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AN EXPERIENTIAL PARADIGM FOR TEACHING BUSINESS PROBLEM SOLVING

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ABSTRACT

Necessitated by pressures to maintain adequate freshman class sizes in light of declining demographics, business schools are admitting students less prepared than those a generation ago. Demands are placed on the faculty to educate the students not only in the functional disciplines, but also to address student developmental deficiencies. These deficiencies typically include both problem solving skills and effectiveness in working in groups. A cooperative work group experiential format to the introductory information systems course is proposed in which the computer is viewed as one of several components of a business information system. The system is applied to a five-step problem-solving model. The model is then experienced by the students through the theme of career development in which the students focus on the issues of college selection, major selection, and career options upon graduation. Thus, the traditional systems development process is introduced through a problem-solving model and used as a basis for future classroom exercises. Employing this cooperative experiential approach the course addresses issues involving both (1) effectively working in groups, and (2) decision making in both individual and group settings. Simultaneously, the course covers the content requirements of the discipline. Since students are actively involved in the learning process and, in effect, teach each other, the emphasis of the course has shifted from a "teaching" environment to viewing the classroom as a learning" laboratory.

INTRODUCTION

The Student Retention Problem

Across the nation, the dwindling college-age population has caused an increased emphasis on student recruitment and student retention efforts. Many colleges and universities have lowered their admissions standards in an effort to maintain an adequate class size. From the viewpoint of the student, this has created a 'buyer's market". Students are often being admitted to schools that a decade ago were academically beyond their reach.

The characteristics of the typical admitted student have changed dramatically over the last decade. Recognizing the presence of the "buyer's market", high school guidance counselors have advised students to apply to schools that in the past were beyond their academic reach. Further, they have told the students that it is acceptable to be undecided about their major. Although some students are undecided for "correct reasons such as keeping their options open, many are undecided for the "wrong" reasons. Gordon (1984) states that among such wrong reasons are (1) information deficits about themselves and career options consistent with their personality, (2) developmental skills deficits in the areas of critical thinking and decision making, and (3) personal and social concerns in which they are experiencing self-conflict about either their lack of major or their declared major.

Research (Gordon (1984); Pascarella & Terenzini (1991)) has consistently shown that this undeclared status has been associated with increased likelihood of not persisting to a degree. Thus, at least on the surface, being undeclared is in direct contradiction with institutional efforts to increase the rate of student retention.

The Introductory Information Systems Course Content Problem

While most of today's college freshmen are entering higher education with significant developmental' skills deficits, they are also entering with increased technological skills in the area of computers. An informal survey by the author of freshmen entering in the fall' of 1993 revealed that approximately 85% of the entering freshmen had prior computer exposure either in school or in the home. Typical exposure includes (1) BASIC or LOGO programming and (2) use of pre-written software such as word processing, graphics, spreadsheets, databases, and games in which learning is embedded in either MacIntosh or PC-compatible environments. Clearly, duplication of prior computer exposure is undesirable in college-level courses.

Many information systems academics advocate moving from a "computer literacy" to an "information systems" approach (Kroenke & Hatch (1993); Lauden & Lauden (1993)). White such an approach is theoretically sound, students have little experience base for understanding information systems concepts. The importance of experiential-based learning has long been advocated in management education (Kolb (1984); Cohen (1992)), but it is in its infancy as applied to the field of information systems. Most faculty use the "text-lecture-test" approach in which student learning is measured through performance on objective tests. In such environments students have 'earned how to pass the course, but little long-term retention of subject matter is present. Thus, the problem of the introductory information systems course is not just what to teach to avoid duplication of prior student exposure, but also how to teach the new content.

CHARACTERISTICS OF THE IDEAL SOLUTIONS

Any solution to the problem of increasing student retention should involve exposure to all students, not just students undecided about their major, because most students change their majors prior to graduation (Gordon, 1984). The solution should address student information deficits about themselves, careers, and college majors. It should also address developmental skills deficits in the areas of decision making and problem solving.

Any solution to the introductory information systems course content problem should build on the students' prior computer exposure. For maximum probability of student use and interest, the solution should employ software that students perceive as relevant to their concerns. Ideally, students should perceive such software to be of immediate value to them. Simultaneously, students should be introduced to information systems concepts through experience.

One last note: any proposed solution should be consistent with what we know about student learning and effective teaching. The "Seven Principles for Good Practice in Undergraduate Education" (Chickering & Gamson, 1987) has been shown (Sorcinelli, 1991) to be a fundamentally sound educational modes.

THE PROPOSED SOLUTION

In the fall of 1991 the author simultaneously addressed the issues of student retention and revised course content in his introductory information systems course. A cooperative work group experiential format resulted in which the computer is viewed as one of several' components in a business/individual problem solving system. The course goal is to:

Teach: Problem-Solving Skills
via a
Cyclic, Multi-Step Procedure
in the context of
Information Systems

Using: Small, Concrete Examples
for students to Experience/Do
so they can
Experience Success at Applying the Skills.

After introducing baseline terminology, the "business computing system" problem-solving model is introduced (Kroenke & Dolan, 1987). Recognizing the necessity of people as a vital component of any system, cooperative work groups are formed and the groups discover principles of effective group interaction through experiential exercises (Johnson, Johnson & Smith, 1991). A five-step problem-solving model adapted from Lauden & Lauden (1991) is then introduced, following which the model is applied to the example of personal career development concerns. What follows is (1) an explanation of the steps involved in the model and (2) an explanation of how the model is applied to the field of career development.

The Decision Making Model

The five-step decision making model employed in the course closely parallels the classical systems development life cycle proposed in most references on systems development. Though the number of steps may not correspond exactly to the phases involved in systems development, the sequence of activities bears a remarkably consistent resemblance. The steps are as follows:

Step 1 - Problem Analysis. The problem/situation faced by the problem solving system or person is defined by employing a "critical thinking" approach which recognizes that how one defines an issue impacts critically upon the range of alternatives available to the problem solver. Students learn that by considering various perspectives such as technological, organizational', and people issues a more global definition of the problem/situation may be formulated. When done in a cooperative setting, appreciation of cultural' diversity and individual differences enter into the problem definition process.

Step 2 - Problem Understanding. The driving force behind this step is to gain an understanding of historically what has given rise to the current problem/situation and discover what forces sustain the current problem. Ultimately, students learn here that not all parts of the current system are necessarily undesirable, and many good features exist which should be preserved in any proposed solution. To use the vernacular, it is undesirable to "throw the baby out with the bathwater'. Once an understanding of the current system has been obtained, a specific solution objective is defined and constraints under which the objective is to be obtained are identified.

Step 3 - Making Decisions. In this step alternative solutions (courses of action) to reach the desired objective are identified. Each of the alternatives are evaluated for feasibility; i.e., can the objective be achieved within the constraints identified in step two. An alternative is then selected, usually employing the criteria that the "best" alternative is the one in which the objective is obtained at the "least" cost. Cost in this sense is not restricted to solely financial considerations; it may involve such factors as effort expended, psychological' energy required, or degree to which the solution may be employed without upsetting the sociology of the organization In which the solution is to function.

Step 4 - Designing the Solution. This step is a two-part process in which the steps to be accomplished to put the selected alternative solution from step three are first identified as to "what" must be accomplished (a logical design). Following this identification a determination of "how" the steps are to be done (a physical design) is accomplished. The goal here is for students to learn that it is important to identity "what" must be done prior to focusing on the many alternative "how's" that may be employed to accomplish a particular step. Students frequently learn here that they do not have to do everything alone, reinforcing the benefits of working together to accomplish a task that would seem to be insurmountable by one person working alone.

Step 5 - Implementing the Solution. Students learn the importance of considering alternative ways in which a solution may be put into effect. They discover that solutions may be implemented a sequential step at a time (in phases), a portion of the whose at a time (a pilot system), or in critical circumstances new ideas should be tried out while keeping the sold methods working (parallel implementation) such that "all one's eggs are not placed in the same basket" by relying solely on something new without a contingency plan if the new system doesn't work according to plan.

The Career Development Example

Step 1 - Problem Analysis. The goal of this exercise is for students to develop a personal career development plan from selection of a major through their first job. Students may fall into one of three categories: (1) happy with their existing major, in which case they will focus on both defining an area of concentration within their major and formulating a strategy for securing their first job; (2) unhappy with their existing major, in which case students will attempt to formulate a strategy for investigating alternative major choices; and (3) undecided about their current major, in which case the goal is to select a major.

Step 2 - Problem Understanding (Data Gathering and Analysis). Students gather data about themselves using the Myers-Briggs Type Inventory (MBTI), one of many possible self-discovery tools available to them. After learning a bit about themselves, they gather data about possible career options using three primary sources: (1) a CD-ROM system available in the college library (an internal data base); (2) on-line access to the Bureau of Labor Statistics (an external data base); and interviews conducted with practitioners in fields that are of interest to the students. They gather data about available majors at the College using the college catalogue. The solution objective becomes to either specialize in a major or change majors, based on the students' individual cases and the data gathered earlier in this step. Constraints are resources available to the students both on- and off-campus, risks associated with the various options and choices available to them, and the individual student's values, goals, interests, ability levels, and energy levels.

Step 3 - Decision-Making. In this step students give at least two alternative career paths, explaining how each alternative meets their solution objective within the context of their constraints. They then evaluate the feasibility of each alternative using expert system software generated by the course instructor. The dimensions of the feasibility analysis include cost, time, and any other concerns that the students have defined as relevant to their particular cases. They then select one alternative, explaining why this alternative is preferred to the other(s).

Step 4 - Designing a Solution. Using CASE software, students create a logical ("what") design for their selected career path. They then translate their logical design into a physical design relative to the parameters of the College. In doing so they discover the in's and out's of getting things done at the College, and invariably recognize that it is they who are responsible for their academic success or failure. Almost without exception, students develop an attitude of assuming more responsibility for their education through the insights gained in their individual solution designs.

Step 5 - Implementing the Solution. Students create a time frame (schedule) for implementing their selected solution. If practical, they begin the process of implementation within the context of the course.

Thus, the system development process is introduced through a decision making model and used as a reference point for future classroom activities. Students are introduced to software that they were not previously exposed to, CASE tools and expert system software. Simultaneously, student decision-making deficiencies are addressed by viewing one portion of a traditional college core course as a means of addressing student developmental deficiencies. Finally, the issue of career development is dealt with, thereby providing a college wide vehicle for partially addressing the retention management problem through an experiential teaching tool.

CONCLUSIONS

Results

The delivery system for the introductory computer course presented herein has been employed for 50% of the sections of the introductory computer course on a college wide basis for two academic years. Preliminary results are encouraging. Controlling for individual differences in teacher and time of day, students in the experimental sections scored approximately one letter grade higher on end-of-semester standardized final examinations than did students enrolled in traditional sections of the course.

Students enrolled in the course enthusiastically embraced the career development example, viewing it as extremely relevant to their educational' goals. The quality of the papers they produced addressing their individual career development plans has been quite good. Undecided students from the experimental sections have declared their major at a pace twice that of undecided students as a whole. It is, however, too premature to see if students enrolled in the experimental sections have a higher persistence rate, and thus a higher retention rate, than students as a whole.

Student reaction to the CASE and expert system software has likewise been enthusiastic. While at first difficult to use, students aid each other in the learning process and most students seem to catch on rapidly due to an accelerated learning curve using cooperative methods. Thus, software relevant to their current interests that does not duplicate prior exposure has been introduced through an experiential format. Likewise, terminology relevant to the field of computers has assumed experiential dimensions.

Future Directions

Three areas in need of specific attention have been identified. First, more time needs to be spent on the front-end of the decision making process. Students have difficulty with the area of problem definition. They tend to define problems in general terms; thus, their proposed solutions cannot be measured in terms of specific success criteria. This is a common problem with unsophisticated decision-makers. Methods to successfully address the issues surrounding problem definition need to be identified and adopted.

Second, a more complete CASE tool package is desirable. The hardware to support the decision making component is currently local area network (LAN) based. A student version of a specific case tool that runs effectively in such an environment has yet to be found. More research needs to be conducted to find such a tool, or to adapt an existing tool to run effectively in a LAN-based environment.

Third, the problem needs further refinement to account for individual differences in students. Specifically, increased diversity of the undergraduate student body has led to a set of unique problems such as adults not viewing the problem of career development as particularly relevant to their individual concerns.

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