
made. We devoted one day for student presentations. A few students emulated existing instruments, and they did a good job. Most students invented instruments that were... well, ... "Far Out," to say the least. We had horror movie instruments, jet plane sounds, heavy metal instruments, jungle rhythm instruments, and other instruments I could not describe in words. At the conclusion of this portion of the course, students knew so well why instruments sound as they do that they could create any instrument to make any desired sound or evoke practically any desired emotion.

We composed MIDI music during the final weeks of the course. MIDI stands for Musical Instrument Digital Interface. My students learned how to program electronic music into a Macintosh computer. The process is similar to word processing. Instead of entering letters into the electronic memory of a computer, we use a program that enters musical notes. Just as in word processing, when we were

displeased with the notes or the rhythms, we edited them to be exactly what we wanted. The final version for any instrument in the program's memory was a "perfect" solo, just as the final version of a word processing document is a "perfect" version of the document. Each student had to program at least five different instruments, all playing together forming a band. At least one of those computer instruments had to be a rhythm instrument such as a drum. Thanks to computer editing, the entire performance could be perfect. It was the logical next step, now that the students knew the basics of individual instruments. For the last days of the class, the students brought their 3 1/2 inch computer discs to class and played their compositions through the Macintosh in the classroom for the other students. I thought most of these electronic performances were astonishing. A sample of the electronic performances included, (1) a stirring rendition of a Civil War song with cannon firing and

with taps played by a lone trumpet at the end, (2) a song entirely of rhythm instruments, (3) a band performance of the mathematical notions of chaos and fractals, and (4) the theme to a popular TV show performed at least as well as the TV version.

I want to acknowledge my colleagues whose assistance allowed this experience to happen. Dr. Dorothy Zinsmeister, my department Chair, had faith in me to give me the chance to teach this course. Dr. Don Davis loaned us the keyboard that all of the students used to program their invented instruments. Dr. Gary Lewis obtained the MIDI music hardware and software necessary to create MIDI music, and the music discovery equipment. Dr. Wayne Gibson allowed us to use his Department of Music and Performing Arts computer music room to assemble our final performances. Mr. Stephen Byess provided musical and MIDI expertise, and I spent many enjoyable hours discussing this course with him.



Simulations as a Strategic Training Tool for the 90s

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In a world that is rapidly changing, training in the work place has become crucial for the work force to adjust to technological changes and economic pressures. The use of simulations is an effective component in educating today's diverse work force.

A simulation is a representation of a real life situation in

which elements are depicted by symbols, numbers or a physical form. It is a training device that artificially duplicates the conditions that would be encountered in an actual situation.

One of the reasons simulations are so important is that some concepts are difficult to learn from words or pictures. And in some situations it can be costly

and dangerous to have inexperienced workers practice with the real systems, such as learning to fly or drive.

Simulations also can be excellent in responding to an array of different learning styles if certain guidelines are followed. For example, when preparing a simulation developers must be sure to determine if there are participants who have physical limitations that could inhibit the learning process if not addressed. The

trainer also needs to account for cultural and even subcultural differences and to avoid language barriers. Taking these factors into account will prevent offensive comments or gestures in the training setting.

In short, it is of utmost importance to know your audience before preparing the simulation and to make the proper adjustments. Also, when devising the simulation, take into account different learning styles. Some participants are visual, while others are aural or haptic. Furthermore, keep in mind the differences in educational, socio-economic backgrounds and geographic experiences.

Simulations can also be categorized as behavioral or technical. The purpose of behavioral simulations is to create an environment that duplicates a real life situation without portraying reality. This type of simulation emphasizes interpersonal behavior and the decision-making process. A supervisor dealing with a problem on the job with an employee is an example. The importance of this type of simulation is that it

can be used to train for soft skills such as performance appraisal, interviewing, on-the-job performance and other managerial skills.

Technical or computer simulation is a model that recreates reality in a controlled environment; its purpose is to create a safe and less costly training environment, such as a pilot learning to fly in a simulator.

We live in a world that requires effective communication, and yet workers have poor communication skills. When and if other types of communication fail, simulations will ensure the continuity of the learning process. During the course of a simulation participants forget they are living in a simulation. Soon they revert to their customary behavior. The simulation, therefore, will help participants discover, through experience, the behavior patterns that exist in organizations and in their own lives and what causes these patterns.

It is vital to remember that a poorly designed simulation can be worse than no training at all. Simulation can solve training

problems, but only if simulation is the right solution. Thornton and Cleveland suggest that simulations be used judiciously within a broad sequence of other developmental efforts, partly because simulations have certain limitations as an assessment and training technique.

Charlene Marmer Solomon suggests that simulations are effective when participants understand themselves better and they function more fully as a team. Basically, participants have an experience that appeals to all their senses; as they go through the simulation, they have a chance to talk about it, to experience it, to see it, and to feel it. They have a chance to learn from their mistakes which will make it an unforgettable experience.

In conclusion, over the past decades simulations have been demonstrated to be effective. They will continue to play a vital role in educating and training the work force of the nineties and the future. Simulations are the key to success in this fast changing and diverse business environment.

Four Types of Simulation

One. Helps participants learn the psychomotor and perceptual aspects of a task as it is performed in real world situations. For instance, a flight simulation helps trainees practice visual and motor coordination as well as task sequences in response to cues from the simulator.

Two. Cognitive-task simulations help participants learn the concepts and abstractions that underlie the rules

and principles governing their work environments, for example a management situation that calls for thinking processes.

Three. For tasks involving communication and coordination simulations are developed where there is a situation where several trainees can perform at one time in different roles as part of a simulation of a work system. The actions of each participant are shown at the other trainees' stations. This application can be used in everything from plan-

ning marketing strategies to managing plants.

Four. Visual-reality simulation attempts to achieve total sensory simulation through the use of special headgear and electronic gloves. The trainee wears goggles fitted with small computer screens where he or she views the target environment in three-dimensional images.

