

The Instructional Gaming Literature: Implications and 99 Sources

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Abstract:

This article begins with an overview of instructional gaming and searches for common threads in the instructional gaming literature during the last dozen years. Our approach was to systematically examine five categories of articles in order to offer guidance to educators, as well as instructional and game designers. The article incorporates implications of the gaming literature for the designing and researching instructional games, particularly as applied to computer-driven media. A reference list with statistical analyses, categories, environments, and purposes of 99 relevant articles is included.

Keywords: instructional games; computer games.

Few would argue these days of the potential instructional gaming has for enriching certain educational and training activities. For instance, Faria (1987) has reported that 4,600 of the larger U.S. firms he surveyed by mail or telephone, use business or experiential games in training or development. Those who profess the educational benefits of gaming have been encouraged to some extent by a number of researchers who have found a wide range of benefits which, for example, include improved practical reasoning skills (Wood & Stewart, 1987), higher levels of continuing motivation (Malouf, 1988), and reduced training time and instructor load (Allen, Chatelier, Clark, & Sorenson, 1982). Some researchers, however, have questioned certain of these claims due to a lack of sufficient empirical support (e.g., Bredemeier & Greenblat, 1981). Even so, very diverse training applications, such as attention reduction or automaticity training (Jacobs, Dempsey, & Salisbury, 1990) and complex problem solving (Hayes, 1981), are hypothesized to be prime candidates for gaming strategies.

The purpose of this paper is to report on our continuing review of five categories of gaming articles in order to present some implications and, in some cases, guidelines to designers and educators. We see this review as part of the search for the beneficial uses of gaming in the learning processes, particularly as applied to computer-driven media and multimedia.

What is gaming anyway?

Gaming is defined as being separate from simulation and is defined, in a basic sense, as any overt instructional or learning format that involves competition and is rule-guided (Dempsey, Lucassen, Gilley, & Rasmussen, 1993-94). A competitive format, as we see it, does not necessarily require two or more participants. If a simulation, for instance, produces an overall “score,” then it is possible for a learner to compete against herself by comparing scores over successive attempts at the simulation. Therefore, this learner may be in a gaming mode. If, however, the focus of the simulation involves the completion of an event only (e.g., navigating a channel in a boat), then according to our definition the simulation would not be considered a game. A game structure may be imposed on the simulation from outside, however. For example, in the boating scenario, learners could compete by seeing how many safe passages they could achieve in a certain amount of time compared with another person or their own prior performance. Gaming elements offer particular characteristics which may be manipulated within the simulation training context, and thus can be treated separately.

Categories of the articles in the Gaming Literature

Our review of the literature to this date consists of 99 sources, most of which are journal articles. We located these using ERIC, PSYCHLIT, MEDLINE, and reference citations from other articles. With few exceptions, we concentrated our review on

articles published in the last 12 years. We oriented (but did not limit) our search to articles concerning instructional games which used some form of technology and were substantive in nature. We felt that our first step in looking at the literature consisted of establishing a typology by which gaming articles could be categorized for study. After some consideration, we defined the following five categories of gaming articles. These definitions were employed in an earlier related article (Dempsey, Lucassen, Gilley, & Rasmussen, 1993-94).

- Research: any systematic approach used in the study of gaming whose goal is to explain, predict or control a particular phenomena or variable. Research studies may be further broken down into their paradigms (e.g., case study, experimental study).
- Theory: articles which offer to explain the basic concept of gaming or aspects of gaming or the outcomes derived.
- Reviews: synthesis of articles concerning gaming in general or a specific aspect of gaming.
- Discussion: articles which state or describe experiences or opinions with no empirical or systematically presented evidence.
- Development: articles which discuss projects involving gaming or the design or development of instructional games.

To date, we have reviewed more discussion articles (n=51) than the nearest category, research (n=38). Although we have only unsystematically sampled a small portion of

the literature thus far, we expect the trend in the gaming literature to continue to be dominated by discussion articles. Twelve literature review and 11 primarily theoretical articles were located. Early on, we were mildly surprised at the low number of worthwhile development articles (n=2) we have located.

Types of Games

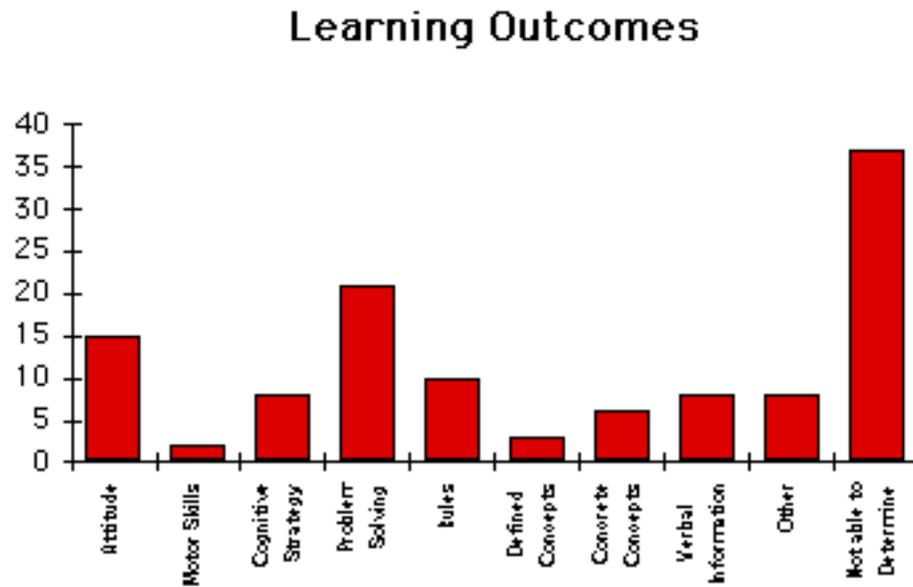
One of our efforts has been to delineate and eventually work toward operational definitions of types of instructional games. In this and our prior review, we separated games into simulations, puzzles, adventures, experimental games, motivational games, modeling, and others (e.g., frame games). To be candid, we are likely to change the types of games delineations we have chosen in future explorations of gaming. At any rate, simulation games accounted for the largest number of articles we encountered in this review (n=43). The “other” category was second (n=26), followed by adventure (n= 10), puzzles (n=4), and experimental and motivation (n=1 each).

This abundance of articles concerning simulation games may, in part be the result of technological improvements and the long and well-documented history of simulation gaming in education, particularly in the military and in business education. Also, simulation gaming parallels current movements in instructional technology such as situated cognition and anchored instruction which hold that knowledge is inseparable from its context. Theorists in these areas (e.g., Brown, Collins, & Duguid, 1989; Perelman, 1992) support the notion that the human brain is designed to learn through

experience and experience has no meaning except in some context. Simulation games can provide that experience in the absence of real life experience. Thus, simulation games are a powerful tool whose use can only be expected to increase.

Learning Outcomes

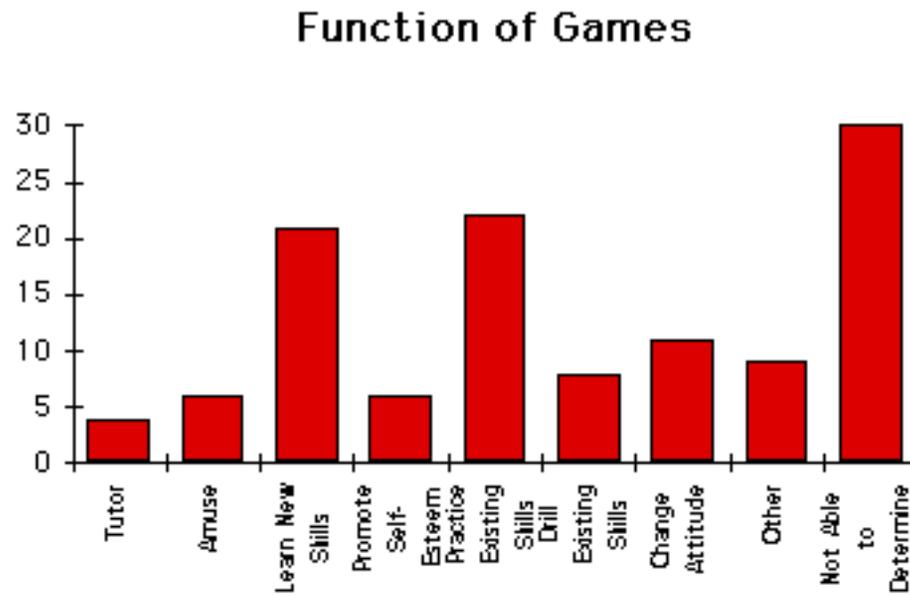
As our literature review focus on instructional or educational gaming, we were interested in what learning outcomes were discussed. In a large number of articles concerning games or gaming (n=45), specific learning outcomes were ignored or a discussion of learning outcomes per se was not germane. The largest specific learning outcome discussed in those articles that did so, however, was problem-solving (n=22). As the reader can see in Figure 1, the articles we reviewed covered most of the nine domains and sub-domains of learning in Gagne's taxonomy (Gagne, 1985), suggesting that technology-based instructional gaming has a wide spectrum of utility for learning. We were particularly interested in the preponderance of games intending to promote higher-level intellectual skills and attitude learning as opposed to verbal knowledge outcomes. We see this as a positive testimonial to the gaming mode.

Fig. 1. Learning Outcomes

Function of Games

Games serve many functions such as tutoring, amusing, helping to explore new skills, promoting self-esteem, practicing existing skills, drilling existing skills, automatizing, or seeking to change an attitude. In the articles we reviewed, the functions of the

instructional games were moderately well-distributed, but suggested that games were not frequently employed to serve as a tutor. As Figure 2 illustrates practicing existing skills (n=21) and learning new skills (n=21) had the same frequencies. Many of the articles stated that games were used to learn new skills after some introductory instructional events had prepared the learner for the competitive instructional interaction. The variety of functions discussed in the gaming literature we reviewed is seen as a positive indicator paralleling the agreeable diversity of learning outcomes with which gaming may be used.

Fig. 2. Functions of Games

Gaming environment

There are great environmental differences assumed by the designers of instructional games. We reviewed articles from the following environments: elementary education, secondary education, adult education, business, management, military, health care. The

largest number of journal articles considered gaming in the context of adult education (n=27). We came upon no claims in our reading that instructional gaming was more effective in one environment compared to any other.

Media

Clearly, there are more media options available today than there were a decade ago. How has this affected gaming? Many of the articles we reviewed that used technology employed the computer only (n=33). A reasonable number of articles employed a combination of media (e.g., the computer and interaction with a live instructor). Other media employed were video-related media (i.e., video tape and optical videodisc). Role-playing was common regardless of the media.

Measurement

Key issues in gaming research are the appropriateness, validity, and reliability of the measured outcomes. Several authors (e.g., Reiser & Gerlach, 1977; Reuben & Lederman, 1982) have chided the lack of appropriate dependent variables and the lack of clarity of their terminology. Expanding slightly on the work of Bredemeier & Greenblat (1981), dependent variables of integrity in this literature include creativity, problem-solving ability, achievement, retention, attitude, self-image, self-efficacy, and

continued motivation. Additionally, control issues have been discussed by several authors (e.g., Remus, 1981).

The variable mentioned most often in our review of the literature was achievement (n=31). This was mentioned almost twice as much as the next most frequent, problem-solving (n=13). Other measurement variables included attitude (n=12), continued motivation (n=10), and retention (n=8).

Learner Characteristics

The various characteristics of the learners participating in gaming experiences were of increasing interest to authors in the gaming literature during the dozen years. Our review searched for personality variables, cognitive style variables, gaming and academic ability, and demographics (sex, race, and age). We found that authors we reviewed were, for the most part, very unclear in reporting these characteristics. Of the articles we reviewed, sex was the most frequently reported (n=12), age was second (11), academic ability and race were reported even less (n=8 and n=3 respectively). Characteristics we expected to be reported such as personality traits (n=1) or cognitive styles (n=2) were reported rarely. Although much attention was given in the articles we reviewed to discussion of “the learner”, few articles considered variables related to learner characteristics.

Implications

Below are stated some assertions that grew out of the articles that we reviewed that might be of use to designers and educational researchers. After each assertion, at least one article is cited which made, or in our opinion supports in some way, the listed assertion. Nevertheless, as presented below, the assertions are very open to deliberation. Although there is some crossover statements (e.g., regarding sex differences), an attempt has been made to separate assertions which may be practicable in using or designing a game for instructional purposes and a separate section for conducting research related to gaming as a learning activity.

Using or Designing the Game

It is preferable in many cases, although usually more difficult, to use a gaming vehicle which is intrinsically motivating as opposed to an extrinsically motivating game. In an intrinsically motivating gaming activity, the game structure itself helps to teach the instructional content. In an extrinsically motivating game, external rewards (real or imaginary) of some sort are usually given. (Deci, 1972; Malone, 1981).

In considering which game to employ in a learning activity, pay special attention to gender preferences. There appears to be some disparity in the types of games and the types of

gaming activities preferred by males and females (Braun, Goupil, & Giroux 1986; Malone, 1981).

When possible, employ debriefing as an a part of or in addition to gaming activities. (Carrol, 1986; Thiagarajun, 1992).

Change the methods of scoring in a game to channel attention and vary the level of challenge (Allen, Jackson, Ross, & White, 1978).

Gaming used for instructional purposes should not be overly complex. Complex rules and scoring require the learner to use up limited learning time in order to understand the game (Jacobs, & Dempsey, 1993).

Change the levels of complexity or difficulty based on the learner's experience with the gaming structure. This will help promote interest in instructional materials as the learner's gaming abilities increase (Jacobs, & Dempsey, 1993).

When developing or adapting games for instructional purposes, look for existing gaming strategies which can be used for your particular purposes (Driskell & Dwyer, 1984).

If the learning activity is construed to be less than exciting to the learning population, consider using adventure games or other games which have a strong challenge component and add an uncertain outcome to the fantasy of the game (Grabe & Dosmann, 1988).

For issues of conflict or control, use or adapt games which employ both role-playing and fantasy. The role playing requires the student to play an active part. The fantasy allows the student to make serious errors with minimum detriment (Kowitz & Smith, 1989).

Intrinsically motivating strategies for use in an educational gaming environment may be discovered by interviewing or observing very effective learners in a particular content area (Logan, Olson, & Lindsey, 1989; Oxford & Crookall, 1988).

If your goal is to change the learner's attitude, simulation gaming, if designed with a theory base in mind, has been shown to be an effective vehicle (Renaud & Stolovitch, 1988; Williams, 1980).

Use a highly visual simulation game which includes all participants to help understand, address, and resolve group decision-making (Hasell, 1987).

Make sure your game has a way of ending so the satisfaction of the learner may be maximized (Reuben & Lederman, 1982).

Researching the Game

Identify the direct and indirect aims of the game (Barnett, 1984).

Avoid the apples and oranges comparison studies between games and traditional teaching techniques. (Barnett, 1984; Fraas, 1982; Megarry, 1977).

Much of the research involving gaming should involve variables relating to motivation (Malone, 1981). The use of motivational scales such as Keller's Instructional Materials Scale should be adopted, adapted, and validated (Klein & Frietag, 1991).

Consider the effect of being on a losing team or in losing roles? For example, how are self-esteem and attitudes toward the winners affected (Greenblat, 1980)? In addition, how do these change when one of the teams or players is a computer?

Allowing learners to "wager" tokens or imagined currency in an instructional gaming environment holds some promise for representing some aspects of learner certitude and therefore internal processes of expectancy. There is some a possibility of unwanted intervening variables, particularly those related to gambling (Griffiths, 1990; 1992).

As gaming becomes a more important area for exploration, there will be an increasing need to develop worthwhile measures of strategy (Laughery, 1984).

Regardless of the findings of some researchers that arcade-style gaming is a social and not an achievement oriented activity (McClure & Mears, 1986), this activity is increasing greatly as a result of more sophisticated and lower priced hardware and software in personal computers. Educational researchers will be more frequently asked how this type of gaming activity can be incorporated into learning environments.

Much of what takes place on a gaming environment may not be easily measurable or, at least easily reduced to a few variables. Therefore, although experimental studies have an important place in the instructional gaming literature, it is critical that researchers honestly recognize the limitations of objective-oriented research for assessment and also look at the effects of incidental learning (Barnett, 1984; Remus, 1981).

The validity of the assessment of an instructional game is somewhat different than with other learning environments and, according to Reuben & Lederman (1982) is dependent on rules, interactions, roles, goals, and criteria.

Girls are often thought to be not as competitive as boys in a gaming environment. To some extent that is situational or a result of a less socially reinforcing scenario (Hughes, 1988).

Increased involvement (e.g., being in control of the program) has been found to increase learning with a simulation game (Wishart, 1990).

Four clusters of factors which influence the effects of a simulation game include administrative variables (characteristics of “who runs the game”), learner variables (e.g., ethnicity or learning style), procedural variables (such as postgame discussion), and game variables (e.g., depicting reality) (Williams, 1980).

Bibliography

Something we thought might be useful to designers and researchers interested in educational gaming was a fairly recent reference list with the category of article, the statistical analysis used for those articles involving quantitative research, the environment for which the instructional gaming is intended, and an additional comment describing the article or its purposes. A table with this information follows.

Gaming References

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Abels, S.L. (1990). A gaming opportunity for multiethnic group experience - the basic game. <i>Social Work with Groups</i> , 13(4), 123-126.			x				
Affisco, J.F. and Chanin, M.N. (1990). An empirical investigation of integrated multicriteria group decision models in a simulation gaming context. <i>Simulation and Gaming</i> , 21(1), 27-47.		63	x	correla- tion, t-test	research	manage- ment, higher education	proposes and compares 2 models of group decision making in a simulation gaming context
Allen, L.E., Jackson, G., Ross, J., White, S. (1978). What counts is how the game is scored: One way to increase achievement in learning mathematics. <i>Simulation and Games</i> , 9(4), 371-389.		78	x	descriptiv es, student t	research	elementa- ry education	explore the effect of channeling attention by changing the method of scoring
Allington, R.L. & Strange, M. (1977). The problem with reading games. <i>Reading Teacher</i> , 31(3), 272-274.	x				discus- sion	NAD	discusses problems of using reading games for reading instruction (e.g., they do not teach, difficulty in determining prior knowledge required, and lack of motivation for non winning participants); offers checklist for evaluating game

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Assa, I. (1983). Management simulation games for education and research - a comparative study of gaming in the socialist countries. <i>Simulation and Gaming</i> , 13(4), 379-412.			x				
Atkinson, F.D. (1977, Feb). Designing Simulation/Gaming activities: A systematic approach. <i>Educational Technology</i> , 38-43.		55	x		discus- sion	NAD	explains systems approach to design of games
Bailey, B.A. (1990). Developing self-awareness through simulation gaming. <i>Journal of Management Development</i> , 9(2), 38-43.							
Balra, A. (1990). Language learning through computer adventure games. <i>Simulation and Games</i> , 21(4), 445-451.		81	x		discus- sion	adult education	adventure games for language learning and motivating students
Barak, A., et. al. (1987). Increasing the level of empathic understanding by means of a game. <i>Simulation and Games</i> , 18(4), 458-470.		61	x	ANOVA	research	adult education	assesses the effectiveness of a simulating game in increasing empathic understanding

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Barber, P. and Norman, I. (1989). Preparing teachers for the performance and evaluation of gaming-simulation in experimental learning climates. <i>Journal of Advanced Nursing</i> , 14(2), 146-151.							USA - biomedical library
Barker, J.A. (1982). Simulation and gaming, without computers, for school biology courses. <i>Journal of Biological Education</i> , 16(3), 187-196.		1	x		discus- sion	secondary education	describes differences between and uses of games, simulations, and case studies; gives examples of use in biological context; appendix gives list of commercial games and articles on biological games.
Barnett, T. (1984). Evaluations of simulations and games: A clarification. <i>Simulation/Games for Learning</i> , 14(4), 64-75.			x		theory, discus- sion	NAD	discusses evaluation issues including identification of direct and indirect aims; limitations of objective-oriented research for assessment; criticizes comparative evaluations of simulation and games with traditional teaching techniques
Basford, P. & Downie C. (1990). How to use ... gaming. <i>Nursing Times</i> , 86(18), 59.							USA - ordered
Senders, R. and DeVries, B (1989). Electric power planning in a gaming context. <i>Simulation and Games</i> , 20(3), 227-244.		x					
Bracken, P. (1984). Deterrence, Gaming, and game theory. <i>Orbis</i> , 27(4), 790-802.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Bradsher, F, and Howard, R. (1981). Gaming-Simulation: A mode of communication for conveying systematic research. <i>Journal of Experimental Learning and Simulation</i> , 3(3-4), 271-292.							
Brand, C.F. (1980). Learning from simulation games: Effects of sociometric grouping. <i>Simulation and Games</i> , 11(2), 163-176.		2	x	ANOVA	research	elementa- ry education	looked at sociometric grouping of students in two games; concluded that this type of learning was not influenced by peer acceptance or membership in work groups with varie degrees of cohesiveness
Branwyn, G. (1986). Gaming: Simulating future realities. <i>Futurist</i> , 20(1),29-35.			x		discus- sion	nad	examines future gaming realities
Braun, C.M., Goupil, G., and Giroux, J. (1986). Adolescents and microcomputers: Sex differences, proxemics, task and stimulus variables. <i>Journal of Psychology</i> , 120(6), 529-542.		67	x	correla- tion, chi- square	research	secondary education	questionnaire re: attitudes toward using microcomputing and arcade games; analyze types of games and behavior o clients in video arcades
Bredemeier, M.E. and Greenblat, C.E.(1981). The educational effectiveness of games: A synthesis of findings. <i>Simulation and Games</i> , 12(3) 307-332.		4	x		literature review	secondary education, business, other	review of gaming constructs; concluded that there is not yet a theoretical-based taxonomy that has clear theories

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Bredemeier, M.E. and others. (1982). Ba Fa Ba Fa and Dogmatism/Ethnocentrism: A study of attitude change through simulation-gaming. <i>Simulation and Games</i> , 13(4), 413-436.		3	x	factor analysis, ANOVA, t-test/eta, mean scores, mean differences, correlation	research	adult education	assesses game effects on student attitudes; summarizes research evidence and reports methodological problems
Brenenstuhl, C., & Catalanello, F. (1976). An analysis of the impact upon the learning effectiveness of traditional instruction, simulation gaming, and experiential learning teaching methodologies: An experimental design. Proceedings, Association for Business Simulation and Experiential Learning (ABSEL), 463-473.		5	x		discus- sion	adult education, business, higher education	overview of proposed research project involving college student; discusses research design

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Breuer, K. and Hajovy, H. (1987, May). Adaptive instructional simulations to improve learning of cognitive strategies. <i>Educational Technology</i> , 29-32.	x						USA - microfilm
Bright, G.W. (1980). Game moves as they relate to strategy and knowledge. <i>Journal of Experimental Education</i> , 48(3), 204-209.	x			descriptives, spearman-rank	research	higher education	experiment to investigate relationship between strategy and topic knowledge; found that correct-strategy moves may indicate intuitive rather than specific knowledge
Brooker, R.G. (1988). Truth as a variable: Teaching Political strategy with simulation games. <i>Simulation and Games</i> , 19(1), 43-58.			x				
Brophy, J. (1987). Synthesis of research on strategies for motivating students to learn. <i>Educational Leadership</i> , 45(2), 40-48.		93	x		literature review, discussion	NAD	highlights of strategies research on student motivation to learn, 5 areas: preconditions, success, extrinsic incentives, intrinsic incentives, stimulating student motivation to learn not specific for gaming; however, applicable with reference to motivation
Brownfield, S. and Vik, G. (1983, December). Teaching basic skills with computer games. <i>Training and Development Journal</i> , 53-56.	x	6	x		development	adult education, military	describes development of military instructional system that includes gaming elements for literacy development

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Butler, R.J., Markulis, P.M., and Strang, D.R. (1988). Where are we? An analysis of the methods and focus of the research on simulation gaming. <i>Simulation and Games</i> , 19(1), 3-26.		83	x		literature review	NAD	evaluate current (1988) status of research on simulation/gam
Butler, J.T. (1983). Games and Simulations in the community college classroom. Funded by Title III grant. ED251161 (long)							
Butler, J.T. (1988). Games and simulations: Creative educational alternatives. <i>Tech Trends</i> , 33, 20-23.			x				
Carlson, J.G. and Hill, K.D. (1982). The effect of gaming on attendance and attitude. <i>Personnel Psychology</i> , 35(1), 63-73.			x	1-tailed t-test	research	other	gaming as a vehicle to improve attendance and attitude in the work place -- operant conditioning
Carroll, C.E. (1986). Computer Simulations. <i>Social Studies Review</i> , 25(3), 57-59.		7	x		discus- sion	elementa- ry education	discusses 4 commercial programs; emphasizes debriefing simulations not intended to standalone; emphasizes development of thinking and problem solving and not merely mastery of content

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Cecchini, A. Frisenna, A. (1987). Gaming simulation: A general classification. <i>Simulation/Games for Learning</i> , 17(2), 60-73.			x				
Chaffin, J.D., Maxwell, B., & Thompson, B. (1982). ARC-ED curriculum: The application of video game formats to educational software. <i>Exceptional Children</i> , 49(2), 173-178.		69	x		discus- sion	other	motivational features of video arcade games: feedback, high response rates, improvement, unlimited ceilings on performance; references to Malone, motivation and master
Chambers, B. and Abrami, P.C. (1991). The relationship between student team learning outcomes and achievement, causal attributes, and affect. <i>Journal of Educational Psychology</i> , 83(1), 140-146.		60	x	descriptiv es, ANOVA	research	elementa- ry education	examination of relationship between prior achievement, individual outcome, team outcome, student achievement, and academic perceptions
Clariana, R.B. (1989). Computer simulations of laboratory experiences. <i>Journal of Computers in Mathematics and Science Teaching</i> , 14-19.	x						USA - journal check vol 8, check citation

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Cohen, R.B. and Bradley, R.H. (1978). Simulation games, learning and retention. <i>The Elementary School Journal</i> , 78(4), 247-253.			x				
Coleman, J. (1973). The Hopkins game program: Conclusions from seven years of research. <i>Educational Researcher</i> , XXX, 3- 7 (August)	x		x				
Coleman, J.S. (1989). Simulation games and the development of the social theory. <i>Simulation and Games</i> , 20(2), 144-164.			x				
Corbett, R.W. & Lee, B.T. (1992). Nurtiquest: a fun way to reinforce nutrition knowledge. <i>Nurse Education</i> , 17(2), 33-5.							USA - ordered
Lox, T. and Kerr, J.H. (1990). Self-reported mood in competitive squash. <i>Personality and Individual Differences</i> , 11(2), 199-203.			x				
Crookall, D., et.al. (1987). Towards a reconceptualization of simulation: From representation to reality. <i>Simulation/Games for Learning</i> , 17(4) 147-171.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Crookall, D. and Saunders, D. (Ed) (1989). <i>Communication and simulation: From two fields to one theme</i> . Multilingual Matters, Ltd. Clevedon, England (Book 89-0880007-00)							
Cruichshank, D.R. (1988). The uses of simulations in teacher preparation. <i>Simulation and Games</i> , 19(2), 133-156.		8	x		discus- sion	adult education	review of simulations for teacher education; one game
Cryer, P. (1988). Making decisions about an educational game, simulation or workshop: A 'games theory' Perspective. <i>Simulation/Games for Learning</i> , 18(4), 245-255.			x		research, theory	adult education	explores theories of games in educational settings
Deci, E.L. (1972). Intrinsic motivation, extrinsic reinforcement, & inequity. <i>Journal of Personality and Social Psychology</i> , 22, 113-120.		76	x				will there be changes in a person's intrinsic motivation when external rewards for performing an activity are given

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Dekkers, J., & Donatti, S. (1981). The interpretation of research studies on the use of simulation as instructional strategy. <i>Journal of Educational Research</i> , 74 (6), XXX	x						USA - journals
DeVries, D.L. & Slavin, R.E. (1978). Team-Games-Tournament (TGT): Review of ten classroom experiments. <i>Journal of Research and Development in Education</i> , 12, 28-38.			x				
Driskell, J.E. and Dwyer, D.J. (1984). Microcomputer videogame based training. <i>Educational Technology</i> , 24, 11-17.		9	x		discus- sion	military	defines video games and their benefits and characteristics lists instructional properties, gives gaming strategies; example of game included
Duchastel, P. (1991). Instructional strategies for simulation-based learning. <i>Journal of Educational Technology Systems</i> , 19(3), 265-276.		10	x		discus- sion	NAD	discusses instructional strategies for simulation features: fidelity, interactivity, artificiality; global strategies: simplification, support; specific strategies: demonstrating tasking, explaining
Duchastel, P (1989). Knowledge-based instructional gaming: GEO. <i>Journal of Educational Technology Systems</i> , 17 (3), 189-203.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Duke, R.D. and Kemeny, N.K. (1989). Keeping score one score later: Two decades of the Simulation and Games Journal. <i>Simulation and Games</i> , 20(2), 165-183.		82	x		literature review	NAD	discusses state of simulation/gaming from historical perspective of articles in simulation and games journal
Dunne, J.J. (1984). Gaming approaches in educational software: An analysis of their use and effectiveness. 13 p. Evaluations conducted by Educational Products Information Exchange Institute.		77	x		discus- sion	secondary education	investigate use and effectiveness of gaming techniques in educational software; the extent s/w uses gaming; ways it is being used; overall effectiveness
Ellington, H., et. al. (1982). Games and simulations teach social relevance of science. <i>Impact of Science on Society</i> , 32(4), 481-491.		11	x		discus- sion	secondary education	broad introduction to simulation and gaming to show how such techniques can be used to demonstrate social relevance of science
Faherty, V.E. (1983). Simulation and gaming in social work education: a projection. <i>Journal of education for social work</i> , 19(2), 111-118.			x				
Faria, A.J. (1989). Business gaming: current usage levels. <i>Journal of Management Development</i> , 8(2) 58-66.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Faria, A.J. (1987). A survey of the use of business games in academia and business. <i>Simulation and Games</i> , 18(2), 207-224.			x				
Fisher, J.E. (1976). Competition and gaming: An experimental study. <i>Simulation and Games</i> , 7(3), 321-328.		75	x	NEED	research	adult education	to investigate the effects of variations in competitive form on the cognitive learning outcome of an educational game
Fraas, J.W. (1982). The influence of student characteristics on the effectiveness of simulations in the principles course. <i>Journal of Economic Education</i> , 13(1), 56-61.		12	x	t-test	research	adult education	investigate effectiveness of simulation-gaming to teach college introductory course, especially in are of student characteristics; findings: neither simulation game nor lecture discussion could be considered exclusively superior, depends on student characteristics
Fraas, J.W. (1982). The use of seven simulation activities in a college economics survey course. Paper presented at the Economics in the Community College Workshop. (Orlando,Fl. 10-15-82) 30 p.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Frederiksen, J.R., Weaver, P.A. Warren, B.M., Gillotte, H.P., Rosebery, A.S., Freeman, B and Goodman, L. (1983). A componential approach to training reading skills. Report No. 5259, Bolt Beranek and Newman, Inc. Cambridge, MA.							
Gerritsma, J.G.M. and Smal, K.A. (1987). A validation strategy for a complex simulation of the study of medical decision making. <i>Simulation and Games</i> , 18(1), 35-56.			x				
Glassman, U. (1990). A gaming opportunity for multiethnic group experience - Teaching Ethno-racial sensitivity through groups. <i>Social Work with Group</i> , 13(4), 127-130.			x				
Goodman, F.L. (1990). Graphix. <i>Simulation and Gaming</i> , 21(4), 467-472.		13	x		discus- sion	NAD	describes gaming procedure and design of graphix

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Grabe, M. and Dosmann, M. (1988). Application report: the potential of adventure games for the development of reading and study skills. <i>Journal of Computer-Based Instruction</i> , 15(2), 72-77.		70	x	descriptiv es	research, discus- sion	elementa- ry education	use of adventure games as an academic activity to develop text processing skill
Gredler, M. (1986). A taxonomy of computer simulation. <i>Educational Technology</i> , 26 (4), XXX	x						
Gredler, M.B. (1990). Analysing deep structure in games and simulations. <i>Simulation/Games for Learning</i> , 20(3), 329-334.		52	x		theory	NAD	discusses deep structure of games and reinforcement theor in relation to gaming -- as well as related concepts such as negative utility

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Greenblat, C.S. (1982). Games and simulations. In Mitzel, H.E., <i>Encyclopedia of educational research</i> (5th ed), The Free Press: New York.		x	x		discus- sion	elementa- ry education, secondary education, adult education, business, military, health care	defines games/simulations
Greenblat, C.S. (1973, October). Teaching with simulation games: A review of claims and evidence. <i>Teaching Sociology</i> , 1(1), 62-83.		14	x				
Griffiths, M.D. (1991). Amusement Machine Playing in childhood and adolescence - A comparative analysis of video games and fruit machines. <i>Journal of Adolescence</i> , 14(1), 53-73.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Griffiths, M.D. (1992). Pinball wizard: the case of a pinball machine addict. <i>Psychological Reports</i> , 71(1), 160-2.		79	x		discus- sion	other	discusses addiction of person to pinball machine gaming - gambling
Griffiths, M.D. (1990). Adolescent gambling-An observational pilot study. <i>Perceptual and Motor Skills</i> , 70(3), 1138.		54	x		discus- sion	other	observation of gaming machines; 4-hour monitoring session; discussion of results
Griffiths, M.D. (1990). Arcade clientele and gaming preferences: A long-term study. <i>Perceptual and Motor Skills</i> , 70(2), 1258.		68	x		discus- sion	NAD	observation of gaming preferences
Grinblatt, M. and Titman, S (1987). How clients can win the gaming game. <i>Journal of Portfolio Management</i> , 13(4), 14.			x				
Habe, R. (1989). Community growth gaming. <i>Environment and Behavior</i> , 21(3), 298-322.			x				
Hand, H. H. and LaFollette, W.R. (1973). A discriminant analysis of organizational performance variables. <i>Journal of Applied Psychology</i> , 58(3), 368-371.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Hasell, M.J. (1987). Community design and gaming/simulation: comparison of communication techniques in participatory design sessions. <i>Simulation and Games</i> , 18(1), 82-115.		15	x	small number of cases, used n	research	other	evaluate the use of gaming/simulation as a participatory method for including users in the design of community projects
Hatch, C.W. (1984). Solution of problems which involve a difference between an individual's behavior and expectations. <i>Education</i> , 104(3), 329-331.		57	x		discus- sion	business, other	proposes model for solving problems involving difference between behavior and expectations in a gaming environme
Hayhoe, M. (1989). Drama as gaming: "to restir and busily occupy." <i>English Journal</i> , 78 (4), 54-58.							
Henson, K.T. (1982, May). Simulation games and teaching. <i>NASSP Bulletin</i> , 66(454), 94-98.							USA - journal
Heyman, M. (1982). What are simulation games? <i>Environmental Education Report</i> , 10(5), 2-5.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Hsu, E. (1989). Role-event gaming simulation in management education: A conceptual framework and review. <i>Simulation and Games</i> , 20(4), 409-438.			x				
Hubbard, P. (1991). Evaluating computer games for language learning. <i>Simulation and Gaming</i> , 22(2), 220-223.		16	x		discus- sion	other	discusses evaluation criteria for using games in foreign language classes
Hughes, L.A. (1988). "But that's not really mean": Competing in a cooperative mode. <i>Seroles</i> , 19(11-12), 669-687.			x	qualitative	research	elementa- ry education	girls are often thought to be not as competitive as boys in : gaming environment; to some extent that is situational or : result of a less socially reinforcing scenario
Hunt, I. (1982). Developing a design philosophy for business games. <i>Simulation/Games for Learning</i> , 12(3), 95-112.			x				
so Ahola, S.E. and Blanchard, W.J.(1986). Psychological momentum and competitive sport performance: A field study. <i>Perceptual and Motor Skills</i> , 62(3), 763-768.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Jacobs, J.W. & Dempsey, J.V. (1993). Simulation and gaming: fidelity, feedback, and motivation. In J.V. Dempsey & G.C. Sales, <i>Interactive Instruction and Feedback</i> . Englewood Cliffs, NJ: Educational Technology Publications.					discus- sion	nad	examines feedback and motivation in simulation and gaming
Jacobs, R.L. and Baum, M. (1987). Simulation and Games in training and development: Status and concern about their use. <i>Simulation and Games</i> , 18(3), 385- 394.		17	x		discus- sion	adult education	discusses status and concerns about using simulation-games for training and development
Jolicoeur, K. and Berger, D.E. (1988). Implementing educational software and evaluating its academic effectiveness; Part I. <i>Educational Technology</i> , 28(10), 13-19.							USA - microfilm
Jones, K. (1989). Running or stumbling through simulations. <i>Simulation/Games for Learning</i> , 19(4), 160-167.		18	x		discus- sion	NAD	describes differences between simulation and other interactive learning events; defines simulation and games in both USA and Britain

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Kelly, R.T., Greitzer, F.L., Hershman, R.L. (1981). <i>Air defense: A computer game for research in human performance</i> . Navy Personnel Research and Development Center: San Diego.			x				
Kette, G. (1986). Attributions restore consistency in bargaining with like/dislike partners. <i>European Journal of Social Psychology</i> , 16(3), 257-277.							USA - microfilm
Keys, B. and Wolfe, J (1990). The role of management games and simulations in education and research. <i>Journal of Management</i> , 16(2), 307-336.		20	x		theory, literature review, discus- sion	adult education, manage- ment	defines terms and parameters for management gaming, reviews history of business gaming, examines studies on management gaming effectiveness, reviews models of learning, reviews literature that deals with management games and simulations, looks at trends and developments
Keys, B. (1976). A review of learning research in business gaming. Proceedings, ABSEL: 173-184.		19	x		literature review	adult education, business	review of learning research in business gaming to clarify existing incongruencies that exist in the literature

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
King, W.C., Jr. (1991). Boys will be boys (and girls will be girls): the attribution of gender role stereotypes in a gaming situation. <i>Sex Roles: A Journal of Research</i> , 25, (11-12), 607-23.							
Kistler, J.R. (1988, December). Expanding the simulation: An interdisciplinary approach. <i>Educational Technology</i> , 23-25.	x						USA - microfilm
Klein, J.D. and others. (1990). Providing practice using instructional gaming: a motivating alternative. Proceedings of Selected Paper Presentations at the Convention of the Association for Education Communications and Technology. See IR 014 535. 19 p.							
Klein, R.D. and Fleck, R.A. (1990). International business simulation/gaming: An assessment and review. <i>Simulation and Gaming</i> , 21(2), 147-165.		53	x		literature review	business	reviews gaming literature to identify gaming's strengths and weaknesses to determine roles that simulations can play in international business pedagogy

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Klein, J. and Freitag, E. (1991). Effects of using an instrumental game on motivation and performance. <i>Journal of Educational Research</i> , 84(5), 303-308.			x	MANOV A, ANOVA	research	adult education	effects of a content-specific board game as measured by Keller's motivational scale
Klein, J.D. and Freitag, E. (1991). Enhancing motivation using an instructional game. <i>Journal of Instructional Psychology</i> , 18(2), 111-115.			x				
Kneer, B.W., Simutis, Z.M. and Johnson, R.M. (1979). <i>Computer-based simulations for maintenance training: Current ARI research</i> (Technical Report 544). Alexandria, VA.: U.S. Army Research Institute.							
Koran, L.J. and McLaughlin, T.F. (1990). Games or drill: Increasing the multiplication skills of students. <i>Journal of Instructional Psychology</i> , 17(4), 222-230.		62	x	ANOVA	research	elementa- ry education	suggests using gaming as a motivator

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Kowitz, G.T. and Smith, J.C. (1989). Conflict and gaming in instruction and performance. <i>Performance and Instruction</i> , 28(2), 28-32.		21	x		discus- sion	NAD	discusses role of conflict and control in gaming and its use in instruction and game theory
Krishnakumar, P. and Chisholm, T.A. 1979). An analysis of team composition as it affects simulation performance. Paper presented at the Annual Conference of the North American Simulation and Gaming Association - Oct. 1979. 23 p.							
Kryukov, M.M. and Kryukov, L.I. (1986). Toward a simulation games classification and game dialogue types. <i>Simulation and Games</i> , 17(3), 393-402.		64	x		theory	NAD	proposes a game classification based on the "game image existing in the minds of the participants
Kues, J.R. (1992). The development and use of gaming in multidisciplinary geriatric education. <i>Educational Gerontology</i> , 18 (1), 27-40.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Laffont, J.J., (1990). Analysis of Hidden Gaming in a 3-level hierarchy. <i>Journal of Law Economics and Organization</i> , 6(2), 301-324.							
Laffont, J.J. (1989). Hidden gaming in hierarchies - facts and models. <i>Economic Record</i> , 64(187), 295-306.							
Lardinois, C. (1989). Simulation, gaming and training in a competitive, multimodal, multicompany, intercity passenger transportation environment. <i>Journal of Research Society</i> , 40(10), 849-861.	x						
Laughery, K.R. (1984) Teaching humans game-playing skills. <i>Simulation and Games</i> , 15(2), 187-212.			x	ANOVA	research	military	explores reverse-role training and mentions measures of strategy
Laveault, D. and Corbeil, P. (1990). Assessing the impact of simulation games on learning: A step-by-step approach. <i>Simulation/Games for Learning</i> , 20(1), 42-54.		22	x		discus- sion	adult education	discusses micro-development sequence of how learning takes place in a simulation game

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
ederman, L.C. (1992). Debriefing: Toward a systematic assessment of theory and practice. <i>Simulation & Gaming</i> , 23(2), 145-160.		96			literature review, discussion	NAD	debriefing process as applied to simulation and games; review of literature on debriefing; analysis of process; strategies for use
Lepper, M.R. and Chabay, R. W. (1985). Intrinsic motivation and instruction: Conflicting views on the role of motivational processes in computer-based education. Special issue: Computers and education. <i>Educational Psychologist</i> , 20(4), 217-230.		23	x		theory, discussion	NAD	discusses theoretical controversies and policy debates concerning using computers; argues that conflicting views underlie differences of opinions about costs and benefits, importance of styles of teaching, and alternative strategies
Lewis, D.J., Saydak, S.J., Mierzwa, I.P., & Robinson, J.A. (1989). Gaming: a teaching strategy for adult learners. <i>Journal of Continuing Education in Nursing</i> (?), 20(2), 80-4.							USA - biomedical library
Lin, S. and Lepper, M.R. (1987). Correlates of children's usage of videogames and computers. <i>Journal of Applied Social Psychology</i> , 17(1), 72-93.		72	x	correlation	research	elementary education	to see if there is a relationship between videogame use and aggressiveness, sociability, academic performance, computer use

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Livingston, L.A. (1992). Monitoring the effect of color on performance in an instructional gaming environment through an analysis of eye movement behaviors. <i>Journal of Research on Computing in Education</i> , 25 (2), 233-42.							
Livingston, L.A. (1991). The effect of color on performance in an instructional gaming environment. <i>Journal of research on computing in education</i> , 24 (2), 246-53.		24	x	descriptives, ANCOVA, ANOVA	research	adult education	discusses impact of color on retention, memory load; color appears to be a distracting variable
Lock, R. (1991). Creative Work in Biology - A Pot-pourri of examples. Part 2: Drawing, drama, games and models. <i>School Science Review</i> , 72(261), 57-64.			x				
Locke, E., & Bryan J. (1967). Performance Goals as determinants of level of performance & boredom. <i>Journal of Applied Psychology</i> , 51, 120-130.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Logan, J.W., Olson, M.W. and Lindsey, T.P. (1989). Lessons from champion spellers. <i>Journal for the Education of the Gifted</i> , 13(1), 89-96.		25	x		discus- sion	elementa- ry education	discusses different strategies champion spellers use to learn competition words and their intrinsic motivation
Loukissas, P.J. (1983). Gaming Simulation as a communications tool in local planning. <i>Ekistics</i> , 50(302), 378-385.							
Madden, G. and McGowin, C. (1989). The effect of the inner game method versus the progressive method on learning motor skills. <i>Journal of Teaching in Physical Education</i> , 9(1), 39-48.		26	x	ANOVA	research	adult education	compared effect of two methods of instruction for teaching volleyball; did not find any difference
Malone, T.W. (1981). Toward a theory in intrinsically motivating instruction. <i>Cognitive Science</i> , 4, 333-369.	x	85	x	ANOVA, correla- tion, ANVOC A	research, theory	na	discusses studies of computer games and promotes a theory which includes challenge, fantasy, and curiosity

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Malone, T.W. (1981). Heuristics for designing enjoyable user interfaces: Lessons from computer games. Proceedings of the Association of Computing Machinery Symposium on Small and Personal Computer Systems, Palo Alto, CA, 63-68.			x				
Malouf, D.B. (1987). The effect of instructional computer games on continuing student motivation. <i>Journal of Special Education</i> , 21(4), 27-38.	x	27	x	ANOVA, t-test	research	secondary education	investigated effects of computer games on motivation and found that the game resulted in significantly higher levels of continuing motivation
Marsh, C.J. (1981). Simulation games and the social studies teacher. <i>Theory into Practice</i> , 20(3), 187-193.		28	x		discus- sion	secondary education	discusses simulation gaming and merits for social studies teachers, types and formats of S/G, prep activities and skill and teacher strategies for eliciting support from colleagues principals, and parents
Martin, A. (1988). Out of the screen: Computers and Simulation. <i>Simulation/Games for Learning</i> , 18(1), 21-29.		29	x		discus- sion	NAD	different ways computer intervention in simulation exercises are explored
McClure, R.F. and Mears, F G. (1986). Videogame playing and psychopathology. <i>Psychological Reports</i> , 59(1), 59-62.		59	x	ANOVA	research	secondary education, other	videogame playing is seen as a social activity and not a serious achievement activity

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Miesing, P. and Preble, J.F. (1985). Group processes and performance in a complex business simulation. <i>Small Group Behavior</i> , 16(3), 325-338.		30	x	Factor Analysis	research	business, higher education	reports processes on team performance using a simulation as an experimental laboratory
Nawrocki, L.H. and Winner, J.L. (1982). <i>Analysis and evaluation of electronic games</i> . Draft of paper prepared for U.S. Army training Support Center.							
Neubeck, K.J. (1989). Simulation and gaming and the teaching of sociology. <i>Teaching Sociology</i> , 16(3), 330.							
Nieswand, G.H. (1986). Gaming simulations for enhancing international education. <i>Simulation and Games</i> , 17(3), 376-381.			x				
Norris, D. and Niebuhr, R.E. (1980). Group variables and gaming success. <i>Simulation and Games</i> , 11(3), 301-312.			x	correla- tion	research	business	game performance as a product of group characteristics
O'Brien, B. (1989). Compuserve role-playing games: a respite from the mundane world. <i>PC Magazine</i> , 8 (10), 476.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
O'Brien, S.J.and Conger, P.R. (1991). No time to look back: Approaching the finish line of life's course. <i>International Journal of Aging and Human Development</i> , 33(1), 75-87.			x				
Oxford, R. & Crookall, D. (1988). Simulation/gaming and language learning strategies. <i>Simulation/Gaming</i> . 19(3), 349-352.		56	x		discus- sion	other	discusses learning strategies of learners and the relationship to simulation/gaming
Oxford, R., Crookall, D., Cohen, A., Lavine, R., Nyikos, M., and Sutter, W., (1990). Strategy training for language learners - 6 situational case studies and training model. <i>Foreign Language</i> , 23(3), 197-216.							foreign language annual?, if so USA - journals
Oxford, R. (1990). Using and learning language through simulation gaming. <i>Simulation and Gaming</i> , 21(1), 73-74.			x				
Oxford and Crookall, D. (1988). Simulation Gaming and language learning strategies. <i>Simulation and Gaming</i> , 19(3), 349-352.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Oxford, R., and Crookall. (1988). Simulation/gaming and language learning strategies. <i>Simulation and Games</i> , 19(3), 349-353.			x				
Parker, L.E. and Lepper, M.R. (1987). The effects of fantasy context on children's earning and motivation. Paper presented at the American Psychological Association, NY. Stanford University, Department of Psychology, CA.							
Paton, D. (1987). Book review of vol 8- Business, Health and Nursing, Vol 9 - Learning for the Future with Gaming and Simulation, Vol 10 - Effective use of games and simulation. <i>Programmed Learning and Educational Technology</i> , 23(4), 380-385.							
Pierfy, D.A. (1977). Comparative simulation game research: Stumbling blocks and stepping stones. <i>Simulation and Games</i> , 8(2), 255-268.		31	x		literature review	elementa- ry education, secondary education	review of studies and focuses on the question of whether games teach particular things better than alternative methods

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Pilkington, R.M., Hartley, J.R., Hintze, D., & Moore, D.J. (1992). Learning to argue and arguing to learn: An interface for computer-based dialogue games. <i>Journal of Artificial Intelligence in Education</i> . 3(3), 275-295.		95	x		discus- sion	adult education	need for more flexible kinds of dialogue between system and user; uses Socratic method or style of dialogue
Potter, J.W. (1990). Understanding utilization data and detecting provider "gaming". <i>Top Health Care Financ (?)</i> , 16(3), 28-35.							USA - ordered
Randel, J.M., Morris, B.A., Wetzal, C.D., Whitehill, B.V. (1992). The effectiveness of games for educational purposes: a review of recent research. <i>Simulation & Gaming</i> , 23(3), 261-276.		32	x		literature review	elementa- ry education, secondary education, military	compares instructional effectiveness of games to conventional classroom instruction
Reetz, L. (1988). Alternative homework for the mildly handicapped elementary student: try gaming! ERIC document: ED299747.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Leigelth, C.M. and Schwartz, E. (1989). An instructional theory for the design of computer-based simulations. <i>Journal of Computer-Based Instruction</i> , 16(1), 1-10.		71	x		discus- sion	NAD	focuses on instructional overlay as a simulation -- optimiz learning and motivation
Reiser, R.A. & Gerlach, V.S. (1977). Research on simulation games in education: A critical analysis. <i>Educational Technology</i> , 17, 13-18.		58	x		literature review, discus- sion	NAD	review of articles involving simulation games and their effects in areas of interest, attitude, efficacy, knowledge, intellectual skills; looks at weaknesses in research method and notes on how to overcome this problem
Remmer, A. M. and Jernstedt, G.C. (1982) Comparative effectiveness of simulation games in secondary and college level instruction: A meta-analysis. <i>Psychological Reports</i> , 51(3, Pt 1) 742. PsychLit 70-06638.							USA - journal
Remus, W.E. (1981). Experimental designs for analyzing data on games: Or even the best statistical methods do not replace good experimental control. <i>Simulation and Games</i> , 12(1), 3-14.		33	x		discus- sion	NAD	discusses research designs and shows that they need good experimental control and most sophisticated statistical methods can't remove the effects of a lack of experimenta control

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Renaud, L. and Stolovitch, H. (1988). Simulation gaming: An effective strategy for creating appropriate traffic safety behaviors in five-year-old children. <i>Simulation and Games</i> , 19(3), 328-345.		34	x	MANOV A, ANOVA	research	elementa- ry education	discusses gaming as an effective strategy for behavior creation in 5-year olds
Reynolds, A. and Martin, J.V. (1988, January). Designing an educational computer game: Guidelines that work. <i>Educational Technology</i> , 45-47.		35	x		discus- sion	NAD	gives guidelines for designing educational computer game
Rickel, J.W. (1989). Intelligent computer- aided instruction: A survey organized around system components. <i>IEEE- Transactions on Systems, Man, and Cybernetics</i> , 19(1), 40-57.			x				
Robinson, K.J., Lewis, D.J. & Robinson, J.A. (1990) Games: a way to give aboratory values meaning. <i>ANNA Journal</i> , 17(4), 306-8, 328.							USA - biomedical library

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Rogers, P.J. (1989). Teaching mathematics through play to primary school children. <i>Educational Studies</i> , 15(10), 37-51. (cite in ERIC wrong or 2 journals Ed St)	x						USA - microfilm
Ruben, B.D. and Lederman, L.C. (1982). Instructional simulation gaming: Validity, reliability, and utility. <i>Simulation and Games</i> , 13(2), 233-244.			x		theory	NAD	provides a framework for analysis of games by assessing validity, reliability, and utility of the activity
Rubin, M. (1981). Games people play: Game Preferences of students as related to sex differences and other factors. ED211344. 14 p.			x				
Rutherford, M. (1976). The use of computer games in education: A critique. <i>Economics</i> , 12, 31-36.		36	x		discus- sion	NAD	locates assumptions that underlie views of the potential of computer games and examines them
Jaegesser, F. (1981). Simulation-gaming in the classroom: Some obstacles and advantages. <i>Simulation and Games</i> , 12(3), 281- 294.		37	x		discus- sion	secondary education	discusses general difficulties encountered while introducing simulation/games into the school system

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Schunk, D.H. (1990). Goal setting and self-efficacy during self-regulated learning. Special issue: Self-regulated learning and academic achievement. <i>Educational Psychologist</i> , 25(1), 71-86.			x				
Shubik, M. (1989). Gaming: Theory and practice, past and future. <i>Simulation and Games</i> , 20(2), 184-189.		38	x		discus- sion	business, military, other	history and potential of gaming
Slanika, S.C. (1992). Coping with cancer: creative teaching strategies in an elective for nursing students. <i>Journal of Cancer Education</i> , 7(1), 67-72.							USA - ordered
Smith, P.E. (1987). Simulating the classroom with media and computers: Past efforts, future possibilities. <i>Simulation and Games</i> , 18(3), 395-413.			x				
Smith, P. (1986). Low-cost simulations: The impossible dream revisited. <i>Educational Technology</i> , 26,35-38.		39	x		discus- sion	adult education	simulation discussion and cost of producing simulation on computer/IVD; gives definitions

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Snider, A.C. (1984). Games without frontiers: A design for communication scholars and forensic educators. <i>Journal of the American Forensic Association</i> , 20(3), 162-170.			x				
Sorenson, D.S. (1981). "Nuclear deterrence" as an adaptive game frame for crisis decision-making. <i>Journal of Experiential Learning and Simulation</i> , 3(2), 103-109.		40	x	mean, frequencies	research	adult education	discusses game "nuclear deterrence," links to other crisis behavior theory and case study
Spivey, P.M. (1985). The effects of computer-assisted instruction on student achievement in addition and subtraction at first grade level. Requirements for the degree of educational Specialist, Augusta College, ED 263874.							
Spraggins, C.C. and Rowsey, R.E. (1986). The effect of simulation games and worksheets on learning of varying ability groups in a high school biology classroom. <i>Journal of Research in Science Teaching</i> , 23(3) 219-229							USA - microfilm

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Straus, R.A. (1986). Simple games for teaching sociological perspectives: Four examples of the do-it-yourself approach. <i>Teaching Sociology</i> , 14, 119-128.			x		discus- sion	higher education	gives examples of games that can be used to anticipate and/or reinforce themes and concepts covered in class lectures; gives instructions, design considerations, and evaluation of student responses to 4 games
Swendsen, L.A. (1982). Simulation and gaming as effective teaching strategies. <i>Journal of Nursing Administration</i> , 12(5), 7.							USA - fiche
Szafran, R.F. and Mondolini, A.F. (1980). Test performance and concept recognition. The effect of a simulation game on two types of cognitive knowledge. <i>Simulation and Games</i> , 11(3), 326-335.		41	x	regres- sion	research	adult education, higher education	studies test performance and concept recognition; conclude that there is no evident that simulation games substantially increase cognitive knowledge
Taylor, M. (1990). Simulations and adventure games in CALL. <i>Simulation and Gaming</i> , 21(4), 461-466.		42	x		discus- sion	NAD	discusses use of communication language teaching approach using CALL
Thatcher, D.C. (1990). Promoting learning through games and simulations. <i>Simulations and Games</i> , 20(2), 165-183.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Tyson, G.A. and others (1988). Games playing strategy as an indicator of racial prejudice among South African students. <i>Journal of Social Psychology</i> , 128(4), 473-385.			x	descriptives	research	higher education	examined cooperation attitudes of black and white South African students
Van Sickle, R.L.(1986). A quantitative review of research on instructional simulation gaming: A twenty-year perspective. <i>Theory and Research in Social Education</i> , 14(3), 245-264.			x	mini-analysis	research	NAD	quantitative review (mini-analysis) of simulation/gaming; indicates small position effects for affective variables and retention; appendix shows coding sheets for study
Van Ments, M. (). Simulations, games, and role-play. <i>Techniques of teaching and assessment</i> .	x	44	x		discus- sion	NAD	defines simulations, games, role play, examples, advantages, disadvantages
Vennix, Jam. (1987). Communicating Insight from complex simulation models - A gaming approach. <i>Simulation Gaming</i> , 18(3), 321-343.	x		x				
Wagner, P.A. and Penner, J. (1982). Games, logic and giftedness. <i>Roeper Review</i> , 4(4), 14-15.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Wankel, L.M. and Sefton, J.M. (1989). A season-long investigation of fun in youth sports. <i>Journal of Sport and Exercise Psychology</i> , 11(4), 355-366.			x				
Watkins, M.W. (1986). Microcomputer-based math instruction with first grade students. <i>Computers in Human Behavior</i> , 2, 71-75.		45	x	ANCOV A	research	elementa- ry education	study assessed posttest math scores; concluded that results were consistent with existing literature, but much remains to be explored in educational applications
Weber, J.R. & Smith, D. L. (1991). Name that nursing diagnosis: a gaming-simulation. <i>Nurse Diagnosis</i> (?), 2(2), 79-83.							USA - ordered
Westrom, M. and Shaban, A. (1992). Intrinsic motivation in microcomputer games. <i>Journal of Research on Computing in Education</i> . 24(4), 433-445.		46	x	NEED	research	secondary education	discusses intrinsic motivation in two games (instructional and noninstructional)
White, B.Y. (1984). Designing computer games to help physics students understand Newton's Law of Motion. <i>Cognition and Instruction</i> , 1(1), 69-108.			x				

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Whiteley, T.R. and Faria, A.J. (1989). A study of the relationship between student final exam performance and simulation game participation. <i>Simulation and Games</i> , 20(1) 44-64.		47	x	ANOVA	research	business	studies whether participation in a game is related to final grade
Wieseman, R. A. (1982). Simulation gaming and racial attitudes. ED227199. 22 p. Research Report (143).							
Williams, R.H. (1980). Attitude change and simulation games: The ability of a simulation game to change attitudes when structured in accordance with either the cognitive dissonance or incentive models of attitude change. <i>Simulation and Games</i> , 11(2), 177-196.		48	x	ANOVA	research	adult education	describes factors that influence effects of simulation/gaming; discusses identification and playability
Wilson, C.C. (1988). Gaming as a method for learning to resolve ethical dilemmas in long term care. <i>Health Education</i> , 19 (1), 42-44.							

	Ref Corr .	En- tere d	Ha ve	Statistical Analysis	Category	Environ- ment	Comments/Purpose
Vishart, J. (1990). Cognitive factors related to user involvement with computers and their effects upon learning from an educational computer game. <i>Computers and Education</i> , 15(3), 145-150.		49	x	chi-square	research	elementary education	builds on Malone's theory, adds control to complexity and challenge
Wood, L.E. and Stewart, R.W. (1987). Improvement of practical reasoning skills with computer skills. <i>Journal of Computer-Based Instruction</i> , 14(2), 49-53.		50	x	3-way ANOVA	research	adult education	study of student reasoning ability increases scores on critical thinking appraisal
Yeo, G.K. (1991). A framework for developing simulation game systems. <i>Simulation and Gaming</i> , 22(3), 308-327.		51	x		development	adult education, business, management, higher education	discusses integrated networked to coordinate activities surrounding a simulation game to have game administrative and decision support system more easily be built and maintained
Zemke, R. (1982). Can games and simulation improve your training? <i>Training</i> , 19(2), 24-27.							