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Does a Successful e-Commerce Project Require Technological Skills Only? Experience in Teaching e-Business Course

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Abstract*--This article discusses the question *raised by the title of this paper in the light of our experience in teaching CPIS380 "Introduction to e-Business"—an undergraduate course of the IS program of the Faculty of Computing and Information Technology at King Abdulaziz University in Saudi Arabia. There is a belief among students that being a good web programmer is sufficient to entrepreneur an e-Commerce project. CPIS380 students have background knowledge in both business and technology, therefore, this course tries to fill in the gap between these two dispersed areas and integrates them into a unified framework that will contribute to building a deeper understanding of the bigger picture of the business environment in the new era of Internet. The course stresses on highlighting the paradigm shift in doing business through applying the technology. Elevating many soft skills is also a goal of this course. The design of CPIS380 abides to ABET's guidelines.

I. Introduction

We live in exciting times. It is a rare event for an economy to move from one form to another. We are participating in the transition from the industrial to the information age. We all have an opportunity to participate in this historic event. The extent to which one participates in this revolution is determined, in part, by both the desire to facilitate change and the understanding of how the new economy operates.

This article try to answer an important question through describing our experience in teaching a course. We went through several discussions with graduating IS students where we recognized that they deeply believe that studying and mastering programming and Web design would be sufficient to entrepreneur successful e-Commerce projects, and that this is their raod to become questionnaires. They use known sites, such as Amazon.com, YouTube.com, and FaceBook.com, as evidence to their argument. Therefore, the Information Systems department of the Faculty of Computing and Information Technology at King Abdulaziz University in Jeddah, KSA has designed a course—CPIS380, Introduction to e-Business—with the target of inspiring students to take a step towards entrepreneur successful real-life e-Commerce and e-Business projects. However, few questions still remain, which this article tries to clarify by describing our experience in teaching CPIS380 and showing how it addressed this question. These questions are: "What skills are required?", "is information and communications technology (ICT) sufficient?", and, last but not least, "is business management knowledge sufficient?"

e-Business is aimed at enhancing the competitiveness of an organization by deploying innovative ICT throughout an organization and beyond—through links to partners and customers. It does not simply involve using technology to automate existing processes, but should also involve using technology to help change these processes. To be successful in managing e-Business, a breadth of knowledge is needed of different business processes and activities from across the value chain such as marketing and sales, through new product development, manufacturing and inbound and outbound logistics. It is apparent that e-Business involves looking at how electronic communication can be used to enhance all aspects of an organization's services and management.

On the other hand, e-*Commerce* refers to all types of electronic transactions between organizations and stakeholders whether they are financial transactions or exchanges of information or other services. These e-Commerce transactions are either buy-side e-Commerce or sell-side e-Commerce. E-Business is applied as a broader term encompassing e-Commerce but also including all electronic transactions within an organization. Management of e-Commerce involves prioritizing buy-side and sell-side activities and putting in place the plans and resources to deliver the identified benefits. These plans need to focus on management of the many risks to succeed, some of which one may have experienced when using e-Commerce sites; from technical problems such as transactions that fail, sites that are difficult to use or are too slow, through to problems with customer

service or fulfillment, which also indicate failure of management.

This course is intended to introduce the appropriate knowledge about e-Business to future managers and to make them aware with the needed practical skills that help them navigate their organizations towards e-Business. Another primary aim of this course is to identify and review the key management decisions required by organizations moving to e-Business. Key questions are: What approach to e-Business strategy do we follow? Which processes should be our e-Business priorities? Should we adopt new business and revenue models? What are the main changes that need to be made to the organization to facilitate e-Business?

However, still remains an essential strategy of this course is to answer few important questions. The first question is: "Is all what is needed for moving from traditional business to e-Business just technological, meaning website development tools and programming skills?" Another question is: "How can the Internet and the new model of e-Business support and hence, enhance the way business is traditionally done?" yet another question that is also addressed in this course is "How did the Internet promote new out-of-the-box ideas and methods in doing business, or in other words, how the Internet affected business: creating new business types and models and mandating the improvement of current services and businesses?" The list goes on and on in clarifying that the e-Business model is not just copying the traditional methods into the web but rather it is a total change in the way business is to be done, or in other words, a paradigm shift in how business is done.

Another essential objective of this course is to stimulate students to think of how to introduce e-Commerce in a nontraditional fashion and being creative and innovative when it comes to moving to e-Business. This is done by requesting students to analyze many real-life case studies to determine how they made it different than its corresponding traditional business. Students are also encouraged to suggest improvements to the solutions presented by those case studies. The course also encourages students, through class discussions and drills, to practice by themselves to play the role of entrepreneurs who employ the technology for changing the paradigm of doing a business. This makes it clear to the students that when it comes to the Internet, we must think differently; we have to think of what the new technology can offer to do what cannot be done in traditional ways without technology utilization.

In summary, this course is intended to introduce the concepts of e-Commerce and e-Business to Computing Information Systems students in such a way that clarifies both managerial and technical aspects that allow students to be able to plan for, create, and materialize their own successful real-life entrepreneur e-Commerce projects that cover all elements of a pure virtual or partially virtual business organization. Hence, this course stresses on two balanced wings: first, e-Business from a managerial perspective, and second, e-Business from a technological perspective.

Section II of this article discusses the design of CPIS380 course, while Section III discusses the implementation of this design. Student assessment and course evaluation are discussed in Section IV and Section V, respectively. Section VI concludes and summarizes.

II. Course Design

CPIS380 "Introduction to e-Business" is an undergrad course offered in the Information Systems department (IS) of the Faculty of Computing and Information Technology (FCIT) at King Abdulaziz University (KAU) in Jeddah, KSA. This course is a third-level mandatory course of three credit hours. Students taking this course should have taken several business and computer science courses before taking this course. The business courses are: management, marketing, organization behavior, and accounting. Among the computer science courses is Java programming, data structures and algorithms, databases management systems, information systems analysis and design, and web programming. So, students should have sufficient backgrounds for both business and technology. CPIS380 is a prerequisite for a series of three courses in the track of e-Systems; hence, it establishes the necessary background knowledge and skills.

Fig. 1 depicts the course design of CPIS380; the inputs affecting the design of the different elements of the course—the IS Program Objectives (PO), the Target Student Outcomes (SO), and the Professional areas that the course is requested to support as specified by ABET (Accreditation Board of Engineering & Technology) [1]. These elements are mandated by the IS Program's curriculum. The following is a description of these elements:

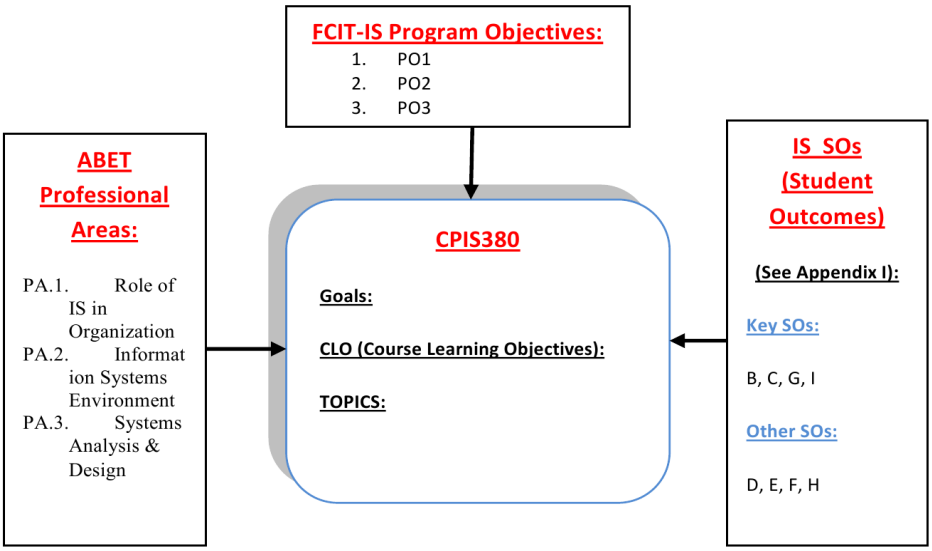

Fig. 1. CPIS380 Course Design

A. Program Objectives

The Program Objectives as mandated by the IS Program at FCIT and that have to be fully or partially supported by each course of the curriculum. These POs state that the program as a whole should help students to gain the necessary skills and knowledge to:

PO1. work as integral part of the information field, connecting people with information using technology,

PO2. advance their careers through knowledge of computer information systems, communication skills, and understanding of business and contemporary technological issues, and

PO3. contribute to the economic growth and the welfare of the Saudi society through the development and management of information systems for business and research.

CPIS380 is designed to support each of these objectives in a way or another. For instance, the business cases discussed in this course, as will be discussed in the course implementation section, not only show how business, society, and individual can benefit from the ITC technology (PO3) but also shed lights on how business operates and how it can move towards the new marketing and commerce approach by employing the technology (PO1). In addition, the course implementation stresses on building the soft skills necessary for our IS student to be a leader and to play an effective role in building the business and commerce Saudi society in the new era (PO2).

B. Professional Areas

Another input to the design of CPIS380 is the professional areas that it supports as a subset of the ABET-identified IS Professional Areas (PA) [2]. Three areas are supported by CPIS380:

PA.1. Role of IS in Organization.
PA.2. Information Systems Environment.
PA.3. Systems Analysis & Design.

Again, the main theme of the course design is not only theoretical-oriented but also practical-oriented, not only business-oriented but also technology-oriented, and not only lecturing-oriented but also lab, case studies, and comparative analysis-oriented. The balance among all of these dimensions is a key of success of this course. All of these dimensions are directed towards comparatively highlighting the innovative differences between the traditional way of doing business and the new paradigm shift of using IS technology in reshaping the IS environments for a more effective, efficient, profitable, and innovative business. In fact, students get involved in the analysis and design of not only the technology infrastructure and web development but also the different elements of the business plan itself. In other ways, a full picture of a successful e-Business project will require building skills for planning and designing for both the business and the necessary technological infrastructure.

C. Student Outcomes

A third input to the process of this course's design is the expected student outcomes (SO) [2]. Studies [3] recommended methods for outcome-based course design. As listed by ABET, there are 10 expected SOs as listed in Appendix I and which are numbered A to J. Some of these SOs are towards technical skills; while others are towards building soft skills, yet, more importantly, others to gain knowledge and understanding of IS environment. CPIS380 is designed to achieve four Key SOs: B, C, G, and I from the technical outcomes. It also supports few non-technical soft skills building outcomes: D, E, F, and H as will be demonstrated in the course implementation section.

Those three dimensions of inputs shaped the design of CPIS380 syllabus, which can be described in terms of: objectives, expected Course Learning Outcomes (CLO), and topics. First, the course objectives lead to students who should by the end of the course:

1. gain improved skills in manipulating the Internet and the World Wide Web world and hence, devise these tools in favor of shifting their company's business forward regardless of whether they are having e-Commerce sites.
2. be able to analyze e-Commerce solutions and projects to identify the different elements of their business plans as well as strengths and weaknesses,
3. be able to assess the benefits and risks of introducing e-Business in their organizations,
4. be able to devise a strategic plan for their organizations' e-Business solutions,
5. gain sufficient knowledge to decide on the different tactical and technical elements of the e-Business solution,
6. be able to select the most suitable payment method and security plans for their e-Business solutions,
7. be able to lead a project of establishing an existence on the Web for their organizations, and
8. master the tools and techniques necessary for developing e-Commerce sites and hence, develop their own ones.

These goals work along many dimensions. First, train students on analyzing existing e-Business solutions to infer their innovations, business plans, weaknesses and strengths along many other analysis criteria. Accordingly, when students get involved in a work, they become able to apply the same skill on their organization and, hence, identify where and how

TABLE I.
CPIS380 COURSE DESIGN MATRIX

CPIS380: Introduction to e-Business		Student Outcomes										Program Objectives			Professional Areas		
CLO	By the completion of this course, the student should be able to:	a	b	c	d	e	f	g	h	i	j	PO1	PO2	PO3	PA1	PA2	PA3
1	Describe the motivators for e-Commerce and e-Business.		1									1			1	1	
2	Classify the different models of e-Commerce and e-		1													1	
3	Analyze the impacts of introducing e-business on the levels of organizations, consumers, and society							1				1		1	1	1	
4	Recognize the different elements of deciding to e or not to e			1								1		1	1	1	
5	Identify the risk elements attained in a business case		2									2	1	1	2	2	
6	Propose and Synthesize e-solutions to overcome attained risks in a business case			3								3	1	3	2	2	1
7	Determine the best staging plan for implementing e-Business in an organization										1	3	1	3	2	2	2
8	Analyze the different models of e-B2C as compared to the traditional ones		1									2	1	2	2	2	
9	Analuze the different models of e-B2B as compared to the traditional ones		1									2	1	2	2	2	
10	Analyze the different models of Cyber-Services as compared to the traditional ones		1									2	1	2	2	2	
11	Identify special differentiating offers of e-services utilizing the web technology		2	2	1	1	1		1	2		2	1	2	2	2	1
12	List the different models of e-Payment as compared to the traditional ones		1							1		1		1	1	1	
13	List the different models, methods, and strategies of web advertizing		1							1		2	1	2	2	2	1
14	Appraise the effectiveness of an advertizing plan and hence reconstruct an updated plan		3	3								2		2	2	2	
15	Prepare a complete business plan for an e-Business project		3		1		1		1			3	1	3	3	3	2
16	Design and Implement an e-Business project			3	1					1		3		3	3	3	3

Legends:

1	Remembering/Understanding	1	Low support	1 Low support
2	Applying/Analyzing	2	Med support	2 Med support
3	Synthesizing/Evaluating	3	High support	3 High support

to employ e-Business technology the best. Second, the course goals stress that students gain the necessary skills for designing successful business plans to apply for their organizations. Of course, they would be trained on how to search for, adopt, and then adapt techniques and ideas found in e-Business sites. Innovation is a key of success here, therefore, training students on thinking out-of-the-box is a target. A third dimension is to teach students and train them on web developments languages, tools, and techniques. Accordingly, students will be supervised and couched on developing strong e-Commerce sites. In conclusion, students would be able to analyze existing e-Commerce projects, synthesize e-Business plans, and Innovate ideas, apply tools and develop e-Commerce Web sites. Therefore, CPIS380's targets achieving the highest levels of Bloom's Taxonomy [4], [5] of instructional design.

Accordingly, the next step in designing the course was to identify the expected Course Learning Outcomes (CLO) in such a way that satisfy the input constraints, especially the SOs, POs, and PAs. Table I lists the CLOs of CPIS380 and demonstrates their relationships to those four categories of input constraints. It should be noted that these CLOs are stated according to the guidelines as recommended by Bloom, i.e., using the appropriate Action Verbs. The support of each CLO for each of the three categories uses a 3-level scale.

Finally, the last step is designing the course topics in such a way to support all the above design criteria. CPIS380 topics are listed in Appendix II.

III. Course Implementation

The pedagogy of CPIS380 is classified into in-class and out-of-class activities. CPIS380's students take three hours of lecturing a week and one hour of lab work. Students are also requested to do other out-of-class works. Table II presents the different in-class and out-of-class activities and their support to the three categories of SOs, POs, and PAs.

Many of the activities are group work. This choice is taken in order to not only enrich the learning process but also to contribute to team work and leadership skill. Also, many of the activities require students to present their work to their classmates in order to positively contribute to their presentation skills not only through getting feedback from the instructor but also by learning from each other groups. Students are requested to evaluate and critique their colleagues work. This technique is also used for information transfer among the groups; each group intensively does its work, nevertheless, gains more information from other groups' presentations.

Real life case analysis is a key component in the pedagogy of this course. Success as well as failure stories are used, e.g., Amazon.com [6], Buy.com [7], Cartoday.com[8], Egghead.com[9], Ernie [10], Mondex [11], …etc.

Each group is assigned three case studies along the whole course to analyze, evaluate, and identify their business plans. This contributes to building the student's analytical skill. The three case studies are degraded from simple, to moderate, to complex cases in order to gradually train students on the expected outcomes of this activity. Through this activity the student will build a deeper understanding of the business environment and increase the capability of analyzing business plans. To contribute to

TABLE II.
CPIS380 COURSE IMPLEMENTATION (PEDAGOGY) MATRIX

	CPIS380: Introduction to e-Business	Group Work?	Student Outcomes										Program Objectives			Professional Areas		
			a	b	c	d	e	f	g	h	i	j	PO1	PO2	PO3	PA1	PA2	PA3
In-class Activities	Interactive Lecturing			x			x		x				x			x	x	
	Group presentations	G				x		x					x	x	x	x	x	x
	Quiz after finishing each chapter and before the beginning of the next chapter			x			x		x				x			x	x	x
	Hands on practicing in the Lab										x		x	x				x
Out-of-Class Activities	Study of Book and handout materials			x			x		x				x			x	x	
	Case studies analysis and presentation preparation	G		x		x	x	x	x	x	x		x	x	x	x	x	
	Synthesizing and designing of a Business plan	G		x	x	x		x	x	x	x		x	x	x	x	x	
	Analysis, design and implementation of an e-Commerce Web site	G		x	x	x		x		x	x	x	x	x	x	x	x	x
	Term paper	G				x		x	x	x	x		x	x	x	x	x	

knowledge transfer, the cases assigned to each group are different than those of all other groups. Studying and analyzing many business cases will help students to entrepreneur their own business plan and then, with the aid of the lab work and hands-on training, design and implement their, hopefully successful, e-Commerce site.

Many topics cannot, yet, be discussed in class; therefore, groups are requested to select a topic from a list of topics and as a group do the necessary research and write a term paper. The paper should present the different views of the different stakeholders of the topic selected. For instance, for a service domain, expected is a separate section for each of the views of the customer, the service provider and the intermediary presented with evidences from existing sites, studies, reports, articles, etc. Students are requested to use sites from around the world especially regional. Another section is expected in this paper to include comparisons, critiques, and recommendations to enhance existing Web sites.

IV. Student Assessment

Many research efforts have been done for assessment. For instance, the triangulation method [12] recommends many direct assessment methods for a modeling course in the college of engineering. The Hi-Class tool [13] is another comprehensive assessment apparatus that uses both direct and indirect methods for a comprehensive assessment. This article, however, stresses on the direct methods only.

Students of CPIS380 are assessed by many tools. Some of these tools are group work while others are individual assessment tools. The two categories of tools are equally weighted, i.e., 50% each. The pass percentage is 60%.

Table III lists those assessment tools, again, together with their contribution to the three input categories: SOs, POs, and PAs. Quizzes are MCQ-type of questions; exams are a mix of understanding and analytical-type questions; while lab reports are hands on exercises on use of tools and web development skill building.

The assessment of the group work is done on two levels: assessment on the quality of the overall work as a single unit, and assessment on the role of each individual team member and his contribution to the whole work. The mark each student gains is a percentage of the overall assessment for a maximum of the mark assigned to the overall work. Usually assessment is done relatively. Rubrics are used for evaluating each assignment type to guarantee uniform assessment across individuals, groups, and semesters. Table III shows the elements of evaluation as corresponding to the criteria it supports. An extra evaluation criterion is the degree of innovation of the ideas presented in the group project's business plan and design. This criterion is given a big weight that sometimes exceeds the maximum assigned mark for a bonus value. This decision is taken to encourage students not to present classical work, but rather to think out-of-the-box and bring new innovative ideas.

V. Course Evaluation

The course is evaluated based on its contribution on the SOs according to Table III. The evaluation is based on the weighted average of the scores obtained by the students. The scores of three consecutive terms (Fall2011, Spring2011, and Fall2012) are used. The following are the equations used to generate the diagrams of Fig. 2:

$$Contribution(SO_x) = \Sigma(AVG(Activity(SO_x)*MaxGrade(Activity(SO_x)) / \Sigma(MaxGrade(Activity(SO_x)$$

TABLE III.
CPIS380 STUDENTS ASSESSMENT

CPIS380: Introduction to e-Business	%	Group Work?	Student Outcomes										Program Objectives			Professional Areas		
			a	b	c	d	e	f	g	h	i	j	PO1	PO2	PO3	PA1	PA2	PA3
Quizzes	5			x			x		x				x			x	x	x
Exams	35			x	x				x				x			x	x	
Lab work and reports	10										x		x	x				x
Case studies analysis and presentations	15	G		x		x	x	x	x	x	x		x	x	x	x	x	
Synthesizing and designing of a Business plans	10	G		x	x	x		x	x	x	x		x	x	x	x	x	
Analysis, design and implementation of an e-Commerce Web site	15	G		x	x	x		x		x	x	x	x	x	x	x	x	x
Term paper	10	G				x		x	x	x	x		x	x	x	x	x	

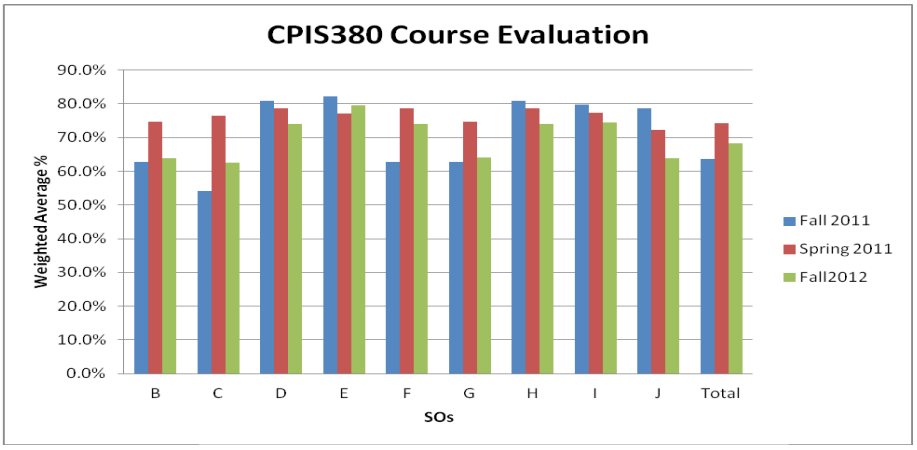

Fig. 2. CPIS380 Course Evaluation

$MaxContrib(SO_x) = \Sigma\ (MaxGrade(Activity(SO_x) * MaxGrade(Activity(SO_x)) / \Sigma MaxGrade(Activity(SO_x)$

$RelativeContribution(SO_x) = Contribution(SO_x) / MaxContrib(SO_x)$

It is worth noting that during those three semesters, although the activities assigned to students were almost the same, however, the recorded marks was different. For instance, except for the Fall2012, the assessment marks for the project were recorded as one number covering both the business plan, design and implementation. Also, the marks for the term paper were recorded as part of the marks of case studies analysis. Of course, this is reflected on the results shown in the diagrams of Fig. 2, though not much effective. This approach is changed starting Fall 2012 for more accurate evaluation.

The accepted percentage as per FCIT regulation is 60%. This indicates that the approach used by CPIS380 reveals acceptable results and contributes appropriately to all involved SOs.

Moreover, it is apparent that the design of CPIS380 also supports both the POs and PAs as discussed in the previous section.

VI. Conclusion

The design of the course "Introduction to e-Business" went through three stages of implementation since 2000 for over 15 occurrences and with different course numbers; experiences that helped in making CPIS380 more mature:

1. MBA students: with good business background and no programming skills.
2. Computer Science students with no business background.
3. IS students with both programming skills and business knowledge.

In the first stage, the project activity was limited to designing the business plan, while all other activities remain the same. However, students were requested to design the web site scenario and structure as painted screens. At that time e-Business was at its early age and students weren't even familiar with the use of the Internet. Some assignments were given at the very beginning of the course to build the necessary skills of Internet access and utilization. By the end of the course, students were very familiar with the concepts and usually presented many innovative ideas and creative projects.

In the second stage, students were having VB programming skills but not web development. They were also missing business background. The curriculum didn't allow for lab sessions. The course began by covering the necessary marketing background as well as building the necessary Internet access skills. The project assignment was again similar to that for the MBA students, especially which the course tried to cover the missing business background. Case studies analysis and project plans were not as fruitful as those done by MBA students. This indicates that the maturity of the students and the professional experience they had played an important role in grasping the concepts introduced by the course.

The third stage began three years ago. The IS students at FCIT have studied about four business courses and many computer science and programming course before they come to CPIS380. A Lab session of one hour every week in addition to the three hours of lecturing is a requirement by the curriculum. This allows the current comprehensive course design, implementation activities and assessment as discussed in this article. The results

are promising and encouraging; it overcame the limitations and negative issues of the previous stages.

The course filled in the gap between two areas of knowledge, namely, business and computer science. Students were puzzled of why they were studying business courses in a computing college, and were asking how they could make use of such knowledge. CPIS380 answered a question they kept asking: "Isn't it enough to master web programming to build successful e-Commerce projects?" Surveys also tell that graduates found the knowledge and skills gained by this course were very supportive and driving in their work and in many cases was a reason for winning the job competition. In addition, end-of-term surveys revealed that both the students and the instructors were enjoying the course.

APPENDIX I
ABET'S IS STUDENT OUTCOMES

a) An ability to apply knowledge of computing and mathematics appropriate to the discipline
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
d) An ability to function effectively on teams to accomplish a common goal
e) An understanding of professional, ethical, legal, security and social issues and responsibilities
f) An ability to communicate effectively with a range of audiences
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
h) Recognition of the need for and an ability to engage in continuing professional development
i) An ability to use current techniques, skills, and tools necessary for computing practice.
j) An understanding of processes that support the delivery and management of information systems within a specific application environment.

APPENDIX II
CPIS380 COURSE TOPICS

CPIS380 covers most of the following topics as time allows and as student acceptance and pace are:

1. Introduction to E-Commerce and E-Business.

I. Models of E-Commerce/E-Business:

2. Cyber-services models and Intranet and Extranet EC models.
3. The Retail/Consumer Marketplace EC models (B2C).
4. The Business-to-Business EC models (B2B) &Electronic Supply Chain Management.
5. E-Payment and Security.

II. E-Business Strategic and Tactical Planning (E-Strategy):

6. E-Strategy for attracting and retaining customers.
7. Advertising and Promotion in e-Business.

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