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The effects of instructional games on student achievement in the social studies

Christine A. Pilotti
Rowan University

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THE EFFECTS OF INSTRUCTIONAL GAMES ON STUDENT ACHIEVEMENT IN THE SOCIAL STUDIES

by
Christine Pilotti

A Thesis
Submitted in partial fulfillment of the requirements of the Master of Arts Degree of The Graduate School at Rowan University June 28, 2001

Approved by Professor

Date Approved June 28, 2001
ABSTRACT


The purpose of this study was to examine the effect of instructional games on student achievement. It has been suggested by educators that instructional games may increase the performance and motivation of students. According to a pretest-posttest control group design, a sample of 34 students was administered a pretest and then instructed on the history of New Jersey for the same amount of hours. The control group used two worksheets as a supplement to the lessons, whereas the treatment group used two instructional games as a supplement to the lessons.

After analysis of all scores, a t-test for nonindependent samples revealed a t-value of 8.93 at a .05 level for the control group. A t-value of 7.21 was determined for the treatment group. This indicated a significant difference between the pretest scores prior to treatment and the posttest scores following treatment for both the control group and the treatment group. However, a t-test for independent samples revealed a t-value of -1.19 at a .05 probability level. This indicated no significant difference between the achievement of those students who used worksheets and those students who used instructional games for reinforcement.
MINI-ABSTRACT


Do instructional games increase students’ academic performance, when being assessed? A t-test for independent samples revealed no significant difference between the academic performance of students who use worksheets for reinforcement and students who use instructional games.
ACKNOWLEDGMENTS

The writer appreciates those who played an invaluable role in the completion of this thesis:

Dr. Randall Robinson, Graduate Advisor, Rowan University, whose time, guidance and patience encouraged the completion of this thesis.

Sylvia Pilotti, my mother, whose love, patience and support flamed an inner drive in me to complete this study. My love for her is immeasurable. I thank her for all she has done for me.

Alicia Colombo, a great friend, who supported me throughout this study. Her encouragement helped me through difficult times.

The student subjects who participated in this study. Their cooperation and enthusiasm were essential to the completion of this project.

Precious, my dog, who opened her ears during the release of my stress, even though she had no idea what I was saying. Her love and licks kept my heart strong throughout this study.
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Chapter I

The Scope of the Study

Introduction

It is important for teachers to provide opportunities for students to practice what they have learned (Blum & Yocom, 1996). Instructional games are considered an effective method of increasing motivation and measuring performance. They make practice and rehearsal a fun experience. Instructional games are a fun alternative to reinforce learning. Many commercially designed games can be adapted to use in the classroom for instructional purposes. Instructional games allow students to have fun while reinforcement is taking place.

Educators are challenged with the development of instructional methods that are effective and motivational (Klein, 1992). It has been suggested that instructional games may increase the performance and motivation of learners. They generate excitement and enthusiasm in the learner. Instructional games produce a high interest level in the learner and increase participation, encouraging active involvement.

Many educators in the past believed that games were "frivolous, ornamental and meaningless artifacts that detracted from the solemnity of educating our nation's youth" (Ball, 1976, p. 42). Our nation's acceptance of instructional games has gradually increased. However, regardless of what studies have demonstrated about the effects of instructional games, school administrators and educators do not find gaming devices
appropriate in the classroom. They reject the notion that games can be useful in
instruction.

Statement of the Problem

Are instructional games an effective method of reinforcement? Do instructional
games increase students’ academic performance, when being assessed?

Statement of the Hypothesis

It was hypothesized that fourth and fifth grade students whose teachers use games
as part of their social studies instructional technique would exhibit a higher achievement
in social studies than fourth and fifth grade students whose teachers do not use games as
part of their instructional technique.

Limitations of the Study

There were some limitations in this study. Because the students have different
educational backgrounds, there may have been students who were already introduced to a
specific concept related to the history of New Jersey. In addition, those students who
have weak reading skills may have resulted in decreased comprehension and retention of
the concepts being taught. The game may have had little effectiveness on their
performance. Finally, there may have been discussion between the control group and the
treatment group concerning the lesson content.

Definition of Terms

The following terms were used in the development and analysis of this study:

*Instructional game* – An instructional game is an activity with set rules for play in
which two or more students interact to reach clearly designated instructional objectives.

*Multiage classroom* – A multiage classroom is a classroom that has a combination
of students of two or more age levels.
Chapter II

Review of Related Literature

Introduction

Educators consider instructional games to be an effective method of increasing motivation and measuring performance. They are a fun alternative used to reinforce learning. It has been suggested that instructional games may increase the performance and motivation of learners. They encourage active involvement through the generation of excitement and enthusiasm in the learner. The acceptance of instructional games has gradually increased. However, regardless of the positive effects that instructional games may have on the learner, school administrators and educators do not find them appropriate in the classroom. The purpose of this study was to determine the effects of instructional games on student achievement. It was hypothesized that fourth and fifth grade students whose teachers use games as part of their social studies instructional technique would exhibit a higher achievement in social studies than fourth and fifth grade students whose teachers do not use games as part of their instructional technique.

Effects of Using Instructional Games

There are several studies that discuss instructional games and their effectiveness on academic performance. Eric Freitag and James D. Klein (1991) conducted a study on the effects of instructional games with 75 undergraduate education major students. The students attended a lecture in their required course in educational psychology. After
attending the lecture, the students were randomly assigned one of two treatments. One group used an instructional board game to reinforce the material presented in the lecture, while the other group used a traditional worksheet. Results indicated that the instructional game had a significant effect on motivation. Results also showed no statistically significant difference on performance when the two groups were compared. It was found that those subjects who read the assigned text performed significantly better than those who had not completed the readings. However, no comparison was made between the group of subjects who had completed the assigned reading. A significant difference in performance between the two groups may have been overlooked.

Eva Baker, Joan Herman and Jennie Yeh (1981), explored the relationship of diverse instructional practices of a total of 288 classrooms: 144 second grade classrooms and 144 third grade classrooms. The use of puzzles, games and other instructional adjuncts was explored. Data was collected through the testing of students in reading, mathematics and attitudinal areas. It was concluded that teachers who have the availability of a larger number of instructional options have classes that perform generally well. Another conclusion made was that the use of puzzles, games and audiovisual devices is negatively related to pupil performance. However, the way the adjuncts were being used was questioned as having an impact on the results.

**Effect of Instructional Gaming and Reentry Status on Performance and Motivation**

James D. Klein (1992) wrote a research report on the effect of instructional gaming and reentry status on performance and motivation. Two experiments were conducted involving undergraduate education major students enrolled in educational psychology. The participants in the first study were 75 undergraduate education major
students enrolled in educational psychology. Thirty of the subjects were reentry students. All subjects in the study attended a 50-minute lecture on the information-processing model of learning, and they read the related textbook chapter. Subjects were randomly assigned to one of two treatment groups after two days of instruction. Both groups of students were given 30 minutes to practice the information presented in the lecture and material in the textbook. One group used an instructional game, and the other group used a worksheet. The instructional game consisted of 25 game cards, a game board that graphically represented the information-processing model, a set of rules that explained how to proceed and a group of players who acted collectively as a team. The worksheet consisted of four pages. The worksheet included the same 25 questions used in the game. After answering five questions, the worksheet instructed the subjects to turn to the last page to receive feedback. The two groups practiced in separate rooms. Subjects in the game group formed two teams of players, each consisting of 8 to 10 players. Each group was given 30 minutes to practice the information from the lecture. Results revealed that reentry status was significantly related to performance. However, the results showed no statistically significant differences in performance between the two treatment groups.

The second study conducted by Klein (1992) investigated instructional gaming as a review strategy rather than a practice strategy. The subjects in this study were 102 undergraduate education major students enrolled in a required course in educational psychology. Of these subjects, 48 were reentry students. All subjects were required to complete a demographic information form regarding their age and reentry status. After several weeks, the subjects attended the 50-minute lecture and read the textbook chapter. Subjects were then assigned to one of two treatment groups. Both groups worked
individually for 30 minutes using the worksheet to practice the information. A week later, the subjects were given 15 minutes to review the information-processing model by using either the instructional game or a structured review form. The structured review form was a written document that reminded subjects of the lesson objectives and included two sets of questions. The first set of questions asked why the subject thought it was important to learn about the information-processing model and how the knowledge of this model could be used in real-life situations. The second set of questions was directly related to the information-processing model. Subjects in the game group followed the same procedures that were described for the first experiment. Subjects in the structured review group were given the review form and told to write out the answer for the first question. Then the experimenter solicited the answer from a member of the group. The subjects then discussed the answer. This procedure was followed for each question. A week after the treatment, all subjects took the delayed post-test. Results revealed that neither the treatment nor reentry status was significantly related to performance.

Designing Instructional Games

Howard Ball (1976) explored the effectiveness of instructional games. The results of his investigation provide an understanding of the qualities and the characteristics of instructional games that affect the cognitive, affective and perceptual-motor behaviors of players from kindergartners to adults. As previously stated, the game should promote a clearly stated instructional objective. It should reinforce basic instructional concepts. The game should not be so competitive that it reduces friendly interaction among players. In relation to pupil readiness, defined as “a point in physical or mental development where the pupil is prepared to interpret particular stimuli or to
perform specific perceptual-motor tasks” (p. 46), the game should require that the player have certain skills and understanding to play the game. And, in relation to teachers, the game should allow a teacher to identify a pupil’s strengths and weaknesses.

Caren Wesson, Rich Wilson and Linda Higbee Mandlebaum (1988) wrote an article, which explains how learning games can be used for active student responding. They believe that using a game format for review can be an efficient mixture of motivation and academic learning. This can be very helpful to students for practicing newly acquired skills, maintaining mastered skills and reinforcing task completion. The authors also believe that active participation and high rates of student responding are associated with greater achievement.

Wesson, Wilson and Mandlebaum (1988) list and explain the basic principles of active, high-response games. High-response games encourage active, fast-paced responding. Great effort is put forth to elicit numerous overt responses from students. Games in which students spend too much time waiting for an opportunity to respond or require a lot of thinking time should be avoided. High-response games also allow for simultaneous responding. The students can respond to a question in verbal or written unison. Or they can indicate in unison whether they agree or disagree with another student’s response. Students’ academic response time is reduced when they take turns. Finally, high-response games include questions that focus on each student’s instructional level. Students do not play games in which they are performing at a frustration level. Traditional games can be modified for use in the classroom. Bingo is the easiest game that can be adapted to promote high-response practice. It can be used to enhance academic learning in many areas, including spelling, mathematics and social studies. The
War card game can also be adapted to provide high-response practice. It can be developed for any topic that deals with comparable amounts or relative positions. Scrabble can be used to reinforce spelling. The length of the game can be a predetermined number of minutes or individual moves.

Paper-and-pencil tasks can also be adapted into a game format (Wesson, Wilson & Mandlebaum 1988). The easiest way this can be accomplished is to give each student a hand-held chalkboard or similar tool. The students write an answer simultaneously in response to the teacher’s question. Answering the question together makes it more of a game than a worksheet activity. Traditional games can also be used as high-response games. The students can play competitively or cooperatively. By having the students work cooperatively as a class, all students are actively involved in the academic task.

Question and answer games such as spelling bees and trivia games can also be adapted (Wesson, Wilson & Mandlebaum 1988). However, they are often more difficult to adapt because they get some motivational features from the verbal interaction and relatively slow pace. One technique that keeps the verbal format while generating responses from all students is for the teacher to hesitate after an individual student answers and allow the other students to hold up a “Yes” or “No” card indicating whether they agree or disagree with the answer. The response cards can vary by using happy or sad faces or opposites such as true-false, fact-opinion or agree-disagree. Question and answer games can also be adapted to reinforce a particular skill. Students can identify parts of speech by holding up one of four words: noun, verb, adjective or adverb. Appropriate cards can also be made for lessons about food groups, weather conditions,
animal species, directions (north, south, east, west), names of continents or presidents. This format allows all students to respond actively and continuously.

There are some caveats to using high-response games (Wesson, Wilson & Mandlebaum 1988). Many times, corrective feedback is sacrificed for a faster response rate. Teachers need to take the time to provide corrective feedback. The difficulty level of the game needs to be controlled. Rules need to be enforced to keep students on-task and minimize disruptions to reduce time lag. Finally, competition can lead to negative feelings. Teachers can make the game into a team-against-team activity or a cooperative game in which all of the students work together.

Games can be used to reinforce reading skills. Florence V. Shankman (1968) states that games are an incentive for learning vocabulary, phonics, word structure and sight words. It is suggested that teachers design the games so that particular needs of the children are met. They should be made out of durable material in order to be used again with different groups or individuals.

Shankman discovered that the children best like certain characteristics found in games, when visiting different classrooms and observing student teachers and master teachers. Clear directions allow games to be played with minimal supervision, giving the child a sense of satisfaction. Team games resulted in the participation of more children and encouraged cooperation among older children. Action games made learning fun and satisfied many basic psychological drives in students. Learning was facilitated, and at the same time, formal instruction was reinforced.

Shankman states that certain characteristics are essential for games used in the classroom. Games must have a real learning value that reinforces or teaches a specific
skill. It should not take long for students to understand the mechanics of the game. The
fun of the game should focus on a specific skill, not the game itself. Games should have
a specific purpose that is meaningful to the child and enriches a classroom goal. Games
should allow self-evaluation. Finally, they should be adaptable to children’s needs,
abilities and interests.

Shankman provides guidelines for teachers to consider when using games in the
classroom. Good sportsmanship should be stressed. Teachers should also be aware of
why a particular game is appropriate and how it will meet the needs and interests of the
individual or group using it. Games should continually be evaluated for effectiveness.
Teachers should make any necessary changes.

Using Instructional Games in the Classroom

Timothy Blum and Dorothy Yocom (1996) provide guidelines for designing
effective instructional games. One important guideline stated that instructional games
must have instructional objectives that have been selected for reinforcement. It is also
suggested that the game be appealing to the students. It should provide active
involvement, which has been shown to increase academic improvement. Games should
provide every child with an equal opportunity to win. Blum and Yocom list cautions that
should be considered concerning the use of games. Games should not be overused, or the
students will get tired of them. Excessive competition and peer pressure should be
avoided. It is suggested that teachers think carefully before using games that penalize for
wrong answers. Most importantly, instructional games should not substitute for
instruction. Rather, they should be used as a supplement.
Chapter III

Method

Introduction

The purpose of this study was to determine the effects of instructional games on student achievement of fourth and fifth grade students in a social studies class. It was hypothesized that fourth and fifth grade students whose teachers use games as part of their instructional technique would exhibit a higher achievement than fourth and fifth grade students whose teachers did not use instructional games. There were some limitations in this study. Because the students have different educational backgrounds, there may have been students who had already been introduced to a specific concept, giving them an academic advantage over the other students. Those students who have weak reading skills may have struggled, resulting in decreased comprehension and retention of the concepts being taught. The game may have had little effectiveness on their performance. Finally, there may have been communication between the two groups of students in which lesson content was discussed.

Subjects

The subjects that participated in this study were 34 fourth and fifth grade students. The subjects were from two multiage classrooms, each with a different teacher. There were 19 fourth grade students and 15 fifth grade students; 17 females and 17 males. In this study, 2 students were classified as learning disabled (1 student in mathematics and 1
student in literacy). There were 2 students classified as having attention-deficit hyper disorder (ADHD), and 1 student was classified as having attention-deficit disorder (ADD).

Design of the Study

The pretest-posttest control group design was used in this study. Students were put into groups based on which teacher they were assigned to for daily instruction. Each group had 17 participants. A pretest on New Jersey facts was administered to the control group (Group 1) (see appendix A). The students received instruction for 9 hours within a 9-day time period on the history of New Jersey using the textbook (see appendix B). Two worksheets were used as a supplement to the lessons (see appendix C). They were designed with a fill-in-the-blank format. After 9 hours of instruction, the posttest was administered.

The pretest on New Jersey facts was then administered to the treatment group (Group 2) (see appendix A). These students received instruction for 9 hours within a 6-day time period on the history of New Jersey using the textbook (see appendix B). New Jersey Bingo and New Jersey Jeopardy were used as a supplement to the lessons. In New Jersey Bingo, students were given a Bingo grid consisting of 24 empty squares and a free a space. Students filled in their grid with selected vocabulary terms pertaining to the unit (see appendix D). The students were given a clue and had to locate the correct term on their game board. The game followed the same rules as the traditional Bingo. The first person to get 5 in a row was the winner. New Jersey Bingo was played twice, each with a different list of terms. In New Jersey Jeopardy, the students were divided into two groups. The students had to select a category. An answer was read to them and the students had to respond by putting their answer in the form of a question (see appendix D). The game
followed the same format as the television show. New Jersey Jeopardy was played once.

After 9 hours of instruction, the posttest was administered.

Description of the Measurement Instrument

A fill-in-the-blank format was used to design the measurement instrument. The students had to fill in 25 items. All questions were based on the history of New Jersey.
Chapter IV

Analysis of Findings

Introduction

Instructional games may be used as reinforcement of a lesson. An instructional game is defined as an activity with set rules for play in which two or more students interact to reach clearly designated instructional objectives. They are considered effective for increasing motivation and measuring performance. Instructional games provide an enjoyable experience while reinforcement is taking place. They encourage the active involvement of students by producing a high interest level in the learner. A control group was given two worksheets for reinforcement of the history of New Jersey. A treatment group participated in instructional games for reinforcement of the history of New Jersey. It was hypothesized that fourth and fifth grade students whose teachers use games as part of their social studies instructional technique would exhibit a higher achievement in social studies than fourth and fifth grade students whose teachers do not use games as part of their instructional technique.

Tabulation of Raw Scores

For the purpose of this study, a pretest was administered to both the control group and the treatment group. After instruction was completed, the control group and treatment group were administered an identical posttest. All scores for both groups were computed for examination.
Sixteen out of the seventeen control group students scored higher on the posttest than on the pretest, while one student demonstrated no change from the pretest to the posttest (see table 1).

Table 1

<table>
<thead>
<tr>
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The treatment group students scored higher on the posttest than the pretest in sixteen out of seventeen cases, while one student demonstrated no change from the pretest to the posttest (see table 2).
### Table 2
Pretest/Posttest Scores for Treatment Group

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<td>17</td>
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</table>

The test contained 25 fill-in blanks regarding the history of New Jersey that was reinforced through either worksheets or instructional games. One question was omitted from the test due to a lack of instruction on that particular concept. Therefore, the range of scores included those from 0 to 24. The mean for the control group on the pretest was 8.18 as compared to a mean of 16.53 on the posttest. The treatment group pretest scores represented a mean of 10.88, while the treatment group posttest scores represented a mean of 18.53.

Tabulation of the t-test
The data in this study was analyzed both with a t-test for nonindependent samples and a t-test for dependent samples. The t-test for nonindependent samples was used to determine whether there was a significant difference between the pretest and posttest scores of the control group at a probability level of .05. The analysis of scores of the subjects who used the two worksheets is presented in table 3.

<table>
<thead>
<tr>
<th>number of pairs of scores</th>
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<tr>
<td>sum of differences</td>
<td>142</td>
</tr>
<tr>
<td>mean of differences</td>
<td>8.35</td>
</tr>
<tr>
<td>sum of differences squared</td>
<td>1424</td>
</tr>
<tr>
<td>t-value</td>
<td>8.93</td>
</tr>
<tr>
<td>degrees of freedom</td>
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At a probability level of .05, the t-value of 8.93 was significant. This analysis indicated a significant difference in the pretest scores of the control group prior to treatment and the posttest scores following the use of worksheets.

The t-test for nonindependent samples was also used to determine whether there was a significant difference between the pretest and posttest scores of the treatment group at a probability level of .05. The analysis of scores of the subjects who used the two instructional games is presented in table 4.
At a probability level of .05, the t-value of 7.21 was significant. This analysis indicated a significant difference in the pretest scores of the treatment group prior to treatment and the posttest scores following the use of instructional games.

The t-test for independent samples was used to determine whether there was a significant difference between the posttest scores of the control group and the posttest scores of the treatment group at a probability level of .05. The analysis of the means of both sets of posttest scores and the t-value calculated for the independent samples are presented in table 5.

### table 5
**t-test for Control Group and Treatment Group Posttest Scores**

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Treatment Group</th>
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</thead>
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<tr>
<td>mean</td>
<td>16.53</td>
<td>18.53</td>
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<tr>
<td>SD</td>
<td>4.72</td>
<td>4.75</td>
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At a probability level of .05, the posttest scores of the treatment group were not significantly different than the posttest scores of the control group. The mean scores for the control group and the treatment group were separated by 2 points. These results indicate that there is no significant difference between the scores of those students who use worksheets following instruction and those students who use instructional games following instruction.

Analysis Related to Particular Purpose of Hypothesis

This study investigated the effects of instructional games on student achievement in the social studies. The purpose of this analysis was to test the research hypothesis, which stated that fourth and fifth grade students whose teachers use games as part of their social studies instructional technique would exhibit a higher achievement in social studies than fourth and fifth grade students whose teachers do not use games as part of their instructional technique.

A t-test for nonindependent samples was used to analyze the pretest and posttest scores for both the control group and the treatment group. Significance was defined at a .05 level in each analysis. The t-value of 8.93, which was determined for the control group, revealed a significant difference between the pretest and posttest scores of this group. The t-value for the treatment group was determined to be 7.21, revealing a significant difference between the pretest and posttest scores of this group, which used instructional games for reinforcement. The t-value determined for the control group was
higher than the t-value determined for the treatment group, which does not support the research hypothesis.

A t-test for independent samples was used to determine the difference between posttest scores of the control group and the treatment group. A t-value of −1.19 revealed no significant difference between posttest scores at a probability level of .05. The data in this analysis does not support the research hypothesis. There was no significant difference between the achievement of students who used worksheets for reinforcement and students who used instructional games for reinforcement.
Chapter V

Summary, Conclusions and Recommendations

Introduction

This study investigated the effect of instructional games on student achievement. An instructional game was defined as an activity with set rules for play in which two or more students interact to reach clearly designated instructional objectives. It is important for teachers to provide opportunities for students to practice what they have learned (Blum & Yocom, 1996). It has been suggested that instructional games may increase the motivation and performance of learners (Klein, 1992). Instructional games excite the learner, increase participation and encourage the active involvement of students. However, despite what studies have revealed about the effectiveness of instructional games, school administrators and educators view them as inappropriate in the classroom and reject the notion that games can be useful in instruction.

Summary of the Problem

Do instructional games increase students' academic performance, when being assessed?

Summary of the Hypothesis

Fourth and fifth grade students whose teachers use games as part of their social studies instructional technique would exhibit a higher achievement in social studies than fourth and fifth grade students whose teachers do not use games as part of their instructional technique.
Summary of the Procedure

The students were divided into two groups, each having 17 participants. A pretest was administered to the control group (Group 1). They received 9 hours of instruction on the history of New Jersey. Two worksheets were used to supplement the lessons. After 9 hours of instruction, the posttest was administered. The treatment group (Group 2) was then administered the pretest. These students also received 9 hours of instruction on the history of New Jersey. Two instructional games, New Jersey Bingo and New Jersey Jeopardy, were used as a supplement to the lessons. After 9 hours of instruction, the posttest was administered to the treatment group.

Summary of the Findings

In this study, 32 out of the 34 students participating in this experiment scored higher on the posttest than the pretest taken prior to instruction. The t-test for nonindependent samples was used to determine if there was a significant difference between the pretest and posttest scores of both groups. At a probability level of .05, the test revealed a significant difference between the pretest scores prior to the treatment and the posttest scores of both groups, following the use of worksheets or instructional games.

The t-test for independent samples was used to determine the difference between the posttest scores of the control group and the treatment group. At a probability level of .05, a t-value of -1.19 revealed no significant difference between the posttest scores of the control group and the posttest scores of the treatment group.

Conclusions
The data in this study revealed no significant difference between the achievement of students who used worksheets for reinforcement and students who used instructional games for reinforcement.

The data analysis revealed a significant difference between the pretest scores and posttest scores of both groups, but it did not uncover a significant difference between the posttest scores of the control group and the posttest scores of the treatment group following instruction. The mean scores of 16.53 for the control group and 18.53 for the treatment group indicated no significant difference. The results of this study did not support the research hypothesis.

Implications and Recommendations

Teachers need to provide reinforcement activities for their students. They need to supplement their lessons with a fun activity that motivates the students and may improve academic performance. Instructional games have been considered an effective method to use when supplementing a lesson. They are a fun alternative to the traditional worksheets. Many commercially designed games can be adapted to use as reinforcement for instructional purposes.

Many studies that have been done concerning the effect of instructional games have not revealed instructional games as an effective tool for increasing student achievement, although they do show an increase in motivation. Despite the outcome, the results should not be generalized due to limitations present in this study. A limited number of students participated in this study. The students were at different academic ability levels. Some students may have already received instruction on the history of New Jersey. The distribution of treatment may also have had an impact on the results.
Although both groups received 9 hours of instruction, the control group was instructed over a 9-day period, while the treatment group was instructed over a 6-day period.

This study did determine the use of worksheets to be equally as effective as instructional games. Although past studies have not revealed a significant impact of instructional games on student achievement, future study should continue to explore this reinforcement method. As national standards of education are set forth, there continues to be a need for the discovery of the most effective method of reinforcement for increasing student achievement and motivation.
REFERENCES


Appendix A

New Jersey Pretest/Posttest
New Jersey

1. __________________________ is the capital of New Jersey.

2. The state nickname of New Jersey is __________________________.

3. New Jersey was entered into the Union on __________________________.

4. New Jersey was the ________ state to ratify the Constitution.

5. New Jersey’s state flower is the __________________________.

6. The __________________________ is the state bird of New Jersey.

7. __________________________, __________________________, and __________________________ are the 3 states that border New Jersey.

8. New Jersey’s state motto is “________________________ and __________________________”.

9. New Jersey is made up of 4 regions: __________________________,
   __________________________, __________________________,
   and __________________________.

10. The state insect is the __________________________.

11. The __________________________ is the state animal of New Jersey.

12. The __________________________ were the first people to inhabit the New Jersey area.

13. The Italian navigator __________________________ was the first European to explore and chart New Jersey, in 1524.

14. The __________________________ is the state tree of New Jersey.

15. The first complete dinosaur skeleton ever found in America, the __________________________, was dug up on a farm near Haddonfield, New Jersey in 1858.
16. New Jersey has ______ counties.

17. __________________________ was the first governor of New Jersey.

18. New Jersey is part of the __________________ Region of the United States.

19. New Jersey is about halfway between the ___________ and the North Pole.
Appendix B

Schedule of Study
## March 2001

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Appendix C

New Jersey Worksheets
Fill in the blank.

State Nickname: ________________

State Tree: ________________

State Bird: ________________

State Flower: ________________

State Animal: ________________

State Capital: ________________

The first people to live in New Jersey were the ____________________.

The first complete dinosaur skeleton, the ____________________ was found near ____________________, New Jersey in __________.

New Jersey is divided in four regions: ____________________, ____________________, ____________________ and ____________________.

New Jersey’s main latitude lines are _______ and _______ north latitude.

New Jersey’s main longitude lines are _______ and _______ west longitude.

New Jersey is bordered by ____________________, ____________________ and ____________________.
1. The first people to live in the New Jersey area were the

2. ___________ means ancient.

3. ___________ and ___________ were used to make necklaces and ornaments.

4. Rock art and stone and ceramic pots are types of ________________.

5. _______________ are scientists who study the things people of the past left behind.

6. _______________ were called the Delaware Indians because many of them lived along the Delaware River.

7. The Lenape Indians spoke an ________________ language.

8. Every Lenape belonged to a ________________.

9. _______________ are stories that are passed down from generation to generation.

10. _______________ was necessary for survival.

11. A ________________ was a special person asked to dream or think up a name for a child.

12. The Lenape Indians used animal skins and furs to make ________________,

____________________ and ___________________.


Appendix D

New Jersey Bingo/New Jersey Jeopardy
New Jersey Bingo Vocabulary List-Game 1

1. Lenape Indians
2. Giovanni da Verrazano
3. Paleo Indians
4. NJ Highlands
5. Piedmont Plain
6. Appalachian Ridge and Valley
7. Atlantic Coastal Plain
8. Trenton
9. Archaeologist
10. Artifact
11. Clan
12. Latitude
13. Longitude
14. Canada
15. Mexico
16. The Garden State
17. Hadrosaurus
18. Purple violet
19. Red oak
20. Equator
21. Honeybee
22. Eastern Goldfinch
23. United States of America (USA)
24. North America
New Jersey Bingo Vocabulary List-Game 2

1. United States of America (USA)
2. North America
3. Trenton
4. Canada
5. Mexico
6. Latitude
7. Longitude
8. Appalachian Ridge and Valley
9. NJ Highlands
10. Piedmont Plain
11. Atlantic Coastal Plain
12. Peninsula
13. Mountain
14. Plateau
15. Island
16. Hill
17. Equator
18. Purple violet
19. Red oak
20. Honeybee
21. Eastern Goldfinch
22. Horse
23. The Garden State
24. Hadrosaurus
NJ Jeopardy

Category 1-People of NJ

1 pt. This group was the first to live in the NJ area.
   *Who are the Paleo Indians?*

2 pt. He was the first European explorer to reach NJ.
   *Who is Giovanni da Verrazano?*

3 pt. These scientists study things that people from the past have left behind.
   *Who are archaeologists?*

4 pt. These people are owners of land.
   *Who are proprietors?*

5 pt. He purchased East Jersey from the proprietors in 1682.
   *Who is William Penn?*

Category 2-NJ Facts

1 pt. This is the nickname of NJ.
   *What is the Garden State?*

2 pt. This is NJ's state animal.
   *What is the horse?*

3 pt. They lived along the Delaware River and met the first explorers and colonists to reach NJ.
   *Who are the Lenape Indians?*

4 pt. NJ was this number state to ratify the Constitution.
   *What is 3rd?*

5 pt. This is NJ's state motto.
   *What is "Liberty and Prosperity"?*

Category 3-Back in Time

1 pt. This was discovered in Haddonfield, NJ in 1858.
   *What is the first complete dinosaur skeleton (Hadrosaurus)?*

2 pt. The Europeans brought goods, but also these.
   *What are diseases?*
3 pt. NJ was eventually divided into this number of counties.
What is 21?

4 pt. Animals were important to the Paleo Indians for this reason.
What is for food, making clothes and jewelry, etc.?

5 pt. These were 3 duties of Lenape women.
What are gathering food, collecting firewood, cooking meals, making pots, baskets and clothing, etc.?

Category 4-Tell Me More! Tell Me More!

1 pt. NJ is located between these 2 points.
What are the North Pole and the Equator?

2 pt. These stories were passed down from generation to generation.
What are legends?

3 pt. NJ is surrounded by these 3 states.
What are New York, Pennsylvania and Delaware?

4 pt. NJ is divided up into these 4 regions.
What are the Appalachian Ridge and Valley, Piedmont Plain, NJ Highlands and Atlantic Coastal Plain?

5 pt. Explorers used this tool to determine the direction they were travelling.
What is a compass?

Category 5-Hodgepodge

1 pt. Fly birdie, fly!
What is the Eastern Goldfinch?

2 pt. Turtle, Wolf, Turkey
What is a clan?

3 pt. Let's go rake those leaves.
What is the red oak?

4 pt. Will you pay for my trip?
What is an indentured servant?

5 pt. Whoa! Whoa! Slow down! Don't make me fall on the ground!
What is the horse?
VITA

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