

# What should the content and focus be for the core Information Systems course? The ongoing debate

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## Abstract

There is an ensuing debate among academicians related to content and teaching approaches of the introductory information systems course typically required of all undergraduate business majors. (1) Should the core Information Systems (IS) course be offered in business schools as a separate course required of all business majors? Or should different functional departments within the business school integrate core IS concepts in appropriate courses within their discipline? (2) What is the best approach in terms of content and focus for teaching this course – the traditional, systems development approach (henceforth referred to as traditional approach) versus the integrative, interdisciplinary functional approach (henceforth referred to as integrative approach)? Questions like these have generated much discussion among faculty at business schools and have resulted in an ongoing debate as to the content area and focus of the core IS course. The interest in such discussion stems from changing business practices; the evolving nature of technology; pervasiveness of information systems in other business disciplines; and students' perceptions of the lack of intrinsic value of a core MIS course for non-MIS majors. All these factors have contributed to accompanying challenges of teaching the core IS course. We attempt to answer the afore-mentioned questions by comparing the traditional and integrative approaches. We do extensive analyses of surveys conducted and data collected by proponents of traditional and integrative approaches. We also discuss the survey conducted by the authors, and analyze the data collected.

**Keywords:** undergraduate introductory information systems course, IS 2002, IS2002.1, AACSB, curriculum

## 1. INTRODUCTION

The core Information Systems (IS) course for business school majors is important specifically for business schools that seek to be accredited and wish to continue to be accredited by the Association to Advance Collegiate Schools of Business (AACSB). The latest *Eligibility Procedures and Standards for Business Accreditation* that were adopted in April, 2003, and revised in January, 2005 by AACSB require that business schools offer subject matter in IS at the undergraduate and graduate level. The specific manner in which the IS course is taught along with teaching methods used are not detailed in

these standards. However in order for a business school to have relevant and current curriculum, it is required that the school teach subject matter in IS to all its business majors. Such a course is also recommended by the IS 2002 curriculum model (Gorgone et al., 2003) for undergraduate degree programs in MIS. Most business schools require students to take the IS 2002 recommended IS 2002.P0, which is a personal productivity course followed by the core undergraduate Information Systems course (IS 2002.1)

IS2002.1 is a challenging course to teach as, in most business schools, it is a required course for all business majors. It is typically

taken by business majors including MIS, accounting, economics, finance, marketing, and management in their junior or senior year of a four-year undergraduate program. The IS discipline is an important function of both business and government organizations and organizations rely on information technology as a fundamental part of their business and competitive strategy.

While IS2002.1 is very important for any business major, on the flip side, the evolving nature of technology, the pervasiveness of information systems in other business disciplines and students' perceptions of the lack of intrinsic value of a core MIS course for non-MIS majors have posed some difficult challenges to effectively teach this course. In addition, though it is recommended in the guidelines (Gorgone et al., 2003) that the core IS course be taken by the students in their junior year, many students may end up taking this course in their senior year. Due to this, there is a considerable time lag since the time the prerequisite course (IS2002.P0) was taken. This may result in lack of enthusiasm.

This paper attempts to address these challenges by studying teaching approaches that academicians have taken to increase student interest. In particular, the paper discusses two teaching approaches, namely, traditional and integrative approaches in the following section. Next results from data and survey analyses of traditional and integrative approaches are discussed and presented. A survey conducted at the author's university that measures and determines students' perceptions in learning MIS concepts is presented along with an analysis of results. Finally, conclusions and recommendations for future work are presented.

## **2. WHAT SHOULD BE TAUGHT IN THE CORE INFORMATION SYSTEMS COURSE?**

The IS 2002 curriculum model, (Gorgone et al., 2003), which provides curriculum guidelines for undergraduate IS programs in business schools, also recommends learning goals and objectives for individual courses in its curriculum model.

Topics recommended in curriculum guidelines for the core IS course by IS 2002 and IS'97 are compared in Table 1. (Gorgone et al., 2003) mention that IS 2002 is only a

minor revision to IS'97 curriculum guidelines. This is especially true for the core IS course. Despite major advances in the technology discipline only four topics have been added to the IS2002.1 course and minor revisions are made for two topics.

The topics recommended by IS 2002 for the core IS course (IS 2002.1) lay a heavy focus on systems theory. This has not changed since IS'97 recommended curriculum guidelines for the core IS course were published (refer to Table 1).

This is also true of proponents of the traditional approach. Proponents of the traditional approach (Salisbury et al., 2004; Ives et al., 2002) maintain that systems theory should be the central theme for the organization and delivery of the core IS course and that knowledge of fundamental IS concepts represents a distinct and vital element of business education.

Whereas proponents of the integrative approach, (Hershey, 2002), advocate that the central theme of the core IS course should be how IT and IS are important to business processes, and procedures and how these relate to business functions and typical business activities. Less emphasis is placed on systems analysis and design, decision support systems, database management, hardware and software management, IT strategies and strategic uses of IT/IS, and IS organization and IT management. According to Hershey (2002), the advantages of the integrative approach are:

1. Student understanding of organizations and operations is enhanced.
2. This approach provides a richer background for study of other functional core courses in finance, marketing, human resources, and operations.
3. Students' satisfaction level with studying IT and IS increases.
4. There is a positive shift in the non-IS business faculty's perception of IS faculty as being business faculty first and technology experts later.

The possible weaknesses mentioned by Hershey (2002) are:

1. The integrative approach places less emphasis on topics recommended in IS2002.1.
2. The majority of textbooks provide very little coverage of business operation, activities, processes, and process analysis making it difficult for faculty to adopt this approach.
3. If any of these textbooks are used, many chapters would not be discussed if the integrative approach is used. This would increase student dissatisfaction as they would have to pay for a textbook that was only partially referred to.
4. The integrative approach relies on IS faculty's understanding of business functions and processes. Lack of such an understanding can be detrimental.

Proponents of both approaches use IS2002 recommended guidelines by emphasizing or de-emphasizing some topics and learning goals for IS2002.1. In the next section, we analyze data and survey results for both approaches.

### 3. SURVEY AND DATA ANALYSES

This section discusses and analyzes:

1. The survey conducted by proponents of the traditional approach (Salisbury et al., 2004) to determine the effectiveness of this approach.
2. Information presented by proponents of the integrative approach (Hershey, 2002) to measure the viability of this approach. Note no survey results were presented in the paper.
3. The survey conducted by McLeod, 1985, which is to date the most comprehensive survey of the undergraduate introductory IS course, to assess and determine the critical factors and important content areas.
4. The survey conducted at the author's college to evaluate the effectiveness of learning goals.

The first survey presented in this paper was conducted by Salisbury, et al. (Salisbury,

Huber, Piercy, & Elder, 2004). This survey was chosen for following reasons:

- a. Its aim was to measure the effectiveness of content coverage and learning goals as specifically recommended by IS 2002.
- b. The survey's recent date of administration (2003).
- c. The survey's target population was IS course coordinators/course instructors.

The third survey was conducted by McLeod (McLeod, 1985) for the core undergraduate IS course offered in AACSB schools. Inclusion of this survey provides an historical perspective on trends in course content coverage in the core undergraduate IS course. Other salient factors for choosing the survey include:

- a. The survey was conducted in 1985, much before the advent of many new technologies including the World Wide Web.
- b. It was administered to business (IS and non-IS) faculty teaching or involved in the curriculum development of the core undergraduate IS course.

The fourth survey presented in this paper was conducted at the author's university. Participants in this survey included students in the core undergraduate IS course. This survey was chosen for following reasons:

- a. The data was collected in 2005 and hence is current.
- b. The survey focuses on gauging students' perspectives on the effectiveness of content and learning goals for this course.

#### 3.1 Analysis of survey conducted by proponents of the traditional approach (Salisbury et al., 2004)

The first survey presented here is by one of the panels at AMCIS 2003 (Salisbury, et al., 2004) that involved discussion of IS 2002 recommended guidelines for course content and learning goals for the core undergraduate IS course. The authors conducted a survey of faculty members who teach this course or who are involved in its curriculum

development. The survey was submitted to IS World readers with the objective of gauging if respondents were familiar with IS 2002 curriculum guidelines and if they had taught recommended topics mentioned in IS 2002.1 course guidelines. The survey also attempted to measure if learning unit goals for IS 2002.1 course were met.

Background of the 60 survey respondents are displayed in Figure 1a. Analysis of Figure 1a underlines the fact that a high percentage of respondents are faculty (75% tenured track/tenured) who are delivering and/or influencing the course content (77% current course instructor/coordinator and 92% past instructors/coordinators).

Figure 1b presents results of the content coverage of IS topics. For each IS 2002.1 content area, a questionnaire asked respondents to rate on a Likert scale from 0 to 5 (N/A to Heavy Coverage) the extent to which each element was covered. The authors categorized responses of 0 to 2 as "low" and responses of 4 or 5 as "high." Salisbury, et al. did not include survey responses of 3 in their survey. They decided to drop a response of 3 from their analysis, reasoning that it was unimportant because a respondent would tend towards "a neutral answer" when he/she was uncertain. From the analysis of survey data, Salisbury, et al. concluded that systems concepts and system components and relationships seem important to IS instructors and course coordinators.

The survey data from Salisbury, et al. (Salisbury, et al., 2004) was analyzed in this paper. For this analysis, the paper followed Salisbury, et al.'s methodology and categorized responses of 0 to 2 as "low" and responses of 4 or 5 as "high." However, unlike Salisbury, et al., this paper considered a response of 3 to be important in the analysis and categorized responses of 3 as "medium." This paper critically revisits Salisbury, et al.'s contention regarding elimination of data related to a response of 3 on the Likert scale. Figure 1b clearly shows that almost a third of the participants (21.67% to 36.67%) gave a medium ranking of 3 to most topic areas covered in the IS course with the exception of two content areas (~6.67% and 11.86%). Our belief is that it would be erroneous to drop these data from a meaningful analysis.

An analysis of survey data (Figure 1b) further shows that less than 50% of total respondents believe that "high" coverage is given to systems concepts and system components and relationships topics. For systems concepts coverage, less than half (~45%) of respondents categorized it as "high." Interestingly, about one-third of respondents (~37%) felt that the coverage given to systems concepts is moderate (category "medium"). Looking back at respondents' backgrounds, almost three quarter are current IS faculty. It is evident from this analysis that more than half the IS faculty involved in coordinating or teaching the IS course do not exhibit "systems focus." Further, greater than one third of the IS faculty thought that only moderate coverage is being given to systems concepts. The findings of this paper are in contradiction to Salisbury, et al.'s contention that systems theory is considered important by respondents. Analysis also shows that, with the exception of database, no other course topics have "high" coverage judged as more than 50% in the "high" category.

Even though Salisbury, et al. (Salisbury, et al., 2004) mention that a survey on learning goals was conducted, no such results were presented in their paper.

### **3.2 Analysis of information conducted by proponents of the integrative approach (Hershey, 2002)**

Although a survey was not conducted by proponents of the integrative approach, Hershey, 2002, we analyze the information provided in the paper. IS 2002.1 course content at UNC Greensboro was changed considerably from the IS 2002 recommended guidelines. Some of the motivations backing the change in content, focus, and learning goals was the dissatisfaction of students and faculty with the traditional focus that lay a heavy emphasis on technology. Faculty members were of the opinion that an integrative experience would be more beneficial in meeting students' learning goals. They also felt that the course targeted students majoring in IT. The course, which is called Business Processes and Information Technology, has received positive student feedback on the focus and emphases of the course.

For topics that were not covered at UNC Greensboro, we have given the score of 0%; topics that received minimal coverage, the score was 25%; for moderate coverage, the score allocated was 50%; and for topics that were covered, the score allocated was 75%. Figure 2a displays the results. Similarly, learning goals at UNC Greensboro are plotted in Figure 2b. It can be seen from Figure 2a and Figure 2b that faculty members at UNC Greensboro give minimal coverage and importance to system concepts and more to business integration.

A caution to readers that our analysis of the data from the survey may not be consistent with the way the authors have used to come to their conclusion. However we were more interested in understanding if the data showed a trend, and if yes, how it compares to work of other authors, than actual numbers. Analysis presented here is still valuable.

### 3.3 Analysis of survey conducted by McLeod, 1985

The third survey discussed here was a mail survey conducted by McLeod (McLeod, 1985). McLeod conducted a survey of 145 AACSB schools of which 113 schools with undergraduate programs responded. Of the 113 schools that responded, 62 offered a core undergraduate IS course.

Survey respondents were asked to check topics included in their courses from a list of 13 topics selected from then-popular Management Information Systems (MIS) texts. **Figure 3** is a plot of content coverage of the core undergraduate IS course at various institutions. From **Figure 3**, we observe that heavy emphasis was laid on systems analysis and systems theory, followed by hardware and database theory. As stated by the author, "The MIS course has a definite systems analysis, rather than management, emphasis" (McLeod, 1985). Topics receiving lightest coverage included management theory and data communication. Poor coverage of management theory could possibly be due to the then-existing understanding that MIS majors would end up as systems analysts rather than managers. Low emphasis on data communication could reflect the lack of proper understanding of the potential of the internet and the World Wide Web that was yet to make its mark in the IT world.

An interesting point to be noted is that computer security, which received a mediocre score, was still considered important but certainly did not enjoy the attention that it currently does.

### 3.4 Analysis of survey conducted at the author's college

The third survey presented in this paper, conducted at the author's university, attempted to measure the effectiveness of course content and learning goals for the core undergraduate IS course. In this survey, a special emphasis was placed on measuring students' responses to the effectiveness of learning goals used in the core undergraduate IS course. The survey approach taken here is slightly different from above-mentioned surveys. Whereas the previous two surveys were administered mostly to faculty involved in teaching or coordinating the core undergraduate IS course, this work seeks to gain the students' perspective. The reason for this approach is that students are the end users and any survey without their point of view will at best be incomplete.

Survey data are presented in **Appendix A**. The survey asked students to rate each learning goal on a Likert scale from 1 to 5, with 1 being least effective and 5 being most effective. For analyzing survey results, responses of 1 or 2 are categorized as "low," responses of 3 as "medium" and responses of 4 or 5 as "high."

The survey comprised a total of 20 respondents. The background and the class standing of respondents are shown in **Figure 4a**. Almost 90% of students surveyed were non-MIS majors, despite the fact that this course is offered by the MIS department. The sample consisted of following majors: 40% business management majors, 20% accounting and finance majors, 10% marketing majors, and 10% MIS majors. The remaining 20% of the respondents are non-business majors. Also, the majority of respondents were in their senior (52%) or junior (43%) years, with only 5% of the respondents being sophomores. Another aspect of the study was to correlate students' enthusiasm with students' class standing. Though an upper-division course, students have not been required to take it in their junior or senior

years. It was observed that even though students' satisfaction was high for all assignments of the course, those who waited to take the course in the beginning of their senior year or the last semester before graduation were less motivated and enthusiastic in completing the projects.

**Figure 4b** shows students' perception of the effectiveness of the IS 2002.1 recommended learning goals. Analysis of **Figure 4b** suggests that overall students felt that the core undergraduate IS course taught at the author's university met the IS 2002 recommended learning goals. Learning goals for which students' response was "high" included professional and ethical responsibilities of the IS practitioner, application of information technology to design, facilitate, and communicate organizational goals and objectives, and IT concepts.

Course content coverage at the author's university is shown in **Figure 4c**. It corresponds closely to McLeod's course content coverage. The course topics for **Figure 4c** were taken from a customized version of a popular MIS text that is used at the author's university. When compared to McLeod's course content coverage (refer to **Figure 3**), there is a higher emphasis on systems concepts and database but no emphasis on hardware. There is also a higher emphasis on information security, crime and ethics, and the competitive advantage of information systems.

In addition to measuring students' perceptions of the effectiveness of IS 2002.1 learning goals, the survey conducted at the author's university also measured the effectiveness of assessments used in the course. Students were asked to qualitatively appraise IS course assessments. These included three projects, case discussions, homework, and two exams. Results of this analysis are shown in **Figure 4d**. Survey results indicate high levels of students' satisfaction towards the assessments.

### **3.5 Comparison of Analyses of Survey 1 and Survey 3 (Surveys by Salisbury, et al. and McLeod)**

In this section, the analysis done in Salisbury, et al.'s paper is compared to that in

McLeod's paper to gain an historical perspective of the coverage given to various topics in IS courses. The two surveys are separated by a period of 20 years, a period marked by the emergence of the World Wide Web. The following points are observed from the comparison of the two survey analyses:

1. The course content area for the core undergraduate IS course does not appear to have changed considerably over the past twenty years. A cursory review of a majority of currently popular textbooks for the core undergraduate IS course shows a content coverage similar to the one in McLeod's paper (McLeod, 1985) that based its survey on contents from popular textbooks during an earlier period. This similarity in course content exists despite several major technological changes that occurred in the intervening period of two decades between the two surveys.
2. What appears to have changed most is the emphasis on course topics. McLeod's survey showed that almost 87% of the respondents considered systems theory coverage to be "high" compared to less than half the respondents in Salisbury, et al.'s survey. This is despite the fact that in McLeod's survey most instructors surveyed were management faculty compared to almost 75% of the respondents being IS faculty in Salisbury, et al.'s survey.
3. Database as a course content area enjoyed the same high importance in both the surveys, pointing to the fact that management of data has historically been considered essential for the IT industry.
4. Object oriented theory is one of the four new content topics updated in the IS 2002 curriculum model. Interestingly, most IS faculty surveyed give this topic the least amount of coverage when teaching the core undergraduate IS course, (please refer to **Figure 1b**).

#### 4. CONCLUSIONS AND RECOMMENDATIONS

1. The ongoing debate centered on the content and teaching approaches of the introductory IS course. The traditional systems focused approach versus the functional integrative approach is not only very important but critical to ensuring a successful transition of business students to the professional world. Such discussion is an outcome of challenges of teaching the IS course including changing business practices; the evolving nature of technology; pervasiveness of information systems in other business disciplines; and students' perceptions of the lack of intrinsic value of a core MIS course for non-MIS majors. However the end result of such a debate is not to take an extreme approach but a middle ground path that encompasses the best approaches of the both the schools. The focus of such debates should be with where the students taking such course might end up in their professional career and what is most important for them to learn to be successful in their career. The adoption of one approach over the other depends on several factors such as the size and presence of the IS department in the business school, focus and goals of IS and business programs, the expectations of the local market, and presence of alternate course offerings for the students.
2. Before instructors choose one approach over the other, it is important for IS faculty members to have a clear perspective of the role of IS in their college and to clearly articulate core objective(s) of IS and convey it to their colleagues in the business school. They also need to know the local market and industry needs. If IS faculty members wish to keep the core IS course within the IS program, an increased focus on IS security issues and industry compliance to SOX, HIPAA, etc. needs to be integrated in the core IS course.
3. Guidelines proposed by IS 2002 is a very good approach to standardize course curriculum. One of the challenges of teaching the core IS course is the rapidly changing technology. Though a great effort in terms of time and resources, a frequent updating of the course curriculum is important to keep pace with rapidly changing technology, security issues and outsourcing.
4. The debate should include not only the course content but a teaching approach. The second half of the equation is ignored.
5. Survey is a great tool. However such surveys should be comprehensive and consistent across schools offering the course. Survey should include both faculty and students. Survey should further include content, learning goals and teaching methodology.
6. IS faculty members involved in teaching this course or in its curriculum development should measure their existing learning goals of the course with the IS 2002 recommended learning goals before implementation of IS 2002 recommended learning goals. It might be useful for instructors to factor in which year the students take the core IS course and whether there has been a considerable time lag between the prerequisite course and the core IS course, especially for non-MIS majors. Rather than choosing one approach over the other, instructors can choose a middle path by designing a course that incorporates both the traditional and the integrative approaches and also experimenting with different teaching approaches to enhance learning.

## 5. REFERENCES

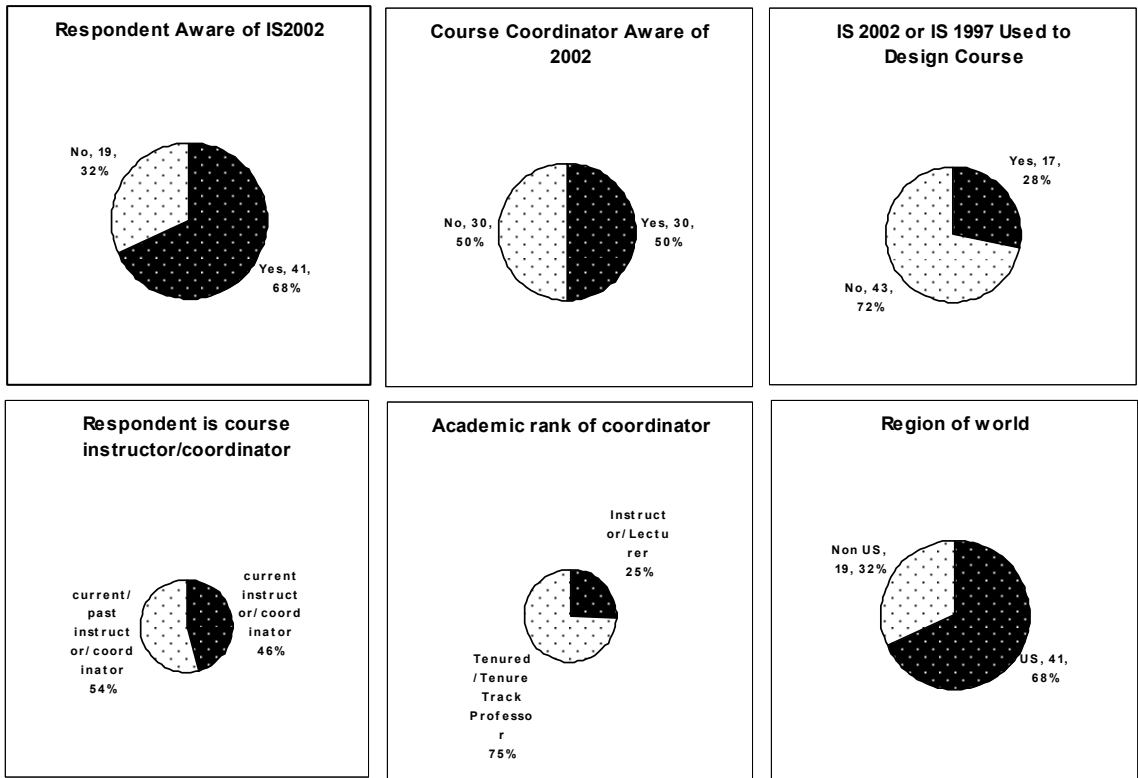
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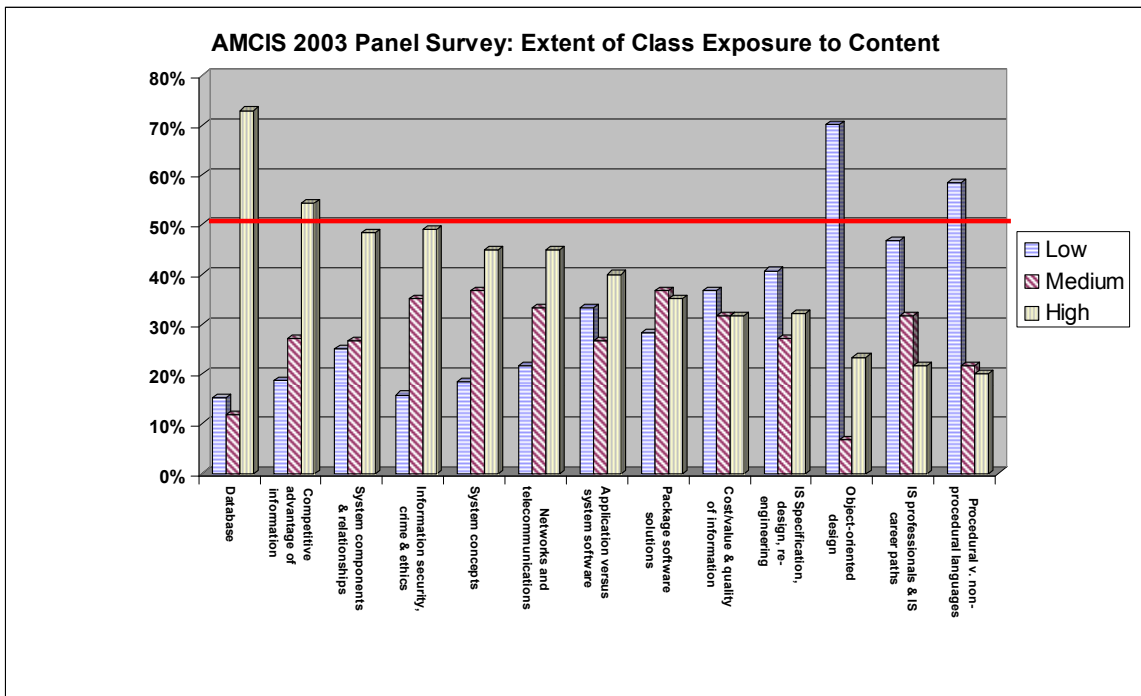
## 6. TABLES AND FIGURES

IS'97 Topics for the core IS course	IS2002.1 Topics for the core IS course
systems concepts	
system components and relationships	
cost/value and quality of information application versus system software	
procedural versus non-procedural programming languages	
database features, functions, and architecture	
specification, design and engineering or re-engineering of information systems	specification, design, and re-engineering of information systems
telecommunications applications	networks and telecommunication systems and applications
	characteristics of IS professionals and IS career paths
	competitive advantage of information
	package software solutions
	object oriented design
	information security, crime, and ethics

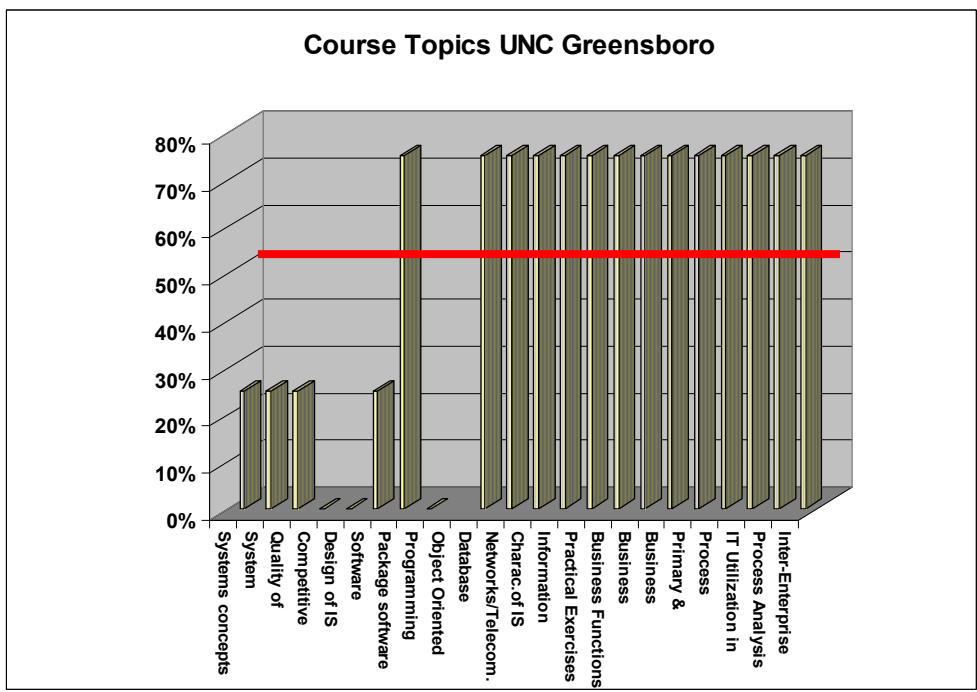
**Table 1: Comparison of topics in IS2002 and IS'97 for the core IS course**



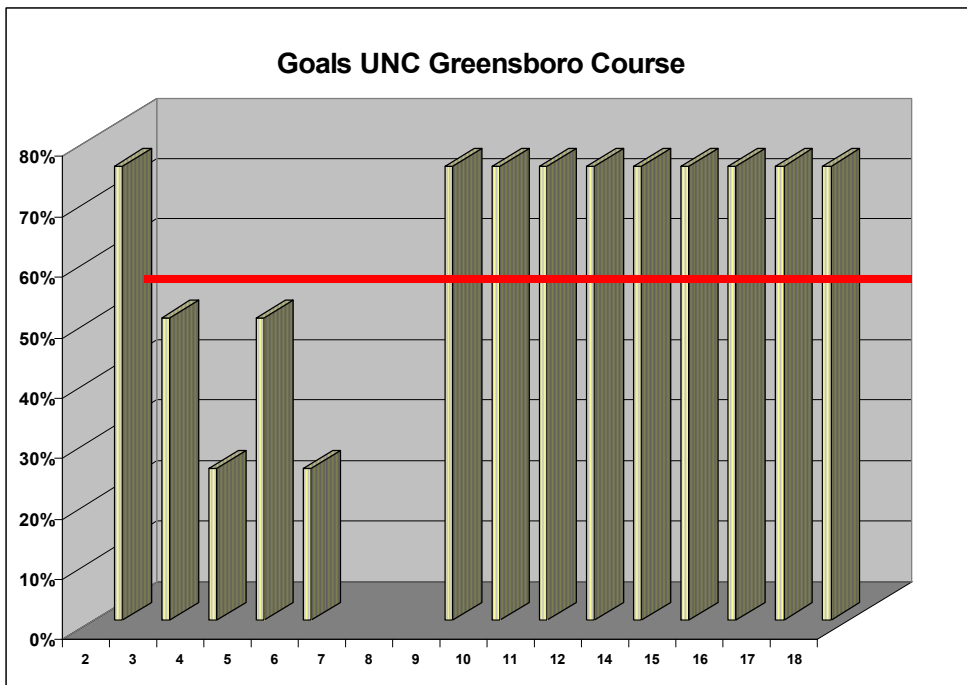
**Figure 1a: AMCIS 2003 Panel Survey**



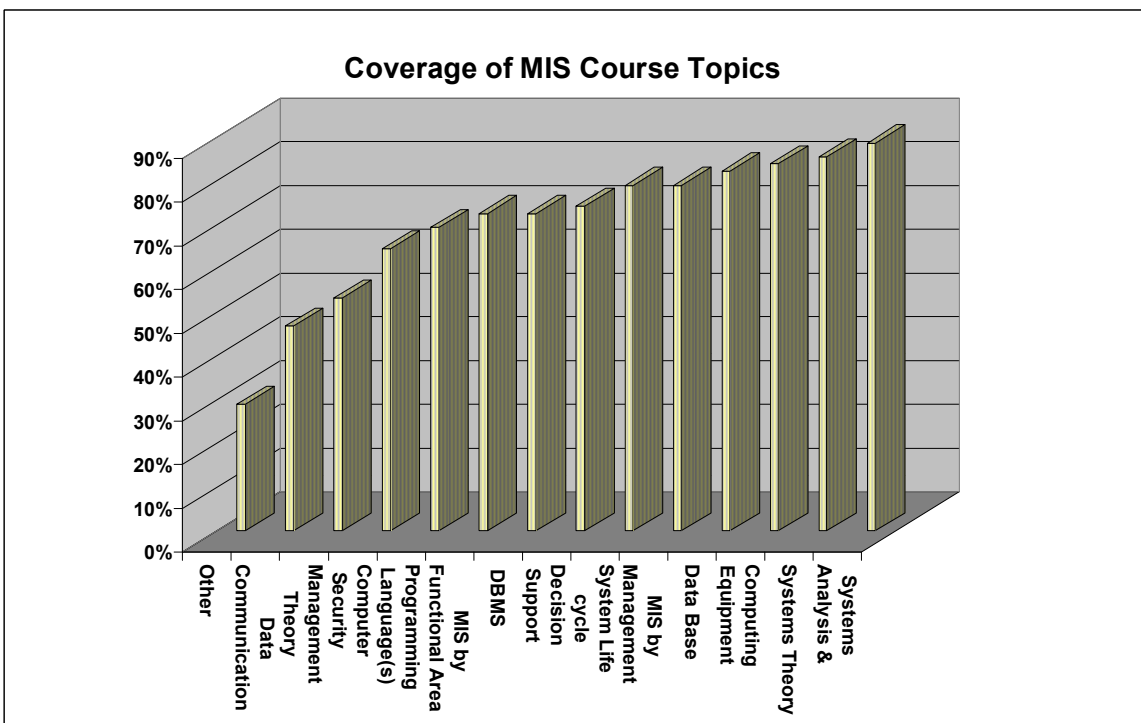
**Figure 1b: AMCIS 2003 Panel Survey**



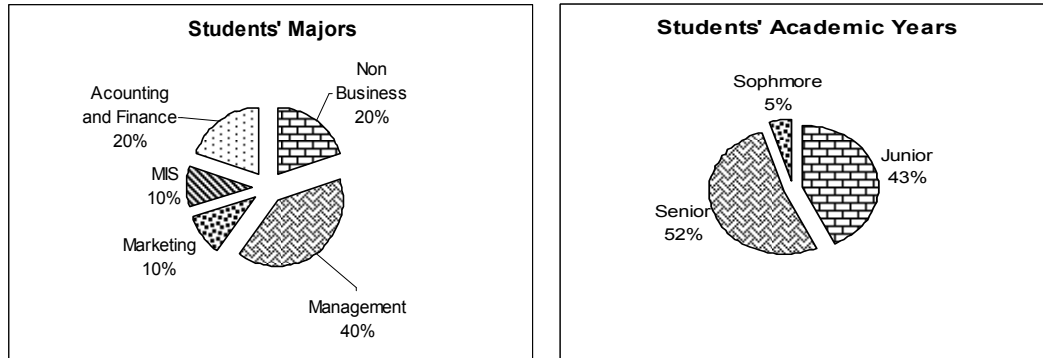
**Figure 2a: Course Content from Hershey's Survey**



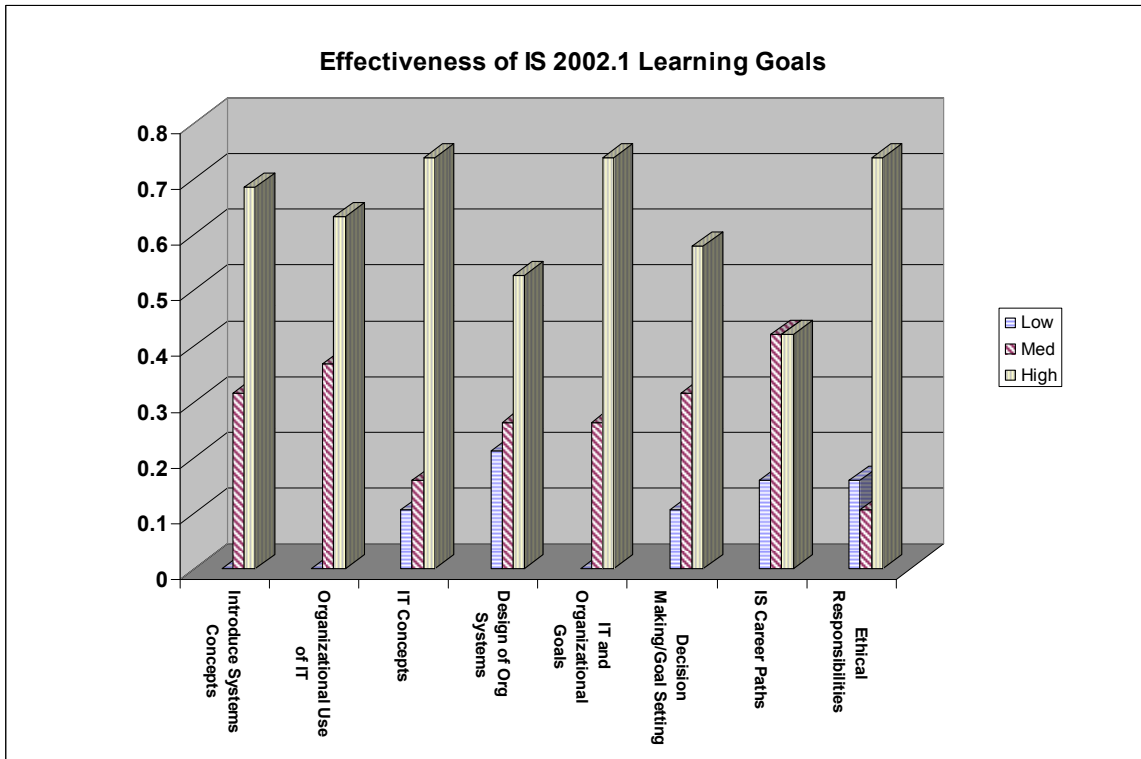
**Figure 2b: Learning Goals from Hershey's Survey**



**Figure 3: McLeod Survey**



**Figure 4a: Author's University Survey**



**Figure 4b: Author's University Survey**

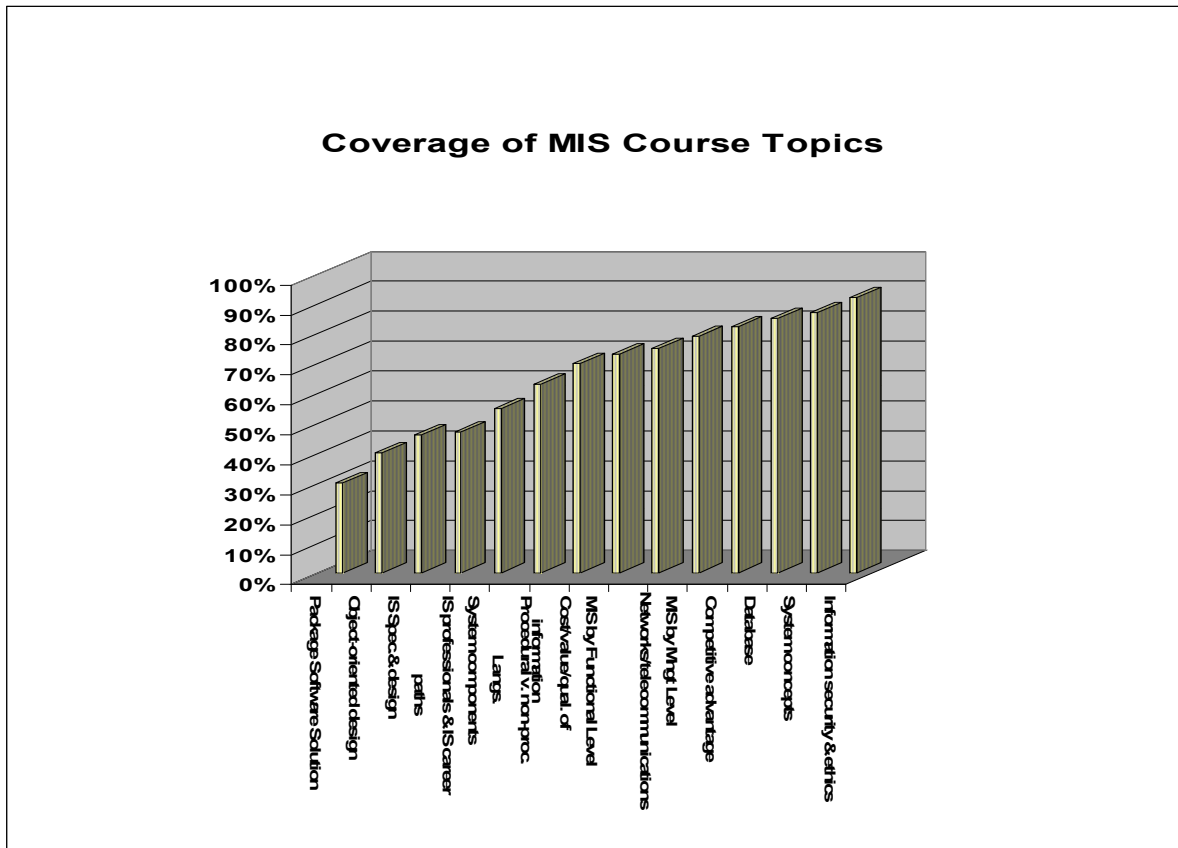
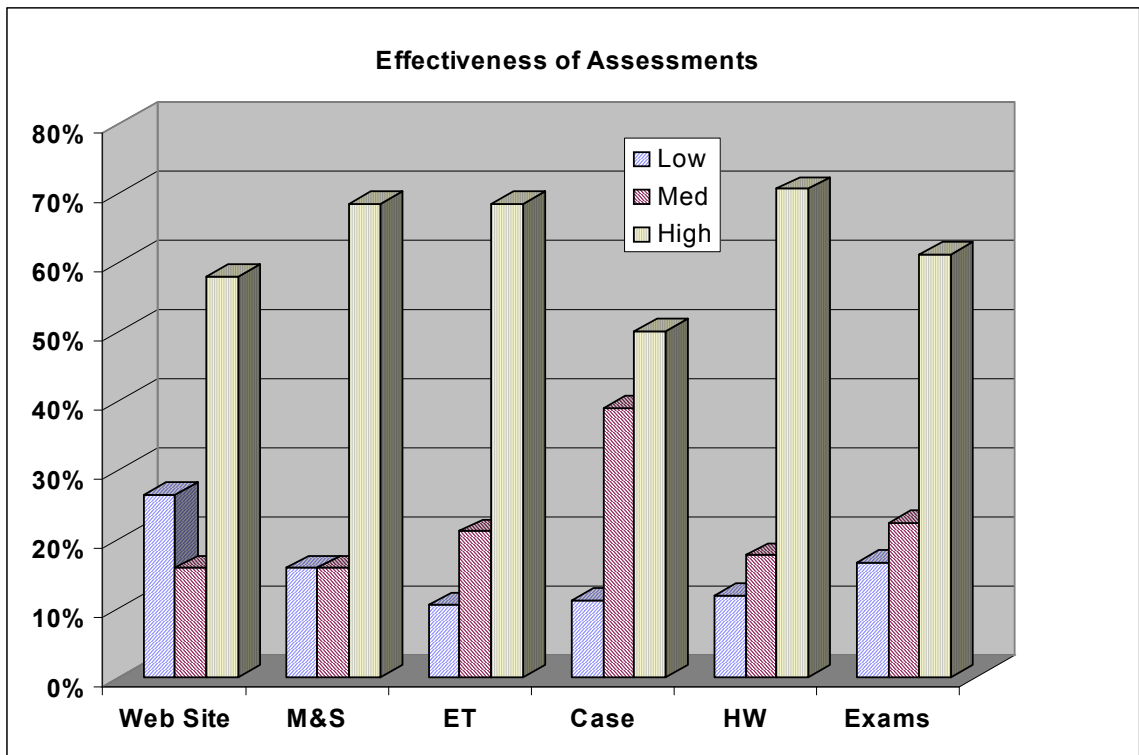


Figure 4c: Author's University Survey



**Figure 4d: Author's University Survey**

**APPENDIX A**

<b>Learning Goals of IS 2002.1 measured at author's college</b>	1	2	3	4	5
to introduce systems and quality concepts	0	0	6	6	7
to provide an introduction to the organizational uses of information to improve overall quality	0	0	7	6	6
to present information technology concepts	0	2	3	7	7
to provide concepts and skills for the specification and design or the re-engineering of organizationally related systems of limited scope using information technology	1	3	5	4	6
to show how information technology can be used to design, facilitate, and communicate organizational goals and objectives	0	0	5	6	8
to explain the concepts of individual decision making, goal setting, trustworthiness, and empowerment	0	2	6	6	5
to show career paths in Information Systems	0	3	8	3	5
to present and discuss the professional and ethical responsibilities of the IS practitioner	0	3	2	8	6