An Examination of the Introductory MIS Course

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Executive Summary

The introductory management information systems (MIS) course is a core course for all business majors at almost every business school. It is common for this course to have multiple sections taught by a mixed group of instructors each semester. Hence, consistent pedagogy and assessment are needed for multiple sections of this course. This paper reports a pedagogical study of this course to address this concern.

The study started with a literature review. Surprisingly, regardless of the commonality and importance of this course in business education and the rich literature about information technology education for business majors, few articles in the literature have discussed integrated pedagogy and assessment design beyond teaching techniques for this course. Using the general content analysis methodology, the study analyzed IS 2002 Model Curriculum and Guidelines as well as 37 online course syllabi of introductory MIS courses offered in AACSB accredited business schools, and identified major components of the introductory MIS course. It revealed important facts with regards to the practices of teaching this course in the AACSB accredited business schools. It was found that while lectures, case analysis, essay writing, and team business project were the major teaching-learning methodologies applied to this course, technical project/hands-on had also been used by many schools. Interestingly, technical assignments were the second commonly used assessment tool after examinations/quiz. The applications taught in the hand-on or technical part of the course highly varied, ranging from elementary IT knowledge such as email and word processing, to database, spreadsheet, and even programming.

The research results were used for the next stage of the study: integrated design of pedagogy and assessment for this course. Four modules (instructional, intellectual, clinical, and technical) and the corresponding assessment measures were designed. The study demonstrated the correlation between the design of the modules and the design of the assessment scheme. The co-design process warranted that the objectives of the course were fulfilled through these teaching-learning modules, and these modules were the best vehicle to deliver these measurable learning outcomes.

The study suggested several teaching strategies specifically for this course based on the author's experiences in teaching this course.

It was concluded that integration of pedagogical design and an assessment scheme for this common core MIS course was useful and achievable.

Keywords: MIS curriculum, introductory MIS course, curriculum design, assessment.

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Introduction

The introductory management information system (MIS) course is a business core course for all business majors at most business schools (Ives et al., 2002). It is a common phenomenon for this course to have multiple sections taught by a mixed group of instructors each semester, including tenure track faculty, full-time visiting instructors, and part-time visiting instructors. The course syllabi and assessment instruments used by individual instructors are often highly diversified. Consistent pedagogy, uniform assessment, and coordination among multiple sections of this course often do not exist (Foltz, O'Hara, & Wise 2004). The lack of consistency across all sections diminishes students' learning potential and fritters away faculty resources (Stephens & O'Hara, 2001). Because of the constraints of the AACSB (Association to Advance Collegiate Schools of Business) curriculum structure (AACSB, 2007), this course is usually the only required MIS course for business majors in most business schools. To improve the overall teaching-learning quality and coordinate multiple sections of this course, a comprehensive pedagogical design and methodical assessment are needed to engage students in active learning.

This paper reports an analysis of the topics and learning outcomes of the introductory MIS course. It presents a design of the modules that unify the teaching-learning approaches, and proposes an assessment scheme for this course.

Literature Survey

There has been a wealth of papers on MIS education in general. Forty prominent MIS scholars (Ives et al., 2002) strongly express their opinions on the importance of information technology literacy in the business education. Noll and Wilkins (2002) have developed an IS curriculum development model based on the IS professional skill requirements. Johnson, Bartholomew, and Miller (2006) conclude that improving computer literacy of business majors is crucial for the success of business education.

These general discussions have raised issues of pedagogical design and assessment for the introductory MIS course (Stephens & O'Hara, 2001). In addressing the pedagogical design, Holmes (2003) suggests that, given the mixed majors in the class, the instructor must focus on the students' needs and opinions during the entire course. Student surveys could be useful for the instructor to adapt class dynamics through soliciting students' input. Sirias (2002, 2005) recommends that writing MIS mini-cases, or analyzing mini-cases with conflict resolution components, can enhance cooperative learning for students with different expectations and levels of knowledge related to MIS. Grenci (2005) proposes a system development life cycle based framework of teaching e-commerce in their introductory MIS course. Mukherjee (2005) uses class exercises to magnify student interest in the introductory MIS course. In addressing the assessment methods for this course, Wehrs (2002) provides the interesting field experiment result that cooperative learning has a pervasive negative effect on individual student learning outcomes in their introductory MIS course. It raises a warning sign for instructors of the introductory MIS course that cooperative learning does not automatically improve student learning outcomes.

Surprisingly, regardless of the commonality and importance of this course in business education and the rich literature about information technology education for business majors, few articles in the literature have discussed integrated pedagogy and assessment design beyond teaching techniques for this course.

In summary, the literature survey indicates that teaching of the introductory MIS course for all business majors is a demanding and challenging task. While a few papers provide specific teaching techniques and suggestions for this course, the literature on systematic design of the pedagogy and assessment schemes for this course is virtually unfilled.

Methodology

The study was based on the general content analysis methodology (Bauer, 2000). The data sources for the analysis were IS 2002 Model Curriculum and Guidelines (IS2002, 2003) and online course syllabi of introductory MIS courses offered in AACSB accredited business schools.

IS 2002 Model Curricula

IS 2002 Model Curriculum and Guidelines for undergraduate degree programs in information systems (IS) (ISWorld, 2007) is the latest report on the model curriculum work in the IS field. The work of IS curricula task groups began in the early 1970s and has continued for the past 30 years. The Association for Computing Machinery (ACM) has been a major organizer for these task groups including AIS (Association for Information Systems), AITP (formerly DPMA) and IFIP (International Federation for Information Processing). The IS 2002 model curriculum is based primarily on the typical IS degree structure in US and Canadian universities. The IS 2002 report provides a description of IS as a field of academic study, presents general course descriptions of the model curriculum, and outlines exit characteristics for graduates. In fact, many programs use the IS 2002 report for curriculum design (Beachboard & Parker, 2005).

The MIS course examined in this study is a required course for all business majors including MIS majors. Hence, the IS 2002 report was reviewed to find references that were related to this course. The major components of the introductory MIS course were identified. These components were then compared with each IS 2002 model course. IS 2002.1 was found to be comparable to the introductory MIS course, and IS 2002.P0 was its prerequisite. The general descriptions of these model courses are summarized in Table 1.

Table 1. IS 2002 Model Courses Relevant to the Introductory MIS Course (Source: IS 2002 Report <http://www.is2002.org>)

Model Course No.	**IS 2002.1**	**IS 2002.P0**
Model Course Title	Fundamentals of Information Systems	Personal Productivity with IS Technology
Prerequisite	IS 2002.P0	Elementary knowledge of word processing, spreadsheets, e-mail, and Web browsing)
Topics	• Systems concepts; system components and relationships; • Cost/value and quality of information; • Competitive advantage of information; • Specification, design, and re-engineering of information systems; • Application versus system software; package software solutions; • Procedural versus non-procedural programming languages; object oriented design; • Database features, functions, and architecture; • Networks and telecommunication systems and applications; • Characteristics of IS professionals and IS career paths; • Information security, crime, and ethics. • Practical exercises may include developing macros, designing and implementing user interfaces and reports; developing a solution using database software.	• Knowledge work productivity concepts; • Advanced software functionality to support personal and group productivity such as templates and macros; reuse rather than build from scratch; • Organization and management of data (sorting, filtering) via spreadsheets and database tools; accessing organizational and external data; • Information search strategies; tool use optimization and personalization; • Professional document design; • Web page design and publishing; • Effective presentation design and delivery.

As will be shown in the following section, the topics generally covered in the introductory MIS course are closely equivalent to the topics listed in IS 2002.1. Table 1 clearly shows that IS 2002.1 requires practical exercises such as developing macros, designing and implementing user interfaces and reports, developing a solution using database software; even though it has its technical prerequisite IS 2002.P0. This feature strongly suggests that practical hands-on might be useful for students to understand the concepts of MIS and further develop IT skills for their careers.

Web Survey on the MIS Course Taught at Other Institutions

The Internet was exhaustively searched by using keywords such as Introduction to MIS, Introductory IS, and MIS course, and by tracing the links of the popular Web site ISWorld (ISWorld, 2007), to find course syllabi of this course (or its equivalence) offered in other AACSB accredited business schools. As a result, 37 course syllabi of introductory MIS courses offered in AACSB accredited business schools for all business majors were found (see the Appendix for the list of the 37 Web sites). The number of observations is not large, but was adequate given the nature of the analysis used. Among the 37 syllabi, 11 syllabi indicate that this course is offered at the sophomore level, and 14 syllabi indicate that it is offered at the junior level. Fifteen (15) syllabi provide details of the teaching-learning methodologies and assessment tools used for this course. The survey results are summarized in Table 2. The survey might contain a potential bias since only the course syllabi posted online were observed. Nevertheless, the survey does reveal indisputable facts.

Table 2. A Summary of Methodologies and Assessment Components Used in Introductory MIS Courses (not a freshman computer literacy course) for All Business Majors at Surveyed AACSB Accredited Institutions

(a)

Attributes		Percentages
Offered at	Sophomore Level	30%
	Junior Level	38%
	Other Levels	32%

(b)

Attributes			Percentages
Methodology Used by the Instructors in the Courses	Lecture/Reading		100%
	Technical Project/Hands-on	Excel	20%
		Access	27%
		PowerPoint	13%
		Word	7%
		Email	7%
		WWW	7%
		Visual Basic	7%
		FrontPage	7%
		Windows Server 2003	7%
		Solve IT	7%
	Case Analysis		33%
	Essay Writing		47%
	Team Project		47%

(c)

Attributes		Weights
Assessment Components	Examination/Quiz	56%
	Technical Assignment	17%
	Case Analysis	5%
	Essay Writing	6%
	Team Project	10%
	Presentation	3%
	Participation	3%

(1) As shown in Table 2(a), the introductory MIS course is offered at the Junior level more than at other levels.

(2) As shown in Table 2(b), while lectures, case analysis, essay writing, and team business project are the major teaching-learning methodologies applied to this course, technical project/hands-on has also been used by many schools. Interestingly, technical assignments are the second commonly used assessment tool after examinations/quiz.

(3) As shown in Table 2(c), the applications taught in the hand-on or technical part of the course highly vary, ranging from elementary IT knowledge such as email and word processing, to database, spreadsheet, and even programming.

Summary of the Analysis

The IS 2002 model course IS 2002.1 has recommended the topics for the introductory MIS course (Table 1). The online syllabi of the introductory MIS course offered in AACSB accredited business schools show their diversified teaching methodologies (Table 2(b)). The pedagogical literature has reported a variety of teaching techniques for this course, but is short of discussion on a unified framework of teaching and assessment for it. As this course is critical for IT education in business curricula, integrated teaching-learning methodologies and assessment tools for this course are imperatively needed.

Module Design

The foregoing analysis provides a general guideline of the topics for the introductory MIS course. It also reveals the major instructional methods and assessment components that are commonly applied to this course. These results were used for the next stage of the study: integrated design of pedagogy and assessment for this course.

Module Design - Balancing Theory and Practice

The introductory MIS course has been a required course in business schools for more than three decades. Business curricula use it to bridge the IT-user gap (Mann, 2002). In its broadest definition MIS is any activity that uses computers for business. Given the breadth of the topics and how MIS has diffused throughout the business curriculum, it is natural to have a variety of approaches to teaching of this course. Table 2 shows that lectures, technical hands-on, case analysis, essay writing, and team projects are the major teaching methodologies used by the instructors of this course. These methodologies are categorized into four teaching-learning approaches: *instructional*, *intellectual*, *clinical*, and *technical*. Using the instructional approach, the instructor typically teaches concepts and theories of MIS such as the roles of MIS in organizations, enterprise MIS architectures, and social issues relative to MIS. In this approach students learn MIS through memorizing the concepts and theories. In the intellectual approach students learn MIS through writing. The writing assignments could be textbook case analysis, essays on questions,

or essays on contemporary topics and issues. In the clinical approach students go out, find organizations, identify the MIS in the organizations, and learn aspects of the MIS to practice the concepts and theories they learned in the classroom. Commonly, the clinical approach is called a business project. Using the technical approach, students receive first-hand experiences of MIS through learning computing techniques for business, including databases, spreadsheet, and other end-user tools.

Curriculum design for IT related courses must balance theory and practice (Andriole, 2006). Module design is ideal to integrate the several approaches into a single MIS course to achieve this goal. The remainder of this section will present the design concepts for the instructional, intellectual, clinical, and technical modules. The following section will explain the interaction between the design of these modules and the design of an assessment scheme.

Instructional Module

There have been many introductory MIS textbooks on the market. In terms of topics, they do not have much difference and seem to follow IS 2002.1 model (Table 1). The commonly adopted textbooks (e.g., Laudon & Laudon, 2004; O'Brien, 2005; Oz, 2004) show that the instructional module is divided into five units. Each unit covers closely related topics, as described below.

Unit 1: Roles of MIS in the organization

- Competitive advantage of information and MIS
- Systems concepts; MIS components and their relationships
- Value and quality of information and MIS

Unit 2: Information technologies in business

- MIS infrastructure and architectures
- Computer hardware
- System software; application software; package software solutions
- Database features; data management
- Telecommunication systems and networks

Unit 3: Types of management information systems

- Enterprise MIS, e-business, and MIS in business functional areas
- E-commerce
- Decision support systems
- Artificial intelligence techniques in business

Unit 4: Information systems development process

- Systems specification, systems analysis and design, and MIS re-engineering
- Roles of MIS professionals in system development
- Structured approach and object-oriented approach

Unit 5: Social and managerial issues of information systems

- Information and MIS security
- Cyber-crime
- MIS ethics

• Cultural factors and global MIS

The instructional module consists of lectures, video tape shows, or class discussion. Through instructional module students learn, understand, and remember concepts, principles, issues, and theories of MIS.

Intellectual Module

The intellectual module uses writing as a tool for students to learn concepts, principles, issues, and theories of MIS through critical thinking and analytical expression. This module helps students to articulate well focused, well organized, and well supported arguments and viewpoints through elaborate writing. There are three alternative types of writing assignments: essay, case analysis, and current topic.

Type 1: Essay

Essay writing assignments request students answer open-ended questions for specific MIS topics. Usually, those open questions are provided in the textbook. Some open questions have right answers, and others call for expression of opinions pertinent to the question. An essay should have a comprehensible introduction, paragraphs of viewpoints, and an assertive conclusion or summary. It should reflect applications of theories and provision of facts that the writer has learned from the textbook, lectures, and the Internet. Students are also encouraged to express their own experiences related to those open questions. References and citations must be used in the essay.

Type 2: Case analysis

Case analysis assignments request students to analyze small cases provided in the textbook. Most textbook cases provide case study questions, which associate the case with the course material, to guide the discussion. Formats for comprehensive case analysis, such as SWOT (strength, weakness, opportunity, threat) analysis and financial position analysis, might not be suitable for this course. Commonly, essay style formats are used for case analysis assignments in this course. A case analysis report should be organized by sections: instruction, discussion sections, and conclusion or summary. Each discussion section should have a short topic title corresponding to the case study question. The analysis must be based on theories learned from the course and supported by the facts provided by the case. Students are often required to search additional material on the Internet to support the arguments. Students' own work experiences related to the case can also be valuable for case analysis.

Type 3: Current topic

The textbook material can never keep up with the fast pace of IT innovation. Writing on current topics can supplement knowledge to this course. The sources of current topics include electronic databases such as ProQuest (2007), day-to-day life (e.g., TV shows), and the Internet in general. There are two alternative tactics for the assignment: in-breadth and in-depth. In the in-breadth approach, each student is supposed to write on a number of different topics for the assignment. In the in-depth approach, each student is supposed to write a series of entries on one topic. In the first entry of an in-depth assignment, the writer overviews the topic and explain why it is important. In the subsequent entries, the writer makes further discussions on the topic, including a historical review of the topic, cases or stories related to the topic, or different arguments on the topic. In the summary entry, the writer explains how this topic is related to the concepts learned from the textbook and provides conclusions. References and citations are always required in writing.

Clinical Module

The clinical approach is different from other approaches in that students go to the business community, find an MIS in the organization, learn the features and roles of the MIS, and identify MIS issues for the organizations. Typically, students work in teams. This module includes the following typical subjects.

- The business nature of the organization that are related to MIS
- The scope of the MIS being investigated
- The feature of the MIS in the organization - MIS architecture, hardware, software, networking, databases, and users
- The IT enabled business processes - process, inputs, outputs, and decision making
- Problems and opportunities of the applications of IT to improve the system
- Recommendations

Usually, students are required to develop following business communication skills that are particularly important to business professionals.

- Writing well organized project report
- System documentation - samples of system inputs, outputs, and user-computer interfaces; diagrams of the system architecture; diagrams of business processes
- Oral presentation - group presentation aided by PowerPoint slides

Technical Module

The technical module of the introductory MIS course concentrates much on "action learning" (i.e., learning through doing), and requires students to conduct technical hands-on assignments. The teaching philosophy of technical module is that people cannot learn without doing. Specifically, students are required to use spreadsheets for decision making (such as accounting and finance problem solving), or to use databases for data management (such as human resource management and inventory management), or to develop Web pages for e-commerce (such as marketing advertising). Ultimately, students can better understand key concepts including computer software, data management, information quality, decision support systems, e-commerce, systems development, and business process.

Several characteristics of this course make teaching of the technical module difficult. Given the mixed majors and interests of students in each section, it might not be a good practice to use a single set of assignments for all students in different majors. Also, the computer literacy of students strongly depends on the curricula of high schools. Transfer students and part-time students add even more computer competence levels to the class. Here, five alternatives for the technical module are designed, as shown in Table 3. The instructor may choose one of them for the class depending on the mainstream interests of the class, or use two or more alternatives for different student groups. In the latter case, it is not easy to provide tutorials for the assignments. This issue will be further discussed in the teaching strategies section.

Summary of the Module Design

While the instructional and intellectual models can be applied to all MIS topics, the clinical module concentrates more on organizational aspects of MIS, and the technical module focuses more on the technological aspects of MIS. The relationships between the four modules and the major topics (see the Instructional Module subsection) are depicted in Figure 1.

Table 3. Alternatives of Technical Module

Spreadsheet (Excel): Basic level	Spreadsheet (Excel): Advanced level	Database (Access): Basic level	Database (Access): Advanced level	Web page development (e.g., Dreamweaver)
• Mathematical formulas • Spreadsheet manipulations such as copying, inserting, deleting, and sorting • Built-in functions such as PMT, PV, and FV • Graphics • Formats and printing • Multiple spreadsheets	• Macros and VBA • Advanced what-if • Spreadsheet-based decision support system • Statistics data analysis • Query feature to access external databases such as Access	• Tables and forms • Query, and use formula in queries • Import and export data to other systems such as Excel • Report • Entity and relation	• Normalization • Macros and VBA • Advanced user-computer interface with command buttons, combo boxes, list boxes • Access-based decision support systems • Advanced user-defined functions • Database-based Web applications	• HTML and CSS • Import graphics and images, menus and hyperlinks, tables, frames • Dynamic Web pages • Animations • Publishing Web pages (uploading to server)

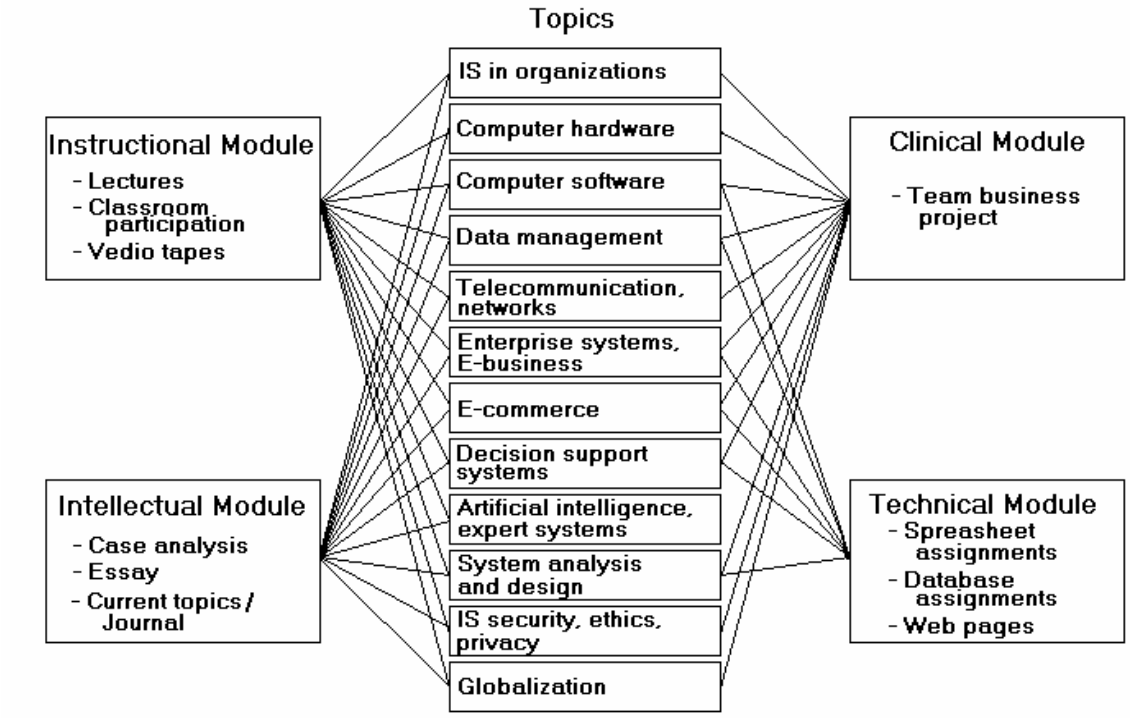

Figure 1. Four Modules for the Introductory MIS Course

In this section the structures of the four modules have been described. However, the framework leaves specific components of the modules for the instructor to decide. For example, the instructor decides whether a lecture or video tape should be used for a class, what case should be as-

signed to students, and what software should be used for hands-on. These tasks always rely on the instructor's experiences, insights into the class, and his/her own visions. Clearly, our module framework is a tool to maintain a uniform course structure shared by all sections of the course.

When designing these modules, assessment is kept in mind. In fact, the modules and the assessment scheme proposed in the next section are co-designed. The assessment scheme for these modules presented in the next section will further demonstrate the concept of co-design.

Assessment Scheme

Co-Design of Teaching-Learning Modules and Assessment Scheme

Assessment has been a critical issue in education (National Commission on Excellence in Education [NCEE], 1983). In common terms, assessment is the process of evaluating student learning outcomes (Angelo & Cross, 1993). Assessment allows us to understand what students are learning; yet, there is no simple method to measure student learning (Michlitsch & Sidle, 2002). This paper proposes an assessment scheme for the introductory MIS course. The assessment scheme can be used by the faculty to assess whether the course meets the requirements across all sections. It can also be used as a guideline by the instructors to develop their specific assessment instruments for their classes.

Our approach to designing assessment scheme is described as follows.

(1) Identify the goals of this course.

(2) Construct objectives that are corresponding to the subjects (topics) of this course, and fit the objectives to Bloom's framework (Bloom, 1956) to generate a set of measurable learning outcomes.

(3) Develop the assessment scheme based on the set of measurable learning outcomes.

As discussed in the previous section, the design of the assessment scheme and the design of the modules are correlated. The co-design process warrants that the objectives of the course can be fulfilled through these teaching-learning modules, and these modules are the best vehicle to deliver these measurable learning outcomes. Figure 2 shows the design process of assessment scheme.

Goals and Objectives of the Course

The first step for the design of assessment scheme is to define learning goals and objectives of the course. Here, goals describe broad learning outcomes in general terms, while objectives are specific learning outcomes in subject terms that reflect the broad goals.

Goals

Students will learn the concept of system, components of MIS, roles of MIS that influence organizational competitiveness, IT infrastructures in modern organizations, the unique economics of information and MIS, MIS enabled business processes and decision support techniques, MIS development and acquisition, the nature of MIS management, and social and global subjects such as ethics, cyber-crime, security, and cultural issues relative to MIS.

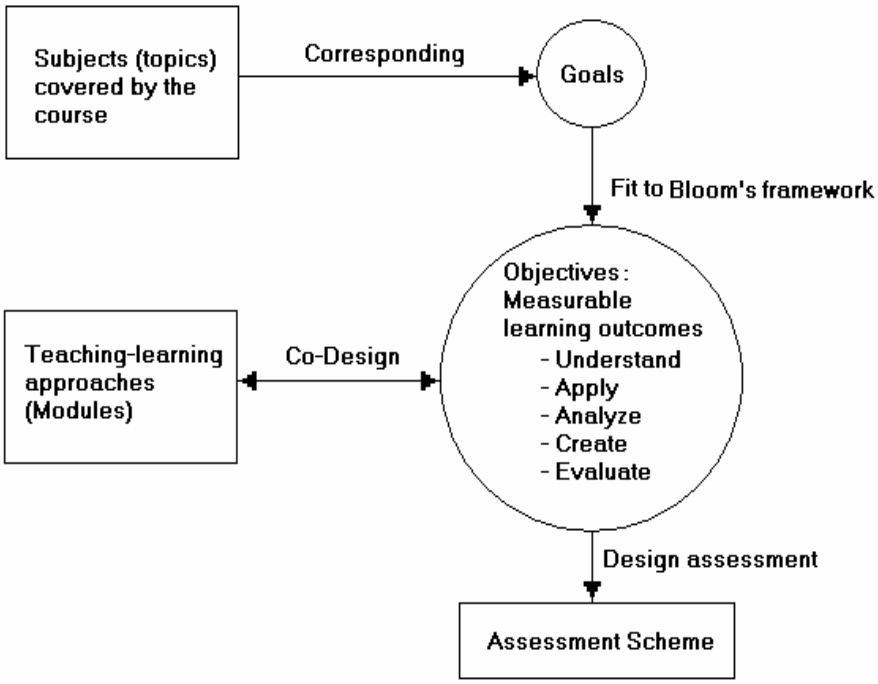

Figure 2. Co-Design of Teaching Modules and Assessment Scheme

Objectives: The Measurable Learning Outcomes

The above goals are corresponding to the subjects (topics) covered by this course. For the following two major reasons, these goals need to be further elaborated to develop objectives that can be used for measuring learning outcomes.

(1) For the purpose of assessment, goals must be decomposed into more specific learning outcomes that can be practically measured by the instructor.

(2) For the purpose of co-design of teaching modules and assessment, measurable learning outcomes must be classified to match each module.

A long list of objectives based on the IS 2002 report and surveyed syllabi was compiled. To fit the list of objectives into a structure, Bloom's framework (1956) with minor modifications was used. The original Bloom's framework includes six levels of learning: knowledge, comprehension, application, analysis, synthesis, and evaluation. Given the recent development in the knowledge management field, the term knowledge is no longer appropriate in this context. Knowledge and comprehension are merged into one level of learning, and come up with five levels of learning outcomes that are particularly pertinent to the MIS field: understand, apply, analyze, design, and evaluate. To reduce redundancy, any outcome listed in a higher level is not listed in the lower level(s). For example, outcome "students should be able to analyze the cost structure of MIS" implies outcomes "students should understand the cost structure of MIS" and "students should be able to apply cost structure of MIS". The measurable outcomes that fit the modified Bloom's framework are represented below.

(1) Understand

Students should remember and understand definitions, concepts, theories, and principles relative to:

• differences between data, information, and knowledge

• the concept of data warehousing and data mining
• networking concepts and components
• the evolution of e-business
• the systems development process
• the concept of MIS security and describe methods for MIS security
• cultural issues in managing IT in the global environment

(2) Apply

Students should be able to use learned concepts, theories, and principles, to answer a question relative to:

• elements of systems (e.g., boundary, environment, decomposition, coupling)
• MIS view to organizations
• the concepts of IT infrastructure to describe interoperability, scalability, and standards
• the concepts of databases

(3) Analyze

Students should be able to identify the elements involved in a complex scenario or situation and explain the relationships between these elements. The scenario or situation is relative to

• the nature and interaction of people, computers, technology
• organizational MIS architectures.
• organizational implications of the Internet and wireless networks
• business models in e-commerce
• the cost structure of MIS
• unique features of information economics, such as network effects and pricing of information products.
• the trade-offs involved in in-house development, purchase of off-the-shelf packages, customization of software, and outsourcing.
• the operational, managerial, and strategic processes associated with MIS management
• ethical issues associated with information privacy, intellectual property, and accessibility
• problems in managing IT in the global environment

(4) Design

Students should be able to actualize

• the use of MIS for business processes
• the use of MIS for organizational learning and decision making

(5) Evaluate

Students should be able to develop a set of criteria for a real business case and arrive at a good judgment for the case. The real business case is relative to

• the need to align IT investments with strategic plan
• how IT can be used to achieve and sustain competitive advantage
• how MIS can both constrain and enable organizations

The Assessment Scheme

An assessment process is characterized by four aspects: assessment sessions, assessment instruments, measurable learning outcomes to be assessed, and course modules that deliver these learning outcomes. The latter two aspects have been explained in the previous sections. This subsection discusses the first two aspects and the general relationships between the four aspects.

Assessment session

To assess whether a course section meets the course requirements, the instructor may use three assessment sessions: initial assessment, interim assessment, and final assessment. Using an initial assessment, the instructor can understand students' expectation, knowledge levels of the prerequisite, and specific interests. The instrument used for this session is a type of test with no-right-no-wrong questions to probe into the audience of the class. The interim assessment session provides feedback for the instructor to predict whether the class will achieve the learning outcomes and decide strategies for the rest of the class. The final assessment session evaluates the learning outcomes students have achieved.

Assessment instruments

There are five types of assessment instruments that can be used for this course to measure whether students have achieved the learning outcomes: test, requirements for writing, requirements for technical assignment, requirements for project, and student self-evaluation. A test instrument contains quiz questions and/or questions for short answers. Test assessment instruments are commonly available in the test banks that go with the textbooks. An instrument for assessing writing specifies the requirements for an essay or a textbook case analysis report. Generally, students are expected to write manuscripts that reflect their critical thinking and analytical skills relative to the learning outcomes. A technical assignment instrument lists the required products of computer applications that match the learning outcomes. A project assessment instrument itemizes the requirements particularly related to the learning outcomes at the highest level (i.e., evaluate). The criteria applied to project assessment include knowledge integration, practical and managerial significance, and organized presentation ability. A student self-evaluation instrument consists of questionnaire that solicits students' own opinions on the value of the learning process.

Clearly, the instructor of the course has the ultimate responsibility to develop their own assessment instruments.

Relationships between the four aspects

The general framework of the assessment scheme for this course is depicted in Figure 3. As shown in the figure, the four aspects of assessment are represented by the four layers of boxes. Each box symbolizes an element of these aspects. The linkages between the boxes symbolize the relationships between these elements. The bold lines indicate strong relationships, and the fine lines indicate weak relationships. For instance, the instructional module is a strong support of understand-type of learning outcome and a weak support of other types of learning outcomes.

Suggestion for Teaching Strategies

Teaching strategies are guidelines and plans applied to the teaching activities to improve classroom practice and enhance student learning. Here, several teaching strategies specifically for this course are suggested based on the author’s experiences in teaching this course.

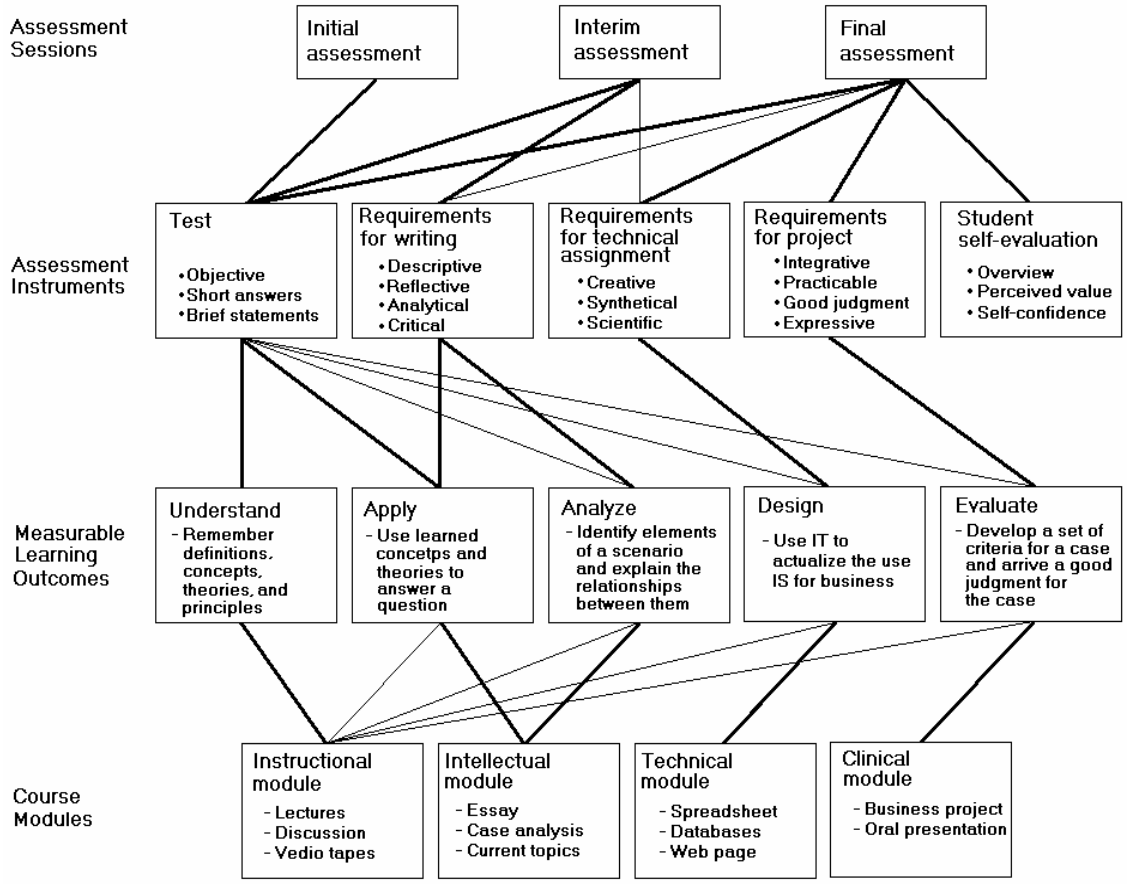

Figure 3. The Assessment Scheme Proposed for the Introductory MIS Course

Make Multiple Modules Cohesive

An instructional module usually carries on for the entire semester, while other modules start weeks later after students learn the context. The instructor shall help students to balance the workload across the course by specifying the agenda in the syllabus clearly. More importantly, the instructor shall make the material of the multiple modules cohesive, and connect these modules through class discussion.

Maintain Continuous Progress and Monitor Self-Paced Learning

Milestones are needed to check the progress of assignments and projects. For instance, students might be required to submit short project proposals to ensure the clinic module to start on time. It might also be necessary to have a midterm check to see whether the projects are on the track towards the requirements. The instructor shall continuously offer suggestions to individual groups. If the instructor gives different sets of technical assignments to students to fit individual interests and levels of computer competence, self-paced learning approach is appropriate since provision of classroom tutorials is infeasible. Specially-designed material and instructions for self-paced learning are then necessary. This teaching strategy helps to build bond between the instructor and students, and provides a mechanism of quality control for these modules.

Effective Cooperative Learning

Cooperative learning is the use of small groups so that students work together to maximize their own and each other's learning. The cooperative learning strategy is commonly used in business education. Cooperative learning does not guarantee positive learning experiences. The instructor shall encourage students to use peer-reviews to maintain the quality of cooperative learning.

Engage Students in Experience Sharing

The instructor shall require students to give oral presentations so that they can share learning experiences. This approach is particularly useful for the clinical module. While they learn a variety of their own real-world MIS projects, students are also supposed to act as the management and evaluate peer projects. The instructor shall encourage students to participate discussion after each presentation session.

Conclusion

The introductory MIS course is usually taught by MIS faculties. Many MIS faculties use the IS 2002 report for MIS course design. However, the IS 2002 report does not provide many pedagogical details. In our view, the development of teaching-learning modules and assessment schemes for a particular course is always open to discussion in the teaching community. This pedagogical study takes a critical look at the introductory MIS course and suggests avenues for improving pedagogy.

In this study, the co-design approach has been applied to the design of teaching-learning modules and an assessment scheme for this course. The paper presents the four modules and an assessment scheme as a framework that unifies the teaching-learning approaches to achieve the objectives of this course. It has been our experience that, while the flexible nature of the framework accommodates differing approaches to preparations and allows instructors to set teaching-learning strategies on their own, the framework is a tool to coordinate across multiple sections of the introductory MIS course. It is concluded that the integration of pedagogical design and assessment scheme design for the common core introductory MIS course is useful as well as achievable.

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Appendix
AACSB Accredited Schools of Business Surveyed for Introductory MIS Courses

1. University of Dayton <http://academic.udayton.edu/davesalisbury/classtuf/mis301/>
2. University of Georgia <http://www.terry.uga.edu/courses/mist2090/>
3. Southern Illinois University <http://webct.siue.edu>
4. Miami University <http://www.sba.muohio.edu/servepd/MIS235Syllabus.htm>
5. University of New Mexico <http://www.magal.com/iswn/teaching/intromis/download.cfm?Resource=s&SyllabusID=3>
6. University of Indianapolis <http://www.magal.com/iswn/teaching/intromis/download.cfm?Resource=s&SyllabusID=12>
7. University of Texas <http://www.mccombs.utexas.edu/dept/msis/courses/syllabi_spg2004/MIS%20381N.7%20Info%20and%20Knowledge%20Management%2003575%20(McDaniel).pdf>
8. Rutgers, The State University of New Jersey <http://business.rutgers.edu/eckstein/mis/syllabus.html>
9. University of Missouri <http://www.bloch.umkc.edu/classes/ward/mis302/302f2000sy.htm>
10. The University of Michigan <http://www-ersonal.umd.umich.edu/~williame/syllabi/syllabus120.html>
11. Ohio University <http://oak.cats.ohiou.edu/~piccard/mis300/rdpsyl.html>
12. Wright State University <http://www.wright.edu/~joan.lumpkin/mis300.htm>
13. Sam Houston State University <http://www.shsu.edu/~mgt_gxk/388_syl_Sm03.htm>
14. University of Texas at Dallas <http://www.utdallas.edu/syllabus/syllabi/mis6204.595adler.pdf>
15. California State University, Sacramento <http://www.csus.edu/indiv/s/sandmant/140S05.htm>
16. The University of Memphis <http://www.people.memphis.edu/~infosys/memphis/undergraduate/2755syllabus_spring2005.htm>
17. Indiana State University <http://misnt.indstate.edu/harper/MIS_320.htm>
18. The University of Mississippi <http://faculty.bus.olemiss.edu/mlewis/309/Syllabus%20and%20Schedule%20Fall%202004.mht>
19. Texas A&M University <http://www7.tamu-commerce.edu/genbus/folden/foldenmis426.htm>
20. University of Massachusetts Boston <http://www.management.umb.edu/courses/msis105.php>
<http://www.management.umb.edu/courses/msis110.php>
21. University of Rhode Island
<http://www.uri.edu/catalog/cataloghtml/ugrad/busadministration.html#managementinformationsystems>
22. Bryant College <http://bryant2.bryant.edu/~cis/descrip.htm#201>
23. Fairfield University <http://www.faculty.fairfield.edu/isom/program.html>
24. Quinnipiac University <http://www.quinnipiac.edu/x2044.xml?ID=526&Term=05/FA>
25. Hartford University <http://admission.hartford.edu/studying/colleges/desc/barney/managementInformationSystems.php>
26. Bentley University <http://ecampus.bentley.edu/ugcatalogue/Programs/Computer_Information_Systems.cfm>
27. Boston College <http://www.bc.edu/crs/md/course/md24000.shtml>
28. Boston University <http://management.bu.edu/upo/curriculum/concentrations.asp#cs111>

29. Baruch College <http://www.baruch.cuny.edu/ugradprograms/cis.htm#cis>
30. Clarkson University <http://www.clarkson.edu/prospective/academic_majors/majors/business.html#infosystems>
31. Pace University <http://appserv.pace.edu/execute/mypace/app.cfm?inc=SearchPrograms2>
32. Susquehanna University <http://www.susqu.edu/accounting/courses.cfm?Code=08>
33. University of New Hampshire <http://www.undergradcat.unh.edu/ug-abm-0506.htm>
34. Rutgers University-Camden <http://www.acs.rutgers.edu:8880/pls/sc_p/sc_display.select_courses>
35. New York University <http://w4.stern.nyu.edu/emplibrary/Information_Systems.pdf>
36. Rochester Institute of Technology <http://www.rit.edu/~932www/ugrad_bulletin/courses/ccis/infotech.html>
37. Alfred University <http://www.alfred.edu/courses/miscour.html#mis190>

Biography

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