

# Developments In Business Simulation & Experiential Exercises, Volume 17, 1990

## COGNITIVE LEARNING USING A COMPUTER-BASED, QUALITATIVE INTERACTIVE BUSINESS SIMULATION

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### ABSTRACT

Criticism has been directed at educators for failing to teach students and managers how to solve problems. Concentration has been on methods for solving structured problems or problems comprised of limited and clear characteristics for which accepted methods of solutions have been developed. Means for providing and coping with a set of uncertain and unstructured factors has been lacking. The paper discusses a language-based computer simulation which permits the subject to utilize cognitive skills for memory-recall of the concepts acquired in education and experience to find and achieve an understanding of a complex business situation.

### INTRODUCTION

A criticism that is now being directed at education on all levels is that today's graduates can crunch numbers, but Cannot solve problems (National Commission of Excellence in Education, 1983). A primary objective of computer-based business simulations has been to give students and managers an opportunity to practice "hands-on" managerial thinking. Still simulations are criticized for being narrow, quantitative and unrealistic.

While the need to develop the managers skills exists and the potential to acquire these skills exists, a major deterrent is that few pedagogies are available that can provide for intensive development of the range of human cognitive skills. Recognizing the broad acceptance of business cases for these cognitive purposes, attention was directed at finding ways to expand the cognitive potential of the classical business case.

#### Achieving an Understanding

A distinct cognitive stage of problem-solving is called "orientation achievement" or reaching an understanding of what the "true" situation is. In current case pedagogy, orientation is achieved by reading and rereading the case.

Normally, one reaches an understanding by first collecting information relevant to the Situation. In today's dynamic society, oneself and others are the primary sources of information. Human sources and sources prepared by humans can be accessed only by questions -

#### Questions: Source and a Structure

In present experiments, certain dimensions have proven particularly helpful when questioning. One dimension is the conscious partition of knowledge by academic disciplines. When this step is taken in the interest of organized questioning, the next level dimension becomes Concepts.

Methodical application of the major academia disciplines significantly facilitates the evocation or recall by the individual of his existent knowledge base. The embedded Concepts of the discipline can then be recalled which, in turn, enables the individual to expand organized questioning.

Three dimensions were used to develop a construct for a proposed structure for questioning - A Knowledge Matrix consisting of Disciplines, Concepts and Environments.

#### Research on the Questioning Process

For these experiments, a computer program, THE MANAGER was developed to organize and simplify the questioning process for the user, make input user-friendly, eliminate the influences of the researcher and to automate question collection and analysis. The device used to motivate and elicit questions from the participants is the classical, business case used as a database. As the total situation (case) is "sheltered" in the computer, the subject can obtain information about the situation (case) only by means of Questions. There are both qualitative and quantitative responses at the terminal and the printer. In effect, the user must first prepare ones own case and then solve it; a more realistic simulation of the true managerial role.

#### Experimental Method and Results

Thirty business school students were individually instructed to ask as many questions as each believed necessary to adequately understand the situation. Students were selected in the following specialization's--marketing, management, economics/finance, accounting, information systems, and insurance. The null hypothesis under test in this experiment was:

The concepts used by the students to ask questions are not significantly influenced by the concentration or specialized training of the students.

ANOVA tests confirm the hypothesis that the subjects concentration or specialization does not influence the disciplines used to search complex, business situations. (P .01).

A total of 353 concepts were used. The ten concepts used most frequently to search the simulated global situation were:

<u>Rank</u>	<u>Concept</u>	<u>Rank</u>	<u>Concept</u>
1	ROI	6	Resources
2	Beliefs	7	Government
3	Values	8	Ethics
4	Truth	9	Growth
5	Quality	10	R & D

The implications of this particular array of questions is now being assessed.

#### Conclusions

It was apparent to both observers and subjects that with an understanding of the questioning process together with an opportunity to practice, the effectiveness and efficiency of the subject's cognitive skills for questioning in complex situations improved rapidly.