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Abstract

This paper describes a required core business course in Introductory Information Systems (IS) that was redesigned as a recruiting tool for MIS majors at a private liberal arts university with an AACSB accredited college of business offering a traditional classroom experience with low faculty to student ratios. The major changes to the core IS course involved: 1) repositioning the course within the College of Business curriculum, and 2) redesigning it to increase student interest. The repositioning of the course changed it from a junior-level course to a sophomore-level course. The intent of the course redesign was to move away from a lecture dominated model to an application-focused learning model providing hands-on experience with IS tools. While there were differences between instructors, student reaction to this approach to teaching was overall positive as evidenced by the questionnaire results that are discussed and feedback from students on course evaluations at the end of the semester.

Keywords: IS Curriculum design, cooperative learning, self-study, pedagogy, ebook, teaching case

Introduction

This paper describes a required core business course in Introductory Information Systems (IS) that was redesigned as a recruiting tool for MIS majors at a private liberal arts university with an AACSB accredited college of business offering a traditional classroom experience with low faculty to student ratios. Students are admitted to the College of Business as freshmen, complete a series of lower core business courses in their freshman and sophomore years, and upper core courses as juniors and seniors. All university students are required to take a microcomputer applications course in their freshman year which is a prerequisite for the core IS and other courses. The major changes to the core IS course involved: 1) *repositioning* the course within the College of Business curriculum, and 2) *redesigning* it to increase student interest. The repositioning of the course changed it from a junior-level course to a sophomore-level course. The intent of the course redesign was to move away from a lecture dominated model to an application-focused learning model providing hands-on experience with IS tools. The objectives and design of the core IS course in undergraduate business education are not without controversy. Course designs ranging from very technical to very managerial have been supported in the literature (Salisbury et al., 2004). The changing nature of the field of information systems further compounds the debate. Three key themes proposed for the core IS course

are 1) information systems and use in organizations, 2) capabilities of information technologies to process information and 3) the new business opportunities and constraints offered by information technologies (Salisbury et. al 2004).

Impetus for New Positioning and Design

IS enrollments peaked in 1982, declined through the early 1990s (Cale, Mawhinney, & Callaghan, 1991) and boomed again in the late 1990s. Since the dotcom bubble burst of 2000, MIS major enrollment has declined dramatically ranging from 15 to 70% (Shah, Martain, & Mehta, 2006). Media coverage of technical jobs being outsourced overseas (McDougall, 2006) has contributed to the perception that IS careers are not as attractive as other business disciplines. Student perceptions of the IS field continue to lag behind most business majors in terms of difficulty, uncertain reputation, and lack of promotion (Lee & Lee, 2006). While a report from the US Bureau of Labor Statistics indicates that four of the top 10 professions (projected growth for the next decade) are in the IS/IT area (Saunders, 2006) a recent survey of IS department chairs showed that slightly more than half expected IS enrollments to remain the same or continue to decline over the next 5 years (Shah et al., 2006). The precipitous drop in enrollment across all computing disciplines has prompted a call for funded research at the national level to address the problem (NSF, 2006). The need to attract students to the field early and for initial IS courses to be more appealing to students (Cale et al., 1991) remains.

Course Repositioning

As part of the recruiting strategy, the IS class was moved from the upper core to the lower core. The new positioning of the course may be controversial because it exposes students to complex concepts very early in their college curriculum. It is also contrary to some models, which suggest that it be delivered just prior to the senior capstone course (Ehie, 2002). However, the change makes it possible to inform students about the MIS major early, allowing them to switch majors and still graduate in four years. In the previous configuration, students changing majors after taking the core IS course may require extra semesters at additional costs.

Previous Course Design

Supported by a common syllabus for all sections, the traditional introductory IS course covered IS textbook concepts and was taught primarily using a PowerPoint supported lecture format. Three assignments gave students practice in spreadsheet, database, and web design and implementation. The semester project required students to investigate the use of IS at a local company and recommend IT changes to benefit the business model.

We discovered that many students did not enjoy this course, viewing it as an unpleasant hurdle in completing core requirements. The semester project was often completed at the last minute with little substance or depth. This trend became more prevalent as the course transitioned from an upper core class to a lower core class. At the same time, feedback on the value of the assignments was consistently positive. Student comments in class and on internship reports indicated that the hands-on assignments, in some cases, increased their competitiveness in the workplace. In line with the experiential learning mission of the university, the faculty jointly decided to move toward an applied learning model combined with student self-study.

Redesigned Course Characteristics

The revised core IS course is designed to provide the student with *a managerial problem solving perspective* and *a basic technology skill set*. It also places a much greater emphasis on cooperative learning in student teams, which gives "students an opportunity to discuss information or practice skills originally presented by the teacher" (Slavin, 1991, p. 73). The redesigned course includes the following features:

1. The course is built on a business case. Students, acting as consulting teams, use information systems concepts and tools to address business problems.

2. The consulting teams of 2 - 5 students (mostly self-selected groups) are established at the beginning of the term and remain intact through the semester.

3. Six hands-on group assignments related to the business case provide students with application-level learning relevant for all business majors.

- *Spreadsheet development and analysis* uses pivot tables, auto-filtering, and conditional formatting tools in Microsft Excel to analyze unstructured business data. Students write a business report on business implications discovered (5% of grade).

- *Simple website design, development and implementation on a live web server* uses a combination of basic HTML coding concepts and web development tools to create and post team resumes (5% of grade).

- *Spreadsheet "what if" analysis uses various techniques* including scenarios and goal seeking. Students developed a weighted average grade sheet or used spreadsheets from the business scenario and then applied what-if analysis techniques to determine the impact of changes in various variables (5% of grade).

- *Database design, development and implementation* including queries, forms and reports uses Microsoft Access to replace a set of independent spreadsheets from the business scenario (5% of grade).

- *Advanced web design emulating a prototype business website* supports earlier recommendations from the team's spreadsheet analysis. The site is built using HTML development tools and integrates the initial web site design in an incremental development approach (5% of grade).

- *Project scheduling, analysis and reporting uses Microsoft Project* to plan and track each team member's assigned work on the business website project. Analysis of critical path and cost projections for the development project are reported in a memo to business owners (5% of grade).

4. Each group presents one project to the class for discussion ensuring that every project is presented with each member being graded individually (5% of grade).

5. Each student takes three exams on contemporary IS concepts, terms and definitions (20% for each test for a total of 60% of grade). In-class lectures during the semester have been greatly reduced, relying instead on student self-study, the use of on-line practice questions, and an interactive online textbook that takes advantage of web-based tutorials, hyperlinked material, and interactive exercises (Rainer et. al 2007).

6. Peer evaluations of group members are taken after each hands-on project and grades are adjusted accordingly to ensure individual accountability and maximize learning in a cooperative learning environment (Slavin, 1991).

7. Individual participation is graded based on class attendance, quizzes and completion of online homework assignments that focused on terms and definitions (5% of grade).

Student Feedback on Revised Course

We distributed two questionnaires to assess student perceptions of the redesigned course. One questionnaire assessed student experience with the e-book that was required to support the self-study component of the course. The mean response for r*ecommending use of the e-book* was 2.82, the mean response for *recommending use of hard copy of textbook* was 3.40 (Likert scale, ranging from 5 = "strongly agree" to 1 = "strongly disagree", n =147). Many students liked the practice tests and quizzes but found reading text onscreen tiring and somewhat challenging. Students also found the concurrent use of two online tools confusing (the textbook publisher's ebook, the school's Blackboard environment).

During the last week of classes, we distributed the second questionnaire to assess various characteristics of the group work experience. Of the 204 students registered for the 7 sections, 167 (82.87%) completed the questionnaire. 10 students were non-business majors. Students represented the following majors: marketing (36), management (35), international business (25), finance (24), accounting (15), entrepreneurship (9), MIS (7), and economics (4). Table 1 shows demographic data for each section. Mean age and number of hours worked outside of the classroom were significantly higher in section 3.

Table 2 shows mean responses for select questionnaire items of interest (Likert scale, ranging from 7 = "strongly agree" to 1 = "strongly disagree"). On average, students indicated positive experiences with the group work in this class and were satisfied with their groups. Students who had worked together previously did not report any better

group experiences than those that had not. Academic major was significantly correlated at the .01 level with student satisfaction with the group. Specifically, MIS majors (n=7) reported the lowest level of satisfaction with their groups (mean = 4.29). Student preference for more individual assignments was mixed. Age, GPA, and number of hours worked per week while attending school were significantly correlated at the .01 and .05 levels respectively with a preference for more individual assignments.

Table 1. Demographics

Section	1	2	3	4	5	6	7	
Time	Day	Day	Eve	Day	Eve	Day	Eve	**All Sections**
Instructor	1	2	1	3	4	3	4	
Mean Age	21.33	21.43	31.33	21.10	21.85	20.96	21.31	22.07
Mean GPA	3.17	3.40	3.13	3.17	3.16	3.25	3.10	3.21
Mean Hrs Work	15.15	14.65	34.46	12.31	17.20	12.24	18.67	16.41
Gender								
Male	14	10	6	17	15	8	8	78
Female	14	19	7	12	12	17	8	89
Total	28	29	13	29	27	25	16	167
Group Type								
All males	11	0	3	7	7	3	7	38
All females	8	7	1	1	5	7	3	32
Mixed	9	22	9	20	15	15	5	95
Total	28	29	13	28	27	25	15	165

Table 2. Questionnaire Item Results

Items		Mean	SD
G1	I have worked on many assignments/projects in groups before.	5.82	1.39
G2	I have had very positive experiences with group work in other classes.	4.80	1.53
G7	I would have preferred more individual assignments in this class.	3.98	1.94
G10	Members in my group had conflicting goals for the group's performance.	3.08	1.99
G14	Working with my group in this class was very frustrating.	2.92	1.94
G15	We fully used the skills & knowledge brought to the group by its members.	5.92	1.14
G16	Everyone in my group completed a different group assignment.	3.92	2.02
G17	We all worked on all the assignments as a team.	5.37	1.67
G18	I enjoyed working with my group in this class.	5.51	1.58
G19	I had very positive experiences with the group work in this class.	5.47	1.65
G26	My group was performing well.	5.79	1.44
G29	Overall, I am satisfied with my group.	5.83	1.53
G30	Some group members dominated the group work more than they should.	3.82	2.04
G34	I would have liked to move to another group in this class.	2.42	1.90
G35	There was a lot of conflict in my group about how to do the assignments.	2.27	1.66
G36	There was a lot of interpersonal conflict in my group.	2.13	1.61

One concern with team assignments is that different group members may complete different assignments, thereby defeating the intent of cooperative and collaborative learning. Means for item G16 shown in Table 2 suggest that that in fact occurred. Both ANOVA and correlation analysis showed, that students who had negative experiences with group work in other classes were more in favor of more individual assignments, had less positive experiences with the group work in this class, enjoyed working with their group less, did not feel their group was performing well, were less satisfied with their group, and wanted to move to another group more frequently. Students who characterized themselves as good team players had better experiences regarding items G15, G17, G18, G19, G26, and G29. ANOVA also suggested significant differences between instructors on items G15, G26, G29, G36.

Table 3 shows that group type (all male, all female, or mixed) was associated with significant differences between groups. All-male groups appeared to have a greater tendency to have different people complete different assignments (G16). Students in all-male groups also seemed to have somewhat more conflicting goals for the group's performance (G10), found it more frustrating to work with their group (G14), had a greater preference for moving to a different group (G34), and experienced greater conflict about doing the assignments (G35).

Table 3. Items with Significant Mean Differences between Group Types

Item	All male	All female	Mixed	All
G10	3.58	2.16	3.22	3.10
G14	3.61	1.88	3.03	2.94
G15	5.79	6.38	5.83	5.93
G16	4.53	3.03	3.95	3.91
G17	4.95	5.97	5.31	5.36
G18	5.11	6.09	5.50	5.52
G19	5.05	6.06	5.48	5.49
G26	5.37	6.31	5.79	5.79
G34	3.13	1.34	2.49	2.41
G35	2.74	1.41	2.35	2.26
G36	2.50	1.31	2.26	2.13

Discussion and Conclusions

The redesign of the course places heavy emphasis on the need for teamwork on IS projects in the workplace where cooperation between user and developer is a critical success factor. Our approach makes it possible for students to tackle more challenging and meaningful assignments, and acquire valuable team and interpersonal skills. While there were differences between instructors, student reaction to this approach to teaching was overall positive as evidenced by the questionnaire results shown in tables 2 and 3. Informal comments by students in class as well as written comments on the student evaluations indicated that the projects were the most beneficial aspects of the course. However, it is also clear from the data in this study that some students may not appreciate the need for cooperative work on IS related projects. This reinforces the need for IS educators to emphasize the requirement for teamwork for future business managers/users as well as for future IS developers majoring in the field.

It is also important that projects are sufficiently complex to make it difficult to be completed by one student alone. Many of the assignments for this course, e.g., the website assignment, allowed students to make choices about aspects of their assigned work and required them to provide their own ideas or materials for projects. Such projects promote "psychological ownership" which increases student learning and satisfaction with experiential projects (Wood, 2003). The ambiguity of such projects also promotes innovative learning (Feisel & Peterson, 2002) and is typical of business situations.

Going forward, and in response to the student feedback we received, we:

- dropped the e-book and its online tools, and are using Blackboard for creating online practice quizzes and exams that more closely resemble real exam questions;

- developed a common glossary of testable terms that is posted on Blackboard;

- adjusted the order of the project assignments to match the change in the order of the topics covered; and

- began building our own case scenario for the projects because publisher material had to be augmented substantially for project assignments to be sufficiently complex.

It is still too early to assess the effectiveness of the redesigned course as a recruiting tool and its impact on the enrollment of MIS majors. Our effort continues to be a work in progress and the design and positioning of the core IS course within the business curriculum will continue to be an area of concern for IS educators as we cope with the cyclical nature of enrollments and rapid changes in the field.

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