

Framing Electronic Commerce within an Introductory Information Systems Course

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ABSTRACT

This paper describes and analyzes a teaching approach that frames ecommerce within an introductory Business Information Systems (BIS) class. The framework is guided by the systems development life cycle (SDLC) as a foundational and defining concept in the information systems (IS) discipline. Within this framework, the teaching approach employs a semester-long series of three assignments in which students propose and analyze an Internet start-up business. Although the assignments loosely parallel the SDLC, they do not emphasize systems development; and as such, they can be readily employed in an undergraduate or graduate core business course. At the same time, the assignments do provide a context for discussing the SDLC at the end of the semester, thus providing a substantive basis for exemplifying the relevance of both ecommerce and information systems alike. Such a context also lends to a discussion of how ecommerce systems change the traditional view of the SDLC. In addition to positioning and presenting the teaching approach and an example case, the paper discusses lessons learned from the experience of having implemented the assignments. The assignments provide an interesting context; and the advancement of the teaching approach has implications as a reproducible teaching exercise as well as for ecommerce and information systems pedagogical research.

Keywords: Electronic Commerce, Internet Marketing, Information Systems Course, Teaching Case Study, Systems Development Life Cycle

1. INTRODUCTION

The information systems (IS) discipline has a foundational knowledge base – the systems development life cycle (SDLC) – that offers a unique and informative perspective for teaching ecommerce topics. However, an SDLC perspective can translate into an emphasis on systems development projects, resulting in ecommerce courses in IS curricula that focus on web design and development. Such courses may be of limited interest to the non-IS business major; and for many business majors, their only exposure to IS-framed ecommerce topics will come from the only IS course that they will take – the business core course in information systems.

This paper describes and analyzes a teaching approach that frames ecommerce within an introductory business information systems (BIS) class. The framework utilizes a semester-long series of three assignments in which students – working in small groups – propose and analyze an Internet start-up business. The assignments loosely parallel the SDLC, but they do not emphasize systems development. As such, the framework and assignments can be (and have been) easily (and effectively) employed in an undergraduate business course of mostly non-IS majors. The approach

likewise could be used in a graduate business class. In addition to positioning and presenting the teaching approach, the paper discusses an example case as well as lessons learned from the experience of having implemented the assignments.

The significance of the teaching approach is due in part to an ability to bring ecommerce to the forefront while maintaining the goals and objectives of an introductory BIS course. The IS topics are arranged to coincide with the assignments and to reinforce the ecommerce topics in context. Integrating the IS topics is important to conveying a broader perspective to students, the majority of whom think of ecommerce as just shopping on the web (Gunasekaran and Ngai 2004). Not only does the approach frame ecommerce within the BIS course, but the assignments also provide a context for discussing the SDLC at the end of the semester. At the same time, the assignments advance a discussion of how ecommerce systems change the traditional view of the SDLC. Such discussions provide a substantive and interesting basis for exemplifying the relevance of both ecommerce and information systems alike.

2. ECOMMERCE AND INFORMATION SYSTEMS

2.1 Ecommerce Curricula

The need to develop and advance ecommerce curricula has been met with a limited amount of research (Gunasekaran, McGaughey, McNeil 2004). This research has been conducted at two levels: broader-level studies covering issues related to the design and implementation of ecommerce programs and degrees; and narrower-level studies focused on the design and implementation of specific courses. Many of the more focused studies (e.g., Dhamija, Heller, and Hoffman 1999; Angeles and Adams 2000; Settle and Berthiaume 2003; Ngai 2004) have described positive results with hands-on, interactive, and collaborative approaches to teaching ecommerce courses. At the same time, broader-level studies have used surveys and descriptions of ecommerce programs to advance the curricula by identifying common or revealing approaches, courses, challenges and opportunities.

Overall, ecommerce programs are known to be highly multidisciplinary (Mechitov, Moshkovich, and Olson 2002). Nevertheless, recent studies (King, Frank, and Platt 2001; Davis, Siau, and Dhenuvakonda 2003) have reported that the vast majority of ecommerce programs are administered in the business school and at the graduate level; moreover, they show marketing, technology management, and strategy to be the most prevalent courses being offered in these programs. Not surprisingly, marketing and IS often are identified as two of the more prominent disciplines involved in ecommerce programs (e.g., Chen, Brunswick, Basu 2000). Some researchers even see the modern day e-business environment as necessitating increased integration between IS and marketing strategy (Celsi and Wolfenbarger 2000).

2.2 Information Systems Curricula

On one hand, the commerce half of ecommerce is related to buying and selling, thus linking it to various business disciplines such as marketing and strategy. On the other hand, the electronic half of ecommerce is related specifically to technology, thus fundamentally linking it to the information systems discipline. Given this explicit and inherent link, leading IS textbooks have attempted to present and discuss information systems principles in the context of ecommerce. For example, Laudon and Laudon's (2004) widely-used "Essentials of Management Information Systems" was given the subtitle "Managing the Digital Firm." Even more to this point, Steven Alter's (2002) "Information Systems" textbook was subtitled "Foundations of E-business." But contextual changes do not necessarily change the foundations of the framework of topics. For example, in these two "ecommerce-based" IS textbooks, in-depth coverage of ecommerce is not presented in the lead chapters but instead appears later in Chapters 4 and 6 respectively.

Beyond contextual changes, topics such as ecommerce can be framed within the IS discipline by way of the traditional structures and foundations of the discipline. The

importance of a foundational framework is particularly emphasized in introductory IS courses, which have been collectively associated with labels such as "uncertainty and inconsistency" (Watson et al. 2000) and even "widow-maker" (Holmes 2003). A study of the knowledge areas of various IS programs revealed the SDLC to be a foundational curricular theme that "highlights IT's relationship to traditional computing disciplines" (Landry et al. 2003, p. 117). Such foundations can be useful when new innovations and technologies are integrated into curricula. For example, one recent study (Grenci and Hull 2004) showed how the SDLC was used to frame the introduction of enterprise resource planning (ERP) topics within the IS discipline.

2.3 The Systems Development Lifecycle

With roots going back to at least the 1960s, early structured systems development methodologies explicitly identified a linear sequence (or waterfall model) of life cycle stages that became associated with the definition of SDLC. This definition typically includes the following stages (Management Outline 1998): feasibility study, systems investigation/analysis, systems design, systems implementation, and review/maintenance. While various development methods differ in concept and approach, many employ tasks that are comparable to the stages of the structured SDLC. Such comparability has been recognized with respect to a range of methods, including the object-oriented (OO) systems life cycle (Henderson-Sellers and Edwards 1990), prototyping methodologies (Plyler and Kim 1993), and even ERP implementations (Grenci and Hull 2004).

Although ecommerce systems face the same development challenges as traditional systems, the former contends with additional issues of rapidly evolving markets, ill-defined business requirements, and volatile technologies (Hevner et al. 2002). As such, an efficient ecommerce system could benefit from a "performance management life cycle" (Rabin 2001) defined by the following steps: understand customer behavior; set performance goals; plan infrastructure; build application; benchmark performance; tune infrastructure; set procedures; and adjust for peak periods. The integrated and distributed ecommerce environment also could benefit from a "component-based framework" (Fingar 2000) that includes: requirements; use cases; unified modeling language (UML) analysis diagrams; UML design diagrams; component assembly; and testing and launch. As with OO activities, the traditional SDLC frames the component-based life cycle with comparable stages – analysis, design, development, and implementation.

3. TEACHING FRAMEWORK AND APPROACH

Despite efforts to reframe the introductory IS course via the inclusion of ecommerce concepts, the overall focus of a course can remain unchanged; and ecommerce can end up being obscured by the survey of IS concepts. In order to change the emphasis of an IS course, ecommerce must be brought to the forefront while being framed by and within

IS concepts. This can be done by taking advantage of the organizational and foundational aspects of the SDLC framework while maintaining a focus on the intended context – in this case, ecommerce – rather than letting the framework become the focus. At the same time, the multi-disciplinary nature of ecommerce dictates the explicit integration of a commerce dimension into the framework. Such a framework can be further enhanced by a more interactive approach, as this too has been revealed as a key factor in the successful delivery of ecommerce content. Ultimately, by using an interactive approach and by emphasizing an Internet commerce context guided by an SDLC framework, ecommerce can effectively emerge from within a survey of IS topics.

The ecommerce-framed teaching approach described in this paper has been used at John Carroll University, a Jesuit institution of 3,000 students located in Cleveland Ohio. John Carroll provides a liberal arts education in which students declare their majors (including business majors) just prior to their junior year. As such, most business majors take the required business IS course during their junior year (although students also can and do take the course as sophomores and seniors). Since John Carroll has a relatively new Business Information Systems (BIS) major, most of the students in the required BIS course are non-BIS majors. It is in this core undergraduate business information systems class of mostly non-BIS majors where the teaching approach has been developed and used. Although this teaching approach was applied to an undergraduate course, it also could be used in a graduate business course as well.

The teaching approach is based on a series of three interrelated assignments that span most of the semester. The assignments begin with each group of students identifying a particular type of business that they propose to launch on the Internet. The context of an Internet start-up provides for the commerce dimension of ecommerce, while the contents of the assignments loosely follow the stages of the SDLC so as to frame the IS topics. In addition, the Internet business context provides a starting point that is familiar and interesting to students – and one that can serve to integrate (and show the relevance of) various IS concepts. As a prelude, the students are given an outline of the scope of the assignments (see Table 1) so that they may propose an appropriate type of business. The outline includes some stated constraints that help to establish a certain level of consistency across all of the student groups. In particular, students are limited to choosing merchandiser business models rather than service provider models. Students also are restricted from choosing music and bookstore business models as they have proven to be the preferred choice of many groups; instead, these businesses are used as examples in class.

Since the teaching approach is incorporated in an introductory BIS class, each of the assignments employs an IS modeling component as well as a software component (see Table 2). Assignment 1 uses functional decomposition diagrams and Microsoft Excel; Assignment 2 uses entity relationship diagrams and Microsoft Access; and Assignment 3 employs use case diagrams and Microsoft FrontPage. The Excel component in Assignment 1 and the use case component in Assignment 3 are not crucial to the delivery and value of the exercises – they are included

Table 1
Prelude to Assignments: Identifying an Internet Start-up

The Group Assignments are based on analyzing an Internet start-up company that you think is value-added as compared to the traditional non-Internet version of the same type of business. Traditional merchants provide for a good contrast to online business as the movement of goods is very different. In addition, online business also can add value by providing new services and information to the customer. Your team will select a business (excluding book and music stores) that will sell goods on the Internet. Your comparison to the traditional model of the same type of business should consider the operations of a brick and mortar business with multiple retail shops. Your business model will be used as the focus of the following three assignments (i.e., you will analyze the same business proposal in all three assignments).

Scope of Assignment 1 (Process Analysis): You want to launch an Internet start-up company. Your goal is to offer insights to potential investors in the start-up by analyzing and comparing the Internet business model to the equivalent non-Internet model. The focus here is on modeling the operations of both types of businesses so as to identify the implications of their differences.

Scope of Assignment 2 (Database Analysis): You want to design a database for your start-up. Your goal is to use the database to show investors the operational and value-added aspects of the online business. The focus is on defining the tables and fields that are necessary for storing and retrieving data that would allow you to manage the business and to interact with customers.

Scope of Assignment 3 (Web Site Analysis): You want to design a web site for your start-up. Your goal is to offer insights to investors by analyzing and comparing the business and functional capabilities of competing sites to those of your proposed site. The focus here is on creating a web page that presents your analysis/comparisons along with mocked-up web pages of your start-up's home page and mockups of any additional pages that characterize important functionality of your business. As mockups, the pages that you create are meant only to visually display the types of pages that would be part of your web site.

Table 2
Summary of Assignment Components

<u>Assignment 1</u>	<u>Assignment 2</u>	<u>Assignment 3</u>
Business Process Analysis	Online Database Analysis	Web Site Analysis
Functional Decomposition	Entity Relationship Diagram	Use Case Diagram*
Microsoft Excel*	Microsoft Access	Microsoft FrontPage

*Excel and Use Cases are tangential to assignments and could be excluded

primarily as IS tools relevant to the overall course and thus are tangentially worked into the assignments. As such, they could be easily excluded from their respective assignments.

These types of exercises and tools are likely to be employed in various forms in various introductory IS courses. It is the overall context and framework of the exercises that results in a series of assignments that offer significant value to the course. Likewise, although similar types of assignments can be employed in ecommerce courses, it is the context and integration within an introductory IS business core course that creates a value-added dimension to that course. This integration is guided by the use of the SDLC as a foundational concept, and it results in a sequencing of IS topics that strengthens the overall teaching approach. Table 3 outlines the sequence of topics based on the use of the Management Information Systems textbook by Haag et al. (2004). In general, the topics for the course are arranged to coincide with the SDLC, progressing from business/strategy topics to information/analysis topics to technology/design

topics. In particular, this progression of topics begins with ecommerce and ends with the SDLC. All three of the assignments are described and analyzed further in the following paragraphs. In addition, an online music store example illustrates several key components of the assignments.

3.1 Assignment 1: Online Business Process Analysis

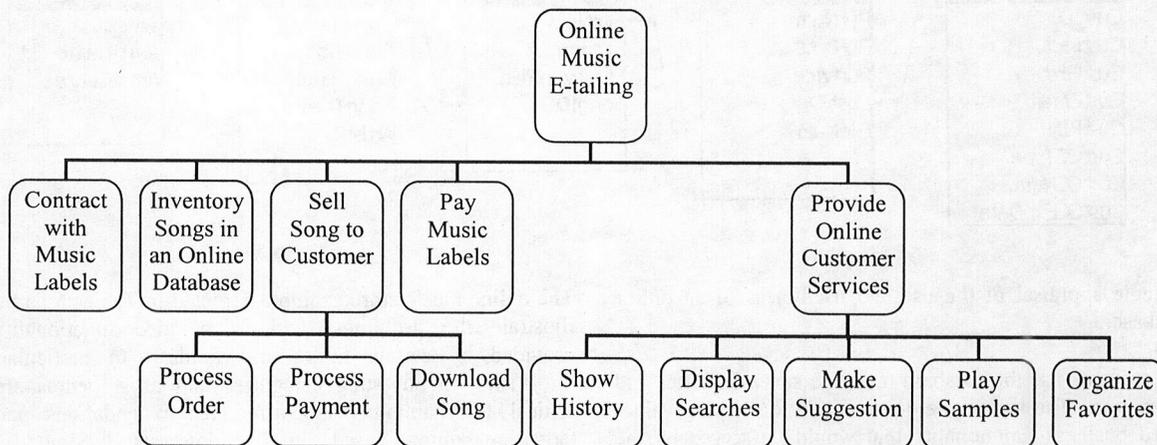
Assignment 1 (see Appendix 1) is centered on a business process analysis that serves to compare the proposed Internet business model to an equivalent traditional, brick-and-mortar model. The analysis is facilitated by functional decomposition diagrams (FDD's), which are described to the students as a hierarchical breakdown of business processes in a form similar to an organization chart. Students create one FDD for the operations of the traditional model, and one for the Internet model (see Table 4 for an example). Microsoft Word has an organization chart option (under Insert, Diagram) that allows for a very easy construction of a multilevel FDD.

Table 3
Sequence of Course Topics for the Semester
(Framing the Ecommerce Assignments within the IS Topics)

Focus	Topics/Subtopics	Chapters* (with Abbreviated Titles)	Assignments
Business	1. Electronic Commerce - Internet Commerce - Supply Chain 2. Business Analysis - Process Analysis - Decision Analysis	Chap 5 (Electronic Commerce) Chap 2 (Strategic Opportunities) Module D (Decision Analysis w/ Excel)	Assignment 1 (Process Analysis)
Information	3. Data Management - Databases - Data Modeling 4. Knowledge Work - Data Warehouses - Collaboration	Module C (Database Design w/ ERDs) Module J (Database Implem. w/ Access) Chap 3 (Databases & Data Warehouses) Chap 4 (Decision Support)	Assignment 2 (Database Analysis)
Technology	5. Business Computing - Computing Trends - Client-Server 6. The Internet - Internet Technology - VPNs and Portals	Module E (Network Basics) Module B (The Web and the Internet) Module I (Building an e-Portfolio)	Assignment 3 (Web Site Analysis)
Management	7. Technology Issues - System Trends - Security/Privacy 8. Buy vs. Build - Front/Back Office - Systems Development	Chap 8 (Protecting People, Information) Chap 7 (IT Infrastructures) Chap 6 (Systems Development)	

*Chapters and Modules are from Haag, Cummings, and McCubbrey (2004)

Table 4
Assignment 1: Functional Decomposition Diagram
(Online Music Store Example)



The assignment requires the FDD's to be defined at multiple levels so as to show the sub-processes of one or more of the higher-level processes. This detail can be used to compare differences that might not be seen at a higher level. The students summarize the comparisons and analysis in a memo that is targeted at a group of potential investors in their business.

The online music store example depicted in Table 4 shows major processes for the Internet model to include contracting with music labels and creating an online inventory of songs. These processes can be contrasted to a traditional model that would involve the purchase of goods and the warehousing and distribution of those goods. The online inventory process does not require a pre-purchase of goods; and payment to the music labels would be based upon actual sales. The comparison of these processes shows that the Internet model is one of brokering versus the traditional model being one of truer retailing. In addition, the selling process is decomposed into an additional level to compare the differences to traditional selling. Once again, the Internet model eliminates traditional retailing and stocking activities associated with the movement of goods. The decomposition of the customer service process is done not to compare it to the traditional model but rather to show the types of value-added processes related to searchability, product sampling, and personalization.

In addition to the process analysis as facilitated by the functional diagramming, students use Microsoft Excel to create graphical analyses of projected differences in costs or profits by making what-if assumptions in the vein of a break-even analysis. In its current usage in an introductory BIS course, the Excel component serves more to incorporate a software tool as a relevant skill rather than to enhance the effectiveness of the assignment. This part of

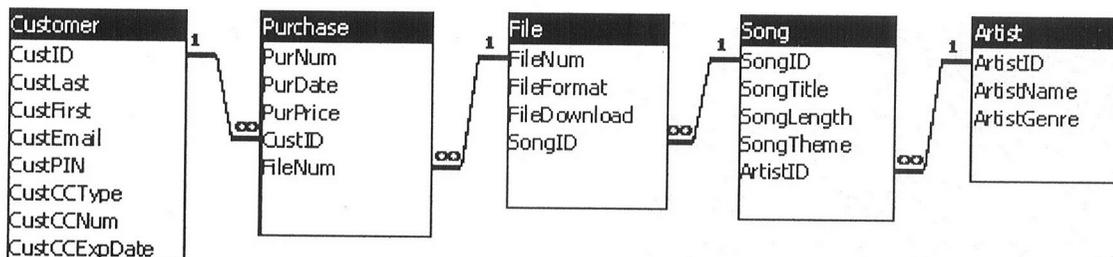
the exercise is only tangential to the substance of the analysis and thus can be excluded without any implications to the overall value of the assignment.

3.2 Assignment 2: Online Database Analysis

Assignment 2 (see Appendix 2) is centered on a database analysis that serves to illustrate the operational and informational functionality of the online business. Informed in part by the proposed functionality as described in Assignment 1, the students begin by defining the relevant tables, fields, and relationships in the database by way of an entity-relationship diagram (ERD). The idea is to create a database that is capable of storing the information necessary to handle the proposed functionality of the business but not to create or program the functionality itself. The relational design then is translated into a Microsoft Access database, and a printout of the Relationships view in Access provides for an ERD-like diagram (see Table 5).

The students use the database to create several queries and one report. The key to the queries is in identifying value-added business functionality that would be served by the queries. The students explain this functionality in a table of contents that precedes printouts of all of the query results (see Table 6). The key to the Access report is to make use of groupings and summary calculations; otherwise, the report may not add much value over a comparable query. Since developing reports can be troublesome (even programmatic), students are instructed to create a multi-table query that can be fed into Access' report wizard so as to guide them in defining groupings and summaries. The Access queries and report provide a basis for a memo that summarizes the overall advantages of an online database. As the students already have produced a table of contents that describes the functionality of the database and the purpose of the queries, the memo is meant more as a

Table 5
Assignment 2: Entity-Relationship Diagram
 (Online Music Store Example)



strategic appraisal of the use and usefulness of an online database.

The students use the database to create several queries and one report. The key to the queries is in identifying value-added business functionality that would be served by the queries. The students explain this functionality in a table of contents that precedes printouts of all of the query results (see Table 6). The key to the Access report is to make use of groupings and summary calculations; otherwise, the report may not add much value over a comparable query. Since developing reports can be troublesome (even programmatic), students are instructed to create a multi-table query that can be fed into Access' report wizard so as to guide them in defining groupings and summaries. The Access queries and report provide a basis for a memo that summarizes the overall advantages of an online database. As the students already have produced a table of contents that describes the functionality of the database and the purpose of the queries, the memo is meant more as a strategic appraisal of the use and usefulness of an online database.

The online music store example depicted in Tables 5 and 6 illustrate the usefulness and value-added functionality provided by certain tables and fields. In particular, information about song categories and artist genres are critical to enabling personalized recommendations and target marketing based on like interests. Similarly, purchase histories can help to identify like interests. Such queries can be compared to Internet mechanisms used by companies like Amazon.com. In addition to marketing and front-end relevance, the database also must incorporate certain fields or tables that have back-end relevance. For example, information about the music labels can be used to inform contract negotiations and pricing. The inclusion of any and all of these fields and tables is based on the ability of the students to identify value-added business functionality. Some of this functionality already has been defined in Assignment 1 and thus should be addressed in the database. For example, the customer service sub-process of "organizing favorite songs" (depicted in Table 3) should result in a table that stores information pertaining to such a function.

Table 6
Assignment 2: Queries and Report
 (Online Music Store Example)

Assignment 2 Appendix Table of Contents (Precedes Printouts of Access Queries and Reports)		
QUERIES		
<u>Page</u>	<u>Name</u>	<u>Tables Used as Input to Query</u>
8	"Customers of Artist"	Customer, Purchase, File, Song
	List of all customers who have purchased a song by a particular artist. Used by marketing to send an email notifying customers of newly released songs by an artist.	
9	"Songs in Genre"	Song, Artist
	List of all songs from the same genre as another song. Used by the web site to recommend other songs to customer based on what they are browsing.	
10	"Customer Purchases"	Customer, Purchase, File, Song, Artist
	All customers and all of their purchases. Used for Report.	
REPORT		
<u>Page</u>	<u>Name</u>	<u>Tables/Query as Input to Report</u>
12	"Label & Genre Popularity"	"Customer Purchases" query (#10)
	All purchased songs, grouped by music label, sub-grouped by genre and sorted by counts. Used by finance to negotiate royalty contracts with music labels based on popularity of songs.	

3.3 Assignment 3: Web Site Analysis

Assignment 3 (see Appendix 3) is centered on a web site analysis that serves to compare and contrast the proposed online business to the sites of competing or similar types of businesses. Informed by the functionality described in Assignments 1 and 2 as well as by the functionality of competitors' businesses, students use Microsoft FrontPage to create mock-ups of web pages for their proposed site. As mock-ups, the web pages are not intended to be functional, but rather are intended to illustrate the types of pages the site would need in order to handle the functionality of the online business.

The mocked-up pages serve as a point of reference for analyzing the business and user functionality of the proposed site as compared to the competing sites. As the mocked-up pages illustrate only the primary functionality of the site, students are able to characterize and describe the capabilities of their online business in ideal terms as they analyze and compare it to competing sites. The students summarize the analysis on a web page that serves as an online report. As such, students are instructed to "write for the web" in a form that is both informative and succinct and that takes advantage of the organizational capabilities of the medium. Such capabilities include the use of inserted graphics and the use of hyperlinks to external pages (both existing and newly-constructed) so as to provide further details and explanations as needed.

In addition to the web page creation and analysis, students produce a use case diagram for their proposed site. This exercise can be used to identify and analyze the audience for whom the web site is being designed. However, as with the Excel component in Assignment 1, this part of the exercise is incorporated primarily as an information systems skill rather than to enhance the effectiveness of the assignment. As such, it is only tangential to the substance of the analysis and thus can be excluded without any implications to the overall value of the assignment. For that matter, the need for a student web server also is tangential to the assignment. If a web server is not available, students can save their web pages in a web folder on a hard drive and then email them to the instructor (or they can be uploaded to a drop-box).

4. DISCUSSION

As described in the previous section, the three assignments provide a context for framing ecommerce topics in a business information systems course. The assignments begin with the proposal of an Internet startup business and then proceed with an analysis of the processes, database, and web site of the business. This framework allows for the introduction and coverage of IS topics with an explicit and relevant ecommerce context. In this context, the approach incorporates and takes advantage of several aspects of the assignments.

4.1 Ecommerce Value-Chain

The assignments are defined such that students are

restricted to proposing online businesses that sell goods rather than services. This restriction allows students to consider packing and shipping functions (as well as the role of third party transportation services) in the online business model that greatly contrast to the traditional model. Furthermore, by having the students compare their online business to a traditional business that has multiple retail locations, the assignments allow the students to consider retail store-level distribution and stocking activities of the traditional model that would contrast to an online model that has no retail outlets. In addition, both the online and traditional models have their own warehousing and distribution challenges that compare and contrast.

Based on the types of activities that are contrasted, Porter's (1985) value chain provides a good basis for considering the range of relevant traditional processes: purchasing, warehousing, distribution, selling, and even support activities such as marketing and customer service. Since students tend to think in terms of the customer, the value chain helps to point them to back-end processes. It also can emphasize the integration between the processes. An informative survey from RIS News (2001) is useful for illustrating much of the front-end to back-end integration that e-tailers employ (and fail to employ). The survey can be incorporated upfront in the course so as to illustrate ecommerce as more than just "shopping on the Web."

4.2 Process and Systems Modeling

Value chain analysis provides a useful perspective for process modeling. In turn, functional decomposition diagrams provide for an easily conveyed yet useful modeling tool that serves the purposes of the teaching approach. Data flow diagramming (DFD) also can be (and has been) employed for these assignments. There are pros and cons to its usage. On the one hand, if students focus on the flow of goods, an integrated enterprise-level DFD does not as easily incorporate support activities such as marketing or customer service. Perhaps more importantly, DFDs are difficult for many students to understand; and in the context of the assignment, the value-added of DFDs over FDDs is limited. On the other hand, DFDs can show how the movement of goods is replaced by the movement of information in a database. For example, in the online music store where the merchant acts more like a broker than a retailer, the sale of songs can be recorded in a database where the information can be later used to pay royalties to the music labels.

Some students have shown a weakness with respect to using process modeling tools in a relevant way. For example, in the functional decomposition diagramming, students often choose to show the sub-processes of a particular higher-level process only because the assignment requires them to break down at least one major process. In many cases, the process that they choose to decompose ultimately shows little value-added information; and it might not even be incorporated into their analysis. In such cases, discussions can point out that unless there is a reason for showing such detail, the students are using a systems tool for the sake of

the tool itself rather than to add insight to their analyses.

Interestingly enough, when data flow diagramming was used for the assignments, it provided for several points of integration that could be discussed at the end of the semester when the SDLC was presented. DFD data stores and external entities can be linked to the ERD entities; and DFD external entities can be linked to actors in the use case diagrams. The difference between external entities (sources/destinations of information) and actors (users of a system) is greater in traditional business systems than in online systems where external entities become users – in other words, where the customer becomes part of the process. The same concept applies to the customer becoming a primary user of the information in an online database.

4.3 Customer Relationship Management

As previously noted, students tend to limit their perspective to thinking in terms of customer processes – processes that are most familiar to them; but with respect to designing the database, some groups of students focus their perspective on the back end, perhaps due to the fact that the business owns and uses the database. However, unlike with a traditional retailer, web-enabled access to a database allows the customer to be a major user of the services as well as the information. The design of the database should reflect that capability. For example, inclusion of product category information is critical for value-added searching, enabling customers (and management) to execute queries that reveal similar products based on product category. Simple queries also can produce information for target marketing based on past purchases.

The value-added information produced by queries offers a simple-to-understand perspective of customer relationship management (CRM) issues. In this case, CRM does not need to involve complex statistical analyses. Instead, simply making use of the information that is collected can provide for various levels of personalized and targeted marketing. Interestingly, much of the information is input by the customers themselves, thus limiting the marginal costs to collecting such information. Even value-added services such as organizing a customer's favorite music also depend on the customer's own actions and input. Although these services provide for valuable and scalable customer relationship-building, they come at the expense of well-designed web sites, and well-developed and integrated systems.

4.4 Web Site Design

While queries may be easy to understand and construct, web site prototypes could prove to be more difficult. However, many students have no problem understanding the idea of producing prototypical, non-functioning mock-ups of their online business' web pages. Even in the most recent semester of using these assignments, very few of the students had any previous experience with building web pages; and even fewer yet had experience with Microsoft FrontPage. Yet, for the purposes of the assignment, only

one hour of class time was used to explain the basics of FrontPage. In addition to explaining how to access the student web server via a network drive, the discussion was focused on how to create a simple web page, including inserting graphics and hyperlinks. From there, many students were very excited to investigate the capabilities of FrontPage. Some even employed layers and inserted web components, while others attempted to create working functionality in their pages.

Somewhat surprisingly though, many students had a very difficult time understanding the idea of creating a report that was to be presented on a web page. Despite the fact that the assignment included references to online articles explaining how to write for the web, a large number of students thought that the report was to be written in paragraph form as a Microsoft Word document. Even after further clarification was offered, several students continued to question their understanding of the requirement. Given the trend for putting all types of information and reports on the Web, this confusion prompts questions pertaining to larger aspects of teaching business communications and whether or not "writing for the web" should become more prominent in the business curriculum.

4.5 The SDLC

Discussions of web page design and prototyping lead to more in-depth discussions of the systems development life cycle. Not only is the SDLC placed in a larger perspective by the context of the assignments, but components of the assignments interrelate to illustrate the integrated nature of the structured life cycle. The processes analyzed in Assignment 1 help to inform the database requirements of Assignment 2, thus putting functional requirements into the context of how they are used. Furthermore, the functionality analyzed in Assignments 1 and 2 help to inform the web site design in Assignment 3, thus integrating systems analysis with design.

The assignments and their context also allow for a discussion of how and whether the traditional SDLC applies to the development of ecommerce systems. Ecommerce systems are characterized by numerous challenges including: ill-defined requirements and users; performance issues and peak use; security and privacy vulnerabilities; highly distributed and integrated systems, changing markets and technologies; and the push for rapid development and replacement of legacy systems. Although the traditional SDLC provides for a general framework, it does not explicitly identify the need to focus on development activities such as performance tuning or component reuse – activities that are relevant to ecommerce systems challenges. However, specific aspects of the assignments can provide a tangible context for such a discussion. For example, student attempts to create a simple "working" prototype can lead to discussions of what it would take to develop the complex systems behind a fully integrated e-corporation.

5. CONCLUSION

Analyzing an Internet startup business within an SDLC framework provides an informative basis for teaching ecommerce topics within an introductory IS course. In addition to its implications as a reproducible teaching exercise for both undergraduate and graduate business classes, the advancement of the approach also should be of interest to IS researchers. Not only does the exercise add to the body of ecommerce pedagogical approaches, but it also offers a basis for positioning introductory ecommerce concepts within the foundations of the IS discipline. Such additions to ecommerce pedagogy in turn provide a basis for comparing, contrasting, and studying various approaches so as to advance and position the larger role of ecommerce within IS curricula. Furthermore, the teaching approach is based on a series of assignments and thus adds to the body of pedagogical approaches and analyses of project-based IS courses.

As it is structured upon a series of assignments, the teaching approach also can contribute to research concerning the personal computing course that often precedes the introductory IS course. IS 2002 (Davis et al. 2001) suggests that even though this personal computing prerequisite – identified as “Personal Productivity with IS Technology” – can be taught as a stand-alone course, it also can be taught as a series of self-study modules or as a series of modules within another course. In that respect, not only could the teaching approach presented here be used to accomplish the latter, but it also could be applied (on a simpler scale) to a stand-alone personal computing course as well. Although personal computing often is thought of as a “skills” course, it can be (and perhaps should be) designed in a broader context. Recent research (Dyer, MacKinnon and Case 2004) has emphasized the continued need for personal computing skills to be taught to business students. In lieu of a tutorial or self-study format, however, a more integrated contextual approach (built upon the ecommerce framework presented here) could help to turn a technology skills course into an interesting and informative business course.

The importance of the teaching approach extends to the appeal and interest of the topic as it is presented to the students. Foundational IS topics (such as the SDLC) are covered (in some form) in practically all introductory IS textbooks. Business students could find such topics to be unexciting or even irrelevant due in part to a lack of a meaningful context. Unfortunately, a lack of context could translate into a lack of appreciation of such topics as well as a lack of interest in the discipline. To that extent, the teaching approach described in this paper provides a context for the SDLC as well as for information systems topics in general – an ecommerce context that is relevant and interesting to many students. Ultimately, the foundations of the information systems discipline must be balanced with innovative topics in efforts to develop effective teaching approaches that can position strategically important concepts within business curricula.

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Appendix 1

Assignment 1: Business Process Analysis

Scope

You want to launch an Internet start-up company. Your goal is to offer insights to potential investors in the start-up by analyzing and comparing the Internet business model to the equivalent non-Internet model. The focus here is on modeling the operations of both types of businesses so as to identify the implications of their differences.

Tasks

- Step 1:* Propose a business to launch on the Internet. Consider one that is value-added as compared to the traditional non-Internet version of the same type of business (please reread Group Assignment Prelude).
- Step 2:* Create functional decomposition diagrams (FDDs) – i.e., “organization charts” of processes. Create one for the traditional model as a point of comparison, and one for the processes in your Internet business operations, keeping in mind how these operations differ from the traditional model. In both of your FDDs, diagram the sub-processes for one or more of your major processes in order to show (as needed) details or differences in those processes.
- Step 3:* Create Excel graphs of projected differences in costs, profits, etc. Any projections are based on assumptions, so account for a range of savings or revenue increases as per a break-even analysis. The idea is to convey as much information as possible in a few charts that could summarize/replace lengthy, complex reports.
- Step 4:* Write a 1-page memo analyzing the efficiencies/inefficiencies and implications of the Internet model as compared to the traditional model. Consider a range of business operations, from acquiring goods to selling them. Rely in part on reference to your diagrams, especially those in Step 2. Consider the role of the Internet and the potential role of information technology (as it could be used in either model) and how it affects the business processes. In addition, consider possible variations of your start-up model and how it is positioned as an e-commerce business.

Deliverables

- Page 0:* Cover page. List your business name and your names.
- Page 1:* Memo. Analyze and compare the Internet and traditional business models.
- Page 2:* Exhibits 1 and 2: FDDs for Traditional and Internet Models. Use Word’s Insert/ Diagram/ Org Chart. Label the diagrams as Exhibit 1, etc., title them appropriately, and reference each at least once in the memo. You do not need to compare every detail of every diagram – they should be used to provide some points of reference.
- Page 3:* Exhibits 3+: Graphs as needed. Label, title, and reference appropriately.

Appendix 2

Assignment 2: Online Database Analysis

Scope

You want to design a database for your start-up. Your goal is to use the database to show investors the operational and value-added aspects of the online business. The focus is on defining the tables and fields that are necessary for storing and retrieving data that would allow you to manage the business and to interact with customers.

Tasks

- Step 1:* Develop an E-R diagram for your online business, considering what fields and tables are needed for value-added information retrieval. The model should be as complete as possible in being able to handle the functionality of your business, but you will NOT be “programming” this functionality (i.e., you will not create screens for ordering, etc.; you just need to have the database necessary to do that). Although you will not be programming screens, you will create sample queries and a report (see Step 3).
- Step 2:* Translate the ERD into Access Tables and Relationships. Add records to each table.
- Step 3:* Create at least 5 Queries and 1 Report that are important to providing information to customers and to your firm. Queries/reports could pertain to accounting, marketing, selling, etc., and they could be used for daily or one-time activities. Queries are easy to construct, so do not be hesitant to define more than five. Reports are more tedious, so use them to add value, particularly by employing groupings and summary calculations. Although invoices are typical reports, do NOT use an invoice as your one report.

Step 4: Write a 1-page memo, describing your business and the overall advantage of having an online database.

Deliverables

Page 0: Cover page. List your business name and your names.

Page 1: Memo. Be sure to consider your audience. Do not repeat the information contained on Page 3 (see below); but instead, refer to it as needed.

Page 2: E-R Diagram. Use Access's Relationships view to print an ERD-like diagram (make sure all fields are visible and use a pen/pencil to underline the primary keys on the printout). Check the "Enforce Referential Integrity" box when building the relationships such that the 1's and ∞'s appear.

Page 3: Appendix Table of Contents (TOC). Summary of tables, queries, reports. List each table's name, the page# of the attached printout, and its purpose. For each query/report, list the same as above as well as who would use it and the queries/tables that are involved.

Pages 4+: Appendix of Sample Printouts. One-page printouts showing the records in each table, query, and report, attached in the order as listed on your *Page 3* (with page numbers matching the TOC). For the Report(s), be sure that you create/print enough records to show its full layout and capability.

Appendix 3

Assignment 3: Web Site Analysis

Scope

You want to design a web site for your start-up. Your goal is to offer insights to investors by analyzing and comparing the business and functional capabilities of competing sites to those of your proposed site. The focus here is on creating a web page that presents your analysis/comparisons along with mocked-up web pages of your start-up's home page and mockups of any additional pages that characterize important functionality of your business. As mockups, the pages that you create are meant only to visually display the types of pages that would be part of your web site.

Tasks

Step 1: Create a Use Case diagram for your proposed web site.

Step 2: Build web page mock-ups for your business. The home page of your business should be as complete as possible; but as mockups, the pages you create are meant only to display the types of pages that would be part of your web site, so they do NOT have to be functional (e.g., you do not have to have a web page that actually take orders; rather you would just mockup an order page to illustrate it).

Step 3: Create a web page that describes your business and analyzes your proposed site as compared to similar sites. Note that your analysis is presented as a Web page rather than as a written report; thus it should be "written for the Web." Your "web page report" should focus on analyzing business and user functions as opposed to site appearance; but you could refer to any element that makes your site better. Your web report should link to the mockup of your business' home page as well as to the sites of the comparable businesses that you are analyzing. Keep in mind that investors that come to your site may not know much about your business plans. At the same time, you can assume that they are business-savvy, so be careful not to explain the obvious.

Step 4: Save all of your pages to your folder on the student web server. Be sure to "test" the pages (view them in a browser and check all links) from a different PC and logged in under a different user ID. Print all of your web pages (from a browser); but print just the home pages of any competing sites that you analyzed. Web pages will NOT print as they appear on a screen. Email the URL of your web page report to the professor.

Deliverables

Page 0: Cover page. List your business name and your names.

Page 1: Use Case Diagram.

Section 1: Web Page Report.

Section 2: Mockup pages of your proposed site.

Section 3: Home pages of competing sites.

NOTE: The three sections listed above will be used by the professor to jot down notes as the assignment is graded while browsing the actual site.



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