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CAPSTONE RENAISSANCE = SIMULATION + INTERACTION + DSS

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ABSTRACT

The capstone course in schools of business has been shifting from "integrating functional areas" to a "strategic management" paradigm. Some of these courses now incorporate a simulation game, but the emphasis of these courses tends to focus on content of strategy concepts. At the same time, computer literacy and decision support systems have emerged as prime concerns in business schools. Yet, these concepts have not been well integrated into extant strategy courses or the simulations used in them. This paper proposes a new "capstone" course based on a simulation which returns to the idea of integrating all areas, including decision support systems, in order to provide application of skills and execution of decisions within an integrated knowledge framework.

INTRODUCTION

Starting with the Gordon and Howell report in 1959, pressure grew for the development of a "capstone" course in business school curricula. Such a course was envisioned as an integrative experience in which students would have "an opportunity to pill together what they have learned in the separate business fields and utilize this knowledge in the analysis of complex business problems" (Gordon & Howell. 1, 1959, p. 206). Such a course was dubbed "business policy". The idea was such a good one that starting in 1969 the American Assembly of Collegiate Schools of Business (AACSB) revised their accreditation standards to include the requirement of such an integrative course in all business and administrative programs. Thus, throughout the 19705 the number of business policy courses offered at American colleges and universities grew.

Along with the growth of the number of business policy courses came a number of other charges. The first of these was in the substance of "business policy" itself. As initially described by Gordon & Howell (1959), business policy would have no "specific body of knowledge" to transmit (p. 207). Nothing new was to be taught. The previously acquired tools (marketing, accounting, finance, etc.) were to be pit to use in an integrated decision making context.

However, business policy began to develop a specific body of knowledge. As this knowledge base increased, business policy evolved into "strategic management". As a discipline, strategic management is vitally concerned with issues such as competition and long-term survival that go beyond merely integrating the functional areas of business. Thus, the strategic management course became more and more a course with its own body of knowledge and less and less an integrative experience.

At the same tine, the computer was becoming a more important presence in the business school, both in terms of its usefulness as a tool and the increased demands for computer literacy on the part of business students and faculty. In many schools, this development has resulted in the use of a computerized business policy/strategic management course. Yet most such games do not seem to contribute to the computer literacy goal, they do not usually incorporate [ES concepts, and most lack the development of other managerial skills (e.g. negotiation) which managers use on a daily basis.

Computer Literacy and Decision Support Systems (DSS)

There are two model curricula for Information systems education. One is sponsored by the Association for Computing Machinery (ACM) (Nunamaker, Cougar & Davis, 1982), the other by the Data Processing Management Association (DPMA) (Adams & Athey, 1981). Commenting on the two models, Hicks (1987, p. 546) observes:

> The primary difference between the two models is that the ACM curriculum has a more theoretical and conceptual basis, whereas the DWA model curriculum is more practical and applied in nature. Another difference is that the DPMA model curriculum emphasized that Information systems education should be housed within colleges of business.
>
> It is rare that an information systems curriculum at a specific university or college exactly matches either of these two curriculums, You do not have to follow these model curriculums exactly to receive a good information systems education.

From the perspective of computer use, the student should have a basic understanding of computer technology, sate limited application software (including, [ES software). In terms of the model curricula, courses P1 Computer Programming and IS1 Computer Concepts and Software Systems in the ACM curriculum, and courses CIS/86-1 Introduction to Computer Information Systems, CIS/86-2 Microcomputer Applications in Business, and CIS/86-3 Introduction to Business Application Programming in the DPMA curriculum, are intended to address these topics.

In actual practice, universities and colleges that do not have well-developed information systems programs will attempt to achieve basic computer literacy in students in a variety of ways consistent with the model curricula. Often students will be required to satisfy some minimum computer course requirement in order to graduate. The requirement can usually be satisfied by taking an introductory computer science department course, or an equivalent course in another department such as computer information systems or engineering. Also, instructors in all departments have been showing and increasing willingness to incorporate computer demonstrations, assignments with projects as integral parts of courses in order to better achieve individual course objectives.

Business schools have risen to the computer literacy challenge, in part as a response to the popularity of microcomputers both in industry and in education. Various kinds of general-purpose arid special-purpose business applications software are uses in business courses. In particular, the popularity of such micro-computer software as Lotus 1-2-3, dBase, Symphony, Framework, IFPS Personal and Javelin have made it possible to expose students to DSS within the structure of a course with its own topic thrust, such as accounting, production/operations management, personnel, finance and marketing. Students get to observe and work with various decision support tools and techniques, usually to solve small, topic specific problems within a narrow time frame.

However, the integration of these various DSS is usually not attempted, if it is attempted at all, until the capstone course in many business programs. And then it is often made a voluntary exercise whose accomplishment is aspired to by students who are Often more interested in impressing the instructor with their computer proficiency than with their strategic management ability. In short, the only students to benefit from such an approach are the “techies” who may not learn much about strategic management from the experience.

While some computer literacy skills (basic familiarity with computers, ability to use applications programs, come programming skills) must be assumed, the demands of the capstone course can help to achieve the five possible goals of computer literacy identified by Van Dyke (1987, p. 368):

(1) Functional competence: Students should be able the use a computer for practical tasks, especially for vocational advancement.

(2) Collective prosperity: The labor force should become more productive and more competitive in the worldwide "information economy".

(3) Academic development: Students should be able to use computers as tools in other fields of study.

(4) Cultural and intellectual empowerment: Students should be able to make use of ideas from the cultures surrounding computer programming and computer applications as part of their collection of strategies for information retrieval, communication and problem solving.

(5) Civic and moral responsibility: Students should be able and willing to promote the just and ethical use of information processing technology.

The Need for a Capstone Renaissance

Thus the situation today can be characterized as follows. There is still the requirement that each student in an ac credited business program have an integrative experience in which he/she can put into practical decision-making terms all the skills and knowledge acquired in the business program. This should happen in a capstone course. At present, this course is generally a business policy/strategic management class. However, strategic management has a broader focus than the traditional scope of integrated decision making. Thus it is becoming more difficult for strategic management instructors to both teach the substance of strategic management and provide the integrated decision-making experience required by the AACSB. See Kraft, Jauch & Snodgrass, (1986) for one business school ‘s approach to this dilemma. At the same time the computer has developed as a basis for conducting a business simulation.

Often students are asked to be merely input-output specialists to a computer simulation, inputting decisions and receiving results as output, without the benefit of DSS or of interaction with "flesh and blood" managers.

To remedy these problems, we propose the development of a new capstone course, one based on a computer simulation game which uses decision support systems (DSS) to support integrated decision-making. Such a course would have the benefits of providing the integrated experience vital to the development of business students while enhancing their computer literacy and their ability to manage and negotiate the external environment.

Role of Interaction in the Capstone Simulation

Given some of the problems with integrating a business simulation game into the policy/strategy course, some schools have established a standalone course to accomplish the purpose of such an experience. One of the more interesting courses is offered at New York University (NYU).

As in other business games, teams of students "compete” in an industry simulated by a computer. But unlike such games incorporate within a policy course, numerous activities beyond mere decision making can be accomplished.

For example, student teams are required to meet with a Board of Directors composed of actual executives from the local community. The overall strategic plan, and any major diversions from the plan, must be formally presented to that Board for approval before decisions are processed in the simulation. And "Annual Reports” are presented to the “stockholders”. Moreover, key decisions requiring “outside” involvement are subject to negotiation with actual representatives or outsider groups. For instance, if a team wishes to finance activities with long-term debt, a meeting with a local banker is necessary. At such a meeting, the team presents its plan and “negotiates term” for the loan with that banker. At various tines, industry-wide (or sometimes teamspecific) negotiations with local labor leaders would be required to secure a new labor contract (or deal with an imposed “strike"). Or negotiations with "suppliers” for the price of materials may be required. The results of such negotiations are then incorporated as parameters in the simulation.

Nonetheless, the NYU game does not appear th explicitly incorporate the computer literacy goal. The course we propose starts with the NYU model but adds a DSS component in an attempt to provide a truly integrated capstone experience.

Clearly, the administration of such a simulation goes far beyond the relatively straightforward mechanics of setting up a game within the confines of an existing policy course. It is believed that such an experience would be difficult to administer within an existing policy/strategy course which has other objectives to be accomplished.

Nonetheless, it would seem that such an experience is invaluable to the business student. Effective executives do far more than merely decisions. They must interact with outside parties in sometimes complex negotiations before such decisions can be implemented. Indeed, negotiations may actually lead to a change in strategy decisions. Moreover, information on which such decisions are based must be compiled, processed, and analyzed.

In effect, managerial skills of DSS and engaging in environmental interaction and negotiation are unlikely to be practiced in the usual simulation game in extant policy courses. For one thing, given the numerous objectives of a pol icy/ strategy course, the addition of these types of applied skills might detract from the accomplishment of other types of learning. Furthermore, the burdens placed on the instructor could become untenable. On top of preparing for and grading numerous cases and other activities, faculty would be hard pressed to set and administer such a wide-ranging "simulation". The sheer logistics of securing the ass istance of local outside participants requires substantial time for coordination. Furthermore, if a DSS is incorporated, the development arxl operation of such a system as part of the simulation may well require expertise the typical "policy instructor does not have.

Role of Strategic DSS in the Capstone Simulation

Computer-based systems have been developed in industry for supporting decision analysis at all organizational levels under the rubric of "decision support systems". DSS are also available for management simulations at different levels of sophistication. For example, Micromatic by Scott & Strickland, (1985) contains some limited features which support decision making in a minicomputer-based simulation. At the other extreme, BMD/ SLIM DeSanctis & Kasper, 1983; Courtney, Paradice & Mohammed 1987) represents a large-system simulation with extensive decision support which has been used as the basis of an ongoing research effort over a number of years.

For most educational institutions, it reasonable to suggest that the level of decision support should fall somewhere between these two extremes. In a strategic management simulation, the student must perform as a top-level strategy executive (1) in applying problem solving approaches and techniques useful for decision making, (2) in exercising an analytical and critical attitude toward problem solving, and (3) making decisions in the presence of risk and uncertainty. Generally speaking, the goals of a strategic DSS are to (1) support students in performing f firm and industry analyses within the context of competition, (2) increase the awareness of students of the importance of considering and evaluating as many courses or action as possible when making strategic decisions which affect a business over the course of time, and (3) to make it realistically feasible for students to realize the benefits of using the support system by minimizing student involvement with the information technology and by maximizing student involvement in making better strategic decisions.

Considerations of efficiency and effectiveness should dominate in the design of the strategic DSS. The design should serve to increase the efficiency of the user by handling the calculation of the many details which often overwhelm the user, especially in the early stages of play. This can be very unfortunate for the user, since an early strategic mistake can be almost impossible to recover during the course of play. By freeing the user having to make these detailed calculations, the user Will have more time to focus on strategic decision making.

The design should serve to increase the effectiveness of the user by allowing the user investigate strategic alternatives before committing to a particular strategy. Glueck & Jauch (1984) identify four grand strategies that strategic managers can adopt: stability, expansion, retrenchment. and a combination of the other three strategies.
The strategic DSS should allow users to explore the consequences of adopting various alternative grand strategies and their implementations in all aspects of managing the firm (production, marketing, financial, etc.>.

The strategic DSS should have four major subsystems: dialog subsystem, a data subsystem, a models subsystem (Sprague & Carlson. 1982), and a learning subsystem.
The dialog subsystem should allow the user to input decisions and receive the same results as output as would occur in the actual simulation ("what-if"). Ease-of-use should be viewed by the DSS developer as a fundamental design objective, lest the mechanics of using the DSS detract from the user's decision making itself.
The data subsystem should allow the user to build up a data base of past decisions and key results over the course of the simulation. These past decisions and key results can be analyzed visually or through the use of analytical models. The decision on what constitutes a 'key" result should be basal on the perceived importance of a result for possible use in a decision model (Ackoff, 1967). The design should allow for experimentation extending for any number of periods into the future, so the anticipated effects of different strategies can be explored aril compared.

The models subsystem should allow the user to use analytical models of choice to analyze the data stored in the data subsystem/ The design decision may be made not to include any finished models in the models subsystem (except simple examples of how one might utilize the models sub-system) so as not to prejudice the student user into thinking that the included finished models were more important to the management simulation than models which were not included. if this design decision is made, then the user should have provided the wherewithal to develop models at choice for firm and industry analyses. Otherwise an extensive library of models relevant to strategic planning (Grant & King, 1982) may be included in the models subsystem.

The learning subsystem should allow the user to retrieve selected data from the data subsystem and to retrace his stem and reassemble his thinking processes and strategies for any point in time in the management simulation in order to carry out possible what-if scenarios after-the-fact. This capability can be of great value in the writing of a report on an individual's or group's performance in the simulation.

Since only a low level of computer literacy can be assumed for potential users, the strategic DSS should be implemented to realize the characteristics of a user friendly" system identified in detail by Meyer & Harper (1984). These characteristics encompass system design, training and documentation, welcoming, user working dialogue user errors and system response. Since the purpose of the strategic DSS is to support and improve a student's s performance in the management simulation, every effort should be made to minimize the presence of the DSS as a technical tool and to maximize the focusing of the student' s attention on the task of strategic decision-making.

Conclusion

Student need hands-on experience in numerous skills of an integrated nature. Given the limitations of what can be accomplished in a single policy/strategy

course, it would appear that a standalone "capstone" course is clearly needed. But the capstone envisioned here goes beyond what can be accomplished by case analyses and presentation, which is often somewhat static. The capstone simulation can be a dynamic exercise which goes beyond the integration of knowledge. It integrates application of skills of using DSS to make decisions, and incorporates the execution of decisions. In some ways, this is a return to the concept of the "senior project" which educators used to require of graduates.

Sixth a standalone capstone course can also serve to advance the cause of computer literacy. In today' s technological business environment, achieving these goals through an experiential exercise as envisioned for the capstone course appears to be an educational imperative.

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