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Bridging the Gap Between Industry and Academia through Collaborative Teaching in Information Systems Education

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ABSTRACT

Purpose: The use of a consultant, collaboration software, and collaborative teaching methods employed in a systems analysis and design course are described. The interactions between faculty, consultant, and students are reviewed. Results: A contemporary clinical information system project was used in the course. The consultant was able to provide unique course resources and function as a client. Students made significant use of the collaboration software. At times the differing roles of the instructors were unclear to students. Students perceived conflicting instruction given by the instructors. Conclusions: . At times, the students were confused by instructions that they perceived were conflicting. Collaborative techniques and use of consultant arecan be beneficial. Challenges arise whenfrom using these methods. may be minimized with c Careful pre-course planning and project definition are critical to course success.

KEYWORDS:

Collaborative teaching, team teaching, consultant

INTRODUCTION

There often exists a disparity between technical needs within industry and the academic experience of college graduates. Industry seeks graduates possessing not only basic technical knowledge, but also an understanding of group dynamics and refined group interaction skills. Similarly, students desire hands-on opportunities to prepare for post-graduate employment. As a result, there is a need to expose students to academic challenges with application to current issues in the business environment. This paper presents an example of how collaborative teaching methods are being utilized at Central Michigan University in Mt. Pleasant, Michigana large public university in the Midwest to bridge the gap between industry and academia through the use of a consultant and collaborative software.

THE COURSE

Systems Analysis and Design is a graduate-level course in the Master of Science in Information Systems (MSIS) program at Central Michigan University. The mission of the course is to provide students with opportunities to acquire concepts, applications, research and direction regarding the analysis and design of enterprise information systems. To develop group-building skills, students are required to work in self-selected groups of seven or eight members. During the initial phase of the course students are presented with a business scenario in which there are unfulfilled information technology needs. The students subsequently proceed through analysis and design phases, producing a final report detailing a solution. Students also have two individual examinations and are required to use the course shell, blackboard, for communication. They learn to use various project management tools such as Pert and Gantt charts. Data flow diagrams and data models are required for their group projects. Because students bring many different backgrounds and skills to the course, the group approach is used not only to develop group-building skills, but also to maximize the ability of the groups to complete the project. Students use the CASE tools COOL:Gen 5.1a and COOL:Biz 5.0. In addition, they have access to Microsoft Project and Office 2000. Thirdly, Accelerated SAP 4.6c, an SAP rapid implementation tool, is available.

THE PROJECT

To explore current issues in systems analysis and design, a physician with information technology experience was recruited used to assist with the project portion of the course.

Through a collaborative combined effort between faculty and consultant, a scenario was designed to to model a contemporary information technology challenge: the development of a medical information system within an outpatient clinical setting. The scenario, including a general outpatient clinical setting, was the presented to students in a lecture format and via the blackboard system. Improving clinical office efficiency and ensuring medical data accuracy was the project's mission. The scenario was prompted by a recent study from the Institute of Medicine that revealed medical information errors are estimated to cause between 44,000 and 98,000 deaths in the United States each yeayear [1]r[1]. Improved health-care information systems may play a role in reducing such iatrogenic deaths. The course project is related closely to the field of Medical Informatics, an evolving information technology discipline defined as the study, invention, and implementation of structures and algorithms to improve communication, understanding and management of medical information.

The class was divided into seven groups defined by functionality: medication management, demographics management, active medical problem management, clinical practice guidelines management, patient medical reference management, patient scheduling, and integration. The need to share system functions and data between the groups was expected to be a para-

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mount challenge, critical to the success of the project. The integration group's primary task was to facilitate inter-group communication and ensure overall project objectives were met. To facilitate group interaction in the course, the instructors elected to use collaborative software (groupware) as a primary communication tool.

THE ONLINE COLLABORATION SYSTEM

Collaborative network technology (gGroupware) has become ubiquitous over the last decade [2]e[2,3] and literature suggests that groupware may improve the quality of students' educatioeducation [3].n[4]. At Central Michigan University, a course shell has been implemented using technology from www.blackboard.com. Using this technology, students, graduate assistants and lecturers can communicate and coordinate course events using real-time chat functions, secure messages boards, and email. The University is currently using this software in a pilot study involving approximately 90 faculty members and 2200 students, including all members of the Systems Analysis and Design course. Training sessions were conducted for faculty members, while students received brief handouts and online help references. Some software difficulties have occurred, attributed primarily to the need for additional server resources including increased secondary storage capacity.

During the course, all of the 45 enrolled students utilized at least one feature of the system. Over the same period, the total number of accesses to the different functional areas of the system was 29,322 hits. Students accessed the content areas the most (45.7%). They used the communication tools such as email, class discussion board, group discussion boards, and web pages, 26.9% of the time. Although they used the group areas (16.8%) to exchange files, they used the student areas (16.8%) for activities such as posting their personal web pages. Post-lecture summaries were uploaded to the message board. Assignments were disseminated via the system as well. Due to technical difficulties, online chat functions were not employed. Each group had the opportunity to communicate through the message board as well. The system was utilized most heavily near the end of the semester to share files. The class met on Tuesday evenings. Consequently, access to blackboard was most frequent on Tuesday (25%) with Friday (14.4%) and Monday (14.4%) the second most frequently accessed.

FACULTY-CONSULTANT INTERACTION

The idea of collaborative teaching developed through a series of informal discussions prior to the start of the semester. During the course, sThe clinical scenario was developed by consultant and faculty and then presented to students. Student interactions were shared on a regular basis between collaborating faculty. When similar questions were repeatedly posed to faculty, the particular subject matter in question would be reviewed together by facultyby the instructors for clarification. Throughout the semester a regular exchange of email and informal meetings were employed to review course progress. Online collaboration software (blackboard) was not utilized for faculty-consultant interaction due to a lack of perceived incentive to switch from standard email.

CONSULTANT-STUDENT INTERACTION

Following an introductory lecture on the outpatient medical clinic setting and the basic information needs therein, the seven groups were expected to investigate their area of functionality in greater depth, using the consultant as a resource. Questions regarding the specific workflow and information needs relating to each group's functionality were anticipated. Initially students posed few questions. Following initial critiques of early analysis phase work, students began to develop a sense of the level of detail expected. Face-to-face consultant-student interactions were often simulated as discourse between a client and an IT consultant (student). This allowed students to experience the process of determining client requirements. An effort to initiate online chat interactions was unsuccessful due to technical difficulties with the blackboard system. The consultant used the online message board to post critiques of group presentations, as well as providing in-class feedback, and modifications to the group project.

FACULTY-STUDENT INTERACTIONS

Initially, because there was also a graduate assistant involved with the course, the students were going to the graduate assistant instead of the faculty member for assistance. Although the faculty had emphasized in class that emails should be sent to her, the students continued to communicate mainly with the graduate assistant. Finally, the faculty had to schedule meetings with the students. Subsequently, the students learned to approach the faculty member for help. However, the graduate assistant continued to be the conduit of communication between the students and her. The faculty did use blackboard to post announcements to the students.

ADVANTAGES OF HAVING A CONSULTANT

With industry-specific experience, consultants can provide contemporary challenges from their field of expertise, providing students with desired "real world" experience. In addition to serving as a knowledge resource, consultants can also function as a client. Consultant-student interactions can be modeled to allow students an opportunity to extract functionality desired by the client. Unique resources may be more accessible: In this particular case, health-care specific materials and resources were provided to augment student research, including medical software websites and sample software packages. Prototypical examples of medical face sheets, flow sheets, and other paper-based resources were provided as well. Additionally, the faculty member felt the process of scaling back or altering the course project was made easier by having a consultant available for advice. For example, per the consultant, the scheduling module was felt to be the most difficult to develop since it changes often. To a faculty member not experienced with the dynamics of the physician's office, this may not be obvious.

DISADVANTAGES OF HAVING A CONSULTANT

At times students were confused about the roles of the faculty and ~~the~~ consultant, and were unclear about whom to ask for information. Additionally, students were uncomfortable having two instructors in the class due to the fact they felt that the faculty and consultant gave conflicting information with regard to the project. Specifically, students were frustrated when they received lower grades than expected for not meeting the specifications of the faculty when they believed their data flow diagrams were consistent with instructions provided by the consultant. Related to this, there is a risk that students may perceive the faculty as less knowledgeable than the consultant. Because the students felt that the consultant had verified their work, they believed the faculty should not question its accuracy. Although their data flow diagrams were accurate in depicting the flow of information in the medical information system, the diagrams were inaccurately drawn with respect to syntax.

CONCLUSIONS AND /RECOMMENDATIONS

The authors feel that utilizing a consultant and collaborative teaching tools effectively promotes practical real world experiences. It is important to recognize that there are challenges associated with such methods. To avoid redundancy or conflicts with respect to information dissemination and pedagogical style, faculty and consultant should establish clear guidelines for teaching the course. Students should be well informed as to the roles of the consultant and faculty. At times students may be unclear regarding the role of the consultant, whose chief administrative responsibility in this case was to ensure that the students' work accurately fulfilled the functional objectives of the project. The faculty member served as the primary administrator of the course, evaluating the technical work and fundamental skills of the students. She was ultimately responsible for the students' final grade.

For courses utilizing group projects, guidelines regarding the scope, definition, and administration of the project should be agreed upon by the instructors prior to course initiation. Students may benefit by receiving a definitive outline of the project, similar to a Request for Proposal, rather than requiring in-depth student research to establish information needs. Other relevant information such as organizational charts may also be useful. If advanced utilization of groupware is desired, formal training beyond online tutorials and brief written instructions are recommendedFurther, student expectations should be clearly defined with particular attention to the need for developing team-building skills. An early portion of the course should be devoted to working with the groups in activities that strengthen team membership. Such activities promote collaborative learning, critical thinking, and discovery learning. After such activities, each group would have guidelines to moderate their interactions. For example, members may be rewarded for an exceptional job or penalized for not adequately completing their allocated assignments. If advanced utilization of groupware is desired, formal training beyond online tutorials and brief written instructions are recommended..

A collaborative team must take care not to create levels of complexity beyond the scope of the course. Retrospectively, the level of complexity introduced by requiring integration between all groups was felt to be beyond the mission of the this course. To reduce complexity, each group should focus predominantly on only their project without concerning themselves with other groups. During the course faculty and consultant should consider establishing scheduled meetings where course progress can be reviewed. At these meetings, they could decide whether the project should be simplified or perhaps the students should be given more information.

Student expectations should be clearly defined with particular attention to abstract concepts such as the need for developing group-building skills. An early portion of the course should be devoted to working with the groups in activities that strengthen team membership. Such activities promote collaborative learning, critical thinking, and discovery learning. After such activities, each group would have guidelines to moderate their interactions. For example, members may be rewarded for an exceptional job or penalized for not adequately completing their allocated assignments.

It should be noted that for faculty, the risk associated with collaborative teaching might be significant. If students do not like the outcomes of the class, then the student evaluations of the faculty could unfavorably affect the faculty's prospects in terms of promotion and tenure. Conversely, previous authors have noted a positive favorable aspect to collaborative teaching: it representsr provides a "positive means by which new faculty can be mentored and current faculty can be encouraged to be excellent teachers" [4].

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