-three percent found that instructional games were more effective than conventional instruction (Randel, Morris, Wetzel, & Whitehill, 1992). Five studies or seven percent favored instructional games but the variables in the study were questionable (Randel, Morris, Wetzel, & Whitehill, 1992). Three studies or five percent found that conventional instruction was more effective than instructional games (Randel, Morris, Wetzel, & Whitehill, 1992). One explanation for the inconsistent findings of these studies is flawed experiment designs (Klein & Freitag, 1991). Another explanation is not examining how the instructional games were integrated into the classroom, since instructional games are more effective combined with other instructional methods (Klein & Freitag, 1991). A final explanation is not clearly defining the variables including motivation and cooperation (Klein & Freitag, 1991).

Instructional games can be effective at helping students to retain the information learned. Instructional games show greater retention over time than conventional classroom instruction (Randel, Morris, Wetzel, & Whitehill, 1992). In general, students retain 5% of lecture, 10% of reading, 20% of audio-visual, 50% of discussion group, 75% of practice by doing, and 90% of teaching other (Saskatchewan Education, 1994). Instructional games normally involve practice by doing and engaging in audio-visual. Instructional games can sometimes involve teaching others and discussion groups. Randel, Morris, Wetzel, and Whitehall (1992) explain that "because games require active participation of students, the material has a greater chance of being integrated into the cognitive structures of the individuals and thus being retained" (p. 270).

Seven out of eight studies looking at the use of instructional games in math showed that instructional games are effective at improving students' performance (Randel, Morris, Wetzel, & Whitehill, 1992). Three of these studies were conducted by Bright, Harvey, and Wheeler (1979-1981). These studies look at the use of instructional games in the elementary math classroom. The findings of these three studies are described below.

The first study was conducted during the first ten days of the school year in two fourth grade classes, four fifth grade classes, two fifth and sixth grade classes, and six sixth grade classes from three different elementary schools (Bright, Harvey, & Wheeler, 1979). During day one and two, the classes were given a pre-test and explained the rules of the game and the tournament. On days three through nine, the classes played the math games, MULTIG or DIVTAG, using a teams-games tournament model. On day ten, the classes were given a post-test. The results of this study showed an improvement from the pretest to the posttest. On average there was a fifty-six percent increase from the pretest to the posttest (Bright, Harvey, & Wheeler, 1979). Therefore, the study concluded that instructional games are effective at helping students retrain basic math facts (Bright, Harvey, & Wheeler, 1979).

The second study was conducted with four fifth and sixth grade classes. This study took place during the course of a school year (Bright, Harvey, & Wheeler, 1980). Students were given a pretest and a posttest. The math games, MULTIG or DIVTIG, were played on fourteen occasions. The intervals between game playing occasions ranged from six to twenty days. Throughout the study, there was no instruction on basic multiplication facts other than the instructional games. The results showed that the

students' scores improved from the pretest to the posttest. Based on these results, the study concluded that instructional games are effective at helping students maintain basic math facts (Bright, Harvey, & Wheeler, 1980). The interval between game playing occasions varied in order to determine how often games must be played to help students retain basic math skills. The results showed that the interval between game playing sessions can gradually increase and still help students retain the skills (Bright, Harvey, & Wheeler, 1980). For these results, the study was able to conclude that instructional games do not need to be played frequently in order to help retention (Bright, Harvey, & Wheeler, 1980).

The last study included four fifth grade classes and eight seventh grade classes (Bright, Harvey, & Wheeler, 1981). This study had three treatment groups: a group that practiced math using a game that included manipulatives, a group that practiced math using a game that included pictures of manipulatives, and a group that practiced math using a game with no manipulatives. All students were given a pretest and a posttest. This study was conducted for seven consecutive school weeks, so students played the instructional game for about five consecutive school weeks. All three groups showed improvement from the pretest to the posttest (Bright, Harvey, & Wheeler, 1981). However, there was no significant difference between any of the treatment groups. Since all three groups showed improvement and the only similarly between all three groups was the instructional game, the study concluded that the instructional game was effective (Bright, Harvey, & Wheeler, 1979).

As shown above, instructional games can be effective at reviewing and teaching academic content. The studies conducted by Bright, Harvey, and Wheeler demonstrate

how instructional games can be used in the math classroom (1979-1981). Instructional games can also be used to help students retain academic information (Randel, Morris, Wetzel, & Whitehill, 1992).

Instructional games to actively engaged students in learning

Most instructional games require students to actively engage or participate in learning (Klein & Freitag, 1991). Hewitt (1997) conducted a study where two hundred ninety five fourth through sixth grade students participated in environmental instructional games. The students were given a pretest and posttest. Instructional games were used in this study in order to allow students to become actively involved in their learning (Hewitt, 1997). The results of this study showed that instructional games create a classroom environment where students are actively engaged and participating in learning (Hewitt, 1997).

Klein and Freitag (1991) conducted a study exploring the use of instructional games in a college psychology class. Their study included research and results that support the use of instructional games to actively engage students. Many researchers used to back up this study agreed that instructional games actively engage students in learning and create enthusiasm, excitement, and enjoyment in students (Klein & Freitag, 1991).

These two studies illustrate how instructional games can be used to actively engage students in learning. When students are actively engaged in learning it creates excitement and students are more willing to learn (Klein & Freitag, 1991).

Instructional games to increase students' motivation

Twelve out of fourteen studies show that instructional games are more interesting for students than conventional instruction (Randel, Morris, Wetzel, & Whitehill, 1992). Motivation is defined is to "provide with an incentive" (Paras & Bizzocchi, 2005, p. 1). The ARCS Model of Motivational Design identifies four elements of motivation: attention, relevance, confidence, and satisfaction (Paras & Bizzocchi, 2005). Instructional games that include challenge, a clear goal, and feedback normally fulfill the four elements of motivation (Paras & Bizzocchi, 2005). "Games foster play, which produces a state of flow, which increases motivation, which supports the learning process" (Paras & Bizzocchi, 2005, p. 4). The state of flow refers to Csikszentmihalyi's Flow Theory that one becomes completely involved in an activity when it has appropriate challenge, goal, and clear feedback (Paras & Bizzocchi, 2005). Most instructional games include the elements like challenge and a clear goal, which increase motivation in students.

Klein and Freitag (1991) conducted a study where a college psychology class was split into two treatment groups: one group that used an instructional game to review material and one group that used a worksheet to review material. This study defined motivation according to the four elements of the ARCS Model of Motivational Design: attention, relevance, confidence, and satisfaction (Klein & Freitag, 1991). The results of this study showed that using an instructional game to practice material enhanced the students' motivation. This study also showed that visual representations and active participation can increase student attention, one element of motivation (Klein & Freitag, 1991). Motivation increased when the instructional game was combined with instruction such as reading the textbook (Klein & Freitag, 1991).

Hewitt (1997) conducted a study where two hundred ninety five fourth through sixth grade students participated in environmental instructional games. The students were given a pretest and posttest. The results of this study suggested that instructional games can also motivate students to work hard to learn instead of working hard to get a good grade (Hewitt, 1997).

A study conducted by Pinder (2008) study looks at a small sample of students that were in kindergarten or first grade. These students participated in a science instructional game, where students classify living and nonliving things. The purpose of this study was to explore the effects of instructional games and compare the results of the two grades: kindergarten and first grade (Pinder, 2008). The students were given a pretest, a posttest immediately after playing the instructional game, and a delayed posttest. When interviewing eight teachers at these schools, all of the teachers expresses that instructional games are highly effective at increasing students' motivation (Pinder, 2008).

As early as 1973, Devries and Edwards (1973) conducted a study where four seventh grade math classes participated in two activities: an instructional game and quizzes. This study used two reward systems: one rewarded the team and the other rewarded the individual students. The students were encouraged to work together during practice times but performed individually during the game and quiz. The instructional game resulted in a lesser amount of perceived difficulty and a greater amount of satisfaction than the quizzes (Devries & Edwards, 1973).

More recent studies reveal similar findings. These studies show that instructional games contain many elements including a clear goal, and challenge which promote

motivation (Paras & Bizzocchi, 2005). Instructional games in these studies also resulted in a lesser amount of perceived difficulty (Devries & Edwards, 1973).

Instructional games to promote cooperation and encourage peer tutoring

Instructional games can also be used to promote cooperation and peer tutoring in an elementary education classroom. Hewitt (1997) conducted a study where two hundred ninety five fourth through sixth grade students participated in environmental instructional games. The students were given a pretest and posttest. Instructional games were used in this study since they encourage student to student interaction. While playing the instructional game, students were encouraged to interact with each other and help each other. This requirement encourages less competition and more cooperation while playing the instructional game (Hewitt, 1997). The results of this study showed that instructional games can increase cooperate in the classroom (Hewitt, 1997).

Devries and Edwards (1973) conducted a study where four seventh grade math classes participated in two activities: an instructional game and quizzes. This study used two reward systems: one rewarded the team and the other rewarded the individual students. The students were encouraged to work together but completed the activities individually. The results of this study showed that both the instructional game and the team reward system increased levels of peer tutoring in these classrooms and the number of helping relationship reported in these classrooms (Devries & Edwards, 1973). This study also showed that instructional games that encourage students to work together can create an environment that the students feel is less competitive and where students are concerned about and willing to help each other (Devries & Edwards, 1973).

Instructional games that promote competition in the classroom may ruin the feeling of safety and security in the classroom (Self, 2009). Students may start to feel hopeless if they frequently lost the instructional games. Some way to avoid creating competition in the classroom is to encourage team work and cooperation (Self, 2009). Instructional games can encourage cooperation by creating instructional games where students work together in pairs or groups (Randel, Morris, Wetzel, & Whitehill, 1992).

These studies show how instructional games encourage student to student interaction and cooperation (Hewitt, 1997). Instructional games also increased the level of peer tutoring in the classroom (Devries & Edwards, 1973).

Benefits of technology-based instructional games

The use of digital and technology-based games to teach academic content has increased recently (Sardone & Devlin-Scherer, 2009). Digital games are any type of game played online normally on a computer, video game system, or handheld device (Sardone & Devlin-Scherer, 2009). Technology-based instructional games have showed similar benefits as instructional games (Chuang & Chen, 2009).

As early as 1974, Lucas (1974) conducted a study that took place for five weeks. Twelve high school United States History classes participated in this study, a total of 294 students. The subjects were split into two groups. Both group studied United States History and were assigned readings from the textbook. The first group learned the material through a traditional lecture- discussion technique. The second group learned the material through simulation-gaming technique. The students were given a pretest, posttest, and a delayed posttest. On the posttest given immediately after the study no significant difference was noticed between the two groups. However, on the posttest

given ten weeks after the study, the lecture- discussion group scored an average of 14.84 while the simulation-gaming group scored an average of 18.71 (Lucas, 1974). From these results, the study was able to conclude that simulation-gaming is effective at increasing students' retention (Lucas, 1974). This study also showed that the teacher of the students impacted the students' performance on the posttest and the delayed posttest (Lucas, 1974).

More recent studies reveal similar findings. Chuang and Chen (2009) conducted a study with one hundred and eight third graders. This study used two instructional methods to teach students about firefighting: computer-assisted instruction and a computer-based video game. The computer-assisted instruction consisted of text-based format. The computer- based video game was a real-time strategy game called Fire Department 2: Fire Captain. The computer-based video game fulfilled the four components of the ACRS Model of Motivation: attention, relevance, confidence, and satisfaction (Chuang & Chen, 2009). The students participated in two 40 minute sessions of instruction using either the computer-assisted instruction or the computer-based video game. The students were given both a pretest and a posttest. The results of this study showed that playing computer-based video games were more effective in teaching students than text-based computer-assisted instruction (Chuang & Chen, 2009). The computer-based video game was also effective at improving students' higher level thinking skills and problem solving skills (Chuang & Chen, 2009).

Sardone and Devlin-Scherer (2009) conducted a study with twenty-five teacher candidates. At the beginning of this study the participants completed a survey about their attitudes about instructional games. The participants were able to play instructional

games off of a list of thirty three computer based games. Each participant then chosen a game to learn and teach to younger students. The participants in this study were able to see the benefits of computer based games (Sardone & Devlin-Scherer, 2009). One participant said "Digital games are a great way to teach students things because not every student likes to be taught through lectures. This gives the student a chance to use their own mind and work toward game goals and learn information while being part of a simulation" (Sardone & Devlin-Scherer, 2009). After this study, many participants expressed that they would use computer based games in their classroom because of the benefits (Sardone & Devlin-Scherer, 2009).

These studies on technology based instructional games have shown similar benefits as instructional games (Chuang & Chen, 2009). Technology based instructional games help students to learn and retain academic information (Lucas, 1974). Motivation, higher order thinking skills, and problem solving skills can also be increased by technology based instructional games (Chuang & Chen, 2009).

Conclusion

As a review of the literature suggests, instructional games can be used to effectively teach or review instruction taught in school (Randel, Morris, Wetzel, & Whitehill, 1992). In addition to effectively teaching and reviewing academic subjects, instructional games can also actively engage students and help students to retain the information (Randel, Morris, Wetzel, & Whitehill, 1992). Research has shown that most instructional games increase students' motivation (Paras & Bizzocchi, 2005). Studies have also shown that instructional games can encourage students to work together and encourage peer tutoring in the classroom (Devries & Edwards, 1973).

As shown above, a number of studies have been conducted on the use of instructional games in the classroom. However, most of these studies have been inconclusive about whether instructional games are an effective method to teach or review. It is hoped that this study will further document and emphasize the benefits of instructional games that have already been researched by the authors explored in this literature review. This study will also try to add to the current research by providing research about the benefits of instructional games in the elementary education classroom.

Chapter three discusses the context of the study and describes the research design and methodology.

Chapter Three

Methodology

Research Design and Methodology

This study is qualitative research since I was immersed in the natural setting of the classroom (Marshall & Rossman, 1989). As a student teacher in this classroom, I will be fully invested in the classroom and able to interact with the students. Qualitative research fits this study since it focuses on actual practices in the classroom (Lytle & Cochran-Smith, 2009). This study uses multiple methods of data collection that require involvement and interaction from the students, which is a key component of qualitative research (Lytle & Cochran-Smith, 2009). Qualitative research best fits this study since the research focused on in this study is open ended and I will interpret the data (Key, 1997).

This study is teacher research, which is a form of qualitative research. Teacher research is research that is carried out by teacher in their classrooms (Hubbard & Power, 1999). This study will take place in a fourth grade classroom I will be a student teacher who is fully invested in the classroom. One key component of teacher research is that the researcher learns from the students' perspectives (Hubbard & Power, 1999). This study uses questionnaires given to the students to learn about the students' opinions on the instructional games used in this study.

Procedure of Study

Prior to the start of this study, I gave the students in the class a questionnaire that asked about their attitudes towards math and instructional games, their previous experience with instructional games, the number of people in the class they like to play

with, and the number of people in the class they like to work with. This questionnaire included short answer and multiple choice questions. This questionnaire was used as a baseline.

This study took place for a two week period during math. During the course of this study, the students were learning about fractions. For each lesson I introduced the skill and allowed the students to practice the skill. Then I modeled an instructional game that reinforced the skill. This study included five instructional games. The instructional games ranged in rules, types, educational objectives, and if the students played individually, in pairs, in groups, or as a whole class. The games were bingo for equivalent fractions (individual), board game for simplifying fractions (small groups), around the world for comparing fractions (individual), matching game for mixed numbers and improper fractions (pairs), and Smartboard game for ordering fractions (class). At the end of each instructional game, students filled out a short multiple choice questionnaire about the instructional game.

At the end of this study, the students filled out a questionnaire that was similar to the one given at the beginning of this study. This questionnaire asked students about their attitudes towards math and instructional games, the number of people in the class they like to play with, and the number of people in the class they like to work with. The questionnaire included short answer and multiple choice questions.

Sources of Data

In order to collect data throughout this study the following sources will be used: teacher researcher journal, questionnaires, and student work.

Throughout this study, I observed the students playing the instructional games. I wrote down my observations, questions, and ideas in the teacher researcher journal. I documented many important points throughout the study and used this data to reflect upon the effects of instructional games.

A questionnaire was given to students at the beginning of the study. This questionnaire asked students about their attitudes about math and instructional games, their previous experience with instructional games, the number of people in the class they like to play with, and the number of people in the class they like to work with. This questionnaire included short answer and multiple choice questions. A similar questionnaire was given to students at the end of the study.

At the end of each instructional game, students filled out a short multiple choice questionnaire about the instructional game. These questionnaires asked about if the students enjoyed the game and why they did or did not enjoy the game.

Student work was assessed. Student work included any work that students turned in from the instructional games and throughout this math unit. Student work also included student conversations while the students were playing the instructional games.

Description of Data Analysis

The teacher researcher journal described important factors that I noticed during this study. The teacher researcher journal outlined the effects of instructional games that I observed. This data provided insight and was valued in the results.

The questionnaires given at the beginning and end of the study were analyzed and compared. This comparison showed how the students' attitudes about math and instructional changed throughout the study. A figure was used to show the comparison.

The answers from the question that asked students to list the number of people in the class they like to play with and the number of people in the class they like to work with was counted up and constructed into a sociogram (Zirpoli, 2008) . This showed the social interactions in the classroom and identified students who are popular, rejected, isolated, and amiable (Zirpoli, 2008). By analyzing the results before and after the study, I was able to see the effects the instructional games had on the social interactions in the classroom.

The questionnaires that the students filled out at the end of each instructional game were examined to identify the instructional games that the students enjoy the most. This helped me to identify important characteristics of instructional games.

Student work was assessed. Student work and conversations were assessed to show evidence of student learning.

All of the data was analyzed by focusing on themes throughout the data to identify the effects of instructional games. The data sources were organized to help me be able to draw conclusions.

Context of the Study

District

This study took place in an elementary school in Voorhees Township. Voorhees Township is a suburban community in Camden County, New Jersey (Voorhees Township, 2007). According to the 2000 census, this township has a population of about 28,000 (Voorhees Township Fact Sheet, 2000). This is a middle class community with the median household income in 1999 being $68,402 (Voorhees Township Fact Sheet, 2000). 5.7 percent of individuals below the poverty line (Voorhees Township Fact Sheet,

2000). This community is 75.1% white, 12.3% African American, 3.6% Asian, 5.5% some other race, 2.4% two or more races, and 12.5% Hispanic or Latino (Voorhees Township Fact Sheet, 2000).

This district has four elementary schools which are Signal Hill, Osage, E.T. Hamilton, and Kresson (Voorhees Township, 2007). There is one middle school: Voorhees Middle School (Voorhees Township, 2007). Voorhees Township students attend Eastern Regional School District for high school (Voorhees Township, 2007).

School Community

This study took place at E.T. Hamilton elementary school in Voorhees Township. E.T. Hamilton has about 500 students (E.T. Hamilton Elementary School, 2008). This school was a blue ribbon school in 2003 (E.T. Hamilton Elementary School, 2008). E.T. Hamilton consists of a diverse population. Twenty-five languages are represented within the school (Edward T Hamilton 2008-2009 School Report Card, 2009). Twelve point seven percent of the students are special needs (Edward T Hamilton 2008-2009 School Report Card, 2009). E.T. Hamilton has students kindergarten through fifth grade (E.T. Hamilton Elementary School, 2008). The average class size is twenty students (Edward T Hamilton 2008-2009 School Report Card, 2009). There are three half day kindergarten classes, four first grade classes, four second grade classes, four third grade classes, four fourth grade classes, and three fifth grade classes. The school has the following specials: gym, art, music, health, library, and computers. The school also offers the following services: resource room, enrichment, reading specialist, guidance counselor, speech, occupational therapist, basic skills, in-class support, and music lessons.

Classroom

This study took place in a fourth grade classroom at E.T. Hamilton elementary school in Voorhees Township. This class has twenty four students: nine boys and fourteen girls. I will be a student teacher in this classroom from January to March 2011. The classroom consists of a diverse range of students based on race and religion. Most of the students in the classroom are either on grade level or below grade level. There are eight students in the classroom with IEPs. There is a one on one instructional associate in the classroom. A special education teacher comes into the classroom to co-teach for language arts and to help the students with IEPs. These students attend resource room for math. There are also three students in the class with medical concerns. Several students in the class are pulled out for the following services: music lessons, guidance counselor, speech, enrichment, reading specialist, occupational therapist, and basic skills. Twenty of the twenty four students receive the guidance counselor service on a regular basic.

This study took place during math when there were sixteen students since eight were at resource room. The students in the classroom during this study were five boys and eleven girls.

Looking Ahead

Chapter four discusses the results of this study. Chapter five explains the implications of the study and recommendations for further study.

Chapter Four

Data Analysis

The data in this study shows several effects of using instructional games. The results of the study are spilt into the effects of using instructional games: fun, learning, social, and other influences.

Fun

When the topic of this study was introduced to the students, all of the students were excited about playing instructional games during math. After the study was introduced, the students would ask me daily when we were starting my thesis research. Once I started my study, the students would ask me daily if I had a game for today and would be disappointed when I said no. From the students' responses, it was clear that the instructional games were enjoyable for the majority of the students in the class.

On the survey given at the beginning of the study, fifteen students said that they enjoyed playing instructional games to review skills. One student said in the middle but mostly yes. Nine students said that they enjoyed these games because they are fun but also help you learn. Three students said that they enjoyed these games because they help you learn. Three students said that they enjoyed these games because they are fun. One student said that she enjoyed these games because most games played involve using the Smartboard which she likes using. One student said that she enjoys instructional games because "I don't really like math and it makes it more fun."

On the surveys given after each instructional game the students were asked the question, "Did you enjoy this game?" The answers to this question are displayed in the

table below. Table 1, below, shows that the majority of students enjoyed every instructional game.

Table 1
Students' Enjoyment of Instructional Games

Game	Number of students in class day of game	"Did you enjoy this game?"
Bingo	16	yes- 16
Board Game	15	yes- 15
Memory (little time given)	16	yes- 12 no- 4
Around the World	16	yes- 13 no- 3
Smartboard Game	16	yes- 12 no- 4

While observing the students playing the games, I could see how much the students were enjoying the instructional games. During the board game, the small groups were excited and engaged in the game. All of the students were smiling and laughing while playing the game. During the memory game, all the students complained when it was time to stop the game. During the around the world game, the students were excited and competitive. As described later in this chapter, the majority of students enjoyed some games more than other based on the types of games played.

On the survey given at the end of the study, all sixteen students said that they enjoyed playing the instructional games during this study. Seven students said that they enjoyed these games because they are fun but also help you learn. Five students said that they enjoyed these games because they help you learn. Three students said that they enjoyed these games because they are fun. One student said that he/she enjoyed the games since you get to play with classmates. One student said, "I just feel like it is giving

me a better funnier way to really get a feel for the lesson." Another student said, "It's more fun than doing worksheets."

This data suggests that instructional games are enjoyable and fun for students. Based on the observations and the surveys, it is clear that the majority of students enjoyed the instructional games that were played.

Learning

Through out this study, the students were able to demonstrate their understanding of the material learned. For two of the games (board game and memory) the students' written work was collected and used as a grade. On these two assignments, the majority of students received a grade of 90% or higher. On a graded study guide given at the end of the last game to check the students' understanding before giving the unit test, the majority of students scored a 80% or higher. This suggests that the instructional games helped the students to practice and reinforce the skills learned.

On the survey given at the beginning of the study the students were asked "Why do you enjoy instructional games?" Nine students said that they enjoyed these games because they are fun but also help you learn. Three students said that they enjoyed these games because they help you learn. One student said, "They are fun and it is good to know I'm giving my brain an exercise."Another student said, "I like playing these games because it helps me pass the test."

Students were asked the same question on a similar survey given at the end of the study. Seven students said that they enjoyed these games because they are fun but also help you learn. Five students said that they enjoyed these games because they help you learn. One student said, "I liked it because we learned and then to understand it more we

would play a game." Another student said, "I like playing those games because they help me understand the chapter more." This shows that students enjoy instructional games because they help them to learn and understand the material.

At the end of each instructional game, the students were asked, "What was your favorite part of this game?" For the bingo game, six students said that their favorite part was solving the problems and learning about fractions. For the board game, seven students said that their favorite part was solving the problems and learning about fractions and one student said their favorite part was that the game helped them understand more. For the Smartboard game one student wrote that he liked the game because "I didn't understand fractions until we did this".

On the surveys given after each instructional game the students were asked the question, "Do you feel like you have a better understanding of the material after playing this game?" The answers to this question are displayed in the table below. Table 2, below, shows that the majority of students developed a better understanding of the material through playing the instructional games.

Table 2
Students' Understanding of the Material after Playing the Games

Game	Number of students in class day of game	"Do you feel like you have a better understanding of the material after playing this game?"
Bingo	16	yes- 16
Board Game	15	yes- 15
Memory (little time given)	16	yes- 15 no- 1
Around the World	16	yes- 13 no- 3
Smartboard Game	16	yes- 12 already knew- 1 no- 3

The surveys, the class work, and observations suggest that the majority of students were able to learn and develop a better understanding of the material after playing these instructional games. In the surveys, the students expressed that they like instructional games since it helps them to learn.

Social

Playing instructional games gave the students a chance to work together and help each other. While playing these instructional games, students had a chance to work in pairs and small groups. During this study, the groups and pairs were teacher made so the students had a chance to work with a range of students. While students were playing the board game in small groups, I observed several students helping their classmates to solve the problems.

On the survey given at the beginning of the study, the students were asked why they enjoyed playing these games. One student said, ""I like to play the games because I think it's fun and I got to be with my friends." Students were answered the same question on a similar survey given at the end of the study. One student said that he/she enjoyed the games since "I got to play around with other people." Another student said, ""I like to because I think it is fun when I am doing it and I get to learn while having fun with my friends."

At the end of each instructional game, the students were asked, "What was your favorite part of this game?" For the memory game, three students said that their favorite part was playing with a classmate. One student wrote that his favorite part was "playing with a classmate I have never played with before." For the around the world game, three students said that their favorite part was playing with the class. One student said that her

favorite part of around the world was “It was my time to play with the class and get timed.”

On the survey given at the beginning of the study and the end of the study the students were asked “How many students in this class are your favorite playmates?” Figure 1, below, shows the results to this question. The average at the beginning of the survey was 8.94 classmates. The average at the end of the survey was 8.06 classmates. This shows that the average of classmates that students feel are their favorite playmates has slightly decreased from the survey at the beginning to the survey at the end. In the survey at the beginning six classmates had the most with three students. While at the survey at the end ten classmates had the most with four students. Even though the average slightly decreased, the figure shows that several students change their answer based on the instructional games.

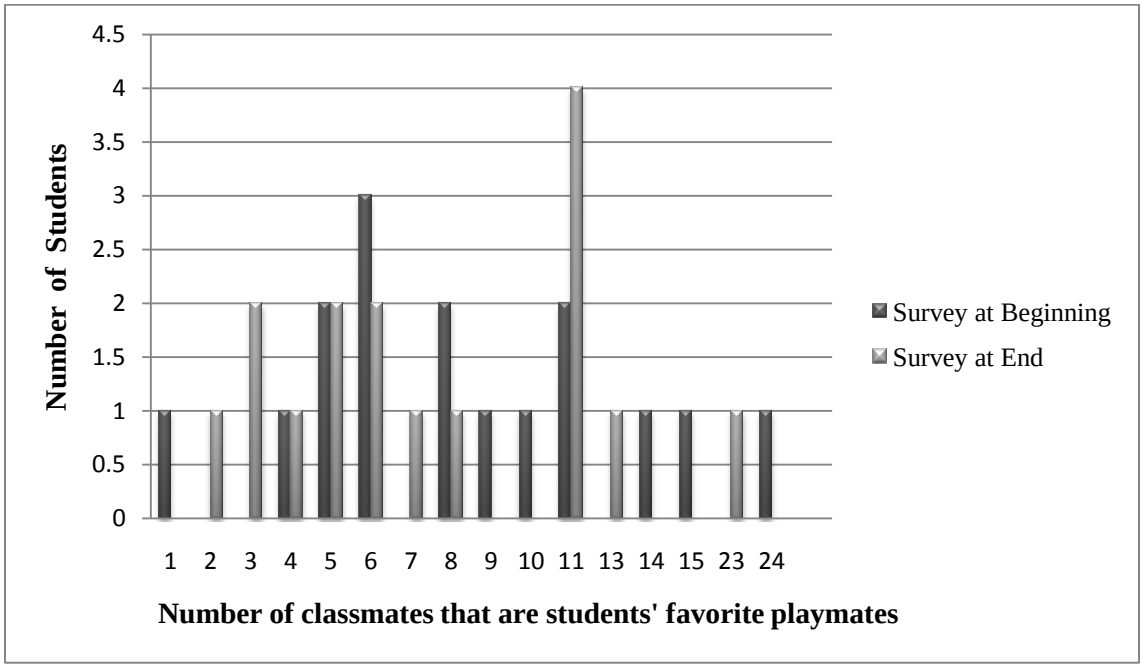

Figure 1
Number of Classmates that are Students’ Favorite Playmates

On the survey given at the beginning of the study and the end of the study the students were asked “How many students in this class would be your favorite people to help you work in school on an assignment or a project?” Figure 2, below, shows the results to this question. The average at the beginning of the survey was 5.62 classmates. The average at the end of the survey was 5.56 classmates. This shows that the average of classmates that students feel are their favorite to work with has slightly decreased from the survey at the beginning to the survey at the end. Even though the average slightly decreased, the figure shows that several students change their answer based on the instructional games. For example in the survey at the beginning three students said one while at the survey at the end zero students said one. In the survey at the beginning zero students said four while at the survey at the end four students said four.

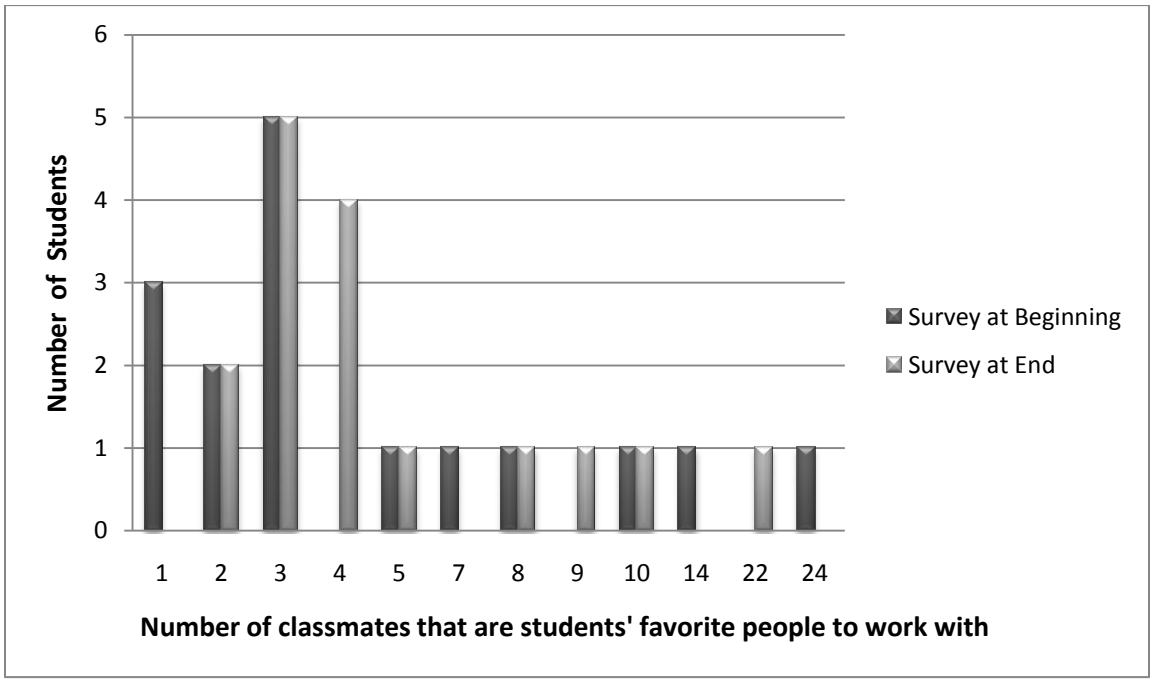

Figure 2
Number of Classmates that are Student’s Favorite People to Work With

The surveys and observations suggest that instructional games allow students many opportunities to work together and help each other. The data suggests that the social interactions created through instructional games are positive to the students and help to foster more relationships among the students.

Different Types of Games

One factor that could change the effects of instructional games is the type of games. During this study a range of instructional games were used. The instructional games ranged in rules, educational objectives, amount of competition, and if the students played individually, in pairs, in groups, or as a whole class. The games played during this study were bingo for equivalent fractions (individual), board game for simplifying fractions (small groups), matching game for mixed numbers and improper fractions (pairs), around the world for comparing fractions (individual), and Smartboard game for ordering fractions (class).

The students' enjoyment of these games depended on multiple factors including reward, competition, and students' preferences. Students' preferences include favorite subject, working preferences, and learning style. The students' preferences could influence if they like the instructional game or not.

On the survey given at the beginning of the study and the end of the study the students were asked "On a scale on one to five, rate how much you like math?" Table 3 on page 34 shows the results to this question. Students' enjoyment of math may influence how much they like the games. This table shows that after this study one student changed from three (ok) to two (disliked). This is a student who preferred to work individually and did not enjoy most of the instructional games during this study. This table also shows that

after this study one student changed from four (liked) to five (strongly liked). This data suggests that the instructional games helped one student to enjoy math more.

Table 3
Students' Enjoyment of Math

	1 Strongly Disliked	2 Disliked	3 Ok	4 Liked	5 Strongly Liked
Survey at Beginning of Study	0	0	6	6	4
Survey at End of Study	0	1	5	5	5

On the survey given at the beginning of the study and the end of the study the students were asked "What is your favorite school subject?" Table 4, below, shows the results to this question. The students' favorite subject shows the subject that the student enjoys learning about the most. This table also shows that after this study one student changed their favorite subject to math. This data suggests that the instructional games helped one student to enjoy math more and make math their favorite subject.

Table 4
Students' Favorite Subject

	Math	Science	Social Studies	Reading
Survey at Beginning of Study (2 students choose 2)	8	5	4	1
Survey at End of Study (3 students choose 2)	9	7	2	1

On the survey given at the beginning of the study and the end of the study the students were asked "Do you prefer to work alone, in pairs, or in a small group?" Table 5 on page 35 shows the results to this question. Students' enjoyment of the instructional games may depend on their work preferences. This table also shows that after this study

one student changed their work preference from working alone to working pairs. This data suggests that the group work done during these instructional games helped one student to prefer to work in pairs.

Table 5
Students' Work Preferences

	Alone	Pairs	Small Group
Survey at Beginning of Study	2	11	3
Survey at End of Study	1	12	3

On the surveys given after each instructional game the students were asked "On a scale of one to five, rate how much you liked this instructional game." Table 6, below, shows the results to this question. This table shows that the students' favorite games were bingo, board games, and around the world. The game that the students seemed to enjoy the least was the Smartboard game.

Table 6
Students' Rating of the Instructional Games

Game	Number of students in class day of game	1 Strongly Disliked	2 Disliked	3 Ok	4 Liked	5 Strongly Liked
Bingo	16	0	0	0	6	10
Board Game	15	0	1		2	12
Memory (little time given)	16	0	2	5	5	4
Around the World	16	0	1	3	2	10
Smartboard Game	16	1	2	6	5	2

On the survey at the end of the study students were asked, "Which was your favorite game?" The figure below shows the results to this question. Eight students said that their favorite game was around the world. Three students said that their favorite

game was bingo. Two students said that their favorite game was the board game. Two students said that their favorite game was memory. One student said that his favorite game was the Smartboard game.

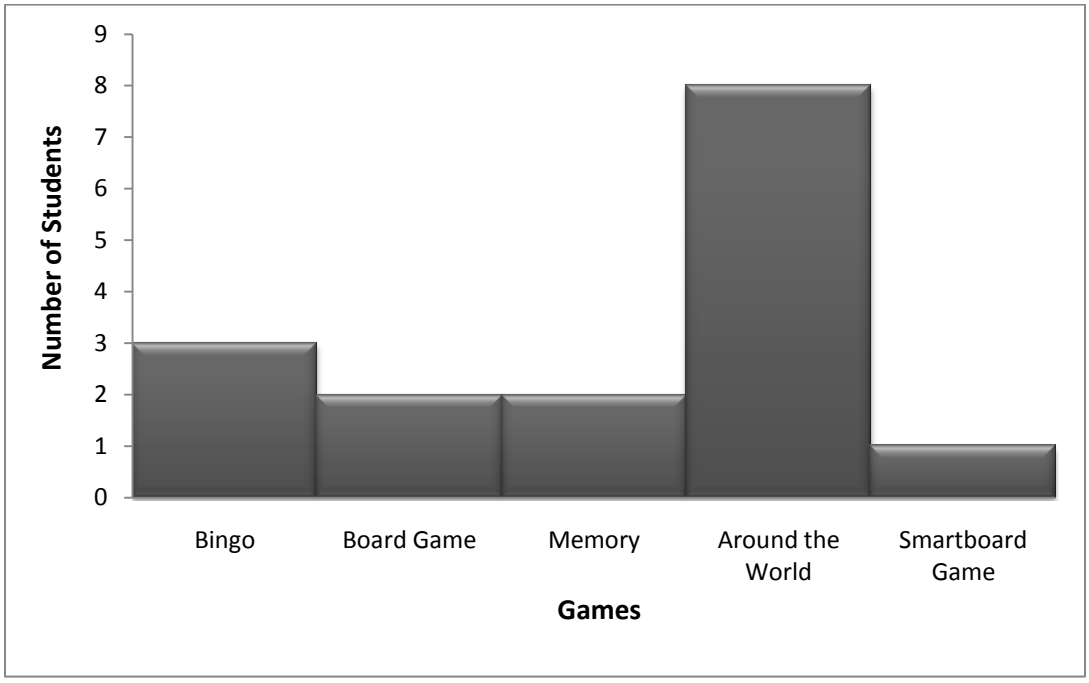

Figure 3
Students' Favorite Games

Bingo had students playing individually and is a game that students are familiar with playing. This version of bingo had students find a matching equivalent fraction and encouraged friendly competition since students were trying to be the first student in the class to get Bingo. Table 6 on page 35 shows that six students rated the game as four (liked) and ten students rated the game as five (strongly liked). This table shows that the majority of students enjoyed and liked this game. Figure 3 on page 36 shows that three students said that their favorite game was bingo. On the surveys, students said that their favorite part of the game was it was bingo, it was fun, winning, and solving the math

problems. One student said they liked bingo because, "it's very exciting." Based on the surveys and observations, students enjoyed this game since it was based on a familiar game, encouraged learning, had some level of competition, and was fun.

The board game had students working in small groups of three to four students. Students were able to move forward on the board game every time they answered the math problem correctly. This game encouraged friendly competition since students were trying to be the first student in their group to cross the finish line. Table 6 on page 35 shows that one student rated the game as two (disliked), two students rated the game as four (liked), and twelve students rated the game as five (strongly liked). This table shows that the majority of students enjoyed and liked this game. Figure 3 on page 36 shows that two students said that their favorite game was the board game. On the surveys, students said that they their favorite part of the game was it was fun, winning, learning, and solving the math problems. One student said that her favorite part was "the whole thing was my favorite. I loved it." Based on the surveys and observations, students enjoyed this game since it encouraged learning, had some level of competition, and was fun.

Memory was played in pairs and had student trying to find matches of one improper fraction and one mixed number. This game encouraged friendly competition since students were trying to get more matches than their partner. Due to time restrictions, students only had only ten minutes to play this game. Table 6 on page 35 shows that two students rated the game as two (disliked), five students rated the game as three (ok), five students rated the game as four (liked), and four students rated the game as five (strongly liked). This table shows that this was not one of the students' favorite games but most students still enjoyed it. Figure 3 on page 36 shows that two students said

that their favorite game was memory. On the surveys, students said that they their favorite part of the game was it playing the game and trying to winning, solving the math problems, and playing with classmates. In the survey given at the beginning of this study, eleven students said they like working in pairs, which may explain while students enjoyed playing with their classmates during this game. One student said that they liked the game because "It was a very fun game to play and a helpful game." Based on the surveys and observations, students enjoyed this game since it encouraged learning, had some level of competition, and was played in pairs.

Around the world had students playing individually competing against their classmates to be the first one to solve the problem correctly. The problems were displayed on the Smartboard and students were able to use whiteboards to solve the problems. This game had the most competition since students were competing against other students to see which student could get the correct answer first. The winner of around the world won no math homework for the night. Table 6 on page 35 shows that one student rated the game as two (disliked), three students rated the game as three (ok), two students rated the game as four (liked), and ten students rated the game as five (strongly liked). This table shows that the majority of students enjoyed and liked this game. Figure 3 on page 36 shows that eight students said that their favorite game was around the world. Students liked this game because it was fun, playing with classmates, learning, the reward, fun, and it is a fast paced game. While observing this game, I noticed that the students were more competitive and engaged in the game. On the survey one student said that their favorite part of around the world was "If you won you got no math homework." Another student's favorite part of the game was "playing against

people and having fun." However, some students felt that the competition placed too much pressure on them and the game moved at too fast of a pace. Another student said, "I didn't like it because it who gets it first so it puts pressure on the person." Based on the surveys and observations, students enjoyed this game since it encouraged learning, had competition, was fun, and playing with classmates.

The Smartboard game had students solved the problem individually on their whiteboard. Then the class decided on the answer to put in the game as a class. The game had little graphics. The game also had little competition. Table 6 on page 35 shows that one student rated the game as one (strongly disliked), two students rated the game as two (disliked), six students rated the game as three (ok), five students rated the game as four (liked) and two students rated the game as five (strongly liked). This table shows that this game was the less liked. Figure 3 on page 36 shows that one student said that their favorite game was the Smartboard game. The students enjoyed this game since it encouraged learning, and used the Smartboard and whiteboards. While observing, the students seemed to think this game was more like a math activity than a game. One student said that her favorite part was, "doing the problems and learning how to do the problems." Based on the surveys and observations, students enjoyed this game since it encouraged learning, and used the Smartboard and whiteboards. However, students did not enjoy this game as much as the other since it had little competition, had little graphics, was not as fun, and didn't involve playing with classmates.

There are many reasons why students enjoyed certain games more than others. In this study, students seemed to better enjoy the games that were fun, encouraged learning, was played with classmates, and had some level of competition. The students enjoyed

trying to be the one to win, however, at high level of competition like around the world some students felt there was too much pressure placed on them. The students also enjoyed games that encouraged learning and was enjoyable to play. Games that had students play with their classmates were more enjoyable for the students.

Conclusion

The data shows that there are three major effects of instructional games: fun, learning, and social. The instructional games in this study were enjoyable and engaging for the students. Students were also able to demonstrate their understanding of the material. The data also suggests that instructional games allow students opportunities to create positive relationships with their classmates.

The data in this study also shows that there are several factors that affect how many students enjoy these games. These factors are reward, competition, and students' preferences. In this study, students seemed to better enjoy the games that were fun, encouraged learning, were played with classmates, and had some level of competition.

Looking Ahead

Chapter five explains the implications of the study and recommendations for further study.

Chapter Five

Implications

Summary of Findings

In the previous chapter, I discussed three major effects of instructional games: fun, learning, and social. During this study, the students were engaged and enjoying the instructional games. Students were also able to demonstrate their understanding of the material. The data also suggests that instructional games allow students opportunities to create positive relationships with their classmates.

The data in this study also shows that there are several factors that affect how many students enjoy these games. These factors are reward, competition, and students' preferences. In this study, students seemed to better enjoy the games that were fun, encouraged learning, were played with classmates, and had some level of competition.

Limitations

I was a student teacher in the classroom while completing this study. Therefore, time was a limitation since I had to follow the time schedule given to me by cooperating teacher. Due to time restrictions, I was able to conduct this study for two weeks with five instructional games. Due to this time restriction, I was limited on the amount of data that I was able to collect.

During this study, I had to focus on teaching the math curriculum, in addition to conducting this study. Therefore, the lessons and ensuring that the students understand the material taught came before conducting this study. My cooperating teacher was concerned that this study could take from the students learning the material. Therefore, more focus was placed on the instruction rather than the instructional games. For some of the instructional games students were only given about ten to fifteen minutes to play the

games. Also I planned an instructional game to review for the unit test but I was unable to play this game with the students due to time restrictions.

After the third game (memory), a couple students expressed that they felt bad or nervous about giving the game a bad rating since they were afraid it would upset me. One student said, "Are you going to be mad if I give the game a bad rating?" Even though at the beginning of the study I told the students to be honest on the survey, after hearing that students felt bad giving the game a bad rating I then addressed the class again telling them to be honest on the surveys and that I don't care if they give the game a bad rating. After I told the class this, I noticed that more students were giving the games bad rating. I am unsure if this is because I addressed the class or because students enjoyed the first two games more.

Implications for Future Research

This study looked at the use of instructional games in the math classroom. Future research should be done looking at the use of instructional games in other subject areas.

Future research should look into other effects of instructional games. This data shows that the effects of instructional games were learning, fun, and social. The research in Chapter Two shows other effects of instructional games are increase students' motivation and retention. Neither of these effects was discovered in this study. Further research could also show other effects of instructional games. Through my observations in other classroom, I have seen negative effects of instructional games including students becoming upset when they lose. These negative effects of instructional games were not discovered in this study. However, further research should be done to discover other effects of instructional games that were not discovered in this study.

Future research should also further look at the types of games that students enjoy. The data here shows the type of instructional games that a small group of students liked. Future research should look at the types of games liked among a larger population to determine the factors that make instructional games more effective. Types of games looked at should include multiple factors including reward, competition, social interactions, and game format. Future research should also look further into technology based games and how students respond to these games.

Implications for Teaching

The results of this study suggest that instructional games are an effective way to provide review and practice for students during the math. Even though this study only look at instructional games in the math classroom. Instructional games can be used in all subject areas.

The instructional games in this study had positive effects: engaging, enjoyable, learning, and creating positive relationships. The research in Chapter Two states that instructional games actively engage students in learning and create enthusiasm, excitement, and enjoyment in students (Klein & Freitag, 1991) Instructional games can be used in the classroom to actively engage students learning which will make learning more fun and motivating for students. The studies in Chapter Two show how instructional games encourage student to student interaction and cooperation (Hewitt, 1997). Instructional games can also be used in the classroom to promote positive relationships and cooperation. Instructional games can be used as practice or review in the classroom to provide students with a fun way to review material learned while creating relationships with classmates.

When using instructional games in the classroom, the teacher should clearly explain the rules and model the instructional games. The teacher should also use a range of instructional games to engage all types of learners. The instructional games used in the classroom should be fun, encourage learning, and have some level of competition. The games should range in the game format and social interactions.

Conclusion

This study shows the effects of instructional games and how instructional games can effectively be used in the classroom. The instructional games in this study had positive effects: engaging, enjoyable, learning, and creating positive relationships. On the survey one student said, "I like to play instructional games because I think it is fun when I am doing it and I get to learn while having fun with my friends."

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Appendix A: Consent Form

March 3, 2011

Dear Parent/Guardian of Miss Merenda's Fourth Grade Class:

I am a graduate student at Rowan University. I am a student teacher in your child's classroom. I will be conducting a research project under the supervision of Dr. Valarie Lee as part of my master's thesis concerning the effects of using instructional games in the elementary education classroom. I am requesting permission for your child to participate in this research. The goal of the study is to determine the benefits of using instructional games.

In addition to the math curriculum, instructional games will be played to review the math skills learned. Throughout this study students will be completing surveys providing feedback about the instructional games. Ethical and confidential procedures will be closely observed. No students' names or pictures will be used or disclosed at the time of this project. Each student will be given a number by which to identify him/her. All data will be reported in terms of group results; individual results will not be reported.

Your decision whether or not to allow your child to participate in this study will have absolutely no effect on your child's standing in his/her class. At the conclusion of the study, a summary of the group results will be made available to all interested parents. If you have any questions or concerns, please contact me at campag96@students.rowan.edu or you may contact my advisor, Dr. Valarie Lee, at (856) 256-4500 ext.3090. Thank you.

Sincerely,

Jennifer Campagnola
Rowan Student Teacher

- -

Please indicate whether or not you wish to have your child participate in this study by checking the appropriate statement below and returning this slip to Miss Merenda by tomorrow, March 4th.

___ I grant permission for my child _________________to participate in this study.

___ I do not grant permission for my child _____________to participate in this study.

Parent/Guardian signature ________________________ Date______________

Appendix B: Survey Given Before Study

Number:_____ Date:_____

1. What is your favorite school subject? _____
2. On a scale of 1 to 5, rate how much you like math.

1 (strongly disliked) 2 (disliked) 3 (ok) 4 (liked) 5 (strongly liked)

3. Do you prefer to work alone, in pairs, or in a small group?
   _____
4. Have you previously played games to review skills? Yes No
5. Do you enjoy playing these games? Yes No
   Why or why not?
   _____
   _____
   _____
6. How many students in this class are your favorite playmates? _____
7. How many students in this class would be your favorite people to help you work in school on an assignment or a project? _____

Appendix C: Survey Given at the end of Each Instructional Game

Number:_____ Date:_____

Did you enjoy this game? Yes No

What was your favorite part of this game?

_____

_____

Do you feel like you have a better understanding of the material after playing this game?

Yes No

On a scale of 1 to 5, rate how much you liked this instructional game.

1 (strongly disliked) 2 (disliked) 3 (ok) 4 (liked) 5 (strongly liked)

Appendix D: Survey Given at the end of the Study

Number:_____ Date:_____

1. What is your favorite school subject? _____

2. On a scale of 1 to 5, rate how much you like math.

1 (strongly disliked) 2 (disliked) 3 (ok) 4 (liked) 5 (strongly liked)

3. Do you prefer to work alone, in pairs, or in a small group?
   _____

4. Did you enjoy playing the instructional games during math? Yes No
   Why or why not?
   _____
   _____
   _____

5. Which was your favorite game? _____
   Why?
   _____
   _____
   _____

6. How many students in this class are your favorite playmates? _____

7. How many students in this class would be your favorite people to help you work in school on an assignment or a project? _____