

A Practical Approach to Teaching Technology

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Introduction

For over a decade, Tusculum College has engaged in a process of examining and reviewing its programs which has resulted in a significant and far reaching transformation of the curriculum and the campus culture. Under the heading, *Civic Arts*, five principal reforms have been inaugurated since the fall of 1991, one of which is the Focused Calendar, where all courses are taught one at a time for the duration of 18 days. The most significant advantage of this calendar for the computer science field is that it gives more opportunity for hands-on exercises and collaborative learning. Although few schools utilize the focused calendar, many schools have short summer terms and a growing number of schools are introducing four week winter terms. The lessons learned and creative teaching practices employed at Tusculum may be used at other institutions. This paper will focus on the pedagogical innovations which have resulted in a significantly unique way of teaching information systems and technology to Business Administration majors, which exploits the focused calendar environment.

The Focused Calendar

The focused calendar is often referred to as the “block program” at Tusculum College, primarily because courses are offered in “blocks” of time. Each block consists of an 18-day period, during which courses meet a minimum of three hours per day (giving a total of 54 contact hours). Students take one course at a time and faculty members teach one course at a time. The most significant advantage of this calendar for the computer science field is that it gives more opportunity for hands-on exercises and collaborative learning.

As is probably true in most disciplines, there is an extensive amount of material to be covered in the computer science courses. Although it might be possible in some disciplines to deliver the necessary material in a lecture format, computer science courses are traditionally so “knowledge intensive” that the idea of conveying the information in a series of three-hour lectures is unreasonable. In addition, the amount of time for absorbing the material, as well as for problem-

solving and critical thinking is condensed into an 18-day stint. Because of this, the faculty had to become more innovative in instructional methodologies.

The Business Administration Course

One of the core courses for all Business Administration majors is the Management Information Systems and Systems Analysis course. The service course offered to our Business Administration majors is one of the courses in which we can effectively make the most of the focused calendar by utilizing a significantly unique way of teaching information systems and technology. The course, although part of the curriculum for business students, is taught by the faculty in the Computer Science department. The prerequisite for the course is a demonstrated proficiency in those packages which make up the Microsoft Office suite. Students may demonstrate this proficiency by taking a course or by passing a test.

The growing acceptance and use of technology in the business world has placed additional demands on those entering the field. Early on, the Business Administration department of Tusculum College recognized this need. This course is our attempt, at a minimum, to expose students to the concepts, terminology, and basic skills required to be an active participant in the management of an organization.

The Early Version

The Business Administration course, at its inception, was entitled “Systems Analysis”. The course description was as follows: “This course will deal with traditional analysis, design, and implementation through data flow analysis and systems development life cycle approach. Methods for structured analysis and design will be covered.” The course was designed not only for business majors, but was also part of the curriculum for Computer Information Systems majors and minors. In 1995, a new upper-level Systems Analysis and Design course was instituted for the Computer Information Systems and Computer Science majors, thus relegating the original course to Business Administration majors and those students wishing to minor in Computer Information Systems.

In 1999, several changes occurred in the curriculum. The students with a minor in Computer Information Systems were now required to take the upper-level Systems Analysis and Design course, rather than the course offered to Business Administration majors. In addition, the course description and objectives of the business course were modified.

The changes in the course were made for a number of reasons. Prior to 1999, the course was taught truly as a Systems Analysis course. Students spent the bulk of the time working on the design of a system. This design involved things such as data flow diagrams and input and output design. It was the belief of the then current members of the Computer Science department that this was not the kind of experience that our business students needed. We believed that they would gain more (and their future employers would gain more) by having the students learn about information systems and how they could be used in the management and administration of a business. In addition, an examination of the curriculum for a number of other institutions fur-

ther confirmed our belief that the focus of the course needed to be redirected to more accurately reflect the kind of experience we felt our graduates needed to carry with them.

The New and Improved Version

The first step was, of course, to change the course information in the college catalog. The course name was changed to “Management Information Systems & Systems Analysis”. The revised catalog description of the course is as follows: “An introduction to information systems and information technology for business students. The purpose of this course is to help students learn how to use and manage information technology in order to improve managerial decision making and gain competitive edge. Methods of developing information system solutions to business problems using structured analysis and design will be covered. Emphasis is on using spreadsheets and databases for problem solving.”

The second, most important, step was to completely overhaul the course itself. One of our goals was to design a course which more realistically mimics the real-world environment, especially for business students. Another goal was to design the course such that it would actually exploit the focused calendar environment. In a calendar environment which is sometimes not conducive to teaching technology, this type of course could flourish. The focused calendar provides substantial opportunities for conveying the necessary information and, at the same time, presents considerable opportunity to provide a more practical approach to the material.

Course Objectives

In many respects, the high level concern in this course is getting those students interested in entering the business arena to understand the importance of data collection and manipulation. To this end, the course objectives require that students learn the basic concepts necessary to be actively involved in management decisions relating to technology. And while a conceptual basis is very important, a more hands-on approach is beneficial to the student’s understanding. In many respects, this is where the focused calendar affords the greatest advantage. Adding a significant project, or in this case a series of projects, has greatly influenced both student interest and understanding of the concepts covered.

Theory and Practice

There are two main objectives in the Management Information Systems and Systems Analysis course. Exposing students to the theoretical components of technology in the business environment is, of course, of paramount importance. Having a common terminology and concept base is a must when considering current practices of managing information in the business world. This is accomplished by asking a few leading questions. Why is data important to businesses? How can a company strategically utilize data to give a competitive advantage? How have organizations typically utilized technology to gain this advantage? What hardware and software is required? How do you determine a cost-benefit or cost-prohibition to these resources?

As previously mentioned, a basic understanding of these concepts is important. However, students – and indeed most prospective employers – are mostly concerned with how this will bene-

fit them in the real world. While understanding the importance of a scheduled report or the elegance of a cleanly designed database is “all fine-and-well”, giving the students an opportunity to implement these concepts in a capstone project provides a wonderful learning tool. As this course is the only required technologically-based business course at Tusculum College, the project is billed as a capstone experience – even though this is merely a sophomore-level course. As stated earlier, the prerequisite for the business course is a “Computer as a Tool” course that covers the basics of the Microsoft Office suite. The scope of the project assumes that students have a fundamental, working knowledge of Microsoft Word, Excel, Access, and Power Point. The project tests this proficiency in many respects.

The project takes the form of a hypothetical organization seeking an MIS team to spearhead a new initiative within their organization. Students are split up into teams of between three and five per group. Each team will compete for the contract, and indeed their grade. The project is constructed in stages, each focusing on one component of either the MS Office suite or a web-based interface. Each phase leads into the next one, with the overall capstone project being kept in focus.

For example, phase one of the project requires the students to do some MIS research and formulate a plan of action to solve the problems posed by the hypothetical company. The format of the plan of action is specific and tests proficiency with MS Word. The second phase requires the students to begin gathering data using MS Excel. Here they must also do some basic data manipulation to demonstrate their understanding of the more intermediate functionality of a spreadsheet program. Phase three requires the students to import the data collected in phase two into a database program. We decided to incorporate this transition phase to highlight the fact that the move from a spreadsheet environment to a database structure is not, in many cases, an insurmountable task. Once the transition is made, students then begin their data management tasks in earnest. During this time, students work on such issues as data collection via a user interface, and running queries against the data to produce executive, demand (ad hoc), scheduled, and exception reports. The fourth phase requires that students incorporate an Internet presence for the mock company. This work requires the student to complete an on-line ordering system and other e-business necessities. The final phase of the project is the capstone presentation. The students must present each of the phases to the executive board of the hypothetical organization. We invite members of the college faculty to participate in these presentations as company board members, which creates an atmosphere of authenticity and anxiety to each of the groups.

Project Observations

As expected, the final few stages require the most amount of time. Students are given the project very early on in the class. One of the advantages of a “staged” project is that students are forced to work towards an end result on a constant basis. With a phase of the project due each week, procrastination is a vice that hurts students early and often. The scope of this project is intentionally ambitious. As everyone who has worked in the business world can attest, it is certainly not unusual for organizations to create or inherit projects that seemingly cannot be finished by a given deadline. At first blush, this seems to be a liability of such a large project; however, we chose to view this as part of the learning process. Perhaps the best lesson in this technologically-

based course has nothing to do with technology. The need to manage time effectively and delegate group member responsibilities becomes of paramount importance early in the project life.

It is important to also credit the focused calendar for some of the successes found in this course. Having three hours a day for eighteen days allows for considerable flexibility and one-on-one interaction between student and faculty. We have often dedicated entire class days to project work, thereby allowing students to hit predictable barriers with their project and have direct and immediate interaction with the teaching faculty.

Outcomes

This revised course is still relatively new, having been in place for about three academic years. As expected, some students do not like having such a large project; however, the project has become easier for students to accept once the decision to break it up into phases was made. No formal institutional research was conducted to determine the outcomes on a class-by-class basis; however we do have some anecdotal evidence that the course is useful to students and employers. The class critiques have been very positive. We often receive responses on evaluations that say, “this was the hardest course I have taken; but I learned a great deal.” We have even had both students and employers contact us to express their appreciation for the experiences gained in the course.

Evolution of the Project

Whenever academicians attempt to incorporate a new approach to an existing class, lessons are learned. The first attempt at utilizing what we call a “staged” capstone project involved students working as teams competing for a contract with an upstart on-line e-book reseller. Some of the details were provided for students such as cost levels for particular categories of books, what web sites to “mirror”, and what specific reports would be required by the organization. In fact, very detailed instructions were given as to the construction of the database and the web-interface, even including what to name individual tables and what fields should likely be included in each. Upon the completion of one cycle of courses using this project, we reviewed what aspects of the project went well, and what needed adjusting.

It became evident early on that, in fact, we had two main areas that needed to be reviewed. First, we felt that too much guidance was provided on the details of the spreadsheets, database, and web-interface. We believe that there are many scenarios in the business industry where minimal guidance is given for project work, and it is up to the design team to exceed expectations even if they may be unclear as to the details of those expectations. The second, and in many respects more important, component reviewed was the amount and nature of required research to complete the project. It was decided that a much more significant research component would be added to the second iteration of the project.

Project II: The Revenge

With lessons learned, we set forth to create a more rigorous project. In this project, students were to design a parcel flight service that would allow users to go on-line and schedule the send-

ing of packages to destinations within the continental United States. The students were told that they had a fleet of specific airplanes (for example four 727's, one 747, five Embreair 125's, etc). The students were then told that among the issues that they must address in their project were where their major airplane hubs would be located, the number of flights needed to and from cities, flight routing (meaning determining and tracking multi-leg flights), a cost analysis of shipping packages in this manner, and other issues related to the physical requirements of such a company. Students quickly found themselves doing research on the cargo and fuel capacity of Boeing 727's and on which airport locations afforded the best access to those cities most desired. To say that the project addressed our concerns about adding a research component may be an understatement.

Current Assessment and the Future

The second project adequately dealt with the issues that arose from the first iteration. In fact, we may have gone from one end of the spectrum to the other. Students struggled through the project with some level of frustration as to the seemingly endless need to do more research to make informed decisions about project needs. Immediately following the completion of the course, our first bluish assessment was that we had set the bar too high. Even the best students complained that the project was too much to expect in such a short amount of time. However, one fascinating aspect of the course was revealed when the department reviewed the student's assessment of the project. Almost unanimously, the class felt a great sense of accomplishment in what they had produced. They all noted very high learning outcomes in the practical components of the class. Their comfort level with spreadsheets, databases, and basic web design were, we believe, higher than previous sections of the same course.

Will we change the project in the future? Almost assuredly, yes. But those changes may not necessarily involve reverting to a variation of the first type of project. As we all know, the pedagogical benefits of establishing a high level of expectation, while providing the support, time, and access to reasonably accomplish the task at hand is a worthwhile pursuit.

References

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