

Learning By Experience[®]

Simulations and Games

A Reference Paper - Don Jones

Philosophy

“

I hear and I forget.
I see and I remember.
I do and I understand.

”

Lao Tsu, Chinese Philosopher,
6th Century B.C.

History

Simulations and interactive gaming have been around for thousands of years. Chess was consciously developed as a representation of war more than 2,000 years ago. Monopoly was created during the 1930's depression as a reflection of popular thinking about the economy. The Germans were first to exploit simulation for research and training. In the 19th century, members of the German General Staff recognized and used this approach to train and prepare their staff in tactical strategies. The Allied forces used simulation extensively throughout World War II and continue to do so to this day.

Business

After W.W.II business began using games and simulation in training and in modeling for decision making purposes. This use has expanded to the point where 48% of American companies now report using games and simulations as part of their instructional methods. (Training, October 1991, see Figure attached).

Education

Most educational institutions are now reporting using a game or simulation in some part of the curriculum including Harvard Business School, the University of Toronto, the University of Western Ontario, and the Wharton School of Business.

Retention

What the early Generals knew instinctively, today's business and educational institutions are proving empirically, that the best lessons are not taught, they are learned. A study in Training and Development Journal, December 1983, stated: "People retain about 25% of what

they hear, 45% of what they see and hear, and 70% of what they see, hear and do." Another study conducted by Linda B. Specht, CPA, J.D., and Petrea K. Dandlin, CPA, Ph.D., led both to the conclusion that simulations were equally good at teaching a new skill or idea as traditional methods, but they were clearly superior in long term retention of the information processed. (Simulation and Gaming Journal of Theory, Design and Research, Vol. 22, #2, 1991).

Learning by Mistakes

Marcia Watson of Learning International in Stamford, CT. states that "Some of the best lessons in complex skills are learned by mistakes, or at least by trying various approaches to the same problem. However, most companies don't want employees practicing on their customers. Simulation is the next best thing."

Participatory

In a recent 1989 study, Richard McKenna (Edith Cowan University, Australia) examined the benefits of using simulation as measured both by the participants and by the instructors. The survey results of both groups were mutually supportive in these three areas:"1. Participants enjoy taking part.3. Participants rate the courses in which simulations are used more highly than others.3. Simulations are superior to other learning techniques." Simulation & Gaming, March 1991, Vol. 22, #1.

Real Life

The findings are reinforced by the experience of many businesses. Harry Lasker, co-founder of Interactive Training Systems of Cambridge, MA, states "Adults like to take an active role in their education." Continental Insurance instituted a simulation for their National Brokerage Service division. Robert Reinke, Vice-President, explains that, "Life at N.B.S. is fast-paced and competitive. The training programs we put our people through should reflect that same ethic. I want my people to develop solid management skills. I don't think they can learn them in a classroom setting that emphasizes role plays and general discussion. I want my people to perform under the gun, or at least under a simulated gun." (Training, March 1990, "Training in Context", by John Hendrickson).

Transfer Encoding

Anita E. Woolfolk, in her book Educational Psychology, 4th Edition, talks about the importance of "encoding information for storage in long-term memory in easily retrievable form." She states, "Making learning meaningful really implies teaching for transfer - teaching for permanent storage, deep processing, and easy retrieval. Learners will be more likely to transfer information to new situations if they have been actively involved in the learning process. It is essential that students be engaged in the material." Jerome Bruner's well known work in this area reinforces this concept and takes it further as he indicates that allowing the learner to select his/her own internal coding produces faster and more durable learning.

**Real Life
Conditions**

Woolfolk also states, "New skills practiced under conditions similar to those they will have to cope with later have a good chance of transferring." Bower and Hilgard in a 1981 study show that this is the reason that simulations have proved so successful in training pilots, physicians, and drivers.

Overlearning

"Even greater transfer can occur by overlearning. This means practicing a skill past the point of mastery. This can combat forgetting." (Woolfolk)

Discovery

Bruner's work in the area of discovery learning is based on the principle "that teachers should provide problem situations that stimulate students to discover the structure of the subject matter for themselves." Bruner suggests that "instructors should encourage the learner to make guesses, act and test situations on incomplete evidence and then receive feedback on their actions. Unfortunately, most educational practices often discourage intuitive approaches by punishing wrong guesses and rewarding safe but uncreative answers." (Bruner, 1960)

Practice

Gagne and Driscoll, 1988, have, through research and testing, developed a theory of instruction that works through a sequence which culminates in the learner using the information or practicing some of the skills in a variety of situations. Gagne states that this practice is where transfer occurs and information goes into long-term memory. As J. Clayton Lafferty, Ph.D., founder of Human Synergetics, Plymouth, MI. says, "The world is always improved when people are able to practice skills and witness the consequences of their actions, knowing that they will not be held accountable for them." (Newsweek, October 2, 1989) Alan Richter, Vice-President, Quality Education Development, N.Y., says, "Games are effective learning tools because they coax players to act; active learning is the best kind." (Training and Development Journal, July 1990) He notes how Prudential Insurance Company successfully uses a game they designed, The Business Unit Strategy Game, to provide an overview of the entire company for middle to senior management.

**Learning to
Learn**

Many education researchers agree that the long-term goal of any training or educational program is to help the participant begin to 'own' their own learning process. Robert Burger and A.E.M. Seaborne (The Psychology of Learning, 2nd Edition) explain, "Most of the learning opportunities that exist potentially throughout life are not initially designed for that purpose and depend entirely on the learner for their realization. If this is to become a part of normal working life, then clearly one of the most important objectives of education must be to enable people to learn without guidance, to extract whatever is to be gained from situations they find themselves in - whether or not those

situations are explicitly labeled 'training' or 'research'."

Dealing with Change

Research in the last decade especially focuses on preparing the learner for the many technological, social and economic changes that will effect every business and organization today. Simulations and games are able to replicate these changing conditions and allow the participants an opportunity to practice their skillset dealing with these changes. As Burger and Seaborne concluded, "If we recognize that specific knowledge will constantly go out of date, then we must concentrate on developing in each individual the ability to search out and assimilate new knowledge, even in circumstances where it is not already organized and processed." R. Harrison and R. Hopkins ("An Alternative to the University Model", Journal of Applied Behavioral Science, 1967) state, "In order to solve problems the learner has to define the problems, generate hypotheses, collect information, and develop problem-solving approaches on the spot."

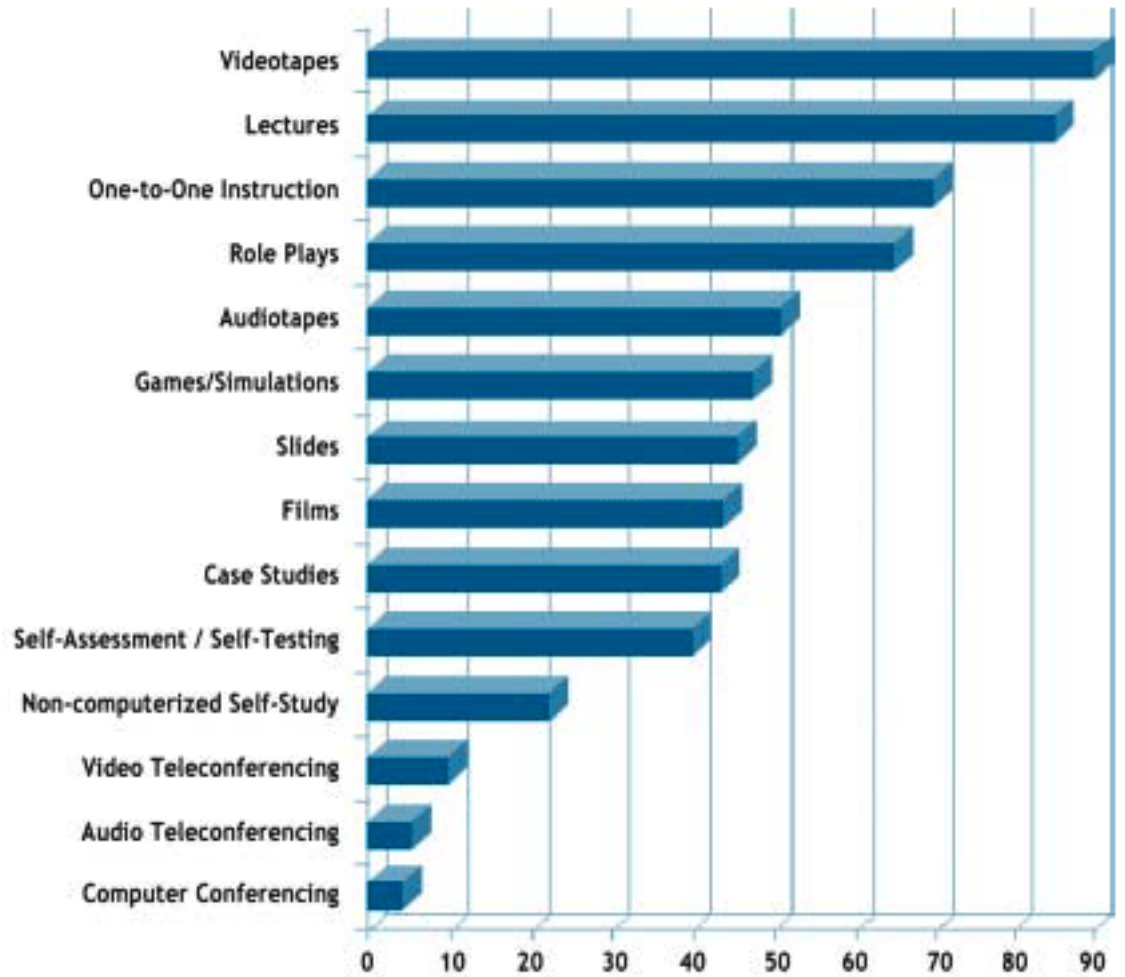
Motivation

The motivation to learn and to engage in the learning process has been clearly shown to be a significant variable in the effectiveness of any instructional method. As Alice Kaplan Gordon points out in her book Games for Growth: Educational Games in the Classroom, "Motivation means 'stimulus to action'. People usually wish to act, to participate, to make things happen in preference to being spectators or passive, if not bored spectators into a laboratory of active participants in the learning process."

Senses

William Herndon asked Abraham Lincoln's cousin, Dennis Hanks, how he and Lincoln were educated. "We learned by sight, scent and hearing," Hanks replied. "We heard all that was said, and talked over the questions heard, wore them slick, greasy, and threadbare." Lincoln spent less than a year "going to school". (The School Without Walls, Bremer and von Moschzisker) Simulations and games engage all of the senses of the participants in the learning process itself and then, through structured debriefing sessions, allow them to discuss what they have experienced.

Percent of U.S. Organizations Using These Methods For Employee Training



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