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In this issue:

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A Systems Analysis and Design Course Experience with both MIS and CS Majors

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Abstract

Systems analysis and design is traditionally a required course for both management information systems (MIS) and computer science (CS) majors, taught by different faculty in the different schools (i.e., business faculty for MIS students and CS faculty for CS students). However, due to an unusual and unpredictable situation at a public university in the US, this course was offered as a combined course taught by an MIS instructor. As expected, the semester had its unique challenges and positive experiences. This paper provides student feedback about the course, advantages and disadvantages of the combined course, and recommendations and lessons learned from both the students and professor on future combined classes.

Keywords: Education, Systems Analysis and Design, Combined Class, Computer Sciences, Management Information Systems

1. INTRODUCTION

Although there is some overlap in material taught, students in management information systems (MIS) and computer science (CS) programs have a different focus in terms of their educations and future goals (Lenox & Woratschek, 2003). This idea is also reinforced by the different skills that employees prefer when hiring either MIS or CS graduates (e.g., Cappel, 2002; Ehie, 2002; Janicki, Lenox, Logan, & Woratschek, 2008; Tesch, Braun, & Crable, 2008). For this reason, students in the two programs may have similar classes (e.g., database development), but they are predominantly, although not always, especially in graduate schools (e.g., Bock, Schrage, Klepper, Waxman, and Stephen, 1999), taught separately in the different departments (Surendran, Ehie, & Somarajan, 2005).

This is precisely the class structure at a public university located in the Midwestern region of the USA, but a unique situation presented itself where there was the potential for a combined class with MIS and CS majors. The situation involved a systems analysis and design (SAD) class, a course that primarily focuses on the developing and maintaining new and existing computer systems (Misic & Russo, 1999), which was being taught separately to MIS and CS majors in the same semester. However, due to an uncontrollable circumstance (i.e., serious illness), one week into the semester the only qualified instructor in the CS area determined that he was unable to teach the SAD class this semester. The CS department chair asked other CS faculty, both full-time and adjunct if they would like to teach a new prep. Unfortunately, this is a class that no one was presently equipped to teach, and due to this factor, as well as others, the ultimate response from all faculty was no. At this point the department chair pondered the idea of canceling the class, although this was trying to be avoided at all costs as this was a required senior-level course only offered once a year, and if cancelled, would result in delayed graduation dates for the CS majors.

As a final step, the CS department chair approached an MIS professor to see if the ten CS students could join the SAD class for MIS majors. After much consideration, the MIS professor agreed to teach the combined class. As might be expected, this semester

turned out to be a unique experience for a number of different reasons. This paper is not meant to imply that there have not been combined classes before, as there have been for MIS and CS majors (Surendran et al., 2005), other disciplines (e.g., Van der Vyver & Lane, 2003), and graduate and undergraduate classes (e.g., Bernhard, 1999; Etzkorn, Weisskop, & Gholston, 2004). What made this situation unique is that the combined classes were unplanned before the semester began, which resulted in different experiences and likely different student outcomes than previously documented planned combined classes. The remainder of this paper will describe how the semester progressed, observations, student feedback both in terms of informal conversations and formal evaluations, and recommendations for other schools faced with similar situations.

2. HOW THE SEMESTER PROGRESSED

After making the decision to allow CS students to take the MIS SAD class, the CS department chair made this announcement to the CS students via email. The MIS class was an hour and a half later than the CS class, which presented an obstacle, but CS students were informed that they could take the MIS SAD class or wait a year to take the class when it was taught by the CS faculty member. As it turned out, nine of the ten CS students decided to take the course at the later time with the MIS professor teaching the class, with the one choosing not to because of time conflicts.

Needless to say, this situation resulted in the CS majors feeling inconvenienced and joining the class with a little bit of a "bad taste in their mouths". Not only did they have to take the class at a different time, but they also had to purchase different books, join the class two weeks into the semester, had to take the class with an MIS as opposed to a CS professor, and were going to be taught the material in a class with an MIS slant.

As already mentioned, the CS department chair sent out an email to the CS students discussing the situation and the best possible solution. Additionally, on the first day when the CS majors joined the MIS SAD class, the CS department chair and another CS professor came to the class to introduce the MIS professor, discuss the situation in person, and answer any questions that students had. On this initial class with both CS and MIS students, the instructor began class with an icebreaker exercise. The goal of this exercise was to begin to help students get to know each other, recognize faces, break down some of the barriers, and help make the classroom environment comfortable for students to be open, ready to learn, and actively participate.

On the third class session with both CS and MIS students, the instructor went to the syllabus and explained in greater detail how students would have to complete the semester project in this class as a group. To make things easier on the students, the instructor asked the students to list who they preferred to work with. After receiving the responses, the instructor formed the five groups (four groups of four and one group of five) as best possible matching up their preferences. The resulting groups included one all CS group, two all MIS groups, and two groups comprised of both CS and MIS students.

3. OBSERVATIONS

All in all, the class went well, but there were some specific observations. First, it was interesting to see how beginning on the first class session and continuing throughout the semester, students self-segregated by their majors. A number of the CS and MIS students had never taken classes with other students in their majors, but they seemed to feel more comfortable with and communicate more with others who were pursuing similar degrees.

A second observation was that although students from both majors studied topics related to IS/IT, they came into the class with different skills and familiarity levels with business and SAD terminology. Some of these differences may have been due to previous classes, exposure, work experience, or differences in interest levels. However, regardless of the reason for the differences, this made class more difficult for those who were less familiar with the concepts being discussed. In particular, since the class was being taught by an MIS professor, the MIS majors were often more familiar with the material, whereas the CS students seemed much less comfortable. As

a result of this unfamiliarity, CS majors often needed help when discussing issues and often asked questions to make sure they understood the concepts. This was not at all a bad thing, but it often resulted in class being slowed down, and MIS students often seemed to be irritated or frustrated as they understood these issues and felt like less class material was being covered to help the CS students "get up to speed."

A third observation was that CS majors asked more detailed questions. Some of this may be a function of the fact that these students were less familiar with business concepts and terminology, but there are also other explanations. One of the biggest of these is that CS students have been trained and become accustomed to making sure they get information at the greatest level of detail. This is necessary when CS students are programming, thus they may have become used to asking many questions of a very specific nature.

A fourth observation was that CS students wanted more of and were more comfortable with technical materials. As was already mentioned, CS students are more familiar with programming and likely chose the CS major because they are good at and enjoy these activities (Zhang, 2007). However, the SAD class when taught for MIS majors has many conceptual, non-technical activities (e.g., project identification and selection, system requirements determination, process models). Although the MIS majors understood the importance of discussing these activities, the CS majors made a number of comments questioning why these activities were being covered and could they study, look at, and engage in more technical elements of the material.

4. STUDENT FEEDBACK

In addition to the observations from the instructor, a short survey was administered at the end of the semester to obtain additional feedback. The survey was composed of 13 questions, eight of which were responded to on 5-point Likert type scale (anchors: 1 = Strongly Disagree and 5 = Strongly Agree) and five open-ended questions (what were the biggest advantages of the combined class, biggest disadvantages, different feel, recommendations for future combined class instructors, and recommendations for university/administration). The eight survey questions responded to on the Likert scale and the means and standard deviations for the responses provided from both CS and MIS students are provided in Table 1 located in the Appendix section.

As can be seen in Table 1, the overall student responses to the eight survey questions were positive. In terms of the course, students enjoyed the class (question 1), found the material to be challenging (question 2), and thought both their own majors and other majors were respectful of each other (questions 6 and 7). Students also felt like the instructor did a good job (question 4) and was respectful (question 8). However, students were more indifferent/agreed less strongly about if they would like to take another mixed class (question 3) and about wanting to learn more technical material (question 5). Surprisingly, CS students enjoyed the class more and wanted to learn less technical material than their MIS counterparts. These results were not anticipated, as the expectation was that CS students would want to learn more technical skills and would be less happy with the overall class because they were taught by an MIS instructor, had to change their times, get the new book, cover more business material, and a number of other inconveniences.

Although the student responses were positive overall, additional analyses were performed to see if there were any significant differences for the responses from CS and MIS students. Given that the sample size and resulting power were quite small, it was interesting and somewhat unexpected to see that one set of means was significantly different and multiple were approaching significance. In particular, for question 6 the CS mean response was significantly higher ($p=.03$) than the MIS mean response. For questions 1, 3, and 7, the results were approaching significance (p ranges between .06-.18) and point toward likely significant differences if the sample size was increased. Further, if the means for questions 1, 3, and 7 were to be extrapolated to larger samples, the mean responses for the CS and MIS students would be significant.

Table 2 provides the biggest advantages of the combined class and Table 3 the biggest disadvantages. As shown in Table 2, both CS and MIS students thought that the com-

bined class allowed for more perspectives, the ability to learn concepts and skills from the other major, and resulted in questions being asked by the students from the other major that students in their own major would not ask. CS students also thought that having both CS and MIS students in the same classroom helped to create a more real-world environment, as students had differential skills, with class work and groups having some people who were good at business analysis and thought processes and others who were more skilled at technical aspects of the class. In terms of MIS students, they thought that two other advantages of the combined class included the ability to see SAD issues from a CS perspective and the general idea that the bigger class allowed for more input in class discussions.

Table 2 Biggest Advantages of the Combined Class

Responses from CS Students	Responses from MIS Students
More perspectives	More perspectives
Able to learn business concepts from MIS students	Able to learn from and rely on technical skills from CS students
It created a more real-world environment	Could see SAD issues through a CS lens
It allowed projects to have some people who were good at business and technical aspects	Bigger class had more input in discussions
MIS students asked questions CS majors wouldn't ask	CS students asked questions MIS majors didn't even think of

A summarization of the student responses to the open-ended question about the biggest disadvantages of the combined class is provided in Table 3. All students felt like the fact that students did not know each other and the terminology barriers of CS majors were drawbacks to the class. Additionally, CS students felt that there was not enough technical information or insight, there was some expected prerequisite knowledge that they lacked (e.g., familiarity with certain business concepts and terms), and they would have liked some sort of software development in completing the class project. On the flipside, some disadvantages that were mentioned only by MIS students were that groups had different levels of technical and business capabilities, questions posed by CS students were unnecessarily technical, and it was difficult for the instructor to cover SAD material at the desired level because there were frequent slowdowns due to terminology issues and lack of general business knowledge.

Table 3 Biggest Disadvantages of the Combined Class

Responses from CS Students	Responses from MIS Students
Students didn't know each other	Students didn't know each other
Terminology barriers	CS students lack of familiarity with terminology
Not enough technical information or technical insight	Groups had different technical and business skills
Some expected prerequisite knowledge they didn't have	Questioning by CS students was often on an unnecessarily technical level
Would have liked the project to require some sort of software development	Hard on the instructor to cover material in an in depth level because of terminology issues

The final open-ended question that reflected on the class itself focused on any differences in "feel" (culture, norms, discussions, etc.) from classes that only had students from your own major. Student responses to this question were both positive and negative. Some positive differences included new perspectives, they were able to see how students from different areas viewed a situation/problem, and students in other majors asked questions they often would not have thought of. Some of the negative differences included students not knowing each other – which led to a lack of familiarity, different student expectations in terms of projects and class assignments, and students in other

majors asking questions that others did not think were important.

5. STUDENT RECOMMENDATIONS FOR FUTURE COMBINED CS-MIS CLASSES

In addition to providing feedback on the advantages, disadvantages, and feel of the class, students also provided recommendations for the instructor and university if there was the potential for a combined CS-MIS class in the future. I will begin with the suggestions for the instructor, many of which were actual parts of the combined class these students experienced, but that students wanted to make sure were also included in future classes. Some recommendations from both MIS and CS majors were to make sure that the class as a whole is introduced to each other, make sure students feel comfortable and get to know each other quickly (potentially an ice-breaker) and make sure to share knowledge between the two majors. Additionally, MIS students specifically recommended that there should be changes to each of the curriculums to include both MIS and CS material, that the instructor needs to better be able to address technical issues/questions along with business issues/questions, and not slow down as much for CS students when discussing MIS (business) issues.

Specific suggestions for instructors that came from CS students included having more discussion to break down terminology barriers and try as much as possible to form groups with both MIS and CS students, and in the process have more well-rounded teams. Some other suggestions from CS students included making sure to cover material from both classes equally and structuring the class to simulate a real-world scenario with CS people doing technical work and MIS people performing more of the managerial/business-related issues.

Finally, the biggest student recommendation for the university was to give the instructor more time to prepare and plan for a combined class. They understood that this situation was unique and there was minimal time to prepare, but they felt that if more time was given, the instructor could make plans accordingly. Some of the other suggestions included making all efforts possible to not force the students from different majors together, giving the students more time to prepare (as many worked and had families and said that having to switch class times was a significant inconvenience), offering to make up the difference between the price of the previous textbook purchased, and not used, and how much they were able to sell it back for, and offering students short classes (maybe 1 hour classes, or just components of another class) to make up for a lack of specific major material in the combined class.

6. INSTRUCTOR RECOMMENDATIONS FOR FUTURE COMBINED CS-MIS CLASSES

Based on observations of the class, student feedback, and time to reflect, I have a number of recommendations for future combined classes. First, as much as possible, there should be activities or exercises that force cross-major (CS-MIS) interactions. As previously mentioned, on the first day together students seemed to naturally self-segregate by majors and the result was minimal interaction. Thus, instructors should take measures to make sure this does not happen. A second recommendation is to include more material from the major that the instructor does not teach in. In this situation, it would have been preferable to include more CS material as the class had an MIS slant (as the instructor was an MIS instructor) and certain elements of class (e.g., project management) were much more familiar for MIS majors.

A third recommendation is to provide the instructor and students with more time to prepare. With additional time, the instructor would have been able to communicate more with the CS department, design activities that allowed for better cross-major interactions, and potentially structure class differently. This fact is reinforced by the positive experiences that have been documented for combined undergraduate classes of MIS and CS majors (e.g., Surendran et al., 2005), as well as other disciplines (e.g., Van Der Vyver & Lane, 2003) and those combining undergraduate and graduate courses (e.g., Bernhard, 1999; Etzkorn et al., 2004), when the classes are planned and the instructor and students have more time to prepare, better know and share expectations, etc. A final recommendation is to have better communi-

cation between the instructor and the other department (i.e., MIS instructor and CS department). This would help in terms of expectations about material taught, normal or expected grade distributions, instructional styles (so the instructor could prepare accordingly or mention to students when and why the instructional techniques were different), and learning outcomes.

7. CONCLUSION

All in all, and especially considering the circumstances that resulted in the combined SAD class, the semester was a success. As might be expected, there were pros and cons to the class which were observed and mentioned. However, based on the experience, there are areas for improvement both for the instructor and the university/administration and I have tried to provide those for any other instructors and schools that might be considering or forced into a situation involving a combined CS-MIS class.

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APPENDIX

Table 1 End of the Semester Questions about the Combined CS-MIS Class

	Avg. CS Student Responses[1]		Avg. MIS Student Responses[2]	
	Mean	**S.D.**	**Mean**	**S.D.**
1. Overall, I enjoyed this class.	4.33	0.50	3.75	1.06
2. The material covered in this class was challenging.	4.11	0.60	4.08	0.79
3. If given the choice, I would again take a mixed class with Business (MIS) and Computer Science majors.	3.78	1.09	3.17	0.94
4. I feel like given the circumstances the instructor did a good job in handling the mixed class.	4.56	0.73	4.25	1.14
5. I would have enjoyed learning more technical material in this class.	3.33	1.41	3.50	0.92
6. I felt like the students in my major (either Business (MIS) or Computer Science) were respectful of students of the other major.	4.78	0.44	4.08	0.79
7. I felt like students in the other major (not your own major) were respectful of students in my major.	4.78	0.44	4.17	0.84
8. I feel like the instructor did a good job of being respectful to students of both majors.	4.67	0.50	4.18	1.17

[1]N=9, [2]N=12