E-Commerce and the Undergraduate MIS Curricula: an Exploratory Study

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ABSTRACT

Undergraduate MIS curricula should reflect the popularity of e-commerce technologies in business practices. The study analyzes current trends of incorporating e-commerce content and skills into the undergraduate MIS curricula of AACSB accredited business schools. A definite trend to incorporate e-commerce knowledge and skills into the elective component of undergraduate MIS programs was found. Problems identified and possible solutions are discussed.

Keywords: E-Commerce, E-Business, Information Systems Curriculum, Undergraduate MIS Curriculum, Client-Side Web Development, Server-Side Web Development

1. INTRODUCTION

Information Technology involves constant and rapid change. IT professionals have to cope with change and be prepared to constantly revise and update their knowledge and skills. IT/IS college education should reflect this dynamic environment and should be able to provide tools that respond to the challenges of the 21st century in a timely manner. While new knowledge and skills need to be incorporated into the existing curricula, the college education system contains factors complicating curricular updating.

The establishment of e-commerce/e-business as a way of doing business raised the question of how corresponding knowledge and skills could be incorporated into the current MIS curricula of business schools. The early approach was to create an e-commerce program as a major. The rapid growth of those programs at the Master's level during the period of 1999-2001 was identified in several publications (Durlabhji & Fusilier, 2002; Mechitov et al., 2002; Fusilier & Durlabhji, 2003; Moshkovich et al., 2005). This was followed by a number of analogous programs at the bachelor's level beginning in 2001 (White, 2001, Fusilier & Durlabhji, 2003).

After the dotcom crisis, the process of establishing e-commerce programs had essentially stopped. At that time, an opinion emerged that it was necessary to equip all MIS students with the ability to work within the environments of e-commerce and the Internet (Lomerson & Schwager, 2002; Lim, 2002). The latest data on the required skills for entry level IS positions (Koong et al., 2002; Liu et. al., 2003; Lomerson et al., 2004-5) state that the category "Web development" has been added to the traditional categories usually associated with the IS area (such as "programming skills", "database management", etc.).

The necessity to introduce the concepts and technologies of e-commerce in the MIS curricula is at variance with some aspects of the established structure of undergraduate MIS programs:

- AACSB accreditation establishes certain requirements for the business core,
- The majority of universities also establish standards for the general education component for all majors,
- There are usually limits on the overall number of hours required by the institution to graduate with a bachelor degree in business.

This results in a limited number of courses, specific to the major area within AACSB accredited programs. The goal of this paper is to investigate to what extent undergraduate MIS curricula incorporates e-commerce content, how the level of e-commerce content is connected with the number of courses in the MIS major, whether or not the coverage corresponds to current market requirements, and possible ways to resolve issues arising from limitations on the number of courses in the MIS major.

The next section will review the primary directions in MIS curricular design, the main requirements for e-commerce skills in the market place, and formulate our research questions. In the third section we will present our research methodology and results. Discussion will be followed by recommendations for future research.

2. PROBLEM STATEMENT

The right balance between fundamental knowledge of the IS field and technical skills necessary to obtain an entry level job in the market place is one of the major challenges of the undergraduate curricular design for an MIS major in AACSB accredited business schools (Lightfoot, 1999). Weber (2004 p. viii) referred to the first component as the "...core of the IS/IT discipline" and the second component as "...vocational in nature".

The first component of IS education deals mostly with concepts, theories, and principles which form the basis of the information systems' world. Its content should be much more stable than actual technologies applied for special tasks in the field of information systems. College education traditionally focuses more on this type of knowledge.

On the other hand, undergraduate MIS education should provide students with knowledge and skills in current technologies. These technologies help the learning of concepts (by applying them) and prepare students for the IT market (Weber, 2004). This is the ever changing part of the MIS curricula.

Although the MIS area does not have its own accreditation system, the IS Model Curriculum (Gorgone et al., 2002) summarizes content required for MIS education. While not all business schools are committed to this model (Daigle et al., 2003), it could be an appropriate starting point in assessing the body of fundamental knowledge to be covered within the MIS major.

The current version of the IS 2002 Model Curriculum includes eleven modules (Davis et al., 2001). The list of these modules is presented in Appendix 1. The main difference in the structure of IS 2002 model at this level from that of the 1997 version (Couger et al., 1997) is the addition of the previously non-existing module "Electronic Business Strategy, Architecture and Design" and changing the title of the module "Physical Design and Implementation with a *Programming* Environment" to "Physical Design and Implementation in *Emerging* Environments."

The prerequisite module IS 2002.0 "Personal Productivity with IS Technology" is usually covered within the general education curriculum. This still leaves 10 modules to be covered within the business school curriculum for an MIS major. One MIS course is often present in the business core. If this course covers one module of the model curriculum, there would still be nine modules left for the MIS major. Limitations of the number of courses in the MIS major may influence decisions on the inclusion of new content into the program. The first question we would like to investigate is: "What are the trends in the number of courses in MIS major programs?"

A recent study (Williams & Pomykalski, 2004) tried to evaluate MIS curricula in AACSB accredited business schools relative to the IS 2002 Model Curriculum. Those authors surveyed courses in MIS majors in 134 accredited business programs. Each of the courses was categorized as belonging to one of the modules in the IS 2002 Model Curriculum (according to content). Results showed that only four of the modules were overwhelmingly present among MIS major programs (see Table 1). All other modules were present as separate courses in less than 50% of schools. The new module for e-commerce (IS 2002.3) was present in 23% of schools, while module IS 2002.9 (Design in Emerging Technologies) was present in 28.1% of schools. These data support previous findings about the structure of MIS major (Gamble & Maier, 1998) but raise questions about the coverage of appropriate fundamental knowledge in MIS curricula.

Courses	Percent
Database Management (IS 2002.8)	94.1%
Systems Analysis and Design (IS 2002.7)	82.2%
Programming (IS 2002.5)	75.6%
Telecommunications& Networking (IS 2002.6)	65.9%

Table 1. Percentage of schools with corresponding courses in the MIS major

The disadvantage of the study mentioned above is the perception that each module of the model curriculum should be covered by a separate course. One of the premises of the authors of the model curriculum (see, e.g., Gorgone et al., 2002) was that its implementation would not require the inevitable change in the course structure but may lead to changes in course content. Different courses in the MIS major may cover parts of several modules from the model curriculum. As a result, the next question we would like to investigate is: "How often is the content connected with e-commerce/e-business knowledge and skills included in MIS major curricula?"

While mapping the content of the courses to the learning goals within the curricula, it is important to identify if the content is present in the required or the elective courses of the major. If an essential part of fundamental knowledge considered necessary for all MIS students is present only among elective courses, some of the students may graduate without required content due to the specific combination of selected electives. An example of mapping courses using the

IS 2002 Model Curriculum is provided in Daigle et al. (2003). Those authors stated that in the actual inventory of courses in their institution they found that elective courses covered a substantial number of learning goals. Therefore, we would like to investigate how the content e-commerce/e-business knowledge and skills is distributed between the required and elective parts of the MIS program.

The knowledge associated with e-commerce/e-business has matured (Gunasekaran et al., 2005). The range of topics covered in the majority of textbooks on e-commerce is rather uniform and mostly deals with such concepts as principles, models, infrastructure, security, payments systems, and e-commerce environment (legal issues, privacy, etc.)

The term "Web development skills" seems to have emerged as a primary skills connected with e-commerce/e-business. Web development is a broad term and includes different features in different studies. For example, in Koong et al. (2002) Web development skills do not include the programming language JAVA but do include SQL which is a query language for databases. On the other hand, in the study of core Web technologies for e-commerce (Lomerson et al., 2004-5), JAVA is included in the server-side Web technologies and SQL is viewed as a "support tool." Though there are differences in the lists of skills connected to e-commerce/e-business (due to the novelty of the area), a three-tier e-commerce model has gained popularity in the academic community (Lomerson & Schwager, 2002; Lim, 2002; Lomerson et al., 2004-5).

The three-tier model connects user interface (client–side Web development), business logic at the level of a Web server (server-side Web development), and enterprise business logic presented in the enterprise database(s). Client-side Web development usually includes HTML for Web design and may include some other tools and/or environments (e.g., JavaScript, FrontPage, etc.). Server-side Web development usually requires a programmable interaction with the Web server, including but not limited to connection to server-side databases. It assumes higher student qualifications, requiring acquaintance with HTML, basics of database management and some programming language to engage in the activity.

In accordance with the model our study will concentrate on the three groups of knowledge and skills connected with e-commerce: 1) concepts, 2) client-side Web development, and 3) server-side Web development.

The majority of MIS courses provide students with some fundamental knowledge of the main concepts, theories and principles of IS and also introduce contemporary technologies with the intent of building appropriate skills. This part of the program helps students to better understand the underlying principles and how to apply them in real life situations. The content of the vocational part of MIS curricula has been widely discussed and investigated (Arnett et al., 1997; Gonzenbach, 1998; Gill & Hu, 1999; Chaudhury & Rao, 2000; Wilkins and Noll, 2000; Ehie, 2002; Koong et al., 2002, Liu et al., 2003; Lomerson et al., 2004-5; Mehta et al., 2005; Petrova and Claxton, 2005). The requirements for vocational courses come primarily from industry and appropriate contemporary skills may help college graduates find their first job. We would not try to develop an inventory of skills offered in different business schools but rather evaluate the level of e-commerce technologies presented in MIS programs.

We can summarize our research questions as follows:

1. How many courses are usually present in the MIS major? How are they distributed between the required and elective parts of the program?
2. How often is the content connected with e-commerce/e-business knowledge and skills included in MIS curricula? How is it distributed between the required and elective parts in MIS programs?

3. DATA COLLECTION AND FINDINGS

To answer the above questions we surveyed AACSB accredited business schools in the United States with an undergraduate MIS or CIS major. The AACSB web site knowledge services (AACSB) was used to select corresponding schools.

For each institution on this list the following information was recorded: number of courses in the MIS major, number of the courses that were required, presence of courses which covered e-commerce concepts, client-side Web development, and server-side Web development. It was also noted whether corresponding e-commerce content was required in the major or was presented as an elective.

Information regarding the programs was obtained via university Web sites, published course descriptions in catalogs, and syllabi available over the internet. The process used was to look for courses with relevant names (e.g., E-commerce, E-business, Web Design and Development, Internet Technologies, Selected Topics, etc.) and through course descriptions (content analysis) to evaluate the level of presentation of topics in the course such as e-commerce concepts, client-side Web development and/or server-side Web development. Credit was given only if in the judgment of the authors there was a considerable amount of coverage of corresponding topics. Primary content analysis of 238 schools was carried out in the spring of 2004. Relevant data available for 232 schools were recorded. In the spring of 2005 additional data collection on the number of courses in MIS major was accomplished and previously gathered information was updated. At that point data for an additional 38 newly accredited schools were found on the Web and corresponding information for these schools was added to the analysis. As a result updated data for 266 schools is used in this study. There were no significant changes for the data previously recorded for the 232 universities.

A set of general characteristics was used to profile business schools. The main characteristics were: level of research (research/teaching), ownership (private/public), size (number of graduates from a business school divided into three groups), and region (Midwest, Northeast, South, and West in accordance with the Census Bureau classification).

3.1 Number of courses in the MIS major

First, we analyzed the number of courses in the MIS major considering it to be a limitation factor in the introduction of new courses in the curricula. Figure 1 shows the percentage of schools with the corresponding number of courses in the MIS major. It is evident that nearly half of the schools use either 6 or 8 courses in the major (with an approximately equal split among them).

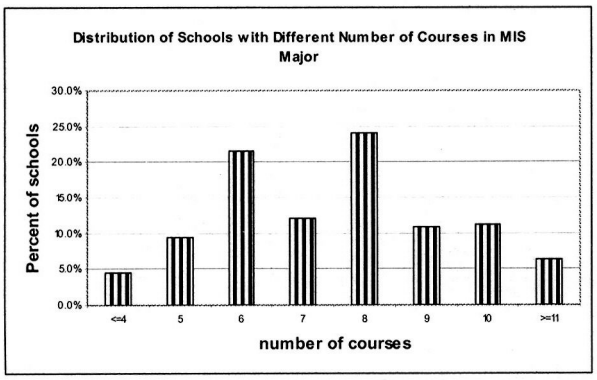

Figure 1. Distribution of schools with different number of courses in the MIS major

The number of required (core) courses in the MIS major concentrated around 5 and 6 with 4, 7, and 8 being next in frequency (see Figure 2)

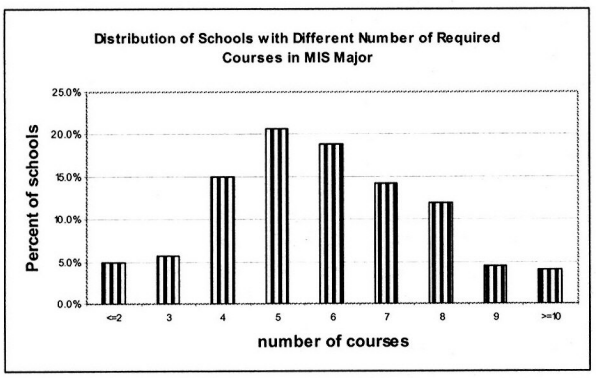

Figure 2. Distribution of schools with different number of *required* courses in the MIS major

The number of elective courses available in MIS majors is presented in Figure 3. Most schools have 1 or 2 electives in the program. It is interesting to note that a rather large number of schools (19%) do not have elective courses for the MIS major.

Summarized data for the average number of courses in the MIS major are presented in Table 2.

To evaluate significance differences in the average number of courses due to different characteristics paired t-tests were carried out. Asterisks mark cases in which equality of the means was rejected with the significance level of .10 or less. There were significant differences in the average number of courses for schools with different research levels, for business schools in the Northeast, and in private universities (they had fewer courses in the major). Schools in the Northeast and private schools on average had six courses in the major while schools in other regions and state schools had higher average number of courses in the MIS major (closer to eight). There were no significant differences in the average number of elective courses for all types of schools analyzed.

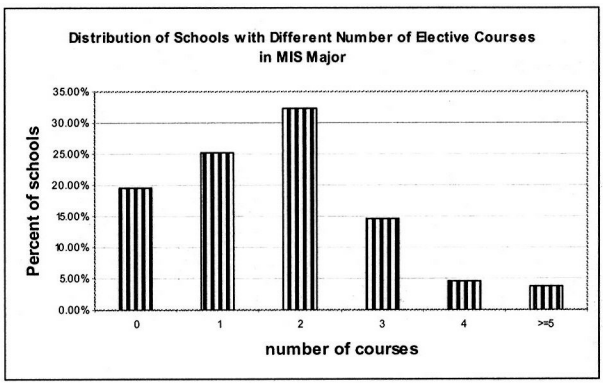

Figure 3. Distribution of schools with different number of *elective* courses in the MIS major

3.2 E-commerce coverage in the MIS major

Table 3 summarizes coverage of e-commerce content in the MIS major evaluated through the substantial presence in required and/or elective MIS courses in 266 business schools. The data show that e-commerce content has started to appear in MIS major programs. Client-side Web development is the part of e-commerce technologies more often present in the MIS curricula. Almost 50% percent of the schools include substantial coverage of client-side Web development skills in their curricula. E-commerce concepts are present in 36% of programs, while server-side Web development is included in curricula of 30% of schools. Overall, essential e-commerce content is present in the curricula of 62% of schools. Table 3 also shows the percentage of schools with essential coverage of e-commerce content in the MIS major differentiated by the structure of the major curriculum, region, research level, size, and ownership of the university. Contingency table analysis was carried out to evaluate significant differences in the distributions. Asterisks mark cases of p-values less than or equal to 0.10.

Most differences are connected with the server-side Web development. Public universities and universities with larger number of courses in the major tend to include server-side web development topics more often in their curriculum. Significant differences in the region were mostly due to smaller percentage of schools in Northeast including server-side web development in their MIS programs. This may be explained by smaller number of courses on average in this region (see Table 2).

Client-side web development content differed essentially for research and teaching universities and for larger universities. Larger universities and teaching universities tend to include this area of e-commerce more in the MIS major. This trend may be explained by the fact that larger universities usually

School characteristics	# of schools	Average number of courses in the MIS major		
		Overall	Required	Electives
All Schools	266	7.52	5.8	1.73
Region		*		
Midwest	68	8.1	6.3	1.8
Northeast	48	6.4	4.8	1.5
South	103	7.8	6.1	1.7
West	47	7.4	5.4	2.0
Research Level		*		
Research	147	7.3	5.6	1.7
Teaching	119	7.8	6.0	1.8
Size		*		
<300	81	7.8	6.0	1.8
300 to 600	102	7.3	5.7	1.6
>600	83	7.4	5.7	1.8
Ownership		*	*	
Private	61	6.6	5.1	1.5
Public	205	7.8	6.0	1.8

Table 2. Average number of courses in the MIS major

School characteristics	Percent of schools with corresponding content			
	At least one	Concepts	Client	Server
Overall	62.4%	35.7%	49.6%	30%
Number of courses		*		*
<6	59%	51%*	41%	11%
6 to 8	61%	32%	52%	29%
>8	66%*	36%	50%	32%
Region				*
Midwest	66%	40%	50%	26%
Northeast	55%	38%	35%	19%
South	61%	33%	52%	34%
West	66%	34%	57%	40%
Research Level			*	
Research	61%	37%	45%	30%
Teaching	65%	34%	55%	30%
Size			*	
<300	60%	28%	47%	23%
300 to 600	57%	36%	43%	32%
>600	70%*	42%	60%	34%
Ownership				*
Private	54%	36%	41%	20%
Public	65%	36%	52%	33%

Table 3. E-commerce Content in the MIS major

have more resources (e.g., faculty and technical support) which allow them to have a more diversified set of courses. Universities in the West in general more often include e-commerce content in their MIS curricula. This may be due to he regional requirements in the IS market, as there is a high concentration of IS development in the area. There is also a trend for public universities to include e-commerce content into their curricula more often than in privately owned institutions, but the differences are significant only for the server-side Web development area.

School characteristics	Percent of schools with corresponding *required* content			
	At least one	Concepts	Client	Server
Overall	22.6%	11%	18%	6%
Number of courses		*		
<6	32%	24%	22%	3%
6 to 8	20%	7%	17%	6%
>8	22%	11%	18%	8%
Region			*	*
Midwest	18%	7%	12%	4%
Northeast	27%	17%	19%	6%
South	27%	10%	25%	9%
West	15%	11%	11%	2%
Research Level				*
Research	20%	10%	16%	3%
Teaching	25%	12%	20%	9%
Size				
<300	22%	11%	15%	6%
300 to 600	20%	9%	15%	5%
>600	24%	12%	25%*	6%
Ownership				
Private	20%	13%	15%	3%
Public	23%	10%	19%	7%

Table 4. Distribution of the Required E-commerce Content in the MIS major

School characteristics	Percent of schools with corresponding *elective* content			
	At least one	Concepts	Client	Server
Overall	47%	26%	34%	24%
Number of courses	*		*	*
<6	30%	27%	19%	8%
6 to 8	49%	25%	38%	24%
>8	50%	25%	34%	34%
Region	*		*	*
Midwest	57%	32%	41%	22%
Northeast	29%	21%	19%	10%
South	44%	23%	30%	26%
West	57%	23%	49%	38%
Research Level				
Research	50%	27%	31%	27%
Teaching	44%	23%	39%	21%
Size				
<300	41%	17%	33%	17%
300 to 600	44%	28%	31%	14%
>600	54%	25%	39%	17%
Ownership	*			*
Private	38%	23%	24%	16%
Public	50%	26%	36%	27%

Table 5. Distribution of the Elective E-commerce Content in the MIS major

Tables 4 and 5 present analogous data for required and elective parts of the MIS major separately, differentiated by the same parameters. There is a significant difference in the inclusion of e-commerce topics into the required and elective part of the courses. Only about 23% of schools include essential e-commerce content into the required part of the MIS major, while 47% include it mostly as an elective coverage.

As far as the *required* content is concerned there were almost no significant differences among universities with different characteristics. Universities with fewer courses in the major tend to include e-commerce content in the required part of the program slightly more often. This may be due to the lack of electives in such schools. The Northeast has a somewhat higher level of inclusion of e-commerce content into the required part of the curricula mostly due to fewer electives.

Midwest schools (with the largest average number of courses in the MIS major) have the lowest level of e-commerce content in the required part of MIS major but the highest proportion of schools with the e-commerce content included in the elective part of the major (see Table 5). Other distributions for required content do not show significant differences.

Some trends and differences, though not significant, may be found in how schools include e-commerce content into the elective part of the MIS curricula. Size of a school and its research level are not significant in this case. Due to the trend to include e-commerce content relatively more often in the required part, Northeast schools have the smallest number of electives with this content, while Midwest schools have more electives (although not in the server-side Web development). Schools in the West include server-side Web development among their elective courses much more than in the other areas of the US.

4. DISCUSSION

MIS programs in business schools should reflect rapid changes in information technology and update their curricula regularly. The emergence of e-commerce/e-business has modified many business processes and introduced corresponding changes into business information systems. New processes require new knowledge from IT specialists.

More than half (62%) of analyzed schools include essential e-commerce content in their MIS curricula. The most frequent topic included in the curricula is "client-side Web development" (50%). General principles of e-commerce are included by 36% and "server-side Web development" is included by 30% of schools. These findings correspond well with the data on e-commerce qualification skills from industry.

Although e-commerce is a relatively new area of knowledge, it is widely implemented in industry. In the majority of latest publications on the job market for the IS graduates (see, e.g., Koong et al. 2002, Liu et al. 2003) e-commerce knowledge and skills are summarized as "Web development tools". It is emphasized that successful graduates "...should have working knowledge of contemporary programming languages and Web-development tools". (Liu et al., 2003 p.195).

The first analysis of the market requirements specifically in the area of e-commerce was presented in Lomerson et al. (2004-5), which analyzed data from a survey of IS professionals at leading e-commerce firms. One of the questions in that study was the "expected knowledge levels of e-commerce technologies." Using a three-tier e-commerce model, e-commerce skills in this study were divided into four wide groups: e-commerce concepts, client-side Web development skills, server-side Web development skills, and support skills (e.g., operating systems, database management, telecommunications, fundamentals of information systems, etc.). The results of this study of the requirements for new hires in an e-commerce area may be summarized as follows:

1. It is important to teach theoretical foundations of e-commerce application development and deployment;
2. Entry-level IS employees are expected to have more knowledge in the area of client-side Web development techniques (HTML, JavaScript, XML, etc.) and general support tools (SQL, operating systems, web servers, etc.), than in the area of server-side Web development;
3. The choice of specific server-side and general support technologies (e.g., Microsoft-based vs. Unix/Linux based with corresponding choices in other areas) should be determined by regional needs, available resources, and expertise.

It is easy to see that trends of e-commerce coverage presented in our research reflect preferences of the industry. At the same time e-commerce content is constrained by the limited number of courses in the MIS major. Our analysis shows that majority of AACSB accredited schools have from six to eight courses in the major with at most two electives. This narrows opportunities to include special course(s) connected to e-commerce principles and technologies into the required part of an MIS program. The majority of e-commerce content is introduced through elective part of MIS programs. Only 23% of schools include e-commerce content in the required part of the major.

Including corresponding topics into the elective part of the major does not guarantee that all MIS graduates are exposed to this content. In general, if we accept Weber's view of MIS curricula (Weber, 2004) as a combination of fundamental knowledge and vocational skills, one would assume that electives should be mostly devoted to the introduction of additional vocational skills based on the same fundamentals taught to all MIS students (e.g., teaching MS Access and Oracle databases, IIS and Apache server software, Windows and Linux operating systems, etc.).

The real situation is often quite different. Analyzing coverage of the IS 2002 Model Curriculum learning objectives in MIS courses (Daigle et al., 2003), the authors found that quite a few of these topics were only covered in

electives. The approach used by 47% of the schools was to include most e-commerce topics in the elective part of the major. The situation is usually more complex as an adequate coverage of relevant knowledge and skills may require more than one course (often some courses should be given in a sequence).

The reasonable resolution of the situation would be in "mapping" e-commerce content to some courses already present in MIS curricula. This approach was demonstrated for the "Project Management" module in Reif and Mitri (2005) and was proposed for "Security Issues" in IS curriculum by Anderson and Schwager (2002). One of the early attempts to map e-commerce topics to IS'97 Model Curriculum was presented in Chaudhury & Rao (2000).

As the area of e-commerce matures, its academic content becomes more standardized. It makes it easier to discriminate between the case of core differences of e-commerce compared to traditional IS topics and the case of applying the same IS principles and theories to a new area of e-commerce. Evidence indicates that it is necessary to introduce E-commerce concepts and techniques in other MIS courses and to base separate E-commerce courses on the previous knowledge from other MIS areas.

An introductory course for information technology may be used to cover essential e-commerce content, including concepts and client-side Web development skills (see e.g., Grenci, 2005; Lim, 2002). The interdisciplinary nature of e-commerce allows using it as a capstone course for MIS majors (Denton and Sprangler, 2001; Mehta et al., 2005; Tabor 2005). Building a functional e-commerce business site integrates knowledge from different areas of MIS as well as from other business areas.

Table 6 provides an example where some specific knowledge and skills connected with e-commerce are covered in traditional courses (most often presented in MIS curricula – see section "Problem Statement"). This example may start a useful dialogue about the reasonable accommodations for new technologies within the traditional system.

Cooperation in the business core area with other disciplines would help cover such "managerial and marketing" topics of e-commerce as "selling and advertising on the web," "legal and international issues in e-commerce," "business planning for e-commerce," "strategic issues in e-commerce," and others.

This approach, though organizationally complicated, seems like a reasonable approach to resolving issues of incorporating e-commerce content in MIS programs. An analogous approach to assessing learning objectives in the business core is now required from all AACSB accredited schools. Applying it to MIS curricula may help ensure the right mix of fundamental knowledge and contemporary vocational skills that is appropriate for MIS students as well as their potential employers.

Traditional MIS courses	**E-commerce connected content**
1. Personal productivity tools (usually offered in General Education)	Elements of Web design, HTML, and some development tool (e.g., FrontPage or DreamWeaver)
2. Management Information Systems (usually offered to all business students in a business core)	2. Overview of e-commerce principles, main types, payment systems, hardware and software, security for e-commerce
3. Database Management (MIS core)	Online databases, SQL, security issues
4. Programming, Object Structures (MIS core)	Working with online databases
5. Network Telecommunications (MIS core)	Web servers and their administration, security issues
6. System Analysis and Design (MIS core)	Requirement analysis for e-commerce business, security issues
7. Project Management (capstone course)	Team design of an interactive business web site with online databases and XML, security issues

Table 6. Possible E-commerce Coverage in Traditional MIS Courses

5. CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

The current study indicates that the academic community recognizes the need for incorporation of e-commerce content in MIS curricula. This paper discusses some aspects of e-commerce incorporation into MIS curricula. Our exploratory study tries to contribute to a dialogue about possible ways of providing the "right" curriculum in modern MIS programs. We attempted to collect and analyze past decisions of business schools about e-commerce and MIS curriculum. More thorough analysis of underlying factors and their mutual effect on the decisions is needed.

Our study was based mostly on the information presented on the Web. Although all efforts were implemented to obtain relevant information there is a possibility of using some outdated information or missing essential content not covered in the courses' descriptions. Though the large size of the sample should compensate for such imperfections, we view the obtained data as the lower estimates of corresponding parameters.

Future studies should examine more closely how curricula are being modified and if the line between e-commerce technologies and traditional MIS programs becomes less evident. Our research mostly was oriented on the presence of specific topics in the descriptions of MIS courses. It would be beneficial to differentiate more thoroughly the level of knowledge presented in those courses. The IS 2002 Model Curriculum differentiates four levels of knowledge: 1–recognize, 2–differentiate, 3–use, 4-apply. It would be interesting to evaluate coverage of e-commerce content using

these levels and compare the depth of coverage with other analogous areas in MIS programs.

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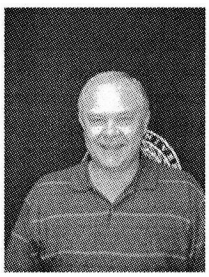

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APPENDIX 1

Recommended Courses in IS 2002 Model Curriculum

IS 2002.P0– Personal Productivity with IS
IS 2002.1 –Fundamentals of Information Systems
IS 2002.2 – Electronic Business Strategy, Architecture, and Design
IS 2002.3 – Information Systems Theory and Practice
IS 2002.4 – Information Technology Hardware and Systems Software
IS 2002.5 – Programming, Data, File and Object Structures
IS 2002.6 – Networks and Telecommunications
IS 2002.7 – Analysis and Logical Design
IS 2002.8 – Physical Design and Implementation with DBMSIS
2002.9 – Physical Design and Implementation in Emerging Environments
IS 2002.10 – Project Management and Practice

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