

THE RELATIONSHIP BETWEEN RECREATIONAL GAMING
AND READING COMPREHENSION, READING
VOCABULARY, AND ATTITUDE
TOWARD READING

by

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CHAPTER 1
INTRODUCTION TO THE STUDY

Problem

Educational games used in the classroom have been accepted as an educational asset often without extensive evaluation of their actual impact in the classroom. Most educational games have either adopted and/or adapted the format of recreational games. The three types of recreational games that have been or are being used in the classroom may be classified as board games, electronic (video) games, and simulation/role play games. Since recreational games have as their spin-offs educational games, investigation needs to be done to determine the relationship of recreational games to reading comprehension and reading vocabulary of students as measured on a standardized test. In addition to possibly influencing reading comprehension or reading vocabulary, the game structure and the reading materials involved in gaming may influence the attitude of students toward reading, and, therefore, warrants investigation.

This study was developed to investigate the possible relationship between recreational games and reading comprehension, reading vocabulary, and the attitude of students toward reading.

Background

Factors that influence reading appear to be almost anything present in the child's world from home environment to birth order to sex to low socio-economic status to games to class size to teachers to text readability to mental retardation to vocabulary to decoding ability to metacognitive strategies (Stevenson, et al., 1984; Badian, 1984; Cleland, 1983; Duffy, 1983; Grauve, et al., 1983; Samuels, 1983; Bright, Harvey, and Wheeler, 1981; and Baker, Herman, and Yeh, 1981). Certain factors may exert a greater influence than others on the reading process. The importance, therefore, lies in isolating those factors which exert the greatest influence in order to determine the direction and magnitude of the influence thus enabling educators to omit or include those factors in the curriculum.

One factor that has been heralded as exerting influence on reading and learning in general deals with games. However, the nature of that influence has not

been clearly established (Telfer and Kann, 1984). Games have been promoted as positively influencing reading, and, thus, it behooves educators to determine if a relationship clearly exists between reading and games.

Educational or instructional games have been identified as having the same components as generic games with the additional element of a definite learning objective (Stolovitch, 1978; and Dunathan, 1978). Generic games have been included in cultural development (McLean, 1978) and have established a viable place for themselves in the development of a culture (McLean, 1978; Dunathan, 1978; and Clark, 1978). The educational sector of that culture has reading as its foundation. Reading in turn has embraced generic games and adapted them to supposedly meet educational needs (Stolovitch, 1978; Dunathan, 1978; Clark, 1978; and Brady, 1977). The components of generic gaming and educational gaming seem to have been generally accepted. Educational gaming in general has been investigated in hopes of ascertaining its impact on the education of a given culture. However, it would appear that where reading is concerned, the relationship between reading and gaming has not been clearly established (Bright, et al., 1981; Games that help children learn, 1981; Baker, Herman, and Yeh, 1981; Clark, 1978; Stolovitch, 1978; and

Brady, 1977). The issue then becomes one of determining if games contribute to the education of a given culture.

Generic and/or educational games may be divided into three broad categories: board games, electronic (video) games, and simulation/role play games. Board games have been strongly supported for their positive educational value (Games that help children learn, 1981; Board games kids liked best, 1981; Clark, 1978; Adams and Edmonds, 1977; and Brady, 1977); however, this value has not been clearly demonstrated through empirical study (Telfer and Kann, 1984; and Baker, Herman, and Yeh, 1981).

Electronic (video) games have both supporters and detractors who claim a relationship exists between video games and education, i.e., reading and/or attitude, that has not been clearly established. Some (Dominick, 1984; Soper and Miller, 1983; Needham, 1982-83; Wanner, 1982; and Bowman and Rotter, 1981) admit that no relationship has been established or that a questionable relationship exists. Thus, no clear relationship has been established between electronic (video) games and reading or attitude toward reading.

The third type of recreational/educational gaming is simulation/role play. A relationship to reading

and attitude toward reading for simulation games has been claimed. However, only one researcher, Vansickle (1977), has established that a relationship does exist; although, he said he was unable to delineate the exact nature of that relationship. Others (Henson, 1982; Gohring, 1978; McLean, 1978; Spannaus, 1978; Stonewater, 1978; Polos, 1977; and Reiser and Gerlach, 1977) embrace simulation gaming without benefit of supporting data. The simulation game mutant, Dungeons and Dragons, has been contended to have a relationship although none has been addressed or established by empirical study (Gygax, 1983; Pulsipher, 1983; Kennedy, 1982; Austin, 1981; Elshof, 1981; Horak, 1981; Parsons, 1981; Gruzen, 1980; Hewson, 1980; Holmes, 1980; and McRae, 1980).

In summary, the relationship of all types of games to reading and attitude toward reading remains an unknown quantity. Thus, this project was designed to investigate the nature of any relationship between games and reading comprehension, reading vocabulary, and attitude toward reading and to delineate the nature of that relationship.

Hypotheses

This study was designed to investigate the following hypotheses:

1. There is no statistically significant

- relationship between gaming (type and/or frequency) and reading comprehension for combined grades.
2. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for combined grades.
 3. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for combined grades.
 4. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for seventh grade students.
 5. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for seventh grade students.
 6. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for seventh grade students.
 7. There is no statistically significant relationship between gaming (type and/or

frequency) and reading comprehension for ninth grade students.

8. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for ninth grade students.
9. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for ninth grade students.

Definition of Terms

Certain terms require definitions as applicable to this study.

Games, generic games, or recreational games are defined as activities which have competition, rules to follow, abstract components, and closure.

Educational games have the same components as games/generic games/ recreational games with the addition of an educational or instructional objective.

Board games are recreational or educational games that also have a board with a sequence of steps to follow. Each participant has a piece that is moved over the board following the sequence of steps as determined by using dice, cards, spinner, etc.

Electronic (video) games are recreational or educational games played between a human participant and a computer with visual graphics on a television-type screen. Electronic games may be home video games which are attached to the home television or arcade video games which are housed in commercial establishments whose business is people playing the video games.

Simulation or role play games must closely resemble a real-life situation in the recreational or educational game format where a student must explore the cause and effect consequences which result from student actions or decisions. Students must actively participate in the game through the application of acquired skills.

Fantasy role play games are recreational games that are a sophisticated form of make-believe in which a player creates a game character and verbally acts out the part of that character in a specially designed game-world controlled by a referee. There is no board or pieces to move. Booklets/books and the referee determine the nature and substance of the game.

Live-action role play games take fantasy role play games beyond the imagination and make-believe world. Players use a consistent and realistic game system that simulates acts of violence. Players can compete in skill

and ability on a personal level, and the game becomes "real".

Frequency levels are lengths of time that a student has been identified as being a nonplayer of games/player of games. A nonplayer is one who has not to his/her knowledge played a particular type of game. An occasional player is one who plays a particular type of game 0-1 hours weekly. A moderate player is one who plays a particular type of game 2-5 hours weekly. A heavy player is one who plays a particular type of game 6+ hours weekly.

Attitude toward reading is defined as the student's point of view toward reading whether it is a positive, negative, or neutral act on the part of the student as measured by The Estes Attitude Scale, Secondary Form (Estes, 1971).

Reading comprehension entails those components that are measured once a year on the California Achievement Test (McGraw-Hill, 1981) as administered by the school system as part of its evaluative program.

Reading vocabulary is also determined to be that which is measured once a year on the California Achievement Test (McGraw-Hill, 1981) as administered by the school system as part of its evaluative program.

Limitations

As in most studies, this study too has its limitations; two of which seem readily apparent. The first is that the instrument was developed by the researcher. While content validity was assumed, it was not empirically evaluated. The second is the Hawthorne Effect. Since the students knew they were in a study, their responses might have been influenced. The statistical procedure used to evaluate the reliability of the students' answers would suggest the Hawthorne Effect, if present, was minimal.

Subject Selection

Subjects were drawn from one junior high school and one senior high school in a predominately rural county in southeastern North Carolina. All seventh and ninth graders were used as subjects. Three hundred forty-seven seventh graders and three hundred three ninth graders were the subjects. The California Achievement Test (McGraw-Hill, 1981) is routinely administered by the classroom teacher and yearly scores are recorded in the student's permanent folders. Four seventh graders and seven ninth graders were omitted from the study as achievement scores were

not available for them. The total number of subjects on whom data was collected was 650.

Research Design

In this descriptive study, nine 3 x 4 factorial designs were used to evaluate the relationship between reading and gaming. They were: three for a combination of seventh and ninth grade students, three for seventh grade students, and three for ninth grade students. The three-category independent variable was type of game. The categories were board, electronic (video), and simulation/role play. The four-category independent variable was frequency of play which on a weekly basis for each type of game was nonplayer (no), occasional player (0-1 hours weekly), moderate player (2-5 hours weekly), and heavy player (6+ hours weekly). The frequency of play was determined by a questionnaire answered by students with a reliability check of the answers received.

The dependent variables were reading comprehension, obtained from the California Achievement Test (McGraw-Hill, 1981); reading vocabulary, obtained from the California Achievement Test; and attitude toward reading, obtained from The Estes Attitude Scale, Secondary Form (Estes, 1971).

Delimitations

In reading this study, it is imperative to keep in mind that it was done with only one group of students in a predominately rural county in southeastern North Carolina; therefore, generalizations to other groups or populations may not be warranted.

Summary

This chapter has presented an overview of this study by providing a statement of the problem, general background, hypotheses, definitions of terms, the limitations, research design, the delimitations, and the subject selection.

A review of related relevant literature will be presented in Chapter 2. Chapter 3 will contain the methods and procedures used in this study. Chapter 4 will present the results and findings of this study while Chapter 5 will present the conclusions, limitations, and implications of this study.

CHAPTER 2
REVIEW OF RELATED LITERATURE

Factors That Influence Reading

Reading has been reported to be an activity that involves getting meanings from print and incorporating that meaning into one's existing store of information (Athey, 1983). Questions arise as to how this "activity" occurs. The process of "incorporating that meaning" leads into more questions as to which factors actually have influence on this process called reading.

What influences reading has been the subject of numerous studies. Samuels (1983) divided the influences into external and internal factors. The external factors have been variously identified into categories such as the following:

1. home environmental factors (Stevenson, et al., 1984; Cleland, 1983; Duffy, 1983; and Graue, et al., 1983).
2. parental awareness/support (Stevenson, et al., 1984; Cleland, 1983; and Graue, et al., 1983).

3. unrealistic view of child's capabilities (Stevenson, et al., 1984).
4. occupation of father (Stevenson, et al., 1984; and Badian, 1984).
5. birth order (Stevenson, et al., 1984; and Badian, 1984).
6. mother's own self-esteem (Stevenson, et al., 1984).
7. amounts of time spent reading for pleasure (Stevenson, et al., 1984).
8. homework (Stevenson, et al., 1984; and Telfer and Kann, 1984).
9. reading newspapers (Stevenson, et al., 1984).
10. prenatal and perinatal diet (Badian, 1984).
11. season of birth (Badian, 1984).
12. male sex (Badian, 1984).
13. amount of time father spends reading (Stevenson, et al., 1984).
14. amount of time spent watching television (Telfer and Kann, 1984; and Fetler, 1984).
15. amount of time spent listening to music (Telfer and Kann, 1984).
16. cultural disadvantage (Badian, 1984).
17. geographical area (Badian, 1984).
18. genetic or familial tendency (Badian, 1984).
19. low socio-economic status (Badian, 1984; and Graue, et al., 1983).
20. games (Bright, Harvey, and Wheeler, 1981; Baker, Herman, and Yeh, 1981; Games that help children learn, 1981; Clark, 1978; Stolovitch, 1978; and Brady, 1977).

21. room dimensions (Duffy, 1983).
22. type of furniture in the classroom (Duffy, 1983).
23. lighting in the classroom (Duffy, 1983).
24. instructional materials (Duffy, 1983; and Samuels, 1983).
25. social context - implicit rules guiding interaction in schooling (Duffy, 1983).
26. class size (Duffy, 1983; and Grauve, et al., 1983).
27. teacher effectiveness (Duffy, 1983; Samuels, 1983; and Veldman and Worsham, 1983).
28. unitary nature of language (Athey, 1983; and Samuels, 1983).
29. experiential background (Athey, 1983; and Samuels, 1983).
30. instructional methods (Athey, 1983; Samuels, 1983; and Veldman and Worsham, 1983).
31. societal demands (Athey, 1983).
32. quality of instruction (Samuels, 1983).
33. conventions of print (Samuels, 1983).
34. clarity of writing style (Samuels, 1983).
35. text readability (Samuels, 1983).
36. format design and structural text elements (Samuels, 1983).
37. time on task (Samuels, 1983; and Grauve, et al., 1983).

In addition to the external influencing factors, there are also internal influencing factors. These

internal factors have been identified in categories such as the following:

1. sensory handicap (Badian, 1984).
2. mental retardation (Badian, 1984).
3. emotional disturbance (Badian, 1984).
4. vocabulary (Athey, 1983; and Samuels, 1983).
5. intelligence (Samuels, 1983).
6. language of instruction (Samuels, 1983).
7. decoding ability (Samuels, 1983).
8. background knowledge and schema (Samuels, 1983; and Athey, 1983).
9. test structure (Samuels, 1983).
10. anaphoric terms (Samuels, 1983).
11. metacognitive strategies (Samuels, 1983).
12. graphic literacy (Samuels, 1983).
13. motivation/attention (Samuels, 1983).
14. self-confidence (Veldman and Worsham, 1983).

It would appear that just about everything influences reading. Certain external and internal factors may exert more influence on the reading process than others. The importance, therefore, lies in isolating those factors which exert the greatest amounts of influence in order to determine direction and magnitude to allow educators to omit or include those factors in the curriculum.

One external factor that has been heralded as exerting influence on reading and learning in general is games. However, the nature of that influence has not been clearly established (Telfer and Kann, 1984). Since games have been promoted as positively influencing reading, it behooves educators to determine if a relationship does indeed exist between reading and gaming. In addition, if a relationship does exist, what exactly is the nature of that relationship. The first step then is to determine if a relationship clearly exists between reading and games.

History and Characteristics of Generic Games

Prior to investigating the possible relationship between reading and gaming, it is necessary to understand the history and development of recreational gaming. Simulation and gaming techniques used today date back to ancient times (McLean, 1978). Archaeologists have found board games in a 6000 year old Egyptian tomb (Board games kids liked best, 1981; and McLean). "Chaturanga," an Indian game on which "Chess" is based, is over 2000 years old (McLean). Backgammon is over 1700 years old, while checkers is a mere 1000 years old (Board games kids liked best).

Games played today in Egypt, Scandinavia, Guatamala, England, Japan, and China have changed very little from their ancient forms (McLean).

Gaming, therefore, has been a part of human culture for literally thousands of years. According to Brady (1977), most children enjoy playing games if they know the rules and feel they have a chance of some degree of success if not winning. If an activity is to be classified as a game, are there gaming components that it must possess? According to Stolovitch (1978), there are four critical characteristics, while Dunathan (1978) claims three essential principles to gaming components.

Stolovitch (1978) reported that games must contain four critical characteristics in order to be categorized as a game, and he identified games which fit each characteristic. The first characteristic dealt with conflict based on a struggle between players (chess); against luck (dice); between teams (football); or against a game master (Dungeons and Dragons). The second characteristic indicated that games have control through rules whether they are simple (tic-tac-toe); complex (Stock Market); fixed (Scrabble); or flexible (They Shoot Marbles, Don't They?). In presenting the third characteristic,

Stolovitch stated that games must come to a conclusion which may be quick (Rock, Scissors, and Paper) or after days or weeks (war games or Dungeons and Dragons). The final characteristic is identified as contrivance, in that a game is not depicting real life but is an artificial copy of life (Monopoly and Ghetto).

The three essential principles of gaming reported by Dunathan (1978) are similar to Stolovitch's (1978), but are described from a somewhat different viewpoint. Dunathan's first principle of gaming dealt with competition. He explained that a player may compete with himself to control personal resources, talent, skill, and discipline; or with other player(s) where the score is the primary objective. He identified a third area of competition not commonly identified, competition with uninvolved others which allows a player to lose the game, but to know that at least he played. Competition was further broken down to elements of competition involving (1) risk which is present in differing quantities in all games; (2) chance which even skill can not totally eliminate; and (3) score which in the generic game has only one winner. The second principle dealt with abstraction. Abstraction occurs when participants must conceptualize the game package as containing goals, objectives,

strategies, restraints, etc. He indicated that when a game becomes more real than abstract, it is no longer a game, and that this usually occurs when the outcome (winning) exceeds the value of playing. He also indicated that participants who can not conceptualize the abstract qualities of gaming rarely play a game, while participants who do not internalize, do play but play poorly. Power was the third principle reported, and this makes most players compete and ultimately determines the winner. He indicated that lessons are provided in manipulating power without the high cost of losing. He further noted that power increases proportionately to commitment even though winning can not be accomplished just through commitment. He stated that constraints or rules directly effect power; however, properly engineered, constraints provide lifelike situations as well as contributing to the teaching value of a game only if equal advantage is provided for all players. Dunathan clearly stated that the one true test of a truly generic game is if it can be repeated without duplicating the outcome.

Educational or Instructional Games

Based upon the general characteristics or

principles of generic games, the issue thus becomes one of determining the general characteristics or principles of educational or instructional games in comparison to generic gaming. Educational or instructional games have the same components as generic games with the additional element of a definite learning objective (Stolovitch, 1978). With the inclusion of generic games in cultural development, the issue becomes one of determining if educational games contribute positively to the education of a culture.

Brady (1977) explained that students who will not complete certain types of reading or language arts assignments will readily play games requiring the same skills. He further stated that if a teacher makes a game to fit an educational objective, it should be patterned after a popular game since students will feel more at ease playing it; such as, Monopoly, Candyland, and Bingo which can easily be adapted for use in science, geography, reading, language arts, etc., and Scrabble which aids in spelling or adapts to content vocabulary. He added that in addition to reinforcing skills, games can help diagnose students strengths and weaknesses, allow for self-evaluation, and/or provide for informal teacher evaluation. However,

the value of a game in instruction is destroyed if games are the sole form of evaluation and/or if a grade is derived from the game. In addition, care should be taken not to make the game structure all work and no fun. Brady strongly supported the inclusion of gaming in a reading program as an incentive for positive attitudes and for skill application; however, in this article he did not identify the skills, if the skills will transfer to reading, or even how or if gaming produces positive attitudes.

Clark (1978) stated that educational games have been proven a viable asset to the curriculum with game benefits being attributed to improving IQ scores, race relations, peer tutoring, attitudes, and academic achievement. Clark stated that several studies, which were not identified, have identified low-ability students as primary benefactors of gaming. She listed several reasons why games have not consistently shown superior outcomes to traditional teaching. Citing the work of DeVries, Clark listed the reasons as poor integration of games into curriculum goals and classroom structure, games as "filler" materials only, and the replacement of all traditional methods with games.

Clark (1978) reported the results of a year-long study of 150 students who, once they fulfilled weekly skill contracts, were able to choose rewards with games being among the choices. Students rated only the games in which that student had actually participated. According to Clark, only five of the 144 students surveyed did not like the idea of earning game time although those five did support the gaming concept. Furthermore, she showed, of the 137 students rating games, the following games were rated as "terrific": Scrabble, Password, Monopoly, Hangman, Checkers, Sentence cube scrabble, Mug Shots, \$20,000 Pyramid, and Concentration. The term "terrific" was defined as "I will definitely play this again."

Clark (1978) reported the difficulties that the teachers encountered in the use of games. These were: (1) rotation of games to prevent boredom, (2) specific gaming areas in the classroom, (3) lack of teacher knowledge of the rules to all games, (4) limitation of games to once every two weeks to prevent saturation, (5) prevention of student participation if contract not fulfilled, (6) provision of choices other than games, (7) allowing students to solve conflicts and decipher directions, (8) requirement of game exploration to reluctant participants, (9) locations

outside of classroom for noisy games, and (10) criticisms by fellow co-workers of gaming. Clark followed her report of difficulties encountered by quoting one teacher who said, "I ... cannot justify returning to less efficient learning models" (p. 109). Clark concluded that this study concurs with previous research allowing that teachers and students judge gaming to be a worthy educational alternative.

Other benefits of gaming cited by Clark (1978) were (1) nonprohibitive prices for maximum variety, (2) ability to share materials with other content teachers, (3) individualization of instruction, and (4) the popularity of gaming with teachers and students. No statistical tests or treatments were reported for the data obtained. It thus appears that the conclusions in the study are opinions only without the support of statistics or treatments needed to determine the depth and validity of the conclusions. Some of Clark's conclusions, i.e., individualization of instruction, do not appear to have been addressed in the study. In addition, benefits that Clark attributed to gaming in the review of the literature, and concurred with in the conclusion, were not addressed. It would appear that the difficulties encountered by the teachers need to be more carefully evaluated, other than

quoting one teacher's opinion, before so strong an endorsement as Clark's is made. Clark seems to present a panacea for all educational ills particularly concerning attitude of students and academic achievement without identifying which reading skills but definitely implying virtually all reading skills.

Bright, Harvey, and Wheeler (1981) stated that students eagerly play games, because, psychologically and socially, they are separated from real-life situations, and, therefore, are nonthreatening in nature. They concluded that games can be evaluated as fair and unfair by students whereby students will be able to transfer this "fair/unfair" concept to real-life situations. They defined fairness as whether each player has the same opportunity to win. Their study involved a pretest and posttest of identifying the fairer situation out of twenty-eight pairs of situations. Students played fair and unfair games. Bright, et al., found that student performance significantly improved ($p < .01$) regardless of similar or dissimilar achievement grouping from which the researchers concluded that grouping does not effect learning. Furthermore, they said that the concept of fairness was learned by students through the playing of the games and not through any explicit instructions

given by teachers with the implication being that some games can be used effectively before formal instruction and that games are not for drill only. Bright, et al., identified their twenty-eight pairs of situations for pretest and posttest as fair/unfair situations, but did not identify them as fair/unfair real-life situations. No bibliography accompanied this article. They identified the fairness concept, but did not identify which particular skills were needed or viewed.

In "Games That Help Children Learn," (1981), three Pennsylvania educators with professional reading credentials evaluated 106 recreational games for their value in enhancing seven educational skills. The educational skills were: readiness (letter, color, or word recognition; rhyming words; or ability to follow directions), vocabulary (skills necessary to follow directions as well as word repetition), word attack, comprehension, spelling, math, and strategy (the ability to anticipate outcomes and analyze cause and effect relationships). They stated that strategy was needed in most games, but was marked only on those games where it is a major skill. They did not identify the evaluative criterion or how the actual assessment took place. It was not reported if assessment was

individual and tallied in some manner or if a group assessment was used. These evaluators credited recreational games as reinforcing critical reading skills and identified clearly which skills, but did not provide anything more than opinion to support their contentions.

Games were identified as instructional and divided into two categories - minigames and microgames - by Stolovitch (1978). According to Stolovitch, minigames required 10-45 minutes to play, contain one to four objectives, and have heavy emphasis on player participation with little stimulus materials. Microgames last from 30 seconds to 10 minutes and have only one instructional objective. Stolovitch contended that microgames and minigames need to be inserted in the educator's repertoire as they are powerful instructional tools. Stolovitch presented a strong endorsement of games.

Baker, Herman, and Yeh (1981) reported that educational institutions spend money to appear progressive without evaluating the impact of these purchases on the learner. They said that it has been assumed that adjuncts have incentive value, that they support skills learned, and that they contribute to, not distract from, learning. They questioned the use

of adjuncts since (1) little is known about the incentive value of adjuncts, (2) the empirical value of games and puzzles as incentives has not been established, (3) it is not known if their use is pertinent to particular, desired outcomes, and (4) the actual effectiveness of instructional adjuncts is questioned. They stated that the school community does not require producers of adjuncts to answer these questions prior to their purchase. Therefore, a study was conducted to assess the relationships among the use of instructional adjuncts, cognitive achievement, and affective behavior.

In this study (Baker, Herman, and Yeh, 1981), data was collected by observing classrooms twice for twenty minutes each to record actual materials in use. Then three students were randomly selected from each of the 288 second and third grade classrooms and were interviewed. They also used achievement measures relating to reading and math skills as well as an affective measurement. They found that (1) adjunct materials were used in a majority of California classes, (2) a majority of teachers would use funds to purchase adjuncts, (3) teachers with a large number of instructional options have classes that perform well, and (4) the observed use of puzzles and games appears

to have a negative relationship between adjuncts and children's attitudes thus eliminating the positive incentive relationship. They stated that adjuncts are used to reward completed work, not quality of work or as reinforcement; and they further make teachers happy thereby contributing to learning. Furthermore, they concluded that the negative relationship which exists between adjuncts and student learning may be attributed to a mismatch between adjuncts and skills, to ineffective materials, or to incompatible strategies for problem solving. However, to them, adjuncts were not totally onerous as they do provide a cosmetic method for appearing to quickly achieve individualization of instruction.

In the Baker, Herman, and Yeh (1981) study, a positive consistent relationship as reported by teachers existed between a greater variety of instructional adjuncts and positive student outcomes; however, the observer of twenty minutes did not concur, and on the observer's notes, the negative relationship was drawn. This negative relationship appeared to be drawn on rather meager data. Since their conclusions were almost diametrically opposed to most researchers (Games that help children learn, 1981; Bright, Harvey, and Wheeler, 1981; Stolovitch, 1978; Dunathan, 1978;

Clark, 1978; and Brady, 1977), this study needs to be replicated as they indicated or have a wider data gathering base. Baker, et al., conducted their study with reading and math classes by addressing relationships among adjuncts, cognitive achievement, and affective behavior. Although skill achievement and behavior modification were broadly identified, no specifics were addressed. The assumption was made that games exert no influence on reading or a negative influence on reading.

It does appear that generic games have established a place for themselves in the development of a culture. The educational sector of that culture has reading as its foundation. Reading in turn has embraced generic games and adapted them to supposedly meet these educational needs. The components of generic gaming and educational gaming seem to be generally accepted. Educational gaming in general has been investigated in hopes of ascertaining its impact on the education of that culture.

Researchers have been trying to establish that educational gaming positively contributes to reading. Brady (1977) contended that students apply language arts and reading skills to gaming without identifying the skills, that gaming enhances vocabulary, and that

gaming reinforces skills learned. Clark (1978) asserted that gaming will improve IQ scores, race relations, peer tutoring, attitude (not identified as toward what), academic achievement (no identification of area or skills), motivation, and individualization of instruction. Bright, et al., (1981) accentuated fairness in real-life situations without identifying which skills are needed to make the transference. Specific, critical reading skills were shown to have a definite positive relationship to gaming in "Games That Help Children Learn" (1981). Games were very powerful educational tools according to Stolovitch (1978). Baker, Herman, and Yeh (1981) declared that the previous researchers had erred and any relationship either does not exist or is negative; however, the application to specific skills was omitted or not addressed. It would appear that where reading is concerned, the relationship between reading and gaming has not been established since research findings are contradictory, confusing, or opinion only.

Since the broad category of educational gaming has not established a relationship - positive, negative, or neutral - towards reading the question arises as to whether researchers have been able to isolate a type of educational game that is related to reading

comprehension. Generic gaming has been demonstrated to be a part of human culture over an extended period of time and educational games have tended to mimic generic gaming as previously reviewed in this section. The nature of the relationship between specific types of generic games/educational games and reading comprehension and/or attitude toward reading becomes an element of vital concern.

Types of Generic Games

There are specific types of generic games. Games may be broadly divided into three types: board games, electronic (video) games, and simulation/ role play games. Board games are recreational or educational games that have a board with a sequence of steps to follow. Each participant has a piece that is moved over the board following the sequence of steps as determined by using dice, cards, spinner, etc.

Electronic (video) games are recreational or educational games played between a human participant and a computer with visual graphics on a television-type screen. Electronic games may be home video games which are attached to the home television or arcade video games which are housed in commercial establishments whose business is people playing the video game.

Simulation or role playing games must closely resemble a real-life situation in the recreational or educational game format where a student must explore the cause and effect of consequences which result from student actions or decisions. Students must actively participate in the game through the application of acquired skills.

Promotion of Recreational Games for Classroom Use

Supply houses for school materials have listed educational games for a number of years which have been recreational games renamed and redesigned to use a specific skill, i.e., number sequencing or cause and effect relationships. However, seven educational supply houses advertise purely recreational games as inherently containing specific reading skills. These games are prominently displayed with the skills listed.

Table 1 indicates the number of times a skill is attributed to a recreational game in several selected catalogs. These support the categories of attributable skills listed.

TABLE 1

NUMBER OF TIMES A SKILL IS ATTRIBUTED TO RECREATIONAL GAMES

*SKILL:	1	2	3	4	5	6	7	8	9	10
I. BOARD GAMES:										
CATALOG										
1	4	2	12	14	7	6	6	3	30	24
2	5	0	8	9	2	7	0	0	9	28
3	3	1	6	6	4	6	6	5	7	17
4	3	24	9	7	8	7	13	20	27	40
5	0	11	1	1	6	1	4	8	45	46
6	16	36	6	5	12	5	15	24	31	72
7	3	15	1	1	4	1	3	15	31	32

II. VIDEO

GAMES:

CATALOG

1	19	20	2	1	0	1	0	21	9	4
2	NO VIDEO GAMES ADVERTISED IN CATALOG									
3	1	0	1	1	1	1	0	0	1	1
4	0	20	2	1	2	0	0	12	2	2
5	3	15	0	1	0	0	0	0	0	14
6	21	17	0	0	5	0	0	23	3	12
7	14	10	1	1	0	1	0	14	5	10

III. ROLE PLAY

"DUNGEONS AND

DRAGONS":

1	0	2	2	2	1	3	2	0	2	5
NOT ADVERTISED IN ANY OTHER CATALOGS										

*SKILLS:

- | | | | |
|---|---------------------|----|--------------------------------|
| 1 | Phonics | 6 | Cause and Effect Relationships |
| 2 | Vocabulary | 7 | Following Directions |
| 3 | Drawing Conclusions | 8 | Spelling |
| 4 | Predicting Outcomes | 9 | Problem Solving/Strategy |
| 5 | Sequencing | 10 | Generic term "Reading Skills" |

Board Games

Although the educational suppliers did not support the skills attributable to gaming, researchers may have obtained data establishing a relationship. The oldest type of game is the board game. A type of board game has been found in a 6000 year old Egyptian tomb (Board games kids liked best, 1981). However, today's most popular game, Monopoly, is only about 50 years old (Board games kids like best). Monopoly received its first place position through a Consumer Reports survey which rated forty-three games comparing the likes and dislikes of third and fourth graders to sixth and seventh graders as well as boys to girls. No criteria was reportedly used except to determine whether or not a game was liked (Board games kids liked best).

According to Adams and Edmonds (1977), the significance of children's play on education has been overlooked. In particular, American board games have been overlooked as transmitters of the American concept of success. Unfortunately, what has finally emerged according to Adams and Edmonds is not a coupling of ends and means, but a single value - the end (winning). The virtue aspect (playing) has faded. Board games have paralleled success philosophies supporting the societal

philosophy in the educational setting. Adams and Edmonds stated that recreational board games of today are instilling and helping to formulate the success philosophy of "winning is everything."

In "Games That Help Children Learn," (1981), fifty-nine board games were identified by three Pennsylvania educators with professional reading credentials. They attributed five reading skills areas as being directly taught by these games. The skills attributed to these board games were readiness (nine times), vocabulary (twenty-six times), word attack (six times), comprehension (thirty-one times), and strategy (fifteen times). They did not, however, reveal their criteria for arriving at the choice of games nor the skill attributed to each one.

Brady (1977) stated that games should be included in the curriculum and attributed to them their ability to reinforce virtually all reading skills, to assess student strengths and weaknesses, to provide for self-evaluation and/or informal teacher evaluation, and to promote positive attitudes. Brady presented his findings as proof of the value of games in instruction without providing statistical data or a bibliography.

Clark (1978) stated that board games have been

proven a viable asset to the curriculum. She ascribed to board games the ability to improve IQ scores, race relations, peer tutoring, attitudes, and academic achievement. Her wholesale endorsement of games does not appear to be supported by statistical data as none was reported in her study.

Hence, although board games have been strongly supported for their positive educational value (Games that help children learn, 1981; Board games kids liked best, 1981; Clark, 1978; Adams and Edmonds, 1977; and Brady, 1977), their value has not been demonstrated through statistical data (Telfer and Kann, 1984; and Baker, Herman, and Yeh, 1981). The studies conducted have assumed a relationship exists between board games and reading. On this basis, researchers have drawn conclusions or presented opinions. A premise about the relationship between games and reading was assumed but had not been established. Just as no relationship between generic gaming and reading has been established; likewise, no relationship between board games and reading has been established.

Electronic (Video) Games

Since no relationship has been established between

generic games and board games and reading, questions arise concerning the relationship, if any, between reading and electronic (hereinafter referred to as video) games. Entering the video game controversy, one finds an emotionally charged arena. Opinion abounds at every turn. Although the computers can be traced back to the abacus, today's computer is attributed to Howard Aiden who worked in the 1930's (Where did pac-man come from?, 1982). In 1977, Atari, building on previously developed technology, introduced its Video Computer System. In 1982, video game companies made profits into the billions of dollars (Nicholson, 1982). Profit is the name of the game (Games addicts play, 1981). Arcade owners push video games for their tremendous profit. One owner in a single year reported grossing \$500,000 on 60 machines. The machines sell for about \$2000 each, gross about \$10,000 each in a year, and resell for about \$1600 as they have negligible depreciation (Pauly, McAlevey, and Huck, 1982; and Games addicts play, 1981). Questions arise as to where this tremendous profit comes from. It has been reported that this profit comes from 20 billion quarters fed into machines one at a time (Games addicts play, 1981). Angry parents claim the \$5 billion came from the lunch money and allowances

of school children. This anger over video games has been taken to the extent that Irvington, New York, has passed an ordinance restricting only three machines to a business thereby effectively closing the arcades (Games that play people, 9182). Babylon, Long Island; Oakland, California; Pembroke Pines, Florida; Durham, New Hampshire; and Marlborough, Massachusetts, have passed ordinances restricting the age of players and/or the hours certain age players may play (Soper and Miller, 1983; Heikes, 1982; and Games that play people, 1982). The controversy concerning video game involvement has extended to legal issues having been taken to the U. S. Supreme Court (Heikes, 1982).

The amount of money involved both spent and profit was not the only area of controversy. Concerns were expressed which covered the spectrum of human development from motor skills to antisocial behavior (Needham, 1982-83). Companies, recognizing the threat to profits, have turned to an area designed to stave off opposition and be lucrative all in one fell swoop - educational software (Dominick, 1984; Gallan, 1984; Ball, 1982; Bowman, 1982; Wanner, 1982; Young, 1982; and Bitter, 1979). Has research then been able to establish a relationship between educational benefits (reading) and the video game?

Video gaming has not been taken lightly by the companies that make them. The video game industry executives reportedly have employed experts in all areas from engineering to medieval French literature to produce software. After a game or program has been designed, they hire "packs" (p. 54) of teenagers to play and evaluate them prior to marketing (Beating the game game, 1982). The companies take their business seriously.

Video games have been called "magic" or classified as "evil". Needham (1982-83) stated that the lure of video games is the possibility of mastery and the lure of escape. Mastery is not instantaneous as the game "thinks" and makes its own moves. Kids of today have very few areas where they can become masters, but video games is one area. Needham cited some observers who feel video games have a positive influence particularly for 8-10 year olds where a sense of mastery is a crucial achievement. Others cited said that "friendly software" allows people to know the capabilities of computers. According to her, other individuals stated that video games develop no appreciation for the value, impact, effect, or use of computers.

Needham (1982-83) further pointed out that by

definition, all serious game players play for mastery, but not everyone plays for mastery as do teenage boys. Males ages 10-20 are the primary targets for the video market. The macho nature of the games allows boys to "step into a comic book frame" (p. 54). Women do play the so-called cute games (Pac-man), but not those with intergalactic violence.

Both sides of the controversy were cited by Needham (1982-83). She said that some feel video games help develop spatial understanding. Contrary to this, some mathematicians said that mathematical benefits are null as students make no association between the two. She stated that pedagogically, games do develop quick reflexes and sure hand-eye coordination while others stated this is a minor gain compared to the time and money wasted as well as possible antisocial behavior that is being encouraged. One concern was that video games are mind-blocking isolation booths. Instead of a means to relax, they are escapes from reality. The second part of the antisocial behavior theory was that they cultivate mindless, ill-tempered individuals who display anger and frustration. An off-shoot of the antisocial behavior according to Needham's other experts is the social problems of gambling, vandalism, panhandling,

loansharking, and theft. The controversy expanded when the 1982 Representative Assembly of the National Education Association went on record opposing the commercial use of video games in schools.

Needham (1982-83) safely concluded that only time can measure the actual impact of video games. Needham has quoted numerous individuals without, in some cases, even naming the individual or providing a bibliography for reference. Opinions are presented as fact when no statistical data or evaluative criterion is provided to support contentions. Needham's "look at the impact of video games on America's youth" (p. 53) appears to be opinion presented as fact and unsubstantiated at that.

Soper and Miller (1983) described the video game addiction growing among teenagers who exhibit symptoms comparable to other addictions: compulsive behavioral involvement, lack of interest in other activities, and association solely with other addicts. In addition, failing grades reportedly were a symptom of addiction as video games occupied their time. Students expressed frustration and anger at their inability to control their impulses. They quoted a study done for Atari which showed that 86% of the U.S. population between the ages of 13 and 20 have played arcade video games.

Soper and Miller (1983) reported their reasons

for the popularity of video games as being: multisensual stimulation, sentient-like simulation, harmless mayhem and destruction, self-worth, macho image, competition, releases hostilities, control of game through mastery, and partial control over one's environment. The electronic game has become the symbol of macho manhood for teenage boys as one may become a "legend" without being physically impressive or rich. Girls do play but not with the devotion of boys according to Soper and Miller. They concluded that no relationship - positive or negative - has been established between video games and behavior, academics, or attitude. They warned that the media does possess a potential for abuse. Soper and Miller express their opinions concerning video games but do not substantiate them with statistics.

Langway and Prout (1982) asserted that the true video game addict is an avid reader, but their reading material was books about video games. The books fell into two categories: detailed strategy manuals and catalogs of games including histories, champions and descriptions.

"Games That Play People" (1982) was published as the cover story of Time magazine. The article attempted to cover the popular aspect of the video game

controversy. This article covered the addicting aspect of the game by interviewing Steve Juraszek who at 15 years old played the game Defender for 16 hours and 34 minutes straight on the same quarter. Juraszek stated that he could have bought a car with the money he has spent on video games while his mother lamented his lack of interest in school work. The article continued that while the \$5 billion is being spent on video games, they consume 75,000 man hours per year. Fears by parents are explored as well as the ordinances and lawsuits involving restrictions on hours of play and/or the age of the players. Loneliness and isolation are mentioned as being relieved by the sense of "a place to go" - the video arcade. Worldwide, countries were discussed as representative of the addiction, expense, moral degradation, homosexuality, drugs, prostitution, and hard liquor which have moved to the video arcades where young people go. It was pointed out that male players outnumber female players 20-1. "Games That Play People" presented a popular overview of the individual as well as worldwide impact of video games.

Margaret Young (1982) stated that conservatively speaking, \$5.7 billion was spent on video games nationally in 1981 which was greater than the NASA

budget, the gross receipts of Nevada's casinos, and television/gate receipts of all baseball, football, and basketball games. On the pro side, Young identified seven individuals with professional credentials who support video games for the following reasons: all students become social equals; violence is directed at a science fiction character not people; video games are a passing fad, but the arcade is a social gathering place; drugs are no more prevalent at an arcade as elsewhere; video games require scientific analysis and strategies; most jobs in the future will require computers; and it requires discipline and concentration. On the con side, she quoted three individuals only one of which had professional credentials who gave their objections as parents will use video games as babysitters; students may skip school to go to arcades; arcades expose young children to drugs and drinking, etc.; and arcade hours are too long. Young heavily slanted the pro side while the con reasons appear to be "card stacking."

Wanner (1982) stated that the impact of computer video games have been grossly exaggerated. He reportedly sees them as just as trivial as the games played 40 years ago which employed the same skills as computers with the difference being packaging. He

considers video games as cheap thrills that will have no impact on today's youth.

Dominick (1984) in his background material quoted the Surgeon General of the United States, C. Everett Koop, as saying there is "nothing constructive in the games. ... Everything is eliminate, kill, destroy" (p. 119). Dominick conducted a study to determine if a relationship exists between video game playing and self-esteem and/or aggressive behavior. Questionnaires were distributed to 292 tenth and eleventh graders, but only 250 were used. The self-esteem variable showed a sex difference for boys only as being inversely correlated with video games. Again for boys only, video game playing correlated significantly with aggressive behavior regardless of school performance; however, when the selected control variables were partialled out, the correlations became nonsignificant. Dominick stated that his findings were preliminary only and more work needs to be done. Dominick's preliminary findings must be viewed skeptically since he did not state why 42 were eliminated; he had no reliability check of the questionnaires; and students were told they were part of a study and asked to volunteer their free time thereby presenting contamination through the Hawthorne effect and the

volunteerism aspect

Hornberger (1982) advocated the inclusion of recreational video games in the classroom. He presented methods for inclusion of them in reading. His advocacy on inclusion in the reading curriculum is based on the statement that video games are everywhere and most students love them.

Bitter (1979) declared that video games are everywhere, and it is time to look at their educational merit. He classified the games into five categories: mathematics, spelling and words, pattern-logic, strategy sports games, and miscellaneous. He then proceeded to list a total of about 50 recreational video games which he placed into the five categories while he extensively discussed the educational merits of each. He concluded that "it is important to recognize that these devices ... can be used to enhance educational opportunities" (p. 82). Bitter presented this information as irrefutable fact without benefit of presenting research results, presenting data, listing a bibliography, or even citing other research done.

Bowman (1982) stated that video centers are social entities; however, they also create the compulsive arcadian. His discussion attempted to

identify clear extrinsic and means-ends-motivational supports and intrinsic rewards for classroom use.

Pac-man provides undeniable extrinsic supports as there is "a feeling of instant success as every dot is devoured" (p. 14). He declared that there is a feeling of momentary success which can easily be displayed to their peers in the arcade setting.

Intrinsic rewards were asserted by Bowman as being heightened concentration and the intense feeling of power since goals are clear, means are available to accomplish the goals, and feedback is immediate and clear.

According to Bowman (1982), teachers in the classroom need to restructure assignments and activities for although classroom and video centers have different goals and resources, they are notably parallel in other areas. Each has or should have (1) a clarity of task; (2) awareness of roles and responsibilities; (3) choices in problem-solving strategies; (4) a system of skills; (5) progressive hierarchy of challenges; (6) unambiguous feedback; (7) areas of error correction; (8) opportunities for self-improvement; (9) active involvement in problem-solving; (10) freedom from fear of reprisal, ridicule, or rejection; and (11) recognition that

learning is enjoyable.

To Bowman (1982), video games represent conscious deliberate mental and physical activity by evolving players into participants. Each decision by the player generates a visible, measurable response. The video arcade provides a strong model for supplemental learning centers in the classroom in Bowman's estimation. Bowman presented strong support of the video arcade concept to be used in the classroom. However, Bowman does not spell out how this adaptation is to be done. The presentation of parallels seems to support the adaptation, but the differences seem to make the adaptation most difficult.

Ball (1978) listed seven educational benefits derived from video games which are: (1) to stimulate alertness and improve thinking abilities; (2) to simulate a real-life experience; (3) to increase attention span; (4) to help develop skills for numerical concepts, word recognition, identification of objects and colors, increased reading rate, improved comprehension, and to present learning processes and procedures; (5) to cope with learning problems resulting from acceleration and retardation; (6) to perceive errors and correct or select other

options; and (7) to transfer learned behavior. Ball also listed the instructional developments of the video games as: (1) instructional value justifies classroom use; (2) outcomes reflect and complement instructional objectives; (3) requires decision-making; and (4) develops the ability to follow a sequence of directions. He further listed specific skills that are developed as: (1) verbal communication; (2) alphanumeric concepts; (3) creativity; (4) interpreting; (5) word recognition; (6) numerical concepts; and (7) self-expression - oral, written, or motor. Throughout the article, Ball lists numerous recreational video games that he said teach a variety of concepts. It would appear that Ball has answered all arguments concerning the validity of the use of video games in education; however, Ball did no study, quoted no study, included no supportive data, nor provided a bibliography.

"Games" (1982) declared that recreational video games have the serious educational purpose of making pedagogical points more palatable for all age students. The article listed the value of selected games; however, no statistical data was given to establish that such purposes exist.

Bowman and Rotter (1983) set forth the premise that

computer video games are the student and teacher's best friend. They listed concerns about computer games as violence, competition, and addiction, but quickly brushed them aside with positive contributions. However, each positive contribution had the qualifier "might" or "some believe." They listed recreational games and attributed to them the ability to enhance cooperation, to allow creativity, to provide for social and emotional learning, to become computer literate, and to simulate realistic situations. They concluded that computer games are useful tools in the positive development of children. Although studies were cited, they were not identified. Bowman and Rotter did no study, but did provide a bibliography. They reported opinion as fact and sprinkled enough data to make it all seem established fact.

A relationship between video games and reading comprehension and/or attitude toward reading has not been definitely established. Lawsuits (Needham, 1982-83; Games that play people, 1982; Heikes, 1982; and Wanner, 1982) still are pending. Concern is expressed that boys are more effected by video games than girls (Dominick, 1984; Soper and Miller, 1983; Needham, 1982-83; and Games that play people, 1982). The supporters of video games attribute to them the

positive aspects of:

1. the lure of mastery (Needham, 1982-83; Games that play people, 1982; and Bowman, 1982).
2. the lure of escape (Needham, 1982-83; and Games that play people, 1982).
3. building familiarity with the capabilities of the computer (Needham 1982-83; and Young, 1982).
4. developing spatial understanding (Needham, 1982-83; Bitter, 1979; and Ball, 1978).
5. quick reflexes (Needham, 1982-83; Games that play people, 1982; and Bitter, 1978).
6. developing hand-eye coordination (Dominick, 1984; Soper and Miller, 1983; Needham, 1982-83; Games that play people, 1982; and Bitter, 1979).
7. enthusiastic popularity with the 10-20 age group (Soper and Miller, 1983; Langway and Prout, 1982; Bowman, 1982; and Bitter, 1979).
8. developing concentration skills (Dominick, 1984; Soper and Miller, 1983; Young, 1982; Bowman, 1982; Bitter, 1979; and Ball, 1978).
9. promoting reading - manuals, catalogs, etc. (Langway and Prout, 1982; Wanner, 1982; Bowman, 1982; Bitter, 1979; and Ball, 1978).
10. providing for social equality (Young, 1982).
11. releasing violence at an object rather than a person (Dominick, 1984; and Young, 1982).
12. an arcade being a social gathering place (Young, 1982; Wanner, 1982; and Bowman, 1982).

13. requiring scientific analysis and strategies (Young, 1982).
14. developing math and spelling skills (Bitter, 1979; and Ball, 1978).
15. being nonthreatening to the student (Bowman, 1982; and Ball, 1978).
16. improving thinking ability (Ball, 1978).
17. simulating a real-life experience (Ball, 1978).

The critics of video games blame them for the negative aspects of:

1. wasting time and money (Games that play people, 1982; and Heikes, 1982).
2. developing no appreciation of the capabilities of computers (Needham, 1982-83).
3. providing the macho image - proof of manhood (Soper and Miller, 1983; Needham, 1982-83; and Games that play people, 1982).
4. having no mathematical benefit (Needham, 1982-83).
5. promoting anti-social behavior (Dominick, 1984; Soper and Miller, 1983; Needham, 1982-83; Games that play people, 1982; and Young, 1982).
6. building emotional isolation booths (Needham, 1982-83; and Games that play people, 1982).
7. providing a means to escape reality (Needham, 1982-83; and Games that play people, 1982).
8. producing ill-tempered individuals (Dominick, 1984; and Needham, 1982-83).

9. promoting social problems - gambling, drugs, stealing, prostitution, homosexuality, and loan sharking (Needham, 1982-83; Games that play people, 1982; and Young, 1982).
10. being addictive (Soper and Miller, 1983; Games that play people, 1982; and Bowman, 1982).
11. lowering SAT scores (Soper and Miller, 1983).
12. promoting absenteeism from school to play the games (Young, 1982).
13. lowering grades (Games that play people, 1982).
14. becoming babysitters for parents (Young, 1982).

Both the supporters and the detractors claim a relationship between video games and education, i.e., reading and/or attitude that has not been clearly established. Some (Dominick, 1984; Soper and Miller, 1983; Needham, 1982-83; Wanner, 1982; and Bowman and Rotter, 1981) admit that no relationship has been established or that a questionable relationship exists. Thus, no relationship has definitely been established between video games and reading or attitude toward reading.

Simulation/Role Play Games

The third type of recreational/educational gaming is simulation/role play. Although no relationship has been established between generic games, board

games, or video games and reading or attitude toward reading, it is conceivable that a relationship may exist between simulation/role play games and reading and attitude toward reading.

Historically, war games were the earliest organized, planned simulations (Spannaus, 1978). Chess was originally an entertaining yet representational war game (McLean, 1978). The development of systematic simulation games began with the Prussian practice of "Kriegsspiel" which is a war game. It was used successfully to defeat Prussian enemies on the field of battle (McLean). Although war was the initial objective, by the mid-1950's, simulation games became crisis oriented. Crisis situations were developed to test engineering and other structural problems. In the early 1960's, Northwestern University developed politically oriented, problem-solving simulations (McLean).

The usefulness of simulation according to Spannaus (1978) is based solely on how closely it resembles real life. A model must be derived that abstracts cause and effect relationships which produce consequences as a result of student actions or decisions. The student must realize that cause and effect relationships are complex and numerous not singular

in nature. Spannaus listed three common characteristics of simulation. First, the simulation model must be based on reality. Second, the objectives of the activity must be on an application level. Third, provision must be made for participants to deal with the consequences of their action. By definition, simulation requires the active participation of the student.

McLean (1978) also described in detail the history of simulation games. Based on its history and his opinion, he stated that it is then no wonder that drill and fun-type games have taken their place as a productive part of the elementary school curriculum. He further commented that educational games and simulations, both computer and non-computer based, have a distinct place in the elementary curriculum.

Gohring (1978) relates the educational history of simulation games as having been adapted to classroom use for only about the last fifteen years. He stated that research is substantiating simulations and games as motivating, positively affecting attitudes both within and without of the classroom, and teaching cognitive materials as good as or better than traditional methods. With this introduction, Gohring went on to list and annotate books, magazines and

journals, professional journals, development and dissemination centers, and articles concerning the concept of simulations and gaming. Gohring's strong support of simulation and gaming was without a bibliography. He quoted research findings, but failed to identify the research studies in any way.

Henson (1982) drew a connecting line from Marie Montessori back through Locke, Rousseau, and Dewey to games through the recognized philosophy that children should be active participants in the school curriculum. He stated that games are used in schools worldwide with the most popular being simulation. He recapitulated the components of simulation and offered the following as advantages: (1) active student involvement, (2) a high degree of interest and enthusiasm, (3) abstract ideas become more concrete, (4) immediate feedback to students, (5) student experimentation with concepts and new skills, (6) students evaluating own mistakes, (7) communication skills practices, and (8) student interaction at own level. Henson reported that simulation has been shown to be effective to motivate and to supplement the text thereby causing learning and increasing retention. Henson's conclusions are constructed on a historical base that he built.

Vansickle (1977) stated that both the effective design or use of simulation is retarded since the criterion of well designed games is not known, and research has basically been case studies of specific games. His study was conducted to address design factors and an operational definition of adequately designed simulation games. To support his hypotheses, he cited several studies to indicate the equivocal results obtained in the areas of attitude, resource independence, and decision-making skills.

Vansickle's (1977) study showed no statistical significance on the effects of degree of resource independence and decision-making procedure specificity and (1) comprehension, (2) interest in real-life analogue of the decision-making procedure, (3) sense of group integration, (4) satisfaction with participation, (5) sense of group integration and comprehension of decision-making criteria, (6) comprehension of outcomes, and (7) sustained interest or comprehension. Vansickle drew as his final conclusion that there is a clear need for further inquiry into the relationships between game design variables and social psychological outcomes as his study and others have established that a relationship exists, but the nature of that

relationship has not been clearly delineated.

Polos (1977) reviewed the history and components of simulation then presented those aspects that support it and those that do not. He presented the positive aspects as being: (1) an opportunity for decision-making, (2) a variety of learning experiences within the confines of a classroom, (3) congruity with a discovery approach to learning, (4) motivation, (5) hands-on experience, (6) a broad range of learning modalities and levels of thinking, (7) attitudinal changes, and (8) the influence of play in learning. The negative aspects of simulation were viewed as: (1) an educational panacea, (2) not having been proven effective, (3) expensive, (4) being "packaged" learning, (5) time consuming, (6) not easily adapted to the classroom, (7) not correlating subject matter, (8) the cause and effect relationship vaguely presented, and (9) not really simulating reality.

Polos (1977) concluded that extensive research indicates that game simulation may not have the positive influence as was thought as previous research data has been confusing and contradictory. Although he did no study of his own, Polos concluded that simulation games must be viewed critically and

incorporated to classroom use cautiously.

Reiser and Gerlach (1977) stated that simulation games are relatively new to the classroom, but research into actual benefits has been sketchy. They summarized most research as having addressed the effects of games on interest, attitudes, a feeling of efficacy, knowledge, and intellectual skills. To them, research evidence contradicts itself where interest is concerned. It was concluded that interest lies in playing the game not on subject matter. Where the effect of simulation on attitude was researched, the findings followed no pattern. Researchers were able to find whatever results they were looking for. Simulation games were reported to have no relationship or a negative relationship on one's feelings of efficacy. Generally, they concluded that research indicates that simulation games are not a highly effective instructional device.

Dungeons and Dragons

As if the contradictions and confusion over simulation games were not enough, a new type of simulation/role play has been introduced to the recreational/educational scene. This new game is fantasy role play which violates all the clearly defined rules of a game: a set number of players, a

clearly delineated set of rules, a closure, and a clear winner or loser (McRae, 1980). It is a sophisticated form of make-believe in which a player creates a game character and verbally acts out the part of that character in a specially designed game-world controlled by a referee. There is no board or pieces to move. Booklets and the referee determine the nature and substance of the game. The name of the game is Dungeons and Dragons.

Dungeons and Dragons was first introduced in 1974 by Gary Gygax. Originally, it caught the interest of high school and college students; however, interest now reaches from elementary school through adults (Hewson, 1980; and McRae, 1980). To date, no studies have been conducted to establish what relationship, if any, exists between Dungeons and Dragons and educational objectives nor between Dungeons and Dragons and the psychological aspects of the game. Available information lies solely in the realm of popular journals/magazines and is opinion only.

The controversy has two diametrically opposed camps with no apparent middle ground. It has been banned in Utah although Arizona has incorporated it into the curriculum for gifted children while Massachusetts wants Dungeon and Dragon clubs during

school hours (Parsons, 1981). Hewson (1980) stated it appeals to students with above average intelligence while J. L. Hammett (1984-85) advertised it for remedial students. Boys are heralded as the majority or almost sole players (Kennedy, 1982; Letters: dragons in the unconscious, 1981; and Hewson, 1980) while Holmes (1980) asserted girls participate and enjoy it as much as boys. It has been said to promote evil and antisocial behavior (Austin, 1981) or to stretch the imagination of the gifted child (Austin) and to provide for social interaction (Holmes). The two camps are clearly defined, but neither have attempted to conduct research to establish data for or against Dungeons and Dragons.

Austin (1981) reported that according to James Ward of TSR Games about 34,000 Dungeons and Dragons games were bought monthly with the number steadily increasing. She identified Dungeons and Dragons as being definitely different from most games as there is no board, no time limit, and all fantasy. As entertaining as Austin claimed Dungeons and Dragons to be, it has raised concern about the player to assume the evil persona who commits crimes to practice strategy or achieve a goal which the Dungeon Master (referee) controls. She stated that advocates play as much as

possible for the strong psychological fascination. On the positive side, she quoted James Ward as saying it draws individuals away from the spoon-fed entertainment of television; in addition, he listed a further attribute as being increased reading skills through the manuals and interaction which supports group dynamics. Although she indicated through James Ward that violence and conflict are the major flaws in Dungeons and Dragons, Ward pointed out that these were secondary to the positive aspects. She quoted Gary Gygax, who created the game, as saying the only major problem is preoccupation with Dungeons and Dragons.

Parsons (1981) claimed that children are fascinated by mysteries, love, "secret" clubs, hideaways, "scary" happenings, and strategy; therein lies the appeal of Dungeons and Dragons as it appropriates all of these. She identified some characterizations as "good", but they do not carry the status nor the appeal of "evil" characterizations who encourage fear, confusion, hate, spells, and magic. According to her, Dungeons and Dragons' strongest point is the player cooperation; however, its weakest is gathering points only through destruction; therefore, she cautions parents to pay closer attention to the games their children play.

Serge King, a psychologist in California, wrote a letter to "Psychology Today" (Letters: dragons in the unconscious, 1981) stating that he is a Dungeon Master to a group of teenage boys. He stated that in his game there is a strong emphasis on violent action with a growing interest in sex, but claimed he and parents have seen all the boys develop an increased sense of self-confidence. However, in the same issue, John F. Messerschmitt of Massachusetts in his letter reported "a surprising number of older adolescents as well as children becoming confused, frightened, and/or depressed after playing Dungeons and Dragons" (p. 6). He went on to advise that unless one has a well-defined psyche, then one should not play a game where the symbols are powerful and numerous; otherwise, the unconscious processes may produce unpleasant consequences.

Elshof (1981) presented the two sides of Dungeons and Dragons as a Monopoly-life game, a mind-expanding substitute for television and a creative enchantment of Tolkien fantasy; or a dangerous dabbling in the occult, an obsessive escape from reality, and an expensive waste of time. She reported that Dungeons and Dragons is a combination of fantasy trip, war game exercise, drama workshop, and psychological act-out session that resembles no other

game as it is booklets only with play controlled by a Dungeon Master, with the "play" occurring only in the mind, and with the game never ending unless a player retires or is destroyed.

Elshof (1981) quoted objections to Dungeons and Dragons as being: (1) encouraging sex and violence; (2) dabbling in the demonic with characters, spirits, spells, and powers; (3) using the fantasy world as a retreat from the real world; and (4) costing a considerable amount for books etc. Quoting from the Dungeons and Dragons' manual, she cited the necessity of a player having a diety or "demigod" with the choices being ancient pagan gods or nonhuman creatures.

In defense of Dungeons and Dragons, Elshof (1981) cited TSR Hobbies spokesman, Byron Pritzer, who insisted that the game can be abused as any game can. Pritzer further stated the objections to Dungeons and Dragons occur only through misunderstanding of the game whereby the manuals are scanned but not understood. He said the game has more benefits than dangers. He cited educators, psychiatrists, and ministers as using Dungeons and Dragons to work out children's problems then applying the solutions to real-life situations. He was asked about the role of the Dungeon Master which Pritzer says is the neutral game controller;

however, the controller could lean toward good or evil since the only real requirement is that he produces a colorful, fanciful, exciting adventure.

Questions have arisen concerning the relationship between morality (good/evil) and fantasy role play games. Horak (1981) maintained that morality comes from the player not from the basic structure of a "mere" (p. 29) game. Horak quoted Emanuel Lasker, a renowned chess master, in defending games as Lasker said that no game can compare to life; however, since games are modeled on life, an analogy must exist. Horak reported an incident in 1979 whereby a Dungeons and Dragons player descended into a sewer system to act out his fantasy. The flaw, Horak contended, was in the player not in the game since the player instills morality as no game can include anything more than superficial morality.

Pulsipher (1983) reported that in the early days of fantasy role playing, many players did not fantasy role play as per the definition since they did not pretend to be in their fantasy world, but merely had characters act out parts with the acquisition of power becoming their only objective. The other extreme also existed in that players believed their characters were acting out a role in a real world. Pulsipher contended

that the actual intent of fantasy role playing gaming is for one to put oneself into an experience that could not occur in the real world and to react as one feels or hopes one would act. In this context, Pulsipher concluded, no one can become overinvolved emotionally.

Gygax (1983) defended his creation, Dungeons and Dragons, from criticisms coming from the Adventure Gaming Industry by comparing it to poker in that there is an official set of rules for both and any variation of the rules and one is no longer playing the game. His next analogy is to chess in that both explain to the player the set up of the game; pieces/characters with respect to placement, moves, strengths, and weaknesses; and the skill required to play the game. The third correlation is to Monopoly in that if other rules, order of play, or strategy is mixed in then the result is a mutant game not the true version.

As a long time Dungeon Master, Holmes (1980) said that participants in Dungeons and Dragons usually project their alter egos and their less-than-ideal impulses on their characters. He described the manner in which players can watch their alter-egos grow and change to fit their imagination. He reported that the weekly games his teenagers hold consist of "murder, arson, torture, rape, and highway robbery" (p.88).

Holmes' teenagers have reported that "their characters had stopped on the way to one of my underground dungeons to spray-paint graffiti on walls" (p. 88). Holmes stated that this is harmless violence as they are allowed to work out harmful hostilities in the game. He expressed the observation that if an alter ego dies, sometimes the player goes into psychic shock and even depression. Holmes added that this "make-believe world assumes an eerie sense of reality" (p. 93) since his Dungeons and Dragons' world contains a social reality, is shared not isolated fantasy, and contains a group spirit which becomes reality or "shared insanity" (p. 93). In the final summary, Holmes concluded that Dungeons and Dragons is a huge Rorschach Test.

Joy Kennedy (1982) wrote in the Journal of Reading that she held a one day Dungeons and Dragons' tournament that was attended by 100 junior and senior high boys. She said that boys who "had been impervious to all efforts" (p. 25) to interest them in reading "spent hours pouring over books to learn to play better" (p. 25). On this meager one-time-only event, she strongly advocated Dungeons and Dragons as the solution for boys who refused all other efforts to get them to read.

Ridgefield Library (Ridgefield holds NLW reading fair, 1981) in Connecticut held a fair for National Library Week which highlighted Dungeons and Dragons. Reportedly Dungeons and Dragons is extremely popular at the junior high and high school level.

Gruzen (1980) reported that Dungeons and Dragons is played more in Great Britain than Clue, Scrabble, and Monopoly combined. Dungeons and Dragons is spreading worldwide.

Live-Action Fantasy Role Play

Some avid Dungeons and Dragons fans have been known to dress up and act out their fantasy (Hewson, 1980). This has grown and developed into a mutant game called live-action fantasy role play. Jacquet (1981a) reported that live games, now called Killer, Assassin, and Godfather, require the physical action on the part of the player whereby the "victim" is actually stalked and mock killed with water pistols filled with colored dye or a bean shooter and points awarded to the performing skills of stalking and dying. Jacquet (1982b) later reported a California State University student being shot but not killed by a security guard while playing Assassin. Jacquet claimed the linking of Dungeons and Dragons with

live-action role play is unfair; however, it is happening in the public's mind.

Simulation games have been claimed to have a relationship to reading and attitude, but only one, Vansickle (1977), has established that a relationship does exist; however, he was unable to delineate the exact nature of that relationship. Others (Henson, 1982; Gohring, 1978; McLean, 1978; Spannaus, 1978; Stonewater, 1978; Polos, 1977; and Reiser and Herlach, 1977) embrace simulation gaming without benefit of supporting statistical data. Fantasy role play, Dungeons and Dragons, has been banned in Utah, incorporated into the curriculum for gifted students in Arizona (Parsons, 1981), provided a time in school as a club in Massachusetts (Parsons), and advertised for low level students in North Carolina (J. L. Hammett, 1984-85). This inclusion/exclusion in the curriculum has not been based on statistical data as research in this area has not yet been conducted. The specific area of generic gaming, simulation, has been shown to have a tentative relationship, but no specifics were forthcoming to delineate that relationship.

Summary

The relationship between gaming and reading

comprehension, reading vocabulary, and/or attitude toward reading remains unclear. Gaming is said to exert an external influence on reading and/or attitude toward reading (Baker, Herman, and Yeh, 1981; Bright, Harvey, and Wheeler, 1981; Games that help children learn, 1981; Clark, 1978; Stolovitch, 1978; and Brady, 1977). Baker, Herman, and Yeh conversely contend that no relationship or a negative relationship exists, but assert that no conclusion can be drawn until more research is done. A generic type of game, board games, has been asserted to have a relationship, but none has been established (Games that help children learn, 1981; Clark, 1978; Brady, 1977; and Adams and Edmonds, 1977). Video games, another type of generic game, has been decreed to have a relationship although none has been established (Dominick, 1984; Bowman and Rotter, 1983; Soper and Miller, 1983; Needham, 1982; Bowman, 1982; Games, 1982; Games that play people, 1982; Hornberger, 1982; Langway and Prout, 1982; Wanner, 1982; Young, 1982; Bitter, 1979; and Ball, 1978). A relationship is said to exist between simulation gaming and reading; however, none has been established or a tentative one at best (Henson, 1982; Gohring, 1978; McLean, 1978; Spannaus, 1978; Stonewater, 1978; Polos,

1977; Reiser and Gerlach, 1977; and Vansickle, 1977). The simulation game mutant, Dungeons and Dragons, has been contended to exert a relationship although none has been addressed or established by statistical data (Gygax, 1983; Pulsipher, 1983; Kennedy, 1982; Austin, 1981; Elshof, 1981; Horak, 1981; Letters: dragons in the unconcious, 1981; Parsons, 1981; Gruzen, 1980; Henson, 1980; Holmes, 1980; and McRae, 1980).

The relationship of all types of games to reading comprehension, reading vocabulary, and attitude toward reading is an unknown quantity. With what appears to be the wholesale inculcation of recreational/educational gaming in the classroom, it behooves educators to determine if there is a relationship between gaming and reading comprehension, reading vocabulary, and attitude toward reading and the exact nature of that relationship.

CHAPTER 3

METHODS AND PROCEDURES

Introduction

This chapter describes the methods and procedures utilized in studying the relationship between gaming and reading comprehension, reading vocabulary, and attitude toward reading. Included in this chapter are the methodology, instrumentation, and the statistical procedures used to analyze the data.

Design of the Study

In this descriptive study, nine 3 x 4 factorial designs were used to evaluate the relationship between reading and gaming. They were: three for a combination of seventh and ninth graders, three for seventh graders, and three for ninth graders. The three-category independent variable was type of game. The categories were board game, electronic (video) game, and role play game. The four-category independent variable was

frequency of play which on a weekly basis for each type of game was nonplayer (no or none), occasional player (0-1 hours weekly), regular player (2-5 hours weekly), and a heavy player (6 or more hours weekly). The frequency of play was determined by a questionnaire with a reliability check of the answers received.

The dependent variables were reading comprehension, obtained from the California Achievement Test (McGraw-Hill, 1981); reading vocabulary, obtained from the California Achievement Test; and attitude toward reading obtained from The Estes Attitude Scale, Secondary Form (Estes, 1971).

Subject Selection

Subjects were drawn from one junior high school and one senior high school in a predominately rural county in southeastern North Carolina. Many of the subjects' parents are unskilled or semi-skilled workers. All the seventh and ninth graders in the county were part of the study except those that were absent the day the data was collected and four seventh graders and seven ninth graders who were omitted due to California Achievement Test (McGraw-Hill, 1981) scores not being available. The total number in the study was 650 with 347 being seventh graders and 303 being

ninth graders. Seventy seventh graders and seventy-three ninth graders were retested for a reliability check of the answers received.

The school system used was where the researcher teaches and was, thus, readily available. Seventh and ninth graders were chosen because this appears to be the level at which children start to exercise independence in choosing their free-time activities.

Instruments

Three instruments were used in this study. The first was a questionnaire developed by the researcher in conjunction with her major professor which was designed to determine the type of game and the frequency of student gaming. A copy is included in Appendix A.

The second instrument was the California Achievement Test (McGraw-Hill, 1981), reading comprehension and vocabulary subtests. The California Achievement Test is part of the students' annual evaluative program and is administered each spring under the auspices of the central office of the county unit and the North Carolina Department of Public Instruction.

The third instrument was The Estes Attitude Scale, Secondary Form (Estes, 1971). The reading portion of

this scale was used. It contained fifteen statements to which students indicated if they strongly agreed, agreed, did not know, disagreed, or strongly disagreed.

Procedures for Data Collection

Initially permission to do the study was obtained from the superintendent of the county system. The researcher with the help of her major professor developed the questionnaire to be used in this study.

All subjects received a questionnaire and The Estes Attitude Scale, Secondary Form (Estes, 1971) for reading. In the high school setting for the ninth graders, the principal of the school assembled the subjects in the cafeteria, explained this study, and instructed the classroom teachers to remain for supervision. The researcher further explained the study and procedure, passed out materials, read each question to the group, and provided time for questions and marking of answers. At the junior high school for the seventh graders, the researcher went into each reading class where the researcher explained the nature of the study and procedure, passed out materials, read each question to the group, and provided time for questions and marking of answers.

Achievement scores were obtained from the

cumulative folder labels. The California Achievement Test (McGraw-Hill, 1981) had been administered in March, 1984; and the researcher obtained the scores in early May, 1984.

Three weeks later, the researcher gave seventy questionnaires and attitude scales to the seventh grade teachers and asked them to choose students at random to respond again. Seventy-five questionnaires and attitude scales were given to the ninth grade teachers with the same instructions; however, for unknown reasons, only seventy-three were returned answered. Thus, a reliability check of student answers was obtained.

Scoring Criteria

Different means of scoring criteria were utilized on this data. A Likert Scale was utilized on The Estes Attitude Scale, Secondary Form (Estes, 1971) for reading. Students' responses to the questionnaire were classified by the researcher using a priority system.

On the questionnaire, students identified the type of game they played and their frequency of play. This information was charted for each student and totals for each cell (12 - 3 type x 4 frequency) calculated. Going from the cells with the fewest individuals to the cells with the most individuals, each student was

assigned to only one cell so that each cell was independent of the others, and there was no overlap.

The following priority selection was determined:

1. Role play game - 6+ hours weekly cell
2. Board game - 6+ hours weekly cell
3. Video game - nonplayer cell
4. Role play game - 2-5 hours weekly cell
5. Video game - 6+ hours weekly cell
6. Board game - nonplayer cell
7. Role play game - 0-1 hours weekly cell
8. Video game - 2-5 hours weekly cell
9. Board game - 2-5 hours weekly cell
10. Video game - 0-1 hours weekly cell
11. Board game - 0-1 hours weekly cell
12. Role play game - Nonplayer cell

Percentile ranks for the reading comprehension and vocabulary subtests of the California Achievement Test (McGraw-Hill, 1981) were used.

Raw scores for The Estes Attitude Scale, Secondary Form (Estes, 1971) were used for attitude. As with the Likert scales, student responses to positive statements were added as recorded. Student responses to negative statements were flipped before being added.

Statistical Procedures

A Pearson Product-Moment Correlation was used to evaluate the reliability of student answers on the questionnaire and The Estes Attitude Scale, Secondary Form (Estes, 1971).

An Unweighted Means of Analysis of Variance was used to evaluate the relationship between reading and gaming. Specifically, the following null hypotheses were tested:

1. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for combined grades.
2. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for combined grades.
3. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for combined grades.
4. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for

- seventh grade students.
5. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for seventh grade students.
 6. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for seventh grade students.
 7. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for ninth grade students.
 8. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for ninth grade students.
 9. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for ninth grade students.

The Dunn-Bonferroni t-test (Ferguson, 1981; and Kirk, 1968) was used for multiple comparisons of those main effects and interactions found significant with the Unweighted Means of Analysis of Variance.

Summary

This chapter has presented the methods and procedures used in this study. Chapter 4 will present the results and findings of this study. Chapter 5 will present the conclusions, limitations, and implications of this study.

CHAPTER 4
ANALYSIS OF DATA

Introduction

This chapter will present the tests that were used to determine significance and the results of those tests.

Tests to Determine Significance

As indicated in Chapter 3, three statistical procedures were used to evaluate the results. For all tests, the $p < .05$ level of significance was used.

The first was Pearson Product-Moment Correlation to determine reliability of student answers on the questionnaire and The Estes Attitude Scale, Secondary Form (Estes, 1971).

The second was the Unweighted Means Analysis of Variance. It was used with nine 3 x 4 factorial designs. The nine designs involved combined seventh and ninth grades, seventh grade, and ninth grade. The three-category independent variable was type of game with the categories being board game, video game, and

role play game. The four-category independent variable was frequency of play with the conditions being nonplayer, occasional player, moderate player, and heavy player.

The third was the Dunn-Bonferroni t-test (Ferguson, 1981; and Kirk, 1968) which was used for multiple comparisons of those main effects and interactions found significant with the Unweighted Means of Analysis of Variance.

Results

The results obtained from these statistical procedures are reported hereinafter.

Reliability

As seen in Table 2, the reliability check yielded an r of .86. This would indicate consistency in students' responses.

TABLE 2
PEARSON PRODUCT-MOMENT CORRELATION
TEST-RETEST RELIABILITY

N=143
 $r=.8601$
 $p<.01$

	Test 1	Test 2
Mean	51.4895	52.2097
Variance	134.4065	147.1951
Standard Deviation	11.5934	12.1323
Standard Error	.9694	1.0146

Hypotheses

Each of the general hypotheses reported in this section was tested for main effects (type of game and frequency of gaming) and interactions. If the results obtained indicated significance for either or both of the main effects or the interactions, then the null hypothesis of no relationship was rejected.

Hypothesis 1: There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for combined grades.

Although it appears in the ANOVA table (Table 3) that both type of game and frequency were significant, these factors were found to interact in a disordinal fashion ($F_{(6,638)}=2.491$; $p<.05$) and, therefore, can not be interpreted unambiguously as main effects. See Table 4 for the means, standard deviations, and numbers of the cells.

TABLE 3
UNWEIGHTED MEANS ANALYSIS SUMMARY
READING COMPREHENSION: COMBINED GRADES

Source	SS	df	ms	F	p
Frequency	248.350	3	82.783	4.843	.01
Type	222.489	2	111.244	6.508	.01
F x T	255.462	6	42.577	2.491	.05
Error	376031.910	638	17.092		

TABLE 4

MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING COMPREHENSION: COMBINED GRADES

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=43.143$ SD=26.562 N=49	$\bar{X}=37.932$ SD=25.411 N=44	$\bar{X}=42.308$ SD=23.075 N=65	$\bar{X}=41.348$ SD=24.784 N=158
0-1	$\bar{X}=44.0$ SD=22.845 N=80	$\bar{X}=55.043$ SD=26.286 N=70	$\bar{X}=54.917$ SD=23.402 N=60	$\bar{X}=50.8$ SD=24.705 N=210
2-5	$\bar{X}=49.806$ SD=24.715 N=62	$\bar{X}=46.808$ SD=24.451 N=78	$\bar{X}=54.917$ SD=22.324 N=59	$\bar{X}=49.894$ SD=23.092 N=199
6+	$\bar{X}=42.495$ SD=25.544 N=11	$\bar{X}=50.885$ SD=24.737 N=61	$\bar{X}=67.091$ SD=20.398 N=11	$\bar{X}=51.928$ SD=23.992 N=83 ^a
TOTAL	$\bar{X}=45.495$ SD=24.493 N=202	$\bar{X}=48.526$ SD=25.746 N=253	$\bar{X}=51.144$ SD=23.669 N=195	$\bar{X}=48.369$ N=650

A series of Dunn-Bonferroni t-tests was computed to evaluate the interaction. Board games were compared to video games, board games to role play games, and video games to role play games. (See Figure 1)

Board games were found to be significantly different from video games except in the none to 2-5 and 0-1 to 6+ conditions. Students did better under the none conditions with board games and better under the 0-1 and 6+ conditions with video games.

Board games were found to be significantly different from role play games in all areas, but the biggest difference was under the 6+ conditions with role play being better.

Video games were found to be significantly different from role play games in all areas except under the 0-1 and 2-5 conditions; however, the biggest difference was the 6+ condition with role play games being better. See Table 5 for results.

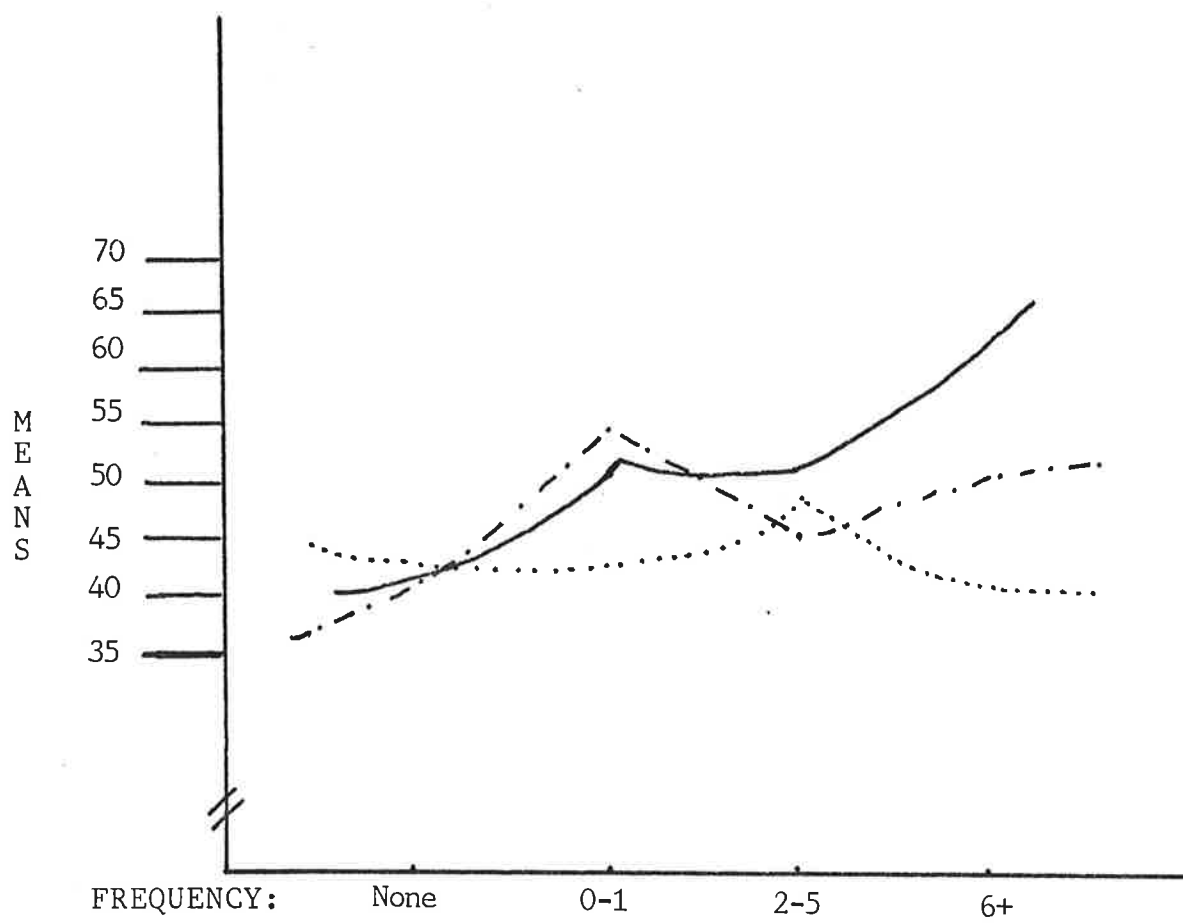


Figure 1: Frequency x Type Interaction

KEY:Board Games
 -.-.-.-.-Video Games
 _____ Role Play Games

TABLE 5
DUNN-BONFERRONI t-tests
TYPE x FREQUENCY

Board - Video

		-11.043	-10.175	2.708	5.279
0-1	-11.043	-	- .868	-13.751**	-16.322**
6+	-10.175	-	-	-12.883**	-15.454**
None	2.708	-	-	-	- 2.571
2-5	5.279	-	-	-	-

Board - Role Play

		-26.364	-10.917	- 4.586	.558
6+	-26.364	-	-15.447**	-21.778**	-26.922**
0-1	-10.917	-	-	- 6.331**	-11.475**
2-5	- 4.586	-	-	-	- 5.144**
None	.558	-	-	-	-

Video - Role Play

		-16.189	- 7.294	- 4.721	.126
6+	-16.189	-	- 8.895**	-11.468**	-16.315**
2-5	- 7.294	-	-	- 2.573	- 7.420**
0-1	- 4.721	-	-	-	- 4.847**
None	.126	-	-	-	-

KEY: * = $p < .05$
** = $p < .01$

Hypothesis 2: There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for combined grades.

Although it appears in the ANOVA table (Table 6) that both type of game and frequency of play were significant, these factors were found to interact in a disordinal fashion ($F_{(6,638)}=5.011$; $p<.01$), and, therefore, can not be interpreted unambiguously as main effects. See Table 7 for the means, standard deviations, and numbers of the cells.

TABLE 6
UNWEIGHTED MEANS ANALYSIS SUMMARY
READING VOCABULARY: COMBINED GRADES

Source	SS	df	ms	F	p
Frequency	245.377	3	81.792	4.663	.01
Type	391.150	2	195.575	11.150	.01
T x F	527.348	6	87.891	5.011	.01
Error	385751.45	638	17.54		

TABLE 7

MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING VOCABULARY: COMBINED GRADES

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=40.755$ SD=27.287 N=49	$\bar{X}=34.045$ SD=22.200 N=44	$\bar{X}=38.2$ SD=22.992 N=65	$\bar{X}=37.835$ SD=24.184 N=158
0-1	$\bar{X}=38.638$ SD=24.168 N=80	$\bar{X}=47.1$ SD=27.316 N=70	$\bar{X}=49.8$ SD=23.708 N=60	$\bar{X}=44.648$ SD=25.481 N=210
2-5	$\bar{X}=44.113$ SD=24.704 N=62	$\bar{X}=40.731$ SD=23.648 N=78	$\bar{X}=49.153$ SD=24.941 N=59	$\bar{X}=44.281$ SD=24.489 N=199
6+	$\bar{X}=34.636$ SD=22.277 N=11	$\bar{X}=43.771$ SD=25.54 N=61	$\bar{X}=67.545$ SD=19.654 N=11	$\bar{X}=45.711$ SD=25.848 N=83
TOTAL	$\bar{X}=40.614$ SD=24.992 N=202	$\bar{X}=42.063$ SD=25.182 N=253	$\bar{X}=46.738$ SD=24.594 N=195	$\bar{X}=43.015$ SD=25.848 N=650

A series of Dunn-Bonferroni t-tests was computed to evaluate the interaction. Board games were compared to video games, board games to role play games, and video games to role play games. (See Figure 2)

Board games were found to be significantly different from video games with board games being better under the none and 2-5 conditions. Video games were found to be better under the 0-1 and 6+ conditions. The biggest difference was the 6+ condition with video games being better.

Board games were found to be significantly different from role play games in all areas, but the biggest difference was under the 6+ condition. Role play games were consistently better under all conditions.

Video games were found to be significantly different from role play games except under the none and 0-1 conditions. Role play games were consistently better than video games with the 6+ condition being the best. See Table 8 for results.

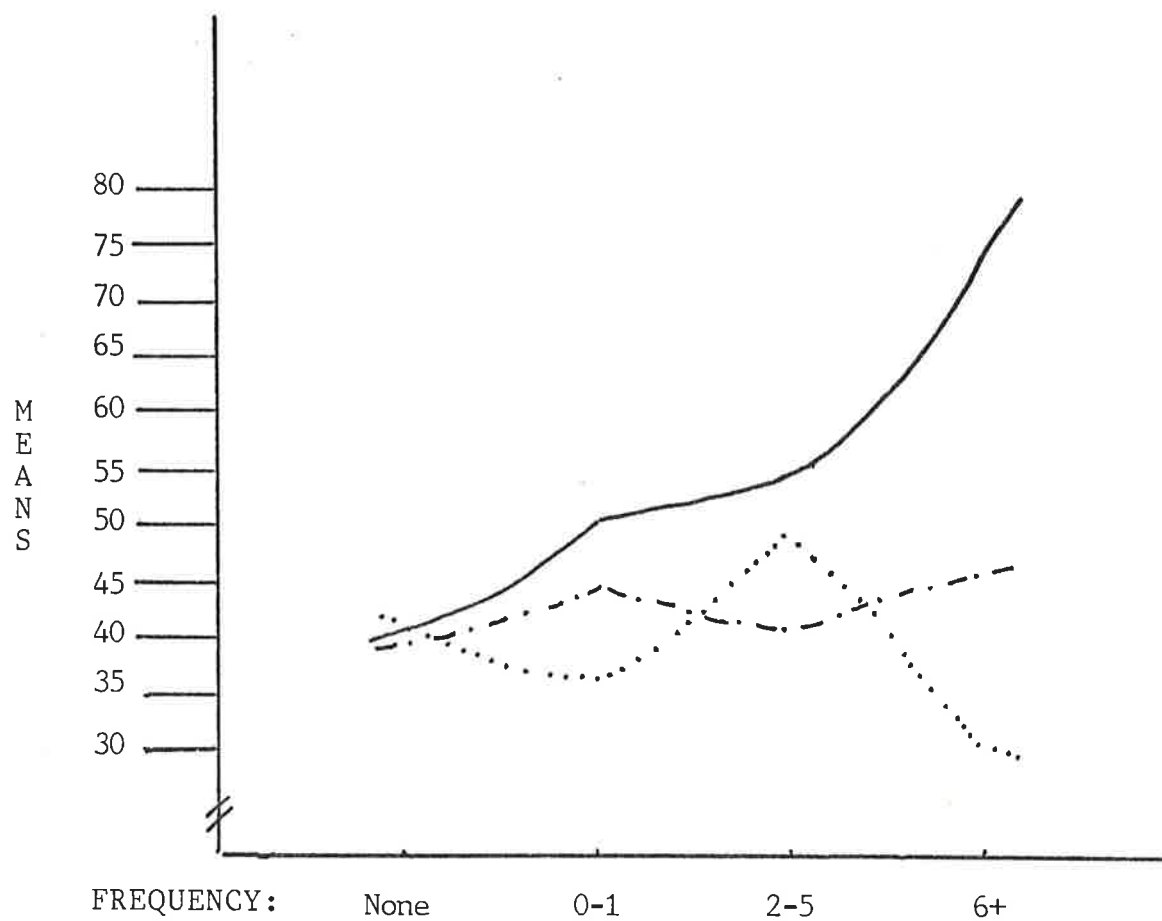


Figure 2: Frequency x Type Interaction

KEY:Board Games
 - - - - -Video Games
 _____Role Play Games

TABLE 8
DUNN-BONFERRONI t-tests
TYPE x FREQUENCY

Board - Video

		- 9.134	- 8.462	3.395	6.71
6+	- 9.134	-	- .672	-12.529**	-15.844**
0-1	- 8.462	-	-	-11.857**	-15.172**
2-5	3.395	-	-	-	- 3.315
None	6.71	-	-	-	-

Board - Role Play

		-38.108	-11.162	- 5.039	2.555
6+	-38.108	-	-26.946**	-33.069**	-40.663**
0-1	-11.162	-	-	- 6.123**	-13.717**
2-5	- 5.039	-	-	-	- 7.594**
None	2.555	-	-	-	-

Video - Role Play

		-28.974	- 8.434	- 4.155	- 2.7
6+	-28.974	-	-20.54 **	-24.819**	-26.274**
2-5	- 8.434	-	-	- 4.279**	- 5.734**
None	- 4.155	-	-	-	- 1.455
0-1	- 2.7	-	-	-	-

Key: * = p<.05
** = p<.01

Hypothesis 3: There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for combined grades.

As can be seen in the ANOVA table (Table 9) neither the main effects nor the interaction yielded significance. It would, therefore, appear that there is no relationship. The null failed to be rejected. See Table 10 for the means, standard deviations, and numbers of the cells.

TABLE 9
UNWEIGHTED MEANS ANALYSIS SUMMARY
ATTITUDE: COMBINED GRADES

Source	SS	df	ms	F	p
Frequency	4.109	3	1.369	0.376	ns
Type	8.575	2	4.288	1.179	ns
F x T	26.134	6	4.356	1.198	ns
Error	80016.133	638	3.637		

TABLE 10

MEANS, STANDARD DEVIATIONS, AND NUMBERS
ATTITUDE: COMBINED GRADES

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=48.592$ SD=11.374 N=49	$\bar{X}=51.227$ SD= 9.523 N=44	$\bar{X}=51.615$ SD=10.663 N=65	$\bar{X}=50.570$ SD=10.608 N=158
0-1	$\bar{X}=49.388$ SD= 9.027 N=80	$\bar{X}=51.886$ SD=11.321 N=70	$\bar{X}=51.615$ SD=10.663 N=60	$\bar{X}=50.210$ SD=10.690 N=210
2-5	$\bar{X}=52.774$ SD= 9.938 N=62	$\bar{X}=50.744$ SD=11.537 N=78	$\bar{X}=50.797$ SD=11.426 N=59	$\bar{X}=51.392$ SD=11.014 N=199
6+	$\bar{X}=46.727$ SD=12.248 N=11	$\bar{X}=50.377$ SD=11.274 N=61	$\bar{X}=54.0$ SD=14.360 N=11	$\bar{X}=50.374$ SD=12.496 N=83
TOTAL	$\bar{X}=50.089$ SD=10.195 N=202	$\bar{X}=51.055$ SD=11.274 N=253	$\bar{X}=50.805$ SD=11.466 N=195	$\bar{X}=50.680$ N=650

Hypothesis 4: There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for seventh grade students.

As can be seen in the ANOVA table (Table 11), the type of game was significantly related to comprehension ($F_{(2,335)}=5.017$; $p<.01$). See Table 12 for the means, standard deviations, and numbers of the cells. A series of Dunn-Bonferroni t-tests was computed to further evaluate this main effect. It was found (See Table 13) that role play games were associated with significantly ($p<.01$) higher comprehension than were video games which in turn were associated with significantly ($p<.01$) high comprehension than were board games.

TABLE 11
UNWEIGHTED MEANS ANALYSIS SUMMARY
READING COMPREHENSION: SEVENTH GRADE

Source	SS	df	ms	F	P
Frequency	146.340	3	48.768	1.504	ns
Type	324.679	2	162.340	5.017	.01
F x T	146.497	6	24.416	.754	ns
Error	193585.490	335	32.360		

TABLE 12
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING COMPREHENSION: SEVENTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=42.542$ SD=21.998 N=24	$\bar{X}=40.455$ SD=23.828 N=22	$\bar{X}=47.154$ SD=22.235 N=39	$\bar{X}=44.118$ SD=22.502 N=85
0-1	$\bar{X}=40.634$ SD=21.211 N=41	$\bar{X}=59.429$ SD=27.133 N=35	$\bar{X}=58.6$ SD=23.526 N=30	$\bar{X}=51.925$ SD=25.376 N=106
2-5	$\bar{X}=44.879$ SD=25.042 N=33	$\bar{X}=50.293$ SD=26.713 N=41	$\bar{X}=54.235$ SD=22.043 N=34	$\bar{X}=49.880$ SD=24.859 N=108
6+	$\bar{X}=41.4$ SD=35.310 N=5	$\bar{X}=49.108$ SD=24.071 N=37	$\bar{X}=60.167$ SD=20.351 N=6	$\bar{X}=49.688$ SD=24.811 N=48
TOTAL	$\bar{X}=42.476$ SD=23.119 N=103	$\bar{X}=50.733$ SD=26.113 N=135	$\bar{X}=53.229$ SD=22.684 N=109	$\bar{X}=49.066$ SD=24.531 N=347

TABLE 13
DUNN-BONFERRONI t-tests
TYPE

		42.364	40.321	55.039
Board	42.364	-	7.457**	12.675**
Video	49.321	-	-	5.218**
Role Play	55.039	-	-	-

Key: * = $p < .05$
** = $p < .01$

Hypothesis 5: There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for seventh grade students.

As can be seen in the ANOVA table (Table 14), the type of game was significantly related to reading vocabulary ($F_{(2,335)} = 3.202; p < .05$). See Table 15 for the means, standard deviations, and numbers of the cells. A series of Dunn-Bonferroni t-tests was computed. It was found (See Table 16) that role play games were associated with significantly ($p < .01$) high reading vocabulary than were video games which in turn were associated with significantly ($p < .01$) higher reading vocabulary than were board games.

TABLE 14
UNWEIGHTED MEANS ANALYSIS SUMMARY
READING VOCABULARY: SEVENTH GRADE

Source	SS	df	ms	F	p
Frequency	128.720	3	42.910	1.310	ns
Type	209.734	2	104.867	3.202	.05
F x T	95.657	6	15.943	.487	ns
Error	195940.840	335	32.754	-	-

TABLE 16
DUNN-BONFERRONI t-test

	TYPE		
	40.814	43.653	50.754
Board	40.814	-	2.839**
Video	43.653	-	9.94 **
Role Play	50.754	-	7.101**

Key: * = $p < .05$
** = $p < .01$

TABLE 15
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING VOCABULARY: SEVENTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=38.417$ SD=23.044 N=24	$\bar{X}=39.636$ SD=21.244 N=22	$\bar{X}=42.205$ SD=23.096 N=39	$\bar{X}=40.471$ SD=22.413 N=85
0-1	$\bar{X}=38.244$ SD=21.926 N=41	$\bar{X}=47.914$ SD=30.341 N=35	$\bar{X}=51.233$ SD=20.786 N=30	$\bar{X}=45.113$ SD=25.145 N=106
2-5	$\bar{X}=42.394$ SD=23.521 N=33	$\bar{X}=43.659$ SD=25.635 N=41	$\bar{X}=49.412$ SD=24.879 N=34	$\bar{X}=45.083$ SD=24.718 N=108
6+	$\bar{X}=44.2$ SD=25.064 N=5	$\bar{X}=43.405$ SD=24.707 N=37	$\bar{X}=60.167$ SD=20.223 N=6	$\bar{X}=45.583$ SD=24.405 N=48
TOTAL	$\bar{X}=39.903$ SD=22.606 N=103	$\bar{X}=44.037$ SD=25.917 N=135	$\bar{X}=47.927$ SD=23.144 N=109	$\bar{X}=44.032$ SD=24.245 N=347

Hypothesis 6: There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for seventh grade students.

As can be seen in the ANOVA table (Table 17) neither the main effects nor the interaction yielded significance. It would, therefore, appear that there is no relationship. The null failed to be rejected. See Table 18 for the means, standard deviations, and numbers of the cells.

TABLE 17
UNWEIGHTED MEANS ANALYSIS SUMMARY
ATTITUDE: SEVENTH GRADE

Source	SS	df	ms	F	p
Frequency	16.676	3	5.559	.818	ns
Type	24.944	2	12.472	1.834	ns
F x T	20.172	6	3.362	.494	ns
Error	40736.593	335	6.8		

TABLE 18
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 ATTITUDE: SEVENTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=52.750$ SD=11.932 N=24	$\bar{X}=51.727$ SD= 9.417 N=22	$\bar{X}=53.103$ SD=10.760 N=39	$\bar{X}=52.647$ SD=10.670 N=85
0-1	$\bar{X}=48.220$ SD= 8.236 N=41	$\bar{X}=55.057$ SD= 9.873 N=35	$\bar{X}=52.767$ SD=13.024 N=30	$\bar{X}=51.764$ SD=10.633 N=106
2-5	$\bar{X}=52.545$ SD= 9.216 N=33	$\bar{X}=52.854$ SD=11.551 N=41	$\bar{X}=55.029$ SD= 9.187 N=34	$\bar{X}=53.444$ SD=10.124 N=108
6+	$\bar{X}=46.2$ SD=14.096 N=5	$\bar{X}=52.162$ SD=12.255 N=37	$\bar{X}=53.333$ SD= 6.408 N= 6	$\bar{X}=51.688$ SD=11.834 N=48
TOTAL	$\bar{X}=50.563$ SD= 9.934 N=103	$\bar{X}=53.052$ SD=10.972 N=135	$\bar{X}=53.624$ SD=10.719 N=109	$\bar{X}=52.493$ SD=10.640 N=347

Hypothesis 7: There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for ninth grade students.

Although it appears in the ANOVA table (Table 19) that frequency was significant, this factor was found to interact in a disordinal fashion ($F_{(6,291)}=2.8$; $p<.05$) and, therefore, can not be interpreted unambiguously as a main effect. See Table 20 for the means, standard deviations, and numbers of the cells.

TABLE 19
UNWEIGHTED MEANS ANALYSIS SUMMARY
READING COMPREHENSION: NINTH GRADE

Source	SS	df	ms	F	p
Frequency	520.503	3	173.501	4.851	.01
Type	171.327	2	85.664	2.395	ns
F x T	600.866	6	100.144	2.800	.05
Error	173477.320	291	35.768		

TABLE 20
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING COMPREHENSION: NINTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=43.720$ SD=30.767 N=25	$\bar{X}=35.272$ SD=27.193 N=22	$\bar{X}=35.038$ SD=22.803 N=26	$\bar{X}=38.082$ SD=26.993 N=73
0-1	$\bar{X}=47.538$ SD=24.214 N=39	$\bar{X}=50.657$ SD=25.241 N=35	$\bar{X}=51.233$ SD=23.780 N=30	$\bar{X}=49.654$ SD=24.070 N=104
2-5	$\bar{X}=55.414$ SD=23.514 N=29	$\bar{X}=42.946$ SD=21.372 N=37	$\bar{X}=53.840$ SD=23.156 N=25	$\bar{X}=49.912$ SD=23.059 N=91
6+	$\bar{X}=43.5$ SD=17.467 N=6	$\bar{X}=53.667$ SD=26.001 N=24	$\bar{X}=75.4$ SD=19.087 N=5	$\bar{X}=55.029$ SD=25.117 N=35
TOTAL	$\bar{X}=48.636$ SD=25.584 N=99	$\bar{X}=45.983$ SD=25.189 N=118	$\bar{X}=48.5$ SD=24.743 N=86	$\bar{X}=47.564$ SD=25.142 N=303

A series of Dunn-Bonferroni t-tests was computed to evaluate the interaction. Board games were compared to video games, board games to role play games, and video games to role play games. (See Figure 3)

Board games were found to be significantly different from video games. Board games were better under the none and 2-5 conditions while video games were better under the 0-1 and 6+ conditions.

Board games were found to be significantly different from role play games with board games being better under the none condition; however, role play games were found to be better under the 6+ condition. The biggest difference was the 6+ condition.

Video games were found to be significantly different from role play games with role play games being better under all conditions except the none condition. The biggest difference was the 6+ condition.

Role play games were found to be consistently better than board games and video games under the 6+ condition. See Table 21 for results.

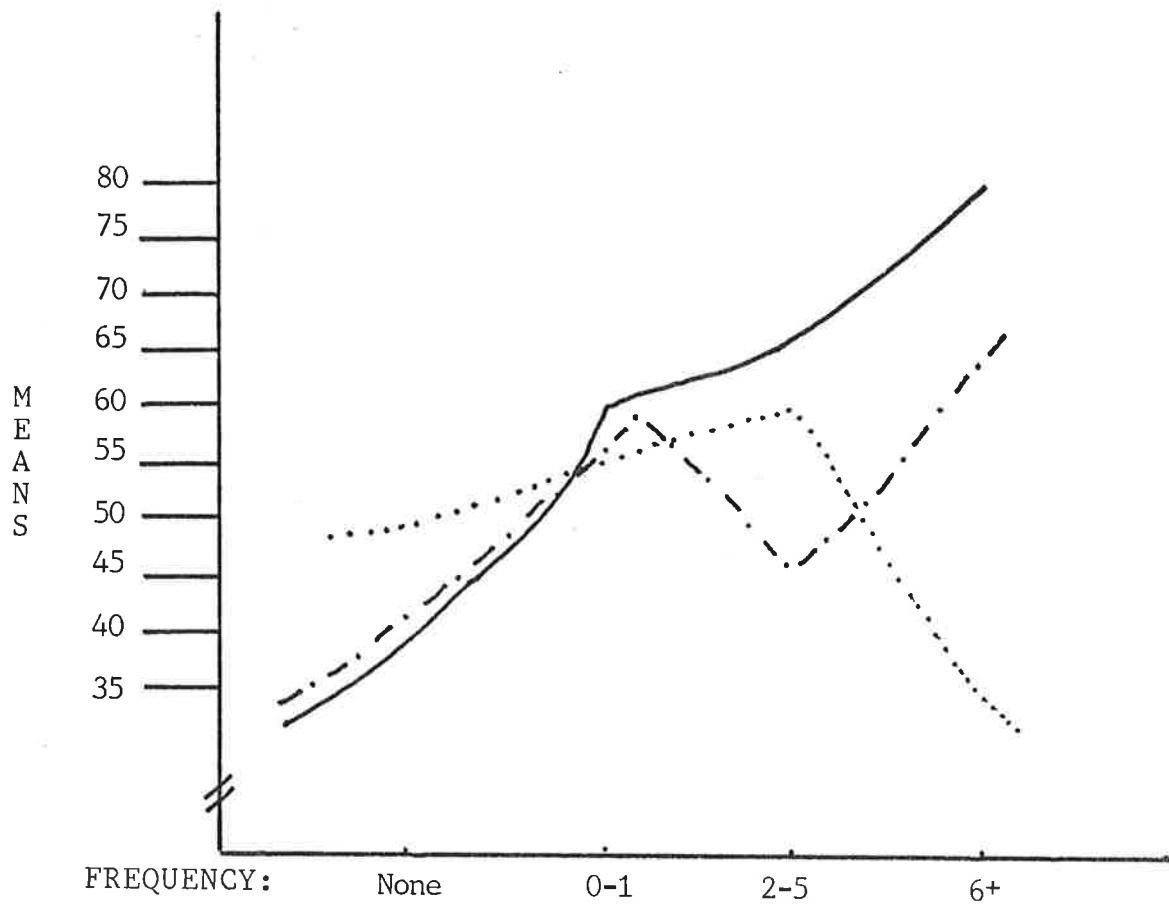


Figure 3: Frequency x Type Interaction

KEY:Board Games
 -.-.-.-Video Games
 _____Role Play Games

TABLE 21
DUNN-BONFERRONI t-tests

TYPE x FREQUENCY

Board - Video

		-13.5	- 3.119	8.447	11.847
6+	-13.5	-	-10.381*	-21.947**	-25.347**
0-1	- 3.119	-	-	-11.566**	-14.966**
None	8.447	-	-	-	- 3.4
2-5	11.847	-	-	-	-

Board - Role Play

		-35.233	- 3.695	.873	7.989
6+	-35.233	-	31.538**	36.106**	43.222**
0-1	- 3.695	-	-	- 4.568	11.684**
2-5	.873	-	-	-	7.116
None	7.989	-	-	-	-

Video - Role Play

		-21.733	-10.974	- .576	- .458
6+	-21.733	-	-10.759*	-21.157**	-21.275**
2-5	-10.974	-	-	-10.398**	-10.516**
0-1	- .576	-	-	-	- .118**
None	- .458	-	-	-	-

Key: * = $p < .05$
** = $p < .01$

Hypothesis 8: There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for ninth grade students.

Although it appears in the ANOVA table (Table 22) that both type of game and frequency of play were significant, these factors were found to interact in a disordinal fashion ($F_{(6,291)}=4.765$; $p<.01$) and, therefore, can not be interpreted unambiguously as main effects. See Table 23 for the means, standard deviations, and numbers of the cells.

TABLE 22
UNWEIGHTED MEAN ANALYSIS SUMMARY
READING VOCABULARY: NINTH GRADE

Source	SS	df	ms	F	p
Frequency	338.099	3	112.700	2.971	.05
Type	418.707	2	209.354	5.518	.01
F x T	1084.558	6	180.760	4.765	.01
Error	184000.420	291	37.938		

TABLE 23
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 READING VOCABULARY: NINTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=43.000$ SD=31.138 N=25	$\bar{X}=28.455$ SD=22.189 N=22	$\bar{X}=32.192$ SD=21.907 N=26	$\bar{X}=34.767$ SD=25.914 N=73
0-1	$\bar{X}=30.051$ SD=26.607 N=39	$\bar{X}=46.286$ SD=24.339 N=35	$\bar{X}=48.367$ SD=26.593 N=30	$\bar{X}=44.173$ SD=25.931 N=104
2-5	$\bar{X}=46.069$ SD=26.264 N=29	$\bar{X}=37.459$ SD=21.094 N=37	$\bar{X}=48.8$ SD=25.532 N=25	$\bar{X}=43.319$ SD=24.317 N=91
6+	$\bar{X}=26.667$ SD=17.952 N=6	$\bar{X}=44.333$ SD=27.308 N=24	$\bar{X}=78.4$ SD=16.577 N=5	$\bar{X}=45.886$ SD=28.071 N=35
TOTAL	$\bar{X}=41.354$ SD=27.351 N=99	$\bar{X}=39.797$ SD=24.223 N=118	$\bar{X}=45.233$ SD=26.378 N=86	$\bar{X}=41.848$ SD=25.902 N=303

A series of Dunn-Bonferroni t-tests was computed to evaluate the interaction. Board games were compared to video games, board games to role play games, and video games to role play games. (See Figure 4)

Board games were found to be significantly different from video games under all conditions. Board games were found to be better under the none and 2-5 conditions; however, video games were better under the 0-1 and 6+ conditions with the 6+ condition having the greatest difference.

Board games were found to be significantly different from role play games except under the 0-1 to 2-5 conditions. Board games were found to be better under the none conditions; however, role play games were better under all other conditions with the 6+ condition having the greatest difference.

Video games were found to be significantly different from role play games except under the none to 0-1 conditions. Role play games were consistently better under all other conditions with the 6+ condition having the greatest differences. See Table 24 for results.

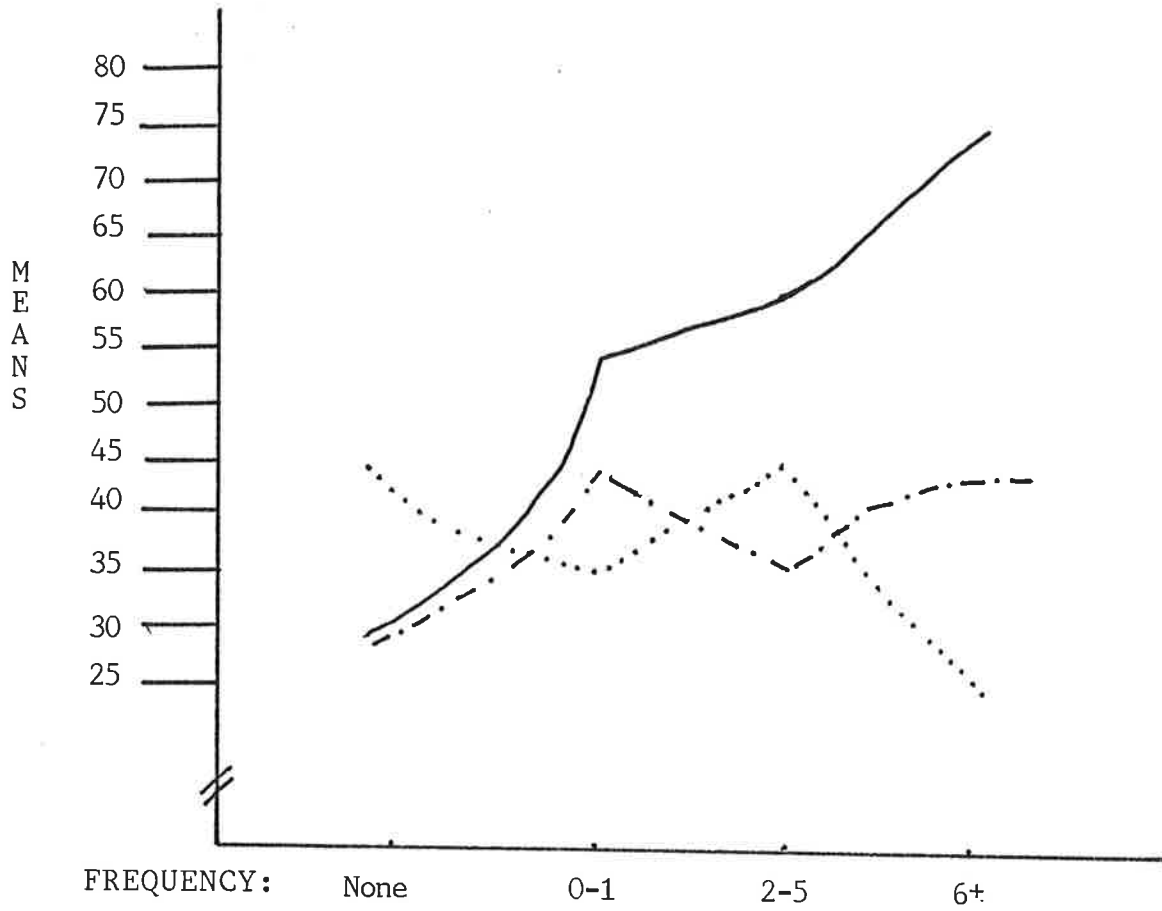


Figure 4: Frequency x Type Interaction

KEY:Board Games
 -.-.-.-Video Games
 _____Role Play Games

TABLE 24
DUNN-BONFERRONI t-tests
TYPE x FREQUENCY

Board - Video

		-17.666	- 7.235	8.61	14.546
6+	-17.666	-	-10.431*	-26.276**	-32.212**
0-1	- 7.235	-	-	-15.845**	-21.781**
2-5	8.61	-	-	-	- 5.936
None	14.546	-	-	-	-

Board - Role Play

		-49.733	- 9.316	- 2.731	10.808
6+	-49.733	-	-40.417**	-47.002**	-60.541**
0-1	- 9.316	-	-	- 6.585	-20.124**
2-5	- 2.731	-	-	-	-13.539**
None	10.808	-	-	-	-

Video - Role Play

		-32.067	-11.341	- 3.738	- 2.081
6+	-32.067	-	-20.726**	-28.329**	-29.986**
2-5	-11.341	-	-	- 7.603*	- 9.26 **
None	- 3.738	-	-	-	- 1.657
0-1	- 2.081	-	-	-	-

Key: * = $p < .05$
** = $p < .01$

Hypothesis 9: There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for ninth grade students.

As can be seen in the ANOVA table (Table 25), neither main effect yielded significance; however, the interaction did ($F_{(6,291)}=2.276$; $p<.05$). See Table 26 for the means, standard deviations, and numbers of cells.

TABLE 25
UNWEIGHTED MEANS ANALYSIS SUMMARY
ATTITUDE: NINTH GRADE

Source	SS	df	ms	F	p
Frequency	5.298	3	1.766	.245	ns
Type	.018	2	.009	.001	ns
F x T	98.461	6	16.410	2.276	.05
Error	34970.447	291	7.210		

TABLE 26
 MEANS, STANDARD DEVIATIONS, AND NUMBERS
 ATTITUDE: NINTH GRADE

	BOARD	VIDEO	ROLE PLAY	TOTAL
NONE	$\bar{X}=44.6$ SD= 9.403 N=25	$\bar{X}=50.727$ SD= 9.823 N=22	$\bar{X}=49.385$ SD=10.319 N=26	$\bar{X}=48.151$ SD=10.077 N=73
0-1	$\bar{X}=50.615$ SD= 9.746 N=39	$\bar{X}=48.714$ SD=11.913 N=35	$\bar{X}=45.933$ SD= 9.631 N=30	$\bar{X}=48.625$ SD=10.565 N=104
2-5	$\bar{X}=53.034$ SD=10.861 N=29	$\bar{X}=48.405$ SD=11.214 N=37	$\bar{X}=45.040$ SD=11.813 N=25	$\bar{X}=48.956$ SD=11.574 N=91
6+	$\bar{X}=47.167$ SD=11.856 N= 6	$\bar{X}=47.625$ SD=11.876 N=24	$\bar{X}=54.8$ SD=21.510 N= 5	$\bar{X}=48.571$ SD=13.311 N=35
TOTAL	$\bar{X}=49.596$ SD=10.488 N=99	$\bar{X}=48.771$ SD=11.225 N=118	$\bar{X}=47.233$ SD=11.443 N=86	$\bar{X}=48.604$ SD=11.056 N=303

A series of Dunn-Bonferroni t-tests was computed to evaluate the interaction. Board games were compared to video games, board games to role play games, and video games to role play games. (See Figure 5)

Board games were found to be significantly different from video games in all areas except under the 0-1 to 6+ conditions. Video games were found to be better only at the none condition. Board games were found to be better under the other conditions with the 2-5 condition having the greatest difference.

Board games were found to be significantly different from role play games in all areas except under the none to 6+ conditions. The biggest difference was in the 6+ condition with role play being better.

Video games were found to be significantly different from role play games. The 6+ condition showed the greatest difference with role play games being better. See Table 27 for results.

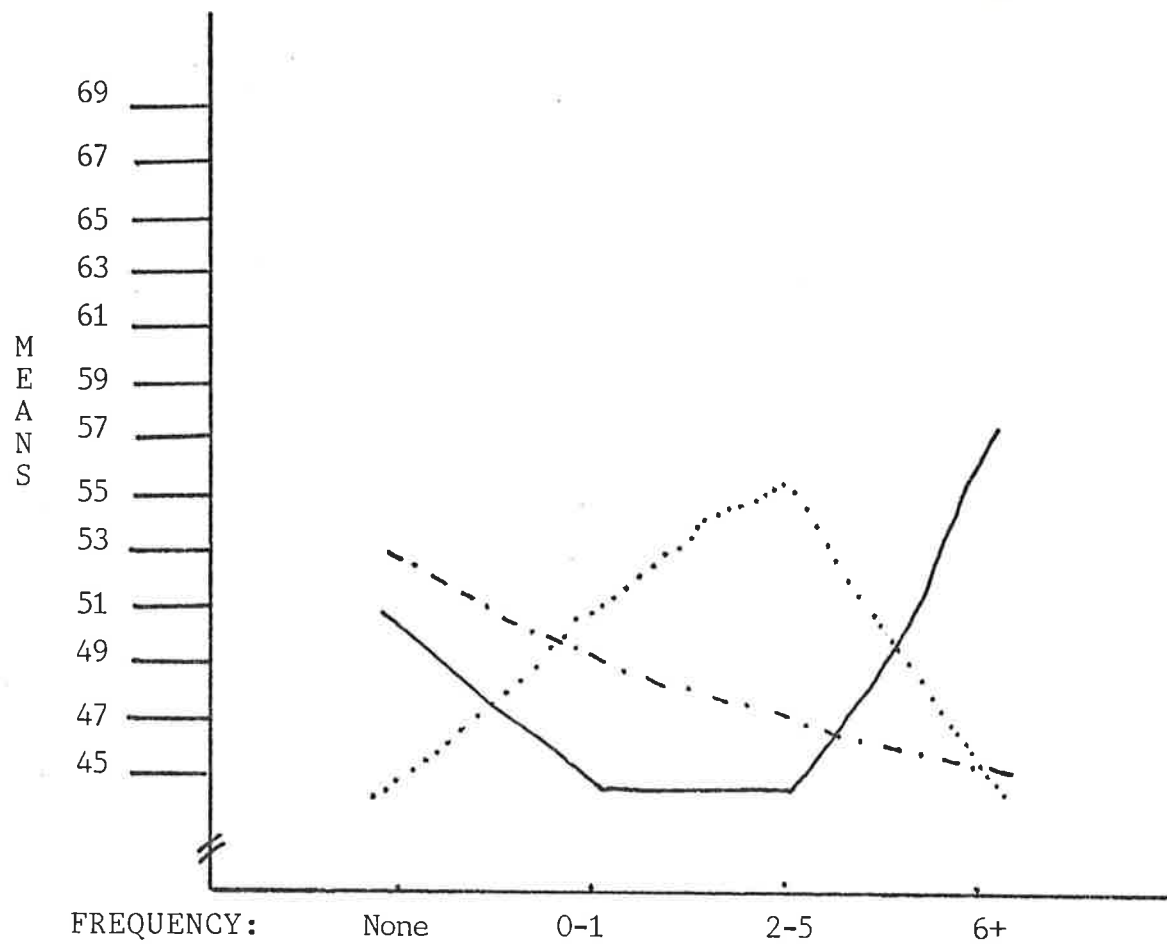


Figure 5: Frequency x Type Interaction

KEY:Board Games
 - - - - -Video Games
 _____ Role Play Games

TABLE 27
DUNN-BONFERRONI t-tests
TYPE x FREQUENCY

Board - Video

		-6.036	- .458	1.491	4.629
None	-6.036	-	- 5.578**	- 7.527**	-10.665**
6+	- .458	-	-	- 1.949	- 5.086**
0-1	1.491	-	-	-	- 3.138*
2-5	4.629	-	-	-	-

Board - Role Play

		-7.633	- 4.746	4.272	7.994
6+	-7.633	-	- 2.887	-11.905**	-15.627**
None	-4.746	-	-	- 9.018**	-12.470**
0-1	4.272	-	-	-	- 3.722**
2-5	7.994	-	-	-	-

Video - Role Play

		-7.176	3.365	2.781	1.290
6+	-7.176	-	-10.541**	- 9.957**	- 8.466**
2-5	3.365	-	-	.584	2.075
0-1	2.781	-	-	-	1.491
None	1.290	-	-	-	-

Key: * = p<.05
** = p<.01

Summary

Chapter 4 has presented the results of this study. Chapter 5 will present the conclusions and implications of this study.

CHAPTER 5
CONCLUSIONS, IMPLICATIONS, AND LIMITATIONS

Introduction

Chapter 5 will present the conclusions, implications, and recommendations of this study.

Summary of Results

Six hundred fifty students in grades seven and nine were given a questionnaire and The Estes Attitude Scale, Secondary Form (Estes, 1971). This information along with the students' California Achievement Test (McGraw-Hill, 1981) scores for reading comprehension and reading vocabulary were used to evaluate the relationship between reading and gaming. The hypotheses tested and the decision reached relative to each one is contained below:

Decision

Hypotheses

Reject

1. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for combined grades.

- | | |
|----------------|--|
| Reject | 2. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for combined grades. |
| Fail to reject | 3. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for combined grades. |
| Reject | 4. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for seventh grade students. |
| Reject | 5. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for seventh grade students. |
| Fail to reject | 6. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for seventh grade students. |

- Reject 7. There is no statistically significant relationship between gaming (type and/or frequency) and reading comprehension for ninth grade students.
- Reject 8. There is no statistically significant relationship between gaming (type and/or frequency) and reading vocabulary for ninth grade students.
- Reject 9. There is no statistically significant relationship between gaming (type and/or frequency) and attitude toward reading for ninth grade students.

In Hypothesis 1, a statistically significant relationship was found to exist between reading comprehension and gaming. Frequency of play and type of game were found to interact in a disordinal fashion ($p < .05$) for combined grades seven and nine. When the interaction was analyzed, students were found to do better with board games under the none condition, but better with video games under the 0-1 and 6+ conditions. Students consistently did better

with role play games than board games or video games under the 6+ condition.

In Hypothesis 2, a statistically significant relationship was found between reading vocabulary and gaming. Frequency of play and type of game were found to interact in a disordinal fashion ($p < .01$) for combined grades. When the interaction was analyzed, students were found to do better with board games under the none and 2-5 conditions, but better with video games under the 0-1 and 6+ conditions. The greatest difference was under the 6+ condition with video games being better. Students consistently did better with role play games than board games under all conditions except under the none condition with the 6+ condition showing the greatest difference. Students did better with role play games than video games with the 6+ condition showing the greatest difference.

In Hypothesis 3, no statistically significant relationship was found to exist between attitude toward reading and gaming for combined grades. The null hypothesis failed to be rejected.

In Hypothesis 4, a statistically significant relationship was found only between reading comprehension and type of game ($p < .01$) for the seventh grade. When the statistically significant relationship

was further analyzed, it was found that video games were better than board games; however, role play games were found to be better than either board games or video games.

In Hypothesis 5, a statistically significant relationship was found only between reading vocabulary and type of game ($p < .05$) for seventh grade. When the statistically significant relationship was further analyzed, it was found that video games were better than board games; however, role play games were found to be better than either board games or video games.

In Hypothesis 6, no statistically significant relationship was found to exist between attitude toward reading and gaming for the seventh grade. The null hypothesis failed to be rejected.

In Hypothesis 7, a statistically significant relationship was found to exist between reading comprehension and gaming. Frequency of play and type of game were found to interact in a disordinal fashion ($p < .05$) for ninth grade. When the interaction was further analyzed, it was found that students did better with board games under the none and 2-5 conditions and better with video games under the 0-1 and 6+ conditions. Board games were better than

role play games only under the none condition. Role play games were consistently better than board games under the rest of the conditions with the greatest difference being the 6+ condition. Role play games were found to be better than video games under all conditions except the none condition, but the greatest difference was the 6+ condition. Role play games were consistently better than board games or video games under the 6+ condition.

In Hypothesis 8, a statistically significant relationship was found between reading vocabulary and gaming for ninth grade students. Frequency of play and type of game were found to interact in a disordinal fashion ($p < .01$). When the interaction was further analyzed, students were found to do better with board games under the none and 2-5 conditions and better with video games under the 0-1 and 6+ conditions. Board games were found to be better than role play games only under the none condition; whereas, role play games were better than board games under the rest of the conditions with the 6+ condition having the greatest difference. Role play games were found to be consistently better than video games with the greatest difference being the 6+ condition.

In Hypothesis 9, a statistically significant

relationship was found between attitude toward reading and gaming for the ninth grade. Frequency of play and type of game were found to interact in a disordinal fashion ($p < .05$). When this interaction was analyzed, students were found to do better with board games under the 2-5 condition, but better with video games under the none condition. Role play games were better than board games under the none and 6+ conditions with board games being better under the 0-1 and 2-5 conditions. Video games were better than role play games under all conditions except the 6+ condition.

Implications

The results of this study would indicate that there is a relationship between gaming and reading comprehension and reading vocabulary for combined grades, seventh grade, and ninth grade. In most cases the type of game and the frequency of play are interacting. It is more helpful to know both the type of game and how often a student plays than either one alone.

While many parents are concerned with the effect video games may be having on reading, the results would indicate they are no better nor no worse overall for students.

A reevaluation of the use of gaming in the classroom might be warranted. Traditionally, educators have used board games, are beginning to use video games, and have avoided role play games. The results of this study do not indicate that any one of these is superior to the others except for seventh grade reading comprehension and reading vocabulary. Teachers might be well advised to consider how often they plan to include the games in their curriculum.

Board games by definition have a concrete board, pieces, and a set sequence of steps to follow. Nothing is abstract and the only application of reading comprehension or vocabulary is entirely what is required to play a particular game. Since reading comprehension skills and vocabulary are taught and learned so as to be applicable to any media, the board game appears to restrict application of skills to only the board game setting and vocabulary is restricted to that which is necessary to the game itself. With their concreteness, board games do not lend themselves to expansion of comprehension or vocabulary, but might re-enforce them.

Although educators must be wary of the tremendous expenditures needed to incorporate video games in the curriculum and should be wary that they

not equate computer software designed to teach a particular skill with games that incorporate or include a skill but do not actually teach it, the results of this study indicate that video games are an alternative to board games. Video games are not as concrete as board games in that the player has more options to play, but the skills are still limited and the vocabulary applicable only to that particular gaming situation.

Role play games also appear a viable option especially at the seventh grade level. Since, by definition, the entire game takes place in the mind, then the retention of comprehension skills, the application of those skills to different media and situations, and the expansion of a vocabulary to fit the gaming situation is a requirement to play. A successful player must be able to call upon more skills, better application of learned skills, and a wider vocabulary. The problems with role play games are time and planning. The amount of time required to successfully play a role play game would require one full school day a week or approximately six hours per week. Planning is the second consideration. A game master (the teacher) must

devise the adventure, provide challenges, and plan alternatives to every outcome that can be anticipated while making the game situation interesting and exciting. Thus extensive planning is required. Taking into consideration the amount of time needed to plan and implement all of the aspects of the classroom situation (reading, language, math, science, health, physical education, testing, paper grading, lesson plans, social skills, etc.), more empirical research needs to be done to determine if there is a cause and effect situation. There is a relationship, but do role play games cause the high scores in reading comprehension and vocabulary or do students already possess higher levels of comprehension and vocabulary in order to be able to play this type of game? This needs to be empirically established prior to including an element in the curriculum that obviously requires a large part of the educational day.

Other researchers have supported gaming in the opinion that gaming improves attitude toward reading. This study did not find a relationship to exist for combined grades or for seventh graders. For ninth graders, only the interaction of type of game and frequency of play showed a significant relationship. More empirical research into the area of attitude and

gaming definitely needs to be done since what is being claimed does not appear to exist in reality.

The results of this study would raise many questions and doubts as to the validity of many of the catalog promises (see Table 1) in the name of selling as well as the opinions of some who claim that one type of game is far superior (Bowman and Ritter, 1983; Needham, 1982-83; Bowman, 1982; Games, 1982; Henson, 1982; Hornberger, 1982; Young, 1982; Bitter, 1979; Ball, 1978; Clark, 1978; McLean, 1978; Adams and Edmonds, 1977; and Brady, 1977). Rarely does one enter an elementary classroom without finding some type of board games. Literally millions are being spent nationally for computers and educational video games. Role play games are usually acting-out situations of but a few minutes duration and concentrating only on one situation, but rarely are extended role play situations evident as they are too time consuming to plan and play.

Although the review of the literature would lead one to believe that board games are as important as a basal text, the results of this study indicate that board games are no better or no worse than video or role play games. Researchers indicated that as long as students are actively involved and

having fun, they then must be learning from the game. It would seem that the educational advantage of board games lies not with the students but with the teachers who have readily available teaching tools, time-fillers, fun-activities, and justification of their use as the students are involved (Clark, 1978; and Brady, 1977). The acquisition of knowledge of skills and application to other media appears to be opinion in order to either justify their use by teachers, or to justify the expense of purchasing, or to make money for the companies which heavily advertise them. The companies with their primary objective being profit have attributed skills and influences to board games that teachers have readily accepted without investigation. Teachers who teach against falling for "slanted propaganda" seem to have done exactly that where board games are concerned. Researchers in turn have supported board games usually basing their support on opinion only. It seems that everyone is jumping on a one-dimensional bandwagon that has an empty cargo. As society steadily enters the highly technological era of prepackaging, fast-food, and instant everything, the educational community may find itself with functionally illiterate students who play a fantastic game of Monopoly.

The hue and cry of today is computers. Every facet of society is in some way hooked to a computer for recordkeeping, cost estimating, personnel, etc. The educational community is no different with student records being kept in computer terminals, scheduling by computers, and report cards being computer print-outs. The carry over once again is that if students like and are actively involved then they must be learning from it. Where board games have been more readily accepted, video games are running into opposition from parents and some educators (Soper and Miller, 1983; Needham, 1982-83; Bowman, 1982; Games that play people, 1982; Heikes, 1982; and Games addicts play, 1981). Educators are going ahead with their purchases even into the millions of dollars with the justification that it is impossible to exist in today's world without basic computer knowledge. Here is where computer knowledge and games seem to get confused. Computer programs designed to actually teach certain skills and have no gaming aspect to them may be beneficial; however, this seemingly has not been addressed in empirical studies. Video gaming is being supported by the fall-out process, that being if specific technical programs are good then games must also have

some good. The results of this study indicate that video games are neither better nor worse than any other type of game in almost all areas that were addressed. One has to consider if educators are looking for a prepackaged, push-a-button education that is easy to manage and requires virtually no work for the educator. Serious questions arise as to who benefits - students or educators. Another aspect that must be considered is the human element. No machine can hug, pat on the back, smile, gently nudge, or even lovingly scold. A cold screen with flashing lights and beeping sounds does not a communicating, well-rounded child make. As parents and educators decry the coldness of a machine age, care must be taken not to create that which is condemned. Video games may have a place in education, but only a place not a substitute for interaction, applications, and plain old good teaching.

Role play games are the newest type of game on the educational scene. Educators have used the acting-out simulation of a few minutes duration addressing usually only one problem. In this study, the more serious and extended role play game was addressed. This type requires days or even weeks to play, requires extensive preparation on the part

of the game master (teacher), and wide application of numerous skills. The most commonly recognized game of this type is Dungeons and Dragons (Austin, 1981; Hewson, 1980; and McRae, 1980) over which a definite controversy rages (Gygax, 1983; Austin, 1981; Elshof, 1981; Horak, 1981; and Parsons, 1981). The religious element of society is very much opposed to the use of Dungeons and Dragons as it incorporates demigods, spells, incantations, and black magic. The other side of the controversy maintains that it is only a game. The results of this study indicate that of the three types of games, role play games of this nature are as good as board games or video games. However, empirical study needs to be done to determine if this type of game causes better reading comprehension and vocabulary or if the player must already possess the skills in order to play the game. If role play games of this type are used in the classroom prior to the establishment of a cause and effect relationship, then a serious recommendation must be made. Rather than create a controversial situation in the classroom, it would be better to use a role play game that contains none of the supernatural elements of Dungeons and Dragons. Other available games without the controversial elements are Sleuth, DeathMaze,

Dawn Patrol, Gang Busters, Top Secret, Star Frontiers, Boot Hill, and Fight in the Skies.

The findings of this study should be used to indicate definite direction for more empirical research. Instead of generalizations toward gaming in the classroom, research could now be designed to address those areas of particular interest to determine if the established relationship is one of cause and effect. The results of this type of further research would prove invaluable to educators and ultimately to those that education is all about - the students.

Recommendations

As a final note, the results of this study must be interpreted in light of the study's limitations. Perhaps had another instrument been used to evaluate type of game and frequency of play, the results would have been different. Perhaps had another group of students been used then the results could have been different. Perhaps had the students been categorized differently, the results would have been different. Additional research either replicating this study or addressing these areas of concern might provide educators important information.

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APPENDIX A
QUESTIONNAIRE

IDENTIFYING NUMBER _____

CAT: R.VOC. _____ COMP. _____ OVER-ALL _____

GRADE EQUI: _____

NAME: (LAST) _____ (FIRST) _____

DATE OF BIRTH: YEAR: _____ MONTH _____ DAY _____

SEX _____

GRADE _____

BOARD GAMES

IDENTIFYING NUMBER _____

1. Have you played any board games in the last year (such as: "Life" or "Monopoly" or others)? Yes _____ NO _____
2. Name the 3 you play the most: (1) _____
(2) _____ (3) _____
3. About how much time do you spend each WEEK playing board games?
0-1 hours _____ 2-3 hours _____ 4-5 hours _____ 6 or more hours _____

IDENTIFYING NUMBER _____

VIDEO GAMES

1. Do you play video games (such as "Pitfall" or "Centipede")?
Yes _____ NO _____
2. Do you have a home video game? Yes _____ NO _____
3. If yes, about how many game cartridges do you have? _____
4. About how much time do you spend each WEEK playing a home video game?
0-1 hours _____ 2-3 hours _____ 4-5 hours _____ 6 or more hours _____
5. Do you go to arcades or other places to play video games? Yes _____ No _____
6. About HOW MANY trips to a video arcade or other places to you make
each MONTH? 0-1 _____ 2-3 _____ 4-5 _____ 6-7 _____ 8 or more _____
7. For EACH TRIP, about how long do you stay at the video arcade
or other place? 0-1 hours _____ 2-3 hours _____ 4-5 hours _____ 6 or more _____

IDENTIFYING NUMBER _____

ROLE-PLAYING GAMES

1. Have you ever heard of the game "Dungeons and Dragons"? Yes _____ No _____
2. Have you ever played "Dungeons and Dragons"? Yes _____ No _____
3. Do you own a "Dungeons and Dragons" game? Yes _____ No _____
4. About how much time have you spent playing "Dungeons and Dragons"?
0-1 hours _____ 2-3 hours _____ 4-5 hours _____ 6 or more hours _____
5. Have you ever played a fantasy role-play game, but NOT
"Dungeons and Dragons"? Yes _____ No _____
6. If yes, what was its name? _____

APPENDIX B
ESTES ATTITUDE SCALE
SECONDARY FORM
(Estes, 1971)

ESTES ATTITUDE SCALE

DIRECTIONS: This scale measures how you feel about reading. Read each statement and decide how you feel about it. Then place an "X" in the square that most matches your feelings. PLEASE be as honest as possible in rating each statement.

READING

	STRONGLY AGREE	AGREE	CANNOT DECIDE	DISAGREE	STRONGLY DISAGREE
1. Reading is for learning but not for enjoyment.					
2. Spending allowance on books is a waste of good money.					
3. Reading is a good way to spend spare time.					
4. Books are a bore.					
5. Watching TV is better than reading.					
6. Reading is rewarding to me.					
7. Books aren't usually good enough to finish.					
8. Reading becomes boring after about an hour.					
9. Most books are too long and dull.					
10. There are many books which I hope to read.					
11. Books should only be read when they are assigned.					
12. Reading is something I can do without.					
13. Some part of summer vacation should be set aside for reading.					
14. Books make good presents.					
15. Reading is dull.					