Preparing Computer Technology Students for the "Real World"

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Abstract

One of the major challenges we face as educators of traditional undergraduates is preparing them to step away from the relative protected environment of our ivy covered campus into the "real world" (whatever that is). At our institution we have developed a senior level course whose primary goal is to do just that. The course ("Information Resource Management") includes the traditional content for such a course, but also includes some activities intended to hone those non-technology skills needed to succeed. Students are required to research a technology related topic of their choice, write a short paper about what they found, and give a 5-10 minute presentation to the class about the topic. Three such presentations are required during the semester. A second, unique aspect of this course is the organization and start up of a fictitious organization. The entire class (20 to 30 students) participates in the same organization.

Background and History

The Quantitative Methods and Computer Science (QMCS) department at the University of St. Thomas was established as a full major field of study in the late 1960's. At that time it was called simply the Quantitative Methods (QM) department and the institution was the *College* of St. Thomas. Because this author was one of the architects (in collaboration with James Lindsay and Stephen Nachtsheim) of that initial curriculum I can speak to its underlying philosophy and goals. They were, at the time, unique goals.

St. Thomas has always been a liberal arts college at the undergraduate level and we wanted to retain that same liberal arts philosophy within the department. Therefore, the curriculum did not follow the prevailing Computer Science curriculum trends, nor the trends for computer education born of mathematics or engineering. The curriculum was best termed "eclectic" in nature. There were some highly technical courses along with some highly mathematical based courses along with some highly non-technical courses. In the liberal arts tradition, we wanted students to graduate with a well-rounded background in the technology and its uses. As one of the allied requirements we made sure that students took a course on verbal communications – i.e., public speaking.

The particular course that is the subject of this paper was introduced later, in the 1980's and was called "Information Resource Management" (QMCS course number 425). At that time its primary focus was on the management of the data processing function within organizations. It evolved and changed over time as it was taught by a number of different faculty members. When I took over the course in the fall of 1997, it was clear to me that I needed to do something different than had been done in the past. Of course, I needed to retain the basic nature of the course (which I interpreted to be information systems and organizations and how they interact), but there were other goals that I believed needed addressing. Therefore, I incorporated two activities into the course:

- a series of short papers and presentations

- a course-wide project called "Komar Korporation"

These are described in detail below.

The enrollment for the QMCS 425 course since Spring of 1997 is shown in Table 1.

Table 1: QMCS 425 Enrollment

Semester	Enrollment
1997 Spring	26
1997 Fall	16
1998 Spring	30
1998 Fall	31
1999 Spring(2 sections)	54
1999 Fall	22
2000 Spring(2 Sections	53
2000 Fall	29
2001 Spring(2 sections)	50
2001 Fall	28
2002 Spring	26
2002 Fall	38
2003 Spring	13

Papers and Presentations

Each student was required to research a technology related topic, write a two to five page paper on the topic and complete a ten-minute presentation to the class on the topic. There were three such paper/presentation assignments for each student during the semester. These constituted 30% of the student's grade. They were weighted 1 for the first paper/presentation, 2 for the second, and 3 for the third. The motive behind the weighting was to encourage students to improve as the semester progressed. In other words, the first paper/presentation would be more of a trial run to get specific feedback, while the third "really counted".

Papers

The QMCS department still requires a "public speaking" course as an allied requirement, but my goal here was to get very specific as to the nature of the presentations they would be giving in the "real world" and the type of papers they would need to write and try to make sure that they succeeded in that environment. Therefore, the papers were to follow these guidelines:

- Use headings to identify major sections

- Use lists to enumerate points to be made

- Have a clear summary or conclusion

- Use appropriate tables and graphics as much as possible

- The writing style was to be concise and clear

The overall objective was to get them to write in a style that was easy to read and, more importantly, easy to scan and pick out specific items. In the "real world" they will be writing reports, analyses, and proposals to be read by busy executives who want to be able to get the gist of the document without having to read every word and every paragraph. As it turned out, the vast majority of students were used to writing in what I call a "novel" style whereby there are pages and pages of uninterrupted, wall-to-wall text.

Presentations

My goal for the presentations was to make sure that the students could give a 10-minute presentation that was clear, informative, and easy to follow. Again, in the "real world" they would be giving such presentations to their superiors and prospective customers. What they learned in the public speaking course was, of course, of great value, but I wanted to focus their efforts in a particular direction. Therefore, I was very explicit as to how the presentations would be evaluated.

First, was the overall organization of the presentation. Since this was to be an informative presentation, I wanted to make sure that the audience could easily follow what was being presented. I used an old, well proven organization to accomplish this:

-- Tell 'em what you're gonna tell 'em

-- Tell 'em

-- Tell 'em what you told 'em

In other words, they were to introduce the topic and mention the main points to be covered, cover the main points, and then summarize and conclude. In this way the audience could easily see what was coming, what it was, and get it summarized for them.

The second aspect of the presentations that was emphasized was the need to use some form of visual aid. Since the course was taught with an instructor's computer connected to a projector, I encouraged them to use the presentation graphics software widely available on campus – Power Point. If they did not know how to use that tool before the course, they quickly learned how to do so. By the end of the semester nearly all students were putting together rather rich presentations using not only Power Point but also using World Wide Web resources as well.

Finally, I presented a list of dos and don'ts to the students. Here are some of those:

-- Avoid "um", "ah", and other such crutches

-- Don't read your presentation verbatim

-- Don't memorize your presentation

-- Use plenty of eye contact and gestures

-- Don't end sentences "up" so it sounds like a question and not a statement

-- Speak conversationally and naturally

The intent of these is to provide a presentation that is more of a conversation than a formal speech. Again, the objective is to provide information to the audience and to make sure that they understand that information. These things will help the audience concentrate on the message and feel an integral part of the presentation.

I made it a point to grade the papers/presentations before the next class period so that students could get as immediate feedback as possible. In addition, every student in the audience provided feedback to the presenter. The students filled out a short evaluation form indicating the things done well and those areas needing improvement. These forms were also given to the presenter at the next class period.

Students were free to choose any topic for their papers/presentations. The only guideline was that it be "technology related". I encouraged topics that were current and also had a major computer content to them, but I did not screen topics beforehand. In very few cases, this proved to be a mistake on my part, quickly corrected for the next presentation by that student. It did give the class exposure to a number of topics that they might not have seen in their regular coursework. Since the mix of students taking this class includes QMCS majors and QMCS minors, the topics chosen went from highly technical to mildly technical. But, in the vast majority of cases, the topics were interesting and informative.

Komar Korporation

Higher education institutions have, for the most part, embraced the idea of group projects. Many courses students take require them to work with a small group of other students to complete some project for the course. I also embrace that idea and use group projects in nearly every course I teach. For QMCS 425, I wanted to take the group concept and take it even further. I knew that most projects in the "real world" do not involve just three or four people, but can involve hundreds of people, all working toward the same goal, but working on different parts of it. Therefore, I devised a project that would involve the entire class working together.

According to the course Syllabus, Komar Korporation is "a privately held corporation financed by the lottery winnings of Joe Komar". The entire class would then be a part of that company, contributing to its success in their own way. During the first class period for the course we put together the basic organization. The first order of business was to choose the industry the firm would service. Originally, the instructor chose the industry, but it was changed so that the students chose the industry. This was done by first doing some brainstorming whereby students would shout out the industry focus they wanted. This list provided for the first round of multi-voting. Each student got three votes and would put a check mark next to the three industries they wanted. After that round, the list was reduced to only the top three to six industries. Students were then given one vote and asked to check the one they wanted. This usually resulted in a clear winner, but if it didn't we then reduced the list to the top two and had a final round of voting. Almost without fail, this process ended up with an industry focus appropriate for the project.

Once the industry was chosen, volunteers for the company officers were solicited. They were:

-- Chief Executive Officer

-- Chief Financial Officer

-- Vice President for Marketing

-- Chief Information Officer

-- Vice President for Consulting and Development

-- Vice President for Human Resources

The responsibilities for each of these officers and their groups were broadly stated.

After the officers were identified the remaining students were asked to join one of the five groups. This was accomplished by having the officers take up positions in different parts of the classroom and then asking the students go to the group they wanted to join. If there was clearly an imbalance in the numbers in the groups, students were asked to voluntarily change groups. In the end, the number of students in each group was reasonably balanced.

The first charge to the officers was to "get organized". This included:

-- Determine specific products and services to supply

-- Set up regular meetings with their groups

-- Identify major roles and responsibilities for each group

My role was to be as a "money man" and a resource to the company. It was made clear that the company was their responsibility. Until recently, I did not even specify what the "finished product" should be, except to say that it was to be some kind of report. Since the Spring of 2000, I have been requiring both an Internet and an Intranet web site be developed. The exact content of those sites was left to the company.

Komar Korporation is 20% of the student grade. Since it is impossible for the instructor to have first-hand knowledge of student performance for this project, a "360 degree" evaluation was used. Each student would list his or her boss, peers, and subordinates and then rate their performance on a scale of one to five on two dimensions – amount of effort given to the project and value or quality of that effort. These evaluations are used to calculate the student's grade for the project.

Experiences and Plans

Overall it is extremely important to let students know "why". They need to understand the purpose of the papers/presentations and Komar Korporation. I spend time during the first class session explaining these activities and providing reasons why I believe them to be important, especially for senior level students. I've also found it necessary to continually reinforce their understanding of "why" throughout the semester. If I don't do this successfully, I get student comments back along the line of "this is a speech course" or "we needed more direction with Komar Korporation" or "this should not be a QMCS course". With more time spent managing student expectations, more understanding and cooperation on the students' part comes along.

Papers/Presentations

It is important to give as immediate feedback for the papers/presentations as possible. I have found that the next class period is not too soon to do so. If it takes a long time for the feedback to get to the student, it loses a lot of its impact. The audience feedback, it turns out, is just as valuable as the instructor's. Each individual has his or her own way of perceiving the presentation and will pick out things missed by the instructor. The presenters diligently look through these feedback forms looking for things on which they can improve.

Enrollment in the course can vary greatly – from a low of 13 to a high of 38. I've learned that I need to adjust the number of presentations accordingly. With 38 students presentations took up a great deal of class time and students felt "cheated" that they didn't get more lecture from the instructor. It turned out to be just too much time spent on presentations with that many students. On the other hand, with fewer students there can be more presentations scheduled.

Since students have broad guidelines regarding their choice of topics (technology related), on occasion topics just aren't technology related enough. When this happens it is

made clear that the next topic should be more technical. Students also choose topics that might require little or no research on their part. Some students are familiar with a technology (software, hardware, etc.) because they have a job working with that technology. Part of the objective of the paper/presentation is to have them learn how to research a topic, so this could be perceived as problematic. I've chosen not to prescreen topics even though the problems above do occur. It's more important to allow a great deal of latitude, than to try to stifle interests.

Some questions on the written exams are taken from the presentations. I quickly learned that students would not show up for the presentation portion of the class (the first part of each session) unless they had some incentive to do so. I also post the papers on the QMCS 425 web site (http://komar.cs.stthomas.edu/qmcs425.htm) so they can be reviewed prior to exams. This has helped a great deal with the problem of skipping presentations.

Komar Korporation

As part of the course evaluation, I ask students whether or not Komar Korporation should be continued for future courses. Of the hundreds of responses, there has only been a couple that said "no". By the end of the semester students have really gotten into the project and start to see its value. Some students continue to ask for more "direction" for the project and have found it difficult to operate in such an ambiguous situation.

One of the important activities of the instructor with Komar Korporation is for the instructor to stay out of the way. The overall nature of the project is made clear, an organization put together, and an industry focus selected. After that it is important that the instructor not take an active role. The students need to learn how to deal with minimal direction and lack of structure. The instructor is there only as a last resort when they have tried everything else to resolve the issue. An example that often occurs is that of personnel problems. Some students do not pull their own weight and the officers will sometimes come to the instructor to have him solve the problem. What I do is make suggestions to them as to how they can solve their own problem and put the responsibility back on them. Without fail, the students are able to somehow solve it without direct instructor intervention.

Again, the problem of enrollment size is one that needs to be dealt with. With fewer than 20 students having five departments means that there would be three or fewer people in each. When enrollment is low, I have combined or eliminated departments to address this issue. When enrollment is below 15, I have even eliminated the CEO position and left it to the "management team" of three to be in charge.

The choice of industry for Komar Korporation has been problematic a couple of times. The industry focus lead the company too far away from the technology and use thereof. I have begun to control the industry choice so that the resulting web sites have a reasonable amount of technical content. Requiring the company to build an Internet and intranet web

site has proven highly beneficial. Technical and non-technical students can all participate in the design and development of the sites. The "techies" enjoy learning how to install and configure web servers and the "non-techies" get a kick out of providing the content and developing the static web pages. Both enjoy learning a little bit about server side processes.

Conclusion

After six years of teaching this course every semester it is clear to me that having papers/presentations and Komar Korporation as a part of the course is extremely valuable. The papers/presentations hone student research and communication skills. Komar Korporation provides them with some experience working with large groups in a more "real world" environment – broad goals with little day-to-day direction. I have recently added case studies to the course to further expand student active learning and have found them well received as well. I can see this course continuing its role in preparing computer technology students for the "real world" (and, as Buzz Lightyear would say "and beyond").

References

See http://komar.cs.stthomas.edu/qmcs425.htm for details of the course