

A Modular Approach to Delivering an Introductory MIS Course

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Abstract

Today's students find the traditional lecture-based teaching format less desirable and seem to prefer a more hands-on learning experience. Consequently, it has become necessary to redesign the introductory MIS course. This paper describes a new modular approach to delivering the introductory course. The primary focus is to provide students with multiple resources and hands-on projects, along with detailed learning objectives, in lieu of traditional PowerPoint lectures and reading assignments from a textbook. A pilot study was initiated to assess student perceptions of the learning experience with regard to the effectiveness and overall satisfaction with the new approach. A learning styles survey, along with a follow-up feedback survey, was distributed to 29 traditional and non-traditional students. Considering the small sample size, initial results were encouraging. However, an extended study to be carried out during the 2008-2009 school year, with more sections of the course, will hopefully confirm preliminary results and give further insight into the effectiveness of this approach.

Keywords: MIS Introductory Course, course redesign, learning styles, participative learning, exploratory learning, objectives-based learning

1. INTRODUCTION

Undergraduate students today no longer respond positively to the traditional lecture method in the Introductory Information Systems course. Over the past ten years students have found the introductory course less and less interesting in its current lecture-based format. With the changing learn-

ing preferences of students and the various levels of ability and technology interest there has become the need to design a more interesting and rewarding course for the students. Lippert and Granger (1998) a decade ago found that the diversity in students' computer knowledge and skills provides many challenges when teaching the introductory MIS course. Mackin, Johnson, and

Paranto (2006) found a very positive student feedback from a redesign of their introductory MIS course. They noted that students were entering the introductory course with a wide variety of skill levels and were looking for more hands-on and interactive environments, so their redesign resulted in students finding the course more rewarding.

Over a decade ago Felder (1992) discussed how lecturing, though the most common instructional method, is the least effective. In 1969 Dale suggested that students retain 10% of what they read, 20% of what they heard and 30% of what they saw but were able to retain far more content when they were actively engaged in the learning. When a student is involved with the learning process and is actually doing something rather than listening or reading about a topic, retention is at its highest. Research has shown that a course reflecting real-world activities and involving the students can result in longer retention (Scott, 2004.) A curriculum for active learning is preferred over passive learning. With this in mind a pilot study was developed which would deliver the introductory MIS curriculum in a student centered manner.

In order to deliver a more student centered course, a modular approach was designed with five independent modules for the Introductory MIS course. These modules were designed to be self-supporting with independent objectives, resources, projects and assessments. Different members of the MIS department, depending on their expertise, contributed to the design of the course. This allowed the department to have the most current and accurate information for the course plus resulted in buy-in from the participating faculty which could lead to a consistent curriculum for the introductory course across the department.

The Student Centered model presented by Griffiths, et al (2007) was used when designing the modules.

- **Students are active participants in their learning.** Clear objectives for each module and at least two hands-on activities to complement the module topic were included in each module. Lecture time was limited in favor of experiential

projects, team discussion and exploratory information gathering.

- **Students make decision about how they will learn.** A wide variety of resources to support the module objectives was provided. These were unique for each module. The student could choose his/her favorite source for learning.
- **Clear learning goals provided within a well defined learning process.** BlackBoard was the delivery mechanism for the course. All materials for a traditional face-to-face class were posted to Blackboard. The modules were posted here so that students could easily access objectives, and projects. Blackboard was also used to deliver and accept assignments, as well as for class discussions and course blogs.
- **Students construct new knowledge and skills by building on their current knowledge and skills.** Many of the assignments built on previous knowledge and activities. For instance, the module on Ethics involved designing a web page on an IS Ethics topic of the student's choice. Having learned how to build a basic web page in an earlier module this activity allowed them to integrate skills.
- **Students understand new knowledge and expectations.** Students were assessed at the end of each module in order for them to see how well they met the objectives of that module.

This paper discusses a pilot study which investigated the success of a modular MIS course. Two non-traditional course formats during the Spring semester of 2008 were used with the thinking that if it could be successful in a non-standard format it could be successful when used in traditional undergraduate formats during normal semesters. The paper further discusses the materials and activities used in the course along with student attitudes toward the change in format. Finally, lessons learned from the faculty are shared along with future plans for building this modular approach into the curriculum.

2. COURSE BACKGROUND

The introductory MIS course is required for all majors in the College of Business, as well as for students with a Business minor or Information Technology (IT) minor. It is part of a comprehensive business core and is the only required IT course. Students also have an extensive liberal arts core which limits the number of classes that can be offered for business majors and minors. The only prerequisite for the course is a one-credit-hour basic Office Application skills course which most students test out. Consequently, this three-credit-hour course covers traditional computer concepts such as hardware, software and networking, as well as MIS strategy components, and an introduction to data modeling with Microsoft Access and Excel.

Approximately five sections of the course are offered each semester in the standard 15-16 week format to traditional students with about 30 students per section. An additional section is offered each semester in a condensed format as part of a week-end degree program designed primarily for adult students. Two sections are also offered each summer in a condensed format. Because the course needs to be standardized across sections, it was important that the new design work for these condensed formats, as well as for the standard semester-long format.

The two non-traditional sections of the course used for this pilot study provided feedback from a diverse group of students with somewhat smaller classes. A total of 26 student subjects were used for the study, with a fairly even mix of traditional and non-traditional students.

3. METHODOLOGY

The five modules were designed to organize materials into logical 3-week components for a standard 15 week term. Each module could have multiple sections. Modules and sections are shown in Figure 1. The modules were designed to cover the same material that had been covered before the redesign, although it was reorganized to present a more logical flow of materials for students. Course content was jointly determined and agreed upon by MIS faculty along with input from the college curriculum com-

mittee and from an IS advisory board made up of about 20 senior IS executives from regional businesses.

Students were assigned to 3-4 person teams at the beginning of the term. Team assignments were based on a questionnaire distributed to students with an attempt to construct teams with diverse technical levels so that students with higher technical skills would be matched with students who had lower skill levels. A standard MIS introductory text was used for the course, along with a casebook used for Access and Excel projects. The textbook was made available through the campus bookstore and in electronic format directly from the publisher. Specific sections of the book were referenced for specific learning objectives.

Multiple resources beyond the textbooks were made available to students. These included the following:

- Web reference and technical sites
- IT vendor sites
- Readings
- Short video clips
- Blogs
- Group discussions
- Hands-on projects

Each specific learning objective referenced available resources as well as appropriate textbook materials. Links to online resources were provided for each module through Blackboard. Key terminology for each section of each module followed the learning objectives. Figure 2 shows objectives and terminology for the Web Development section of the Internet and Web module.

Short (15 minutes or less) PowerPoint presentations were used to introduce certain sections of the course and were made available to students through Blackboard. Lecture time was intentionally limited in favor of hands-on projects, team discussion, and exploratory information gathering. Readiness Assessment Tests (quizzes) were used at the beginning of sections to encourage students to explore the objectives and terminology before coming to class.

Hands-on projects, along with team discussion and written reports, were a key component of the re-design. The following list provides a sampling of projects used for the course:

- disassembly and assembly of computers
- the development of a summation calculator with Visual Basic
- the development of an individual Web site, as well as a team Web site centered around an ethics exploration project
- a Business Intelligence (BI) project based on a real-world case study and podcast interview
- traditional Access and Excel business case projects

All deliverables for these projects were submitted through Blackboard using the Group File Exchange function for group materials and the Assignments function for individual work.

Blogs, administered through Blackboard, were used to share thoughts and solicit feedback from students. A "Share Your Thoughts" public blog was used to explore a specific topic relative to a module in more depth, with input from the entire class. A private "Reflections" blog was used to capture individual feedback for each module concerning student perspectives of the learning experience. Only the professor could see these private blog entries.

Exams were given after each of the first four modules. A hands-on, comprehensive Excel assignment was used to assess performance for the last module. All exams used an open book and open resource (excluding neighboring students or online collaboration) to encourage exploratory learning rather than memorization.

A learning styles survey was administered to each student at the beginning of the class.

To examine the effectiveness of the new course design, the authors examined several research questions. At the beginning of the course, students took the Grasha-Riechmann Student Learning Style Scales (GRSLSS) survey. The GRSLSS is a well-established, sixty-question instrument that measures six

dimensions of a student's learning style (Unal, 2005). The dimensions include Independent, Avoidant, Collaborative, Dependent, Competitive, and Participative. Grasha (1996) established that each person possesses some attributes of each learning style. Rather than categorizing a student's style into one dimension, the GRSLSS provides ten measures for each characteristic, with the mean of each representing the student's score for each learning style.

Students also completed a course feedback survey at the end of the course that measured student perceptions (relative to a traditional course delivery) of how much they learned in the course, how much they enjoyed the course, and provided feedback on the perceived effectiveness of each module in the course. The survey also captured demographic items such as gender, age, and grade point average.

Based on the preceding surveys, the following research questions were examined:

R1: Compared to a traditional course, to what extent do students perceive that the modular course was effective in **learning** course material?

R2: Compared to a traditional course, to what extent do students perceive that the modular course design was effective in their **enjoyment** of the learning process?

R3: To what extent do **student learning styles** impact the perceived learning and enjoyment of the modular course?

R4: To what extent do **student demographics** (age, gender, and GPA) impact the perceived learning and enjoyment of the modular course?

4. RESULTS

Effectiveness in Learning Course Material

The results of student feedback show that students perceive that the course was relatively effective in learning course materials. The median response on a five point Likert scale (with labels of Very Effective, Somewhat Effective, Neutral, Somewhat Ineffec-

tive, and Very Ineffective) was 4.0. The mean result was 3.93. These results compare favorably to course satisfaction results in previous student evaluations for this course.

Since different exams were used for the new format, it was not reasonable to check for a difference in actual performance. However, exams did follow the same structure as exams for earlier courses and the exams for the first two modules were roughly equivalent to midterm exams for previous courses. Combined average scores for the first two modules using the redesigned format were equal to or slightly better than average scores on midterm exams given by the same instructor for prior courses.

Enjoyment of the Learning Process

The results of student feedback show that students perceive that the course was very effective fostering student enjoyment of the learning process. The median response was 5.0 (very effective), while the mean was 4.17. While learning outcomes are clearly the key objective in academia, creating a course that students enjoy is very important to the Management Information Systems field, as the entry level course could be a key determinant for students considering a major or minor in the field.

Impact of Learning Styles on Learning and Enjoyment

Table 1 shows the Pearson correlation coefficient between the mean of each of the GRSLSS student learning styles and student perception of learning and enjoyment of the course. While none of the correlations is significant, the sample size of 29 may play a role in the lack of significance. The styles that have the strongest significance include the Participative style on the Competitive style, showing a potential negative relationship with perceived learning of course materials. The items that measure Participative styles could be interpreted as pertaining primarily to participation in traditional course discussions. More research with a larger sample size should be conducted to more conclusively measure these relationships.

Table 1: Correlation of Learning Style with Perceived Learning and Enjoyment

Learning Style	Learning	Enjoyment
Avoidance	-0.169	-0.024
Collaborative	0.009	0.026
Competitive	-0.242	-0.104
Dependant	-0.086	0.111
Independent	0.061	0.048
Participative	-0.277	-0.179

Impact of Student Demographics on Learning and Enjoyment

Table 2 shows the Pearson correlation coefficients between the age, overall GPA, and gender of students and student perception of learning and enjoyment of the course. None of the correlations is statistically significant at the .05 level. However, given the sample size limitations, the general direction of the data suggests potentially that the modular course is better suited to younger students, students with lower GPAs, and male students.

Table 2: Correlation of Student Demographics with Perceived Learning and Enjoyment

Demographic	Learning	Enjoyment
Age	-0.243	-0.339
Overall GPA	-0.236	-0.222
Gender	-0.228	-0.14

Because the Pearson correlation presumes a linear relationship between the data, we also computed a comparison of means to further explore these relationships. Age data was broken down into traditional students (ages 21 and below, n=15) and non-traditional students (ages 24 and above, n=14). As shown in Table 3, traditional students tend to perceive the course as more effective in both learning outcomes and enjoyment of the process. In many ways, this outcome is to be expected as younger students are more accustomed to the nature of these types of modular computing activities and less entrenched in traditional learning methods. Table 4 shows the mean comparisons by gender (n=15 for males and 14 for females), suggesting that males find the modular course more effective and enjoyable than females do. Table 5 shows the mean comparison broken down by overall GPA,

suggesting that students with GPA below 3.5 (n=18) are more likely to perceive the modular format as effective and enjoyable than do those with higher GPAs (n=11). Clearly more data is required to conclusively analyze these relationships.

Table 3: Mean of Perceived Learning and

Enjoyment by Age Group

Age	Learning	Enjoyment
Traditional (21 or younger)	4.20	4.60
Non-Traditional (24 or older)	3.64	3.71

Table 4: Mean of Perceived Learning and

Enjoyment by Gender

Gender	Learning	Enjoyment
Male	4.23	4.46
Female	3.69	3.94

Table 5: Mean of Perceived Learning and

Enjoyment by Overall GPA

Gender	Learning	Enjoyment
GPA below 3.5	4.17	4.28
GPA 3.5 or above	3.55	4.00

5. OBSERVATIONS AND CONCLUSIONS

Overall, the results from this pilot study were positive. While different exams and quizzes were used that slightly differed from previous sections of the course, the exam format was similar with an equivalent level of difficulty. Student performance was comparable to sections using the older format. This was encouraging since a primary goal of the redesign was that students should learn at least as well using the new format. It was beyond the scope of this project to test for long term retention, but since more emphasis was placed on learning by doing rather than learning by listening, it would be interesting to test for relative retention of concepts beyond the class.

The preliminary survey results were also positive concerning the overall satisfaction with the new approach. Anecdotal evidence based on unsolicited comments during and after classes and on responses to the "Reflection" blog, also seems to indicate that students enjoyed the classes. Most blog

responses were quite positive. Ideally, the level of satisfaction would lead to more students pursuing the IS major or minor or at least taking further IS courses. A much more robust study with more control over extenuating variables would be needed to test for the impact of this course on overall enrollment in IS courses. However, these results do suggest that moving away from a lecture-based format in favor of an objectives-based format, using multiple resources and hands-on projects, may lead to better acceptance of the introductory IS course by students who are required to take it as a part of their business curriculum.

Initially there was the thought that non-traditional students might be more comfortable with the traditional lecture format but the preliminary results show this to not be a concern. Continuing the study with standard semester-long sections of the course, with predominantly traditional students, will be necessary to explore this further.

This revised format will be used in all sections of the course beginning in the Fall semester of 2008 with some adjustments and enhancements. The objectives and terminology will continue to be refined with an introduction of new projects and podcasts. Future studies will explore in more depth the relationships between learning styles and other variables, such as age and gender, with student perceptions and performance, as well as their satisfaction with the process.

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APPENDIX A – Figures

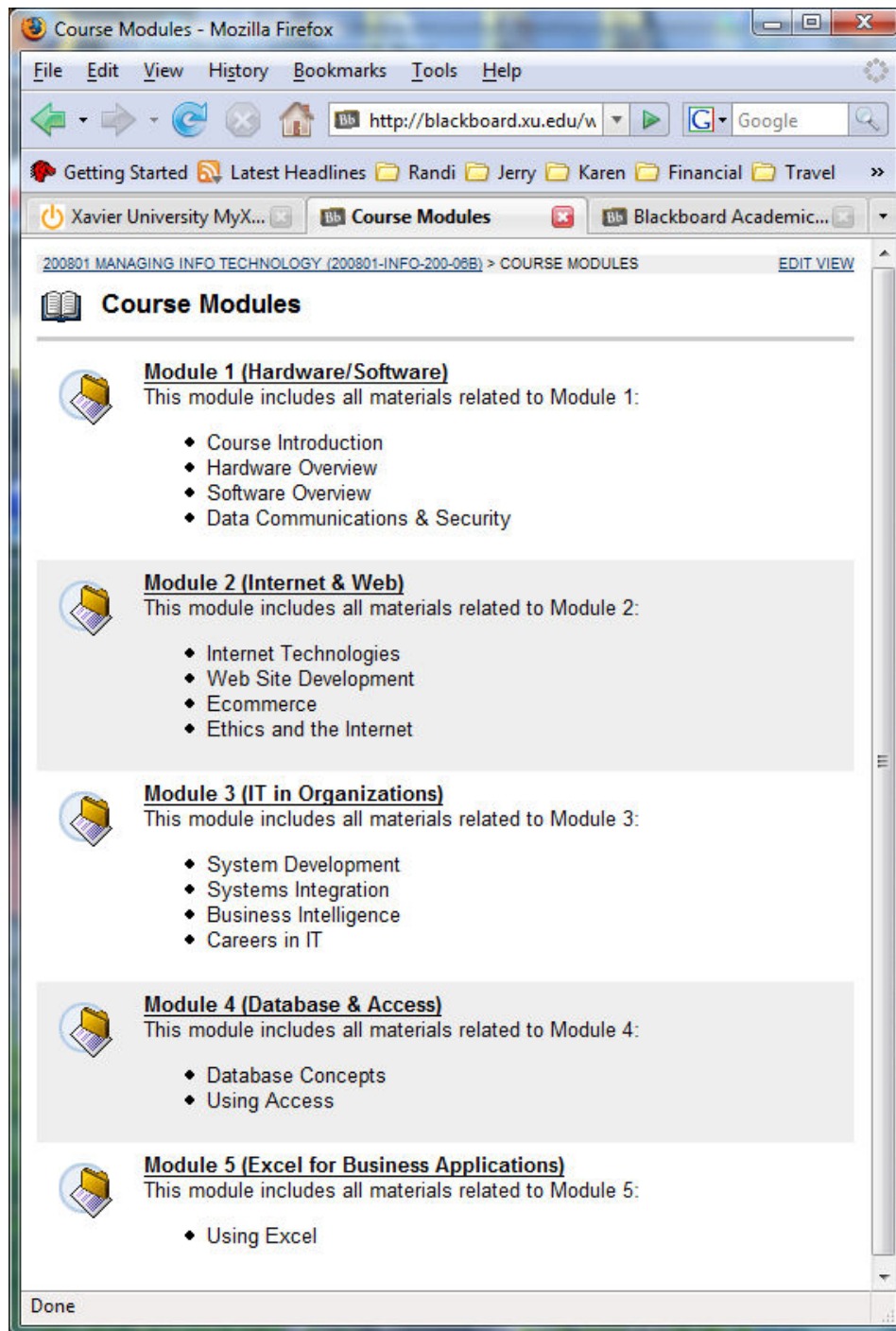


Figure 1. Modules and Sub-modules

Web Site Development

After completing this segment of the course, you should be able to:

	<i>Resources</i>	<i>Text</i>
<ul style="list-style-type: none"> • Understand how the Hypertext Transfer Protocol (http), the Hypertext Markup Language (html), and Web browsers support the use of hyperlinks on the Web. • Identify primary browsers other than Microsoft Internet Explorer. • Know how <i>html</i> is used to build static Web pages. • Build a small Web site using the <i>Nvu</i> development tool. • Build small Web sites for business applications. 	<p>Wikipedia</p> <p>Wikipedia</p> <p>Nvu Project</p>	<p>Project Workbook</p>

KeyTerminology

Hyperlinks	Internet Explorer (IE)	Safari	Tag
Hypermedia	Firefox	Nvu	Header element
Web browser	Opera	Element	Body element

Figure 2. Sample learning objectives with key terminology.