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SYMBOL RECOGNITION AND CORRELATION FOR EVALUATING DECISION MAKING IN COMPUTERIZED AND EXPERIENTIAL SIMULATIONS

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ABSTRACT

Rather than being merely an accessory to the learning process, symbols can become an integral part of that process with important additional learnings. By helping students to more effectively employ symbols, simulations can further improve student thinking and decision making skills.

INTRODUCTION

The use of computerized business simulations in the business curriculum is an excellent tool, if the student is able to establish decision making relationships rather than emphasizing the procedures of the computer program. Too often the user decodes the system and manipulates the simulation to obtain results rather than analyzing key decision points and evaluating their impacts. The business simulation should be designed to present a real life situation in which the student can learn decision making, establish internal/external relationships, define cause/effect situations, and perform under multi-variable conditions. Aiding the student's analytical abilities is the primary reason for incorporating symbols into a business simulation.

WHY USE SYMBOLS?

The reason for using symbols is that they are compact, quickly recognized, and can be displayed in quantity in a small visual area. The symbol cuts across semantics, misrepresentations, and syntactic confusion. The symbol gives the business simulation flexibility to bring together decision relationships without requiring over simplification or over complexity in textual explanation. Some of the other reasons symbols aid evaluation are:

Identification Ease

Symbols are a type of shorthand, representing specific names, descriptions, or ideas without excessive explanations or space requirements. They are a visual summary of meaning, communicating the distinction and individuality of identification needs.

Parallel Vs. Serial Thinking

Symbols can be positioned in abstract or nonpartitioned space. They are not read like a sentence nor do they have style requirements like paragraphs or outlines. They can be put into clear style requirements like paragraphs or outlines. They can be put into closer proximity with one another and still remain unique in themselves. They can be positioned in any variation of spatial sequence: size, diagonal, see-saw, circular, diamond shape, and so on. This type of random display is not possible with normal terms or definitions. Symbols have defined boundaries, are complete within themselves, and connection to another symbol will make little sense. The student can identify each symbol at a single glance and mentally establish its uniqueness as to resources, distinguishable in its smallest

capacity, and past track record. Serial reading or separate identification of descriptors or terms required individual concentration on each part of the presented material. Symbols provide a parallel identification process which gives the student a momentary awareness of all variables at the same point in time.

The Puzzle Approach

The use of symbols also gives the decision maker a dimensional placement in solving the problem. Rather than a checklist approach, the student sees a positional puzzle with each symbol having a place relationship to all other symbols/variables. The decision maker can then establish a mind's eye placement of the symbols (flowchart or hierarchical structure) in the position or flow pattern which best fits his analysis or decision priority. When the student is limited to a checklist, it gives him a chance to establish order priority but not a position or dimensional priority. (For example, a specific variable might not fall into a strictly numerical ranking with a previous variable. It could hold a parallel priority.)

Use in Graphs, Diagrams, and Tables

When referencing a specific variable on a graph, diagram, or table, some sort of coding system or catalog system must be used to aid identification because of space limitations. With symbols, this type searching is not required. The symbol itself is placed as the value marker on graphs, diagrams, or tables. This replaces the plotted point and identifier with a single symbol, which is identified and used throughout the simulation. This decreases errors in referencing codes or numbers, and the confusion of extra detail, explanation, and unfamiliar notations is eliminated.

Hidden Agendas

Where prior learning presents problems of proactive inhibition, this impediment to the learning process can sometimes be overcome by camouflaging the nature of some of the simulation elements through the use of symbols. In this way, students will tend to be less constrained in their perceptions of relationships; that is, freer to try other than conventional solutions. During the post game discussions (debriefing) alternative interpretations of the symbols are then solicited to facilitate learning from the experience.

SYMBOL ALLOCATION

Symbols should be allocated to areas which require specific decisions as to quantitative inputs, sequencing, or priorities. Symbols should be required to be unique to each area of decision making. The design of the symbols should be chosen so as to (1) maximize total space occupation, (2) create the maximum difference between patterns, (3) establish a symbolically identifiable code which will be easy to relate to the variable (for example, "A" for advertising budget), and (4) be graphically

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form.

BUSINESS SIMULATIONS

Most business simulations were developed in order to present the student with problem environments in which to learn avenues of efficient solutions. With the advent of the computer the time and space requirements to utilize such a learning tool have diminished considerably. However, few utilize the computer to its fullest extent. Simulations do, generally, take less time, but the student still is forced to learn by a trial and error process most often. Utilizing symbols to decrease even more the redundancy of simulation activity can allow the process to incorporate both the quantitative decisions plus adding the evaluation of behavioral and structural constraints on the decision and the decision maker. Using symbols can help the student make tradeoff evaluations more quickly and with less identification distortion. Structural relationships of variables are easier to display and visualize. The systems concept can be presented so that any student can grasp the flow dynamics and three-dimensional nature of business decisions. The foundation of business learning is advancing beyond the memorization stage toward a spatial mode of requirements, priorities, and impacts. The business simulations can become vitally alive if the student can interreact with the system without unnecessary linguistic procedures and the serial input/output syndrome. Symbols present an alternative for such a solution.

SYMBOLS IN EVALUATION

The results of using symbols in a simulation produce a many-faceted array of output tools and measures. Evaluating a student on a simulation should not be done on merely his final profit/loss figure. It should encompass improvement, behavioral patterns, and ability to correct recognized faults. The following are a few of the output results which can be used from a simulation utilizing symbols.

Decision mapping

Mapping of the student's priority changes in relation to actual importance ranking. Graphic depiction of variable input relationships and proper output results. A dimensional map showing the parallel development of each variable as to its ranking and output impact.

Realtime evaluation

The student can receive a visual display as to his correct or incorrect placement of variables as the simulation continues. This uses symbol identification and prioritizing to display the student's results for each variable. Output values do not give the student all the feedback needed to make decisions. Bias or randomness of decision making also needs to be pointed out.

Carryover

Utilizing the symbols from the simulation in other material such as handouts, tests, worksheets, or presentations will reinforce the student's recognition of decision areas. Simulations should not be viewed as a separate entity within the learning process. The impact of computer interaction for the students should be counterbalanced with visual and carryover material using symbols in other classroom activities.

Patterns of learning

The long-term use of establishing relationships among

variables and of continued prioritizing will eventually reveal the student's areas of preference or weakness. The use of symbols records and plots the students' progress in a simulation, and thus will expose their biases or vulnerabilities in decision making.

Symbol Usage in Student Reports

Rather than relying solely on profit/loss rankings for evaluation purposes, some professors have effectively employed student reports, both oral and written, to assess the student understanding of the game parameters and the soundness of the strategy employed. The extent of correct symbol usage in these reports then provides a proxy measure of student understanding of the basic concepts of the simulation.

SUMMARY

The use of computerized business simulation can be cumbersome if (1) the tool is not understood, (2) it is used only as a quantitative measure of output efficiency, (3) the student uses it mainly as a trial and error device to obtain some given output, (4) the system is entangled in rhetoric, (5) input procedures are computer-oriented and not human efficient, and (6) the program is easily decoded or predictable in its outcome. The computer is not what is to be overcome -it is the decision making process! Business simulations should not be bound by hardware or software but by the students' time frame of response and feedback requirements.

Symbols can help expedite the simulation process into a sphere of information transparency and relationship conceptualization. Symbols can produce visual solidarity of identification, recognition, and correlation processes. They can add a dimension of time evaluation of students' interactions never before captured.