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Westinghouse
Hanford Company Richland, Washington

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ABSTRACT

The Westinghouse Hanford Company Advanced Training Technologies section is using situational simulations in several Interactive Video training courses. Two applications of situational simulations will be discussed. In the first, used in the Hanford General Employee Training course, the student evaluates employee's actions in simulations of possible workplace situations. In the second, used in the Criticality Safety course, students must follow well-defined procedures to complete tasks. Design and incorporation of situational simulations will be discussed.

INTRODUCTION

The realism of video combined with the power of computer-based simulations provides a unique platform for training. A student can be placed in realistic simulations of potential workplace situations. The author can then allow the student to make decisions based on what they see, hear, and read. And, without endangering the student, the consequences of those decisions can be dramatized.

Westinghouse Hanford Company (Westinghouse Hanford) and the United States Department of Energy (DOE) are using interactive video situational simulations to train employees in a variety of subject areas. Two examples where situational simulations are used are the Hanford General Employee Training (HGET) course and the Criticality Safety (CRITSAF) course.

WHY USE SIMULATIONS

Simulations have proven to be an excellent tool for enabling students to acquire knowledge in procedural tasks (1) ranging from nuclear reactor operations to computer application program operation. The medium has also proven successful in assessing procedural knowledge (2), which is the primary intent for use of simulations in both the CRITSAF and HGET courses. In the CRITSAF course, simulation is used as a means of evaluating the students understanding of procedures for operating chemical processing systems with the potential for criticality. The HGET course assesses a student's ability to recognize potential workplace problems and a student's ability to begin the process of solving those problems. In addition, the programs provide remedial instructional activities as needed.

WHY USE VIDEO

The use of videodisc for training applications has been documented as being highly effective (3). There are two major reasons for using video in computer-based training: realism and "engagement" value. Given video sequences coupled with sound, a student sees real people following real procedures in real settings. The student can be evaluated on recognition of any number of clues (i.e., spoken words, gestures, flashing lights, etc.). Still "photographs" can be used with text and labeling to give a much more exact description of a subject. Sound is an important aspect, especially where sound is an element in recognition of problems. Nearly anyone who has worked around machinery can relate stories where sound played a role in recognition of problems. Testing for alarm recognition also illustrates the advantages of the use of sound. While a recording of an actual alarm plays in the background, the student is asked, "What is the correct immediate action to take upon hearing this alarm in your work area?" The skills involved in answering this question include recognition of the sound and connecting that sound with a particular action.

The second reason for using video in computer-based training, and probably the hardest to quantify, is the "engagement" value. Educators have known for centuries that learning is reduced if students are distracted from the learning activity. The learning curriculum must be revised and upgraded

to ensure that students have the tools required to succeed today. Today's students have been raised with television and computer games. It is becoming more and more difficult to hold their attention. Videodisc and compact disk technologies now allow educators to incorporate advanced computer graphics and video into engaging, interactive courseware.

HANFORD GENERAL EMPLOYEE TRAINING COURSE

The HGET course presents students with video vignettes (short video clips) in which safety, security, and quality issues are addressed. The vignettes are simulations of possible workplace situations. The actors and actresses used in the vignettes are actual Westinghouse Hanford employees who volunteered for screen tests. The students must evaluate each vignette and answer questions concerning the subject matter. The vignettes, with their related questions, act as a diagnostic examination for related instructional material. The questions evaluate the student's recognition of safety, security, and quality problems. The student's understanding of the proper procedures for dealing with such problems in the workplace is also evaluated. For example, one vignette simulates an employee violating several work rules relating to the use of government vehicles and other property. An employee is shown stopping at a local store for lunch while driving a government vehicle. The employee then uses a portable radio-phone to make a one-hour personal phone call. The employee then strikes something with the vehicle while leaving the store parking lot. Following this vignette, the student is questioned on the various work rules that were violated and the correct actions that should have been taken following the vehicle accident. The student's answers to these questions determine whether the student is given remedial training on company work rules.

THE CRITICALITY SAFETY COURSE

The CRITSAF course trains students in the fundamentals of criticality safety. Along with learning such things as the basics of neutron interaction factors, students are made aware of the need for procedural compliance to prevent accidental criticality. For this course, a typical nuclear chemical processing system was simulated. The student is provided with procedures for operating the system and is asked to perform solution transfers from a geometrically safe tank to a geometrically unsafe tank. Errors introduced at strategic points in the program require the student to take actions to mitigate the consequences of those errors. The errors include high nuclear material concentrations, valves out of position and spurious alarms. Each must be dealt with using the procedures provided. Incorrect or out-of-sequence actions are flagged and feedback is provided.

CONCLUSION

The realism and engagement value provided by well-produced interactive video has been demonstrated as an effective alternative to traditional lecture-based training. Experience and research at Westinghouse Hanford has led to the conclusion that the combination of situational simulations and

computer-based, interactive video programs provides a powerful tool for training. Westinghouse Hanford is continuing to apply this medium to increase the effectiveness of training in a variety of areas.

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