2002

A Web Content Management and Personalization Model Using One-to-One Strategy for Higher Educational Institutions

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A WEB CONTENT MANAGEMENT AND PERSONALIZATION MODEL USING ONE-TO-ONE STRATEGY FOR HIGHER EDUCATIONAL INSTITUTIONS

(TITLE)

By

Yee Pong Ng

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF SCIENCE IN TECHNOLOGY

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2002
YEAR

I HEREBY RECOMMEND THAT THIS THESIS BE ACCEPTED AS FULFILLING
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A Web Content Management and Personalization Model Using One-to-One Strategy for Higher Educational Institutions

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SIGNATURES

8-01-02
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8/5/02
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ABSTRACT

This research explored a Web content management and personalization model for higher educational institutions. Through a review of literature and data collected from users, it formulated a conceptual model for Web content management and personalization. The study used the Web site of School of Technology at Eastern Illinois University as a typical case from which to develop the model for higher educational institutions. Understanding the factors influencing user attitudes about the adoption of new Web technologies is extremely important. Such an understanding can help Web developers develop a theoretical framework for a Web model as well as identify its components. Cognizant of user-centered design principles, the study surveyed School of Technology students to assess their attitudes and expectations about applying one-to-one marketing strategy to the School's Web site and to identify the content of the site. Based on the survey results, it formulated design guidelines that helped ascertain the one-to-one Web marketing strategy for the model. Finally, the study formulated a conceptual Web content management and personalization model in Unified Modeling Language formats.

ACKNOWLEDGEMENTS

I am fortunate to have been able to work on this thesis with the talented and dedicated professors at Eastern Illinois University. I especially appreciate the extraordinary efforts of my thesis director, Dr. Gibbs. I am particularly grateful to him for all the time he spent inputting ideas and editing the materials in this thesis. His insight and ways in handling the situations under a tight schedule are sincerely appreciated.

I would like to thank the committee members, Dr. Liu and Dr. Butler. Their comments, criticisms, corrections and suggestions for improving this thesis are greatly appreciated. I also owe special thanks to many other professors in the School of Technology who have conducted surveys in their classes.

Thank you very much!

Yee P. Ng
Graduate Student

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CHAPTER 1

Introduction

Viewed as many-to-many communication media, the Internet and World Wide Web are revolutionizing conventional business models (Shaw and Gardner, 2000). Increasingly, business practices are carried out through information-based systems, particularly the Web. This trend has led to the adoption of Web technologies that provide unique value for customers in the market. Electronic business or e-business is a standard operating procedure for the majority of companies today, with a growing number of them realizing the need to change traditional business models to an electronic-based infrastructure.

Today, many U.S. companies adopt e-business approaches. They recognize the value of integrating one-to-one marketing strategy into their Web practices. Effective Internet marketing strategies are vital to the representation of products and services available online. Web site personalization provides value and benefits to companies as well as Web customers. Personalized Web sites are becoming a popular venue for marketing by providing in-depth content and increased interaction with users. Organizations implement personalization strategy on their Web sites to attract more visitors, to establish individualized relationships with customers, and to gather information to treat diverse customers uniquely. For example, individuals who purchase books from Amazon.com will likely receive e-mail messages tailored to their reading preferences about possible future purchases. There are four widely applied principles of one-to-one marketing strategy to the Web site personalization: 1)

identify each visitor, 2) differentiate each visitor's values and needs, 3) interact with each visitor, and 4) customize for each visitor (Pepper and Roger, 2001).

E-business approaches are certainly not confined to business and industry. Non-profit organizations, colleges, and universities use them to offer unique services. For instance, college students encounter e-business practices, specifically personalization, when using the Web to communicate with peers and instructors through e-mail, listservs, and chat rooms. According to Merril Lynch's The Knowledge Web (2000), college students' Internet use will reach over 13 million by the end of 2002. More than 90 percent of college students in the U.S. access the Internet with 50 percent of them accessing it daily. It is expected that students will spend almost 15 hours per week on the Internet for their studies.

With the growth of the Web, student expectations about related technologies are changing, which presents unique challenges for institutions of higher education. Striving to fulfill the needs of students, many college and university leaders feel competitive pressure to make decisions about developing or purchasing new Web content management systems and defining the categories of information and options available for students. They recognize that their Web sites are unique places capable of bringing together multiple communities and delivering a myriad of services to students.

Many universities develop their own Web content management systems that implement one-to-one Web marketing strategy or personalization on their Web sites. For example, the University of California at Los Angeles and University of Washington are early adopters of new Web content management

and personalization systems with their MyUCLA and MyUW sites. These systems offer personalization and provide a variety of dynamic and customized services based on the information needs and interests of users. They give students one-stop access to content, including campus news, e-mail links, academic records, virtual counseling, chat, and information related to degree programs and the university (see my.ucla.edu, 2002 and myuw.washington.edu, 2002). Through a single-graphical interface, students access information and services individually customized how they are presented. This affords students a single access point to all elements of the university (academic, administrative, and community) and provides them with a convenient set of Web-based communication services.

The Web site of the School of Technology (see Figure 1) uses traditional Web pages to represent the School and information about its degree programs. There are a number of potential shortcomings with this approach. First, the School of Technology and the University sites are decentralized and lack a single access point for users. Students must exit the School's site to obtain information from the University's site, which is inefficient and often time consuming. Secondly, the School's site allows for minimal user interaction. Web pages are static and incapable of retrieving user information dynamically, preventing, among other things, students from communicating electronically. Thirdly, site management is inefficient. Each department has its own Web site, and departments modify their sites individually. The University's Web master must change the University Web site to reflect each modification made by a

department. In addition, with the current site design, changes are often redundant and occur on hundreds of Web pages, which can be time consuming. Fourth, the Web site currently uses a traditional design that displays the same general information to all users. Because it does not support a database management system to organize content, it cannot tailor the information that it presents to users based on their needs or interests.

Figure 1. **Web Site of the School of Technology at EIU.**

The aforementioned problems and a growing reliance on the Web for establishing and maintaining relationships with students, emphasizing the need to apply one-to-one marketing strategy to the design of college and university Web sites. Developing sites based on a database management system and one-

to-one Web marketing strategy can provide users access to personalized content tailored to their specific information needs and interests. It can help attract more visitors to the site and increase the efficiency of information access and delivery (ibm.com, 2000).

This research explored a Web content management and personalization model for higher educational institutions. Through a review of literature and data collected from users, it formulated a conceptual model for Web content management and personalization. The study used the Web site of School of Technology at Eastern Illinois University as a typical case to develop the model for higher educational institutions. Cognizant of user-centered design principles, it surveyed School of Technology students to assess their attitudes and expectations about applying one-to-one marketing strategy to the School's Web site and to identify the content of the site.

Understanding the factors influencing user attitudes about the adoption of new Web technologies is extremely important. Such an understanding can help Web developers effectively develop a theoretical framework for a Web model as well as identify its components (Jiang and Hsu, 2000). Based on the study findings, the researcher formulated one-to-one Web marketing strategy design guidelines and proposed a user-centered approach to guide the development of a conceptual Web content management and personalization model.

1.1 Statement of Purpose

Using the Web site of School of Technology at Eastern Illinois University, this research explored the opportunity for developing a conceptual Web content management and personalization model for a higher educational institution. Specifically, it sought to: 1) examine if and how a Web content management and personalization approach can be applied to the site, 2) identify site content, 3) develop user expectation design-guidelines for site content and personalization, and 4) develop a conceptual Web content management and personalization model based on user-centered design principles.

1.2 Statement of the Problems

This research sought to answer the following questions:

1. Is there a need for building a Web-content management and personalization model for higher educational institutions?
2. What are user attitudes and expectations about applying one-to-one marketing strategy to the Web site of School of Technology?
3. Can the content and services for a Web content management system be clearly identified?
4. What one-to-one marketing strategy applies to the development of the Web content management and personalization model?

1.3 Definition of Terms

Cookies – A virtual identifier stored in a text file on a user's computer.

Click-Through Rate - A measure of how many people who saw a banner advertisement or hyperlink actually clicked on it.

Database Management System – A computer software program that can manage and secure databases.

Destination Sites – Web advertisements that stimulate interests by using information and entertainment value to attract users and bring them back to the site.

Electronic Business or E-business – Commercial activities involving the exchange of money for goods or service conducted over the Internet.

Electronic Mail (E-Mail) - The transmission of computer-based messages over telecommunication technology.

Information – Processed data that is organized, meaningful, and useful.

Internet – A massive global network of interconnected packet-switched computer networks.

Internet Communication Model – A many-to-many communication medium between the customer, media, and the firm on the Internet.

Internet Marketing – Any form of commercial content on the Internet.

One-to-One Marketing Strategy - A marketing program based on the premise of treating each customer differently in order to develop a loyal relationship with him.

One-to-One Web Marketing Strategy – A Web marketing program based on one-to-one marketing strategy that develops a loyal relationship with customers and customizes Web content to meet their individual needs.

Opt-In E-Mail – An action taken to sign up to receive e-mail.

Personalization – A special form of product differentiation that transforms a standard product of service into a specialized solution for an individual.

Personalization Rules – Rules of setting user and content profiles, attributes, and values to make a Web site personalized.

Traditional Web Design – A Web design that uses HTML coded documents, text, and graphics without database support to display information.

User-Centered Web Development Process – A process of designing a Web site that incorporates the input of the user.

Web Content Management System – A Web-based Information management system supported by a database system to create dynamic content on a Web site.

World Wide Web (WWW) or Web – An interlinked collection of graphically rich information sources within the Internet.

1.4 Assumptions

The study assumed that those surveyed had various knowledge of computing and experience on the Internet and they were comfortable with the functions and components of one-to-one marketing strategy principles to a Web site. The research used the responses of those surveyed to formulate guidelines for the development a conceptual Web content management and personalization model. The study assumed that students surveyed were representative of

student populations at other universities of similar size and characteristics as Eastern Illinois University.

1.5 Limitation

This research collected student reactions about Web content management and personalization. Students had various computing and Internet experience.

The study used the School of Technology's Web site and Technology students to explore research questions regarding Web content management and personalization systems at higher educational instructions. There may be characteristics about the School of Technology's site and students that prevent one from generalizing the study results to other higher educational institutions.

1.6 Delimitation

Numerous resources about user-centered design and one-to-one marketing strategy are available on the Internet and in professional journals. The selected population is from undergraduate and graduate students in the School of Technology. Many business organizations have already developed their application sites on the Web. The structure of the sites can be selected as a literature review to identify survey questionnaires, to develop guidelines, and to build a conceptual model.

CHAPTER 2

Literature Review

2.1 Customer Relationship Management

Beardi (2001) explained that Customer Relationship Management (CRM) is a philosophy of maintaining a long-term relationship and loyalty with customers. Some marketers view CRM as a tool or software that helps businesses create a relationship with customers. CRM is a management concept that represents a new way of doing business and leads to one-to-one marketing. CRM was born as the ad world's focus shifted away from mass advertising toward one-to-one marketing. But now, marketers are realizing CRM is simply a new term for an old concept. Its founding principles targeted communications, relevant messaging, contact at various touch points, and loyalty as the roots of direct marketing, and they remain key marketing tenets (Beardi, 2001).

2.2 Personalized Web Site

In 1999, Cyber Dialogue found that from 1997 to 1999 Web users used personalized sites six times more often than non-personalized sites. Personalized Web sites saved users time in obtaining specific information, products, and services and they benefited businesses as well (BEA.com, 2001). "At a minimum, personalization is needed to make a site manageable by understanding visitors' needs based on their roles — for example, presenting the same information in different ways to e-generation customers, suppliers, and

employees" (BEA.com, 2001, p.3). The goals of personalization are to know customer preferences and needs and then to make suggestions for the development of a Web site based on this knowledge (BEA.com, 2001).

Ouimette (1998) indicates that "using one-to-one marketing to target helpful information and establish a 'friendship' with Web site visitors can result in strong relationships with loyal consumers and distributors" (p.3). A personalized Web site can be divided into four different stages to target end-users; entry, standard, advanced, and leading. The primary goal of entry level is to inform. The Web site only provides general information to users. The Standard level provides some form of interaction on the Web site, such as animated graphics and e-mail links. The advanced level supports buy/sell transactions that allow users to order products or retrieve specific information from the database system immediately. Finally, the leading level establishes long-term relationships between the organization and customers. CRM is a good example of this level. It customizes information about products or services for customers on a one-to-one basis. For example, based on user information, Web site banners may change or follow-up e-mail or direct mail notification about appropriate products or services can be sent to users (Ouimette, 1998).

Many Web sites allow users to select the content they want to see from a repertoire of options. In MyYahoo (2002), for instance, there are two levels of personalization: first, users can select the modules that are presented on the site (e.g., Weather, Headlines, Financial, etc.); second, they can select the information to be presented within each module (e.g., cities, types of news,

particular stock quotations, etc.). Figure 2 shows MyYahoo's content customization structure, and Figure 3 reflects that structure, as displayed in users' Web browsers.

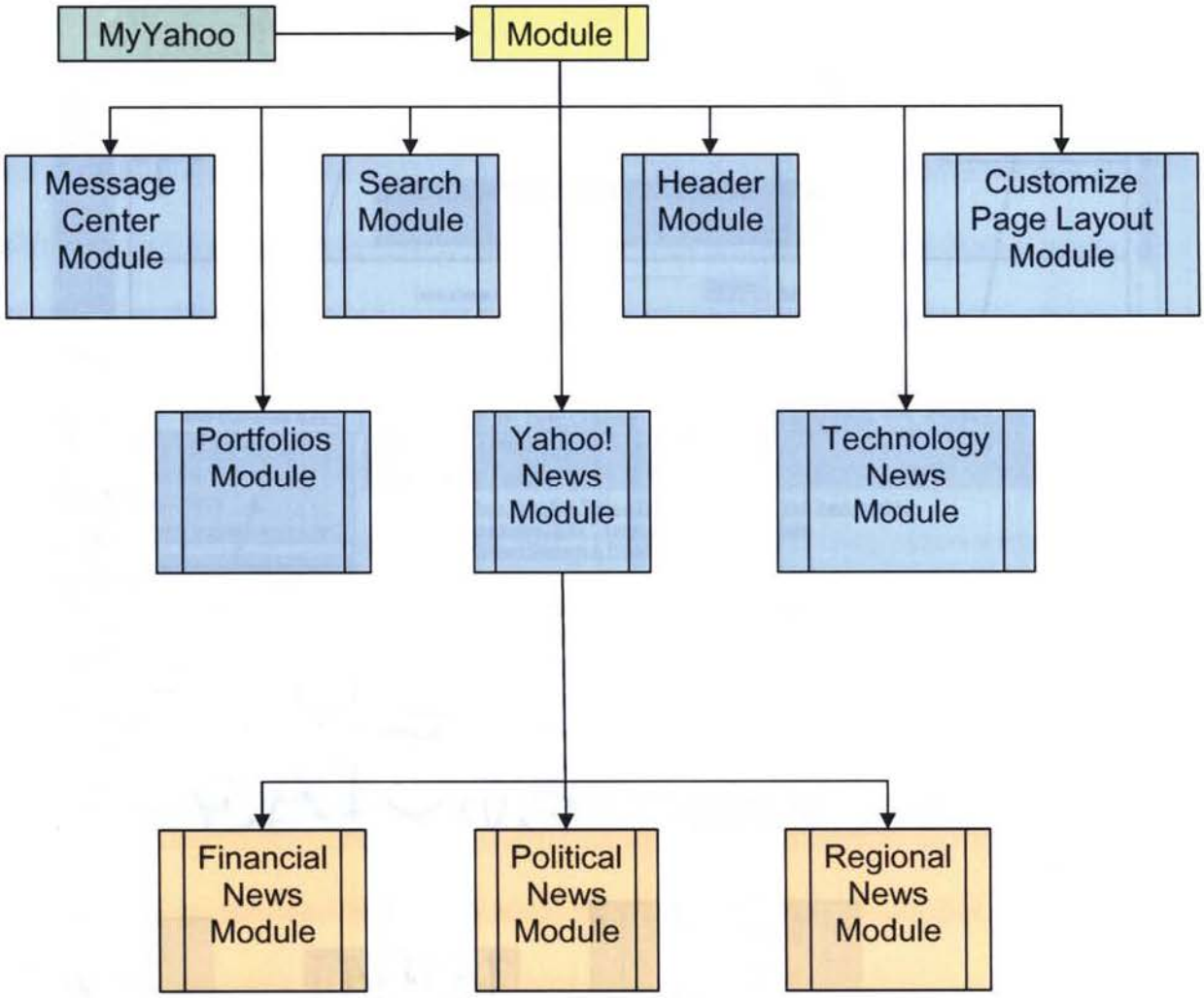

Figure 2. **MyYahoo structure of content customization.**

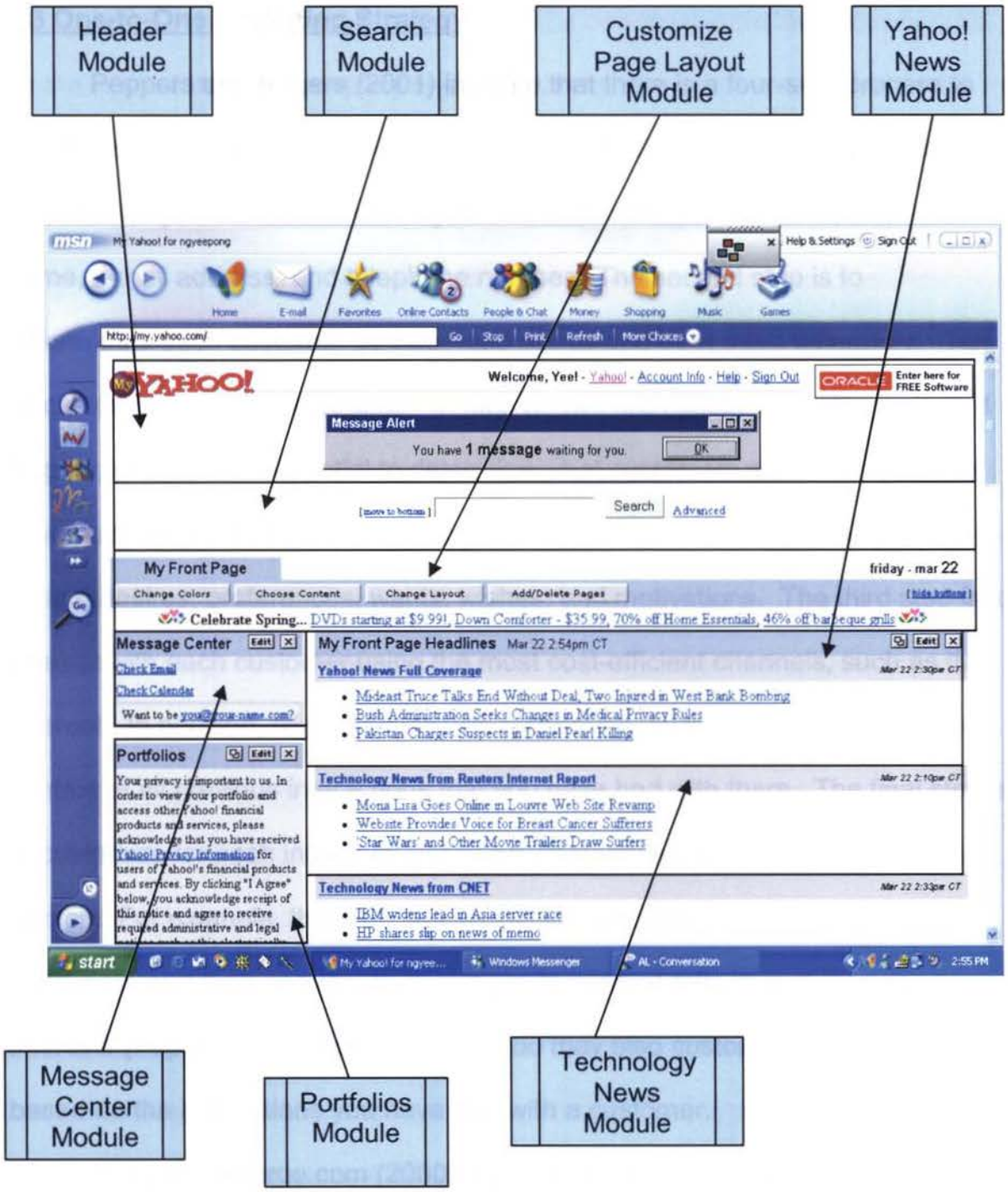

Figure 3. **First level of MyYahoo (www.my.yahoo.com).**

2.3 One-to-One Marketing Strategy

Peppers and Rogers (2001) indicate that there is a four-step process to implementing one-to-one marketing strategy. The first step is to identify each individual in your customer-base by his or her personal information, such as name, e-mail address, and telephone number. The second step is to differentiate each customer by value and needs and treat them differently. "Not all customers are created equal." In fact, no two are exactly alike (Peppers and Rogers, 2001). It is essential to determine what customers want from you and how much they are actually worth to you and then differentiate them by their needs, desires, preferences, wants, wishes, and motivations. The third step is to interact with each customer using the most cost-efficient channels, such as the Internet. In addition, all interaction with customers must take place within the context of all previous interactions that you have had with them. The final step is to customize for each individual based on what you know about that particular person. For example, the Web site should include basic information about customers and their needs with hyperlinks to content reflective of their needs and interests (Peppers and Rogers, 2001). You may also customize the information based on the interactions you have had with a customer.

Directechemerge.com (2000) states that the "...very idea of developing a 'one-to-one' relationship with a customer was little more than a marketing fantasy before the advent of database marketing. But now, companies are putting that concept into practice, using the Internet as a powerful relationship-building tool to move towards one-to-one customer marketing" (p.3). Directchemerge.com

presents five ideas that can be used to build a one-to-one customer relationship on the Web. First, the company treats customers like prospects and delights them with superior services, such as being open 24 hours a day worldwide. Second, it should ask customers what they want and give it to them. Third, it should explore new and innovative ways to encourage and reward customer loyalty by using Web-based customer service centers to offer service and support. Fourth, it must recognize the differences between the classes of customers and treat them differently to specify their needs. Therefore, it should try to keep an optimized one-to-one relationship with customers and make them comfortable while they are doing business with the company (Directechemerge.com, 2000).

2.4 One-to-One E-Mail

Whitford (2000) indicates that direct marketing is a new trend of notifying customers of new products or services. E-mail is a tool to achieve the one-to-one marketing concept and to build relationships one customer at a time. Furthermore, reaching customers by e-mail can save time and costs. However, many companies do not use e-mail properly for marketing purposes. They do not ask the customer for permission prior to sending e-mail or they send mass e-mail mailings regardless of customer interests. Many marketers have found that asking for permission to send e-mail can increase response rates, up to 15 times more than direct mail.

E-mail is interactive and personal communication tool that allows a company to reach current and prospective customers in a concrete way. According to the E-mail Marketing Report (2001), in both home and workplace, there are over 96 million e-mail users. Over one billion e-mail messages are sent daily in the U.S. Permission based or opt-in e-mail involves getting permission to send e-mail communications to others. It enables companies to deliver personalized, relevant, and anticipated content to individuals who signal interest in their particular product, service, or subject matter. Gunn (2000) indicates that e-mail is getting more popular for promoting information to people. About 10% of all e-mails sent in 1999 were to people on some sort of opt-in list, and by 2003, companies using some type of opt-in mailing will send more than 20% of all e-mail. Moreover, research comparing banner advertisements' click-through rates to opt-in e-mail indicates that in the U.S. opt-in e-mail has a higher customer click-through rate than banner advertisements (Direct Marketing Association, 2001).

"Marketers find direct e-mail campaigns lead to better response rates and true blue customers" (Mack, 2000, p.2). According to the Cambridge, Mass-based research firm Forrester Research, by 2004, over 200 billion e-mail messages will generate more than $1.6 billion opportunities for e-mail list owners and $3.2 billion for e-mail marketing services outsourcers. As consumers become interested in the contents of opt-in e-mail, companies can take their relationship with them to the next level and turn prospective customers into loyal and life-long customers (Mack, 2000).

2.5 Communication Media for One-to-One Strategy

Peppers and Rogers (1993) state that there are three important characteristics of one-to-one media: 1) one-to-one media are individually addressable and can deliver a specific message to a particular individual, 2) one-to-one media are two-way from marketers to customers and from customers to marketers, and 3) one-to-one media are inexpensive allowing marketers to make small investments with large returns. Peppers and Rogers also point out that the true one-to-one marketing concept is not trying to sell a single product to mass markets. Instead, businesses should consider selling a single customer as many products as possible over a long period of time and across different product lines. To achieve this goal, one should concentrate on building unique relationships with individual customers, on a one-to-one basis.

Sterne (1999) indicates that a useful Web site contains valuable information for the audience, and users can use it as a reference. Every Web site should present unique information to individuals that gain their interests and offers them the latest news and information for the market segments. Sterne (1999) also states that the Web should be a personal place that reflects the personal interests of users. He used Amazon.com as an example to demonstrate how it provides a personal service for Web customers. Amazon.com came up with the idea of using e-mail to notify customers of new books that they might find interesting. When customers specify a book category, an author, or a title, Amazon.com sends them e-mail about new publications that meets their criteria. This free up-to-date information delivery service saves the

customer from searching for the information. Many customers want to receive this service from Amazon.com. From the seller's perspective, it is fast and efficient way to target and deliver new products or services to customers.

2.6 One-to-One Web Marketing Strategy

Hanson (2000) indicates that "One of the challenges of personalization is determining the proper scale and scope of the activity" (p.195). Consumers do not have unlimited ability or time to process all the information on the Web. Marketers should focus on customers' personal goals, which are important predictors of success. Designers of information programs should scale consumer difficulties and effort of use against the benefits of the information. The scope of information should not require excessive amounts of time to use. There are three broad factors that should be considered: 1) offer new information to consumers, 2) reduce the effort of using existing information, and 3) remind consumers to use existing information (Hanson, 2000).

Peppers and Rogers (1999) propose a number of principles of one-to-one marketing strategy that developers can use as guidelines for developing a theoretical framework for a Web content management and personalization model (Kleindl, 2001). The following section presents those principles:

1. Define the audience and its need for content.
2. Web site personalization should build on a single page and clearly display the personalized content to a specific user.

3. Web site personalization should contain an auto-reply e-mail system that delivers e-mail content to individuals for marketing purposes and personal feedback.
4. Online registration forms for personalized Web site acquire user profile information in order to personalize the Web site. Users can also sign up for opt-in e-mail that delivers up-to-date news and information to support them.
5. Web site personalization should include a selection menu for Web content. When first-time users sign into the Web site, the site should ask them questions to specify their interests and needs, which may also be combined with online registration forms.
6. Transcend cookies are an anonymous method that can be used to store a unique ID as well as password, identifying the user each time he visits the site.
7. The Web should contain some form of security system to make individuals feel secure in providing personal information.
8. In the database server, the system should be able to store user profiles, such as user identifications to create specific information for each individual.
9. The Web site should frequently display up-to-date personalized information to users.
10. Web site personalization should include editing functions that allow users to modify and update the content depending on their interests and needs.

11. Web site personalization should have some form of virtual community services, such as a chat room and a discussion board that provide additional information for users about products or services.

Geith and Wagner (2000) illustrate some of the detailed elements that might be included in Web site personalization on a university or college campus.

1. Calendars and to-do list – schedule, hours of operation.
2. Discussion groups and chat
3. Announcements and alerts
4. Job openings, career opportunities
5. Reports and documents
6. Personal Human Resource information – benefits, medical information
7. Access to data warehouse
8. Search engine
9. E-mail and address book
10. Collaboration on Intranet and Internet
11. Work flow
12. Course schedules, grades, GPAs, transcripts, etc.
13. Residence hall menus
14. News – campus and world
15. Weather condition
16. Maps and images

2.7 Types of Personalization System and Customization

Hanson (2000) points out that there are four common types of personalization system. Rule-based systems use the information that a company collects from Web visitors to make educated guesses about special offers, promotions, and information. Computer-assisted self-explication (CASE) systems help users narrow their choices from many possibilities to a few highly ranked alternatives. Endorsement systems help the consumer judge quality and explain the value of available products instead of putting great effort on products or services differentiation. Collaborative filtering is a leading approach when product space is complicated and preferences are highly subjective, qualitative, and complex. It is the most complicated system that can help each individual to share recommendations and suggestions about hard-to-judge products and services (Hanson, 2000).

Hanson (2000) indicates that there are four types of customization available to end users to filter out the information they need. Adaptive customization provides the end user choice settings to customize the content displayed on the Web page at any time. Spinner.com is currently using this approach for its Internet music service of over 100 channels that are selectable from a pop-up menu. Cosmetic customization breaks up the information on the Web page into components that are separated by a header at the top, the main content of the page, and footer at the bottom. It also requires a cookie to be stored on a user's machine. Transparent customization automatically changes the Web content to reflect end-user behaviors and needs without collecting

personal information from them. Collaborative customization is used for business-to-business product development. "Collaborative customers conduct a dialogue with individual customers to help them articulate their needs, to identify the precise offering that fulfills those needs, and to make customized products for them" (Hanson, 2000, p.202).

IBM.com (2000) defines personalization as a process of gathering and storing information about site visitors, analyzing the information, and, based on the analysis, delivering the right information to each visitor at the right time. Personalization is a key technology needed in e-business applications, such as managing customer relationships, targeting advertisements and promoting products, managing marketing campaigns, managing Web site content, managing knowledge, and managing personalized portals and channels. Each application area needs tailoring, especially in the areas of user interface and data collection.

IBM.com (2000) points out that the basic elements of a personalization system should include: 1) identify site visitors, 2) retrieve visitor profile information, such as user identification, password. or interests, 3) select content that matches visitor preferences, and 4) retrieve content and assemble pages for display to the visitor. Figure 4 illustrates the basic elements of a personalization system (IBM.com, 2000).

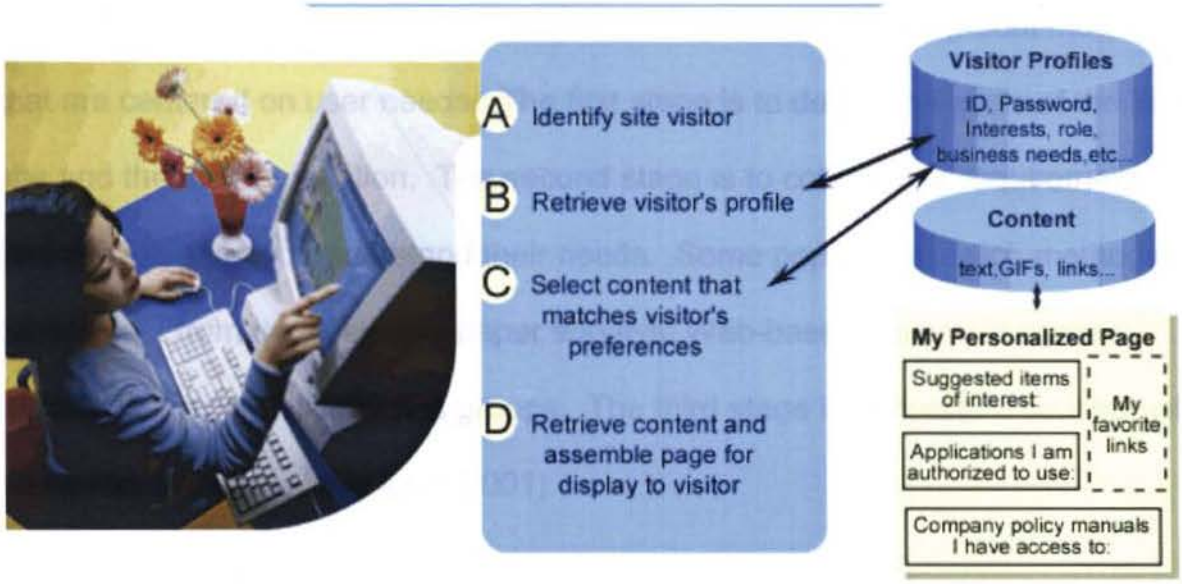

Figure 4. **Elements of a personalization system.**

2.8 User-Centered Design Principles

Kubie and Melkus (1996) indicate that most Web developers focus primarily on technical, interface, and design validation issues. However, systems that have not included the user in the design process will likely be unsuccessful. Such systems leave users frustrated and possibly unable to achieve their goals. A Web site is a type of information system and, as such, needs to be designed to meet user needs. It must offer content that is easily accessible and reflective of user wants and needs. Fichter (2000) indicates that user-centered design proponents advocate the proactive role of the user in the Web development process. It maximizes the likelihood that users will find an application solution useful and effective, while also reducing development cycle and failure risks.

There are three stages involved in a lifecycle Web development model that are centered on user needs. The first stage is to define the goals of the Web site and the user population. The second stage is to collect user requirements for the Web site and understand their needs. Some popular research methods to collect data from the users are paper surveys, Web-based electronic surveys, personal interviews, and focus groups. The third stage is to create a conceptual design for the Web site (Lazar, 2001).

2.9 Information Architecture of Web Content Management and Personalization Systems

The information architecture of Web content management and personalization system includes three basic principles: 1) customization where the interface is customized to users unique needs and interests, 2) one-to-one marketing strategy where users automatically receive different types of information based on their interests, and 3) collaborative filtering where the system provides users with recommendations about future purchases, and related content, among other things (Instore, 2000).

Instore (2000) suggests that there are three major components of a personalization system: user interface layer, profile layer, and vocabulary layer (see Figure 5). The user interface layer displays content to users through the process of personalization. Personalization links together users and content and it forms the personalized user interface. The profile layer contains user and content profiles that determine the content to present to a specific user at the

user interface layer. In the vocabulary layer, user preferences and categorized content are specified based on user and content profiles.

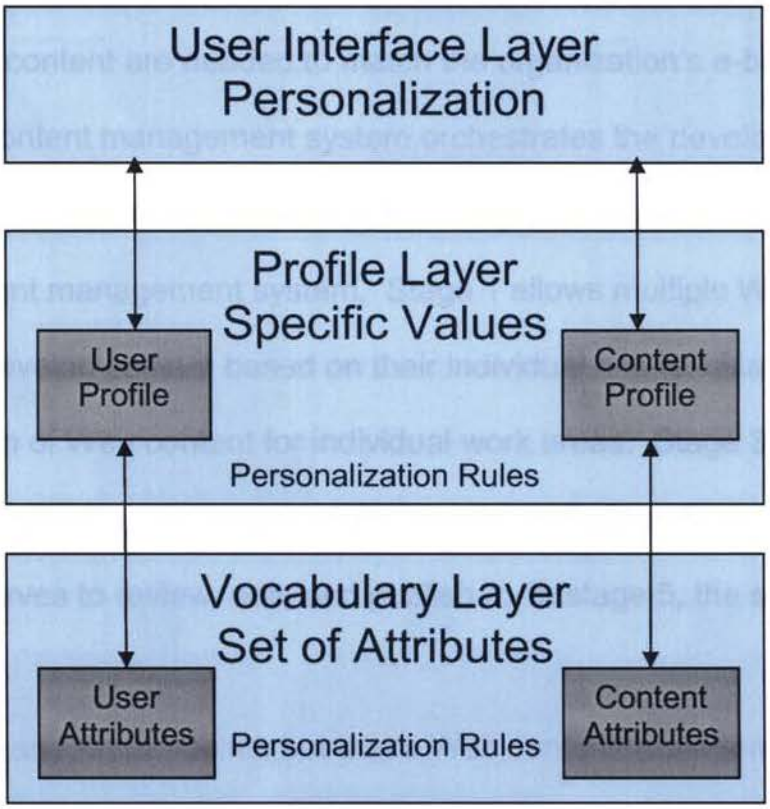

Figure 5. **Information architecture components for Web site personalization.**

2.10 Web Content Management

Nakano (2002) indicates that Web content is one of the most valuable properties on a Web site. Web content management is a discipline that manages the timely, accurate, collaborative, iterative, and reproducible development of a Web site. Organizations choose varying approaches to manage their Web content. As the size of the Web operation increases, different techniques for managing content are needed to match the organization's e-business model.

A content management system orchestrates the development, testing, review, and deployment of Web content. Figure 6 illustrates an example of a Web content management system. Stage 1 allows multiple Web developers to edit and develop content based on their individual needs. Stage 2 is the compilation of Web content for individual work areas. Stage 3 is the staging area that combines all work areas and Web content. Before deploying the Web site, stage 4 serves to review, edit, and publish it. In stage 5, the site is deployed to users.

Nakano (2002) points out that a Web content management infrastructure consists of four subsystems that include the following four functions:

1. Content editing (stage 1 and 2 of Figure 6): The Editing subsystem consists of content editing tools, such as HTML editors, word processors, image editors, and XML editors. The job of editing subsystem is to accept input; effect appropriate processing on the input, such as error checking, bounds checking; and whenever possible present direct feedback to prepare users about the results of their actions.

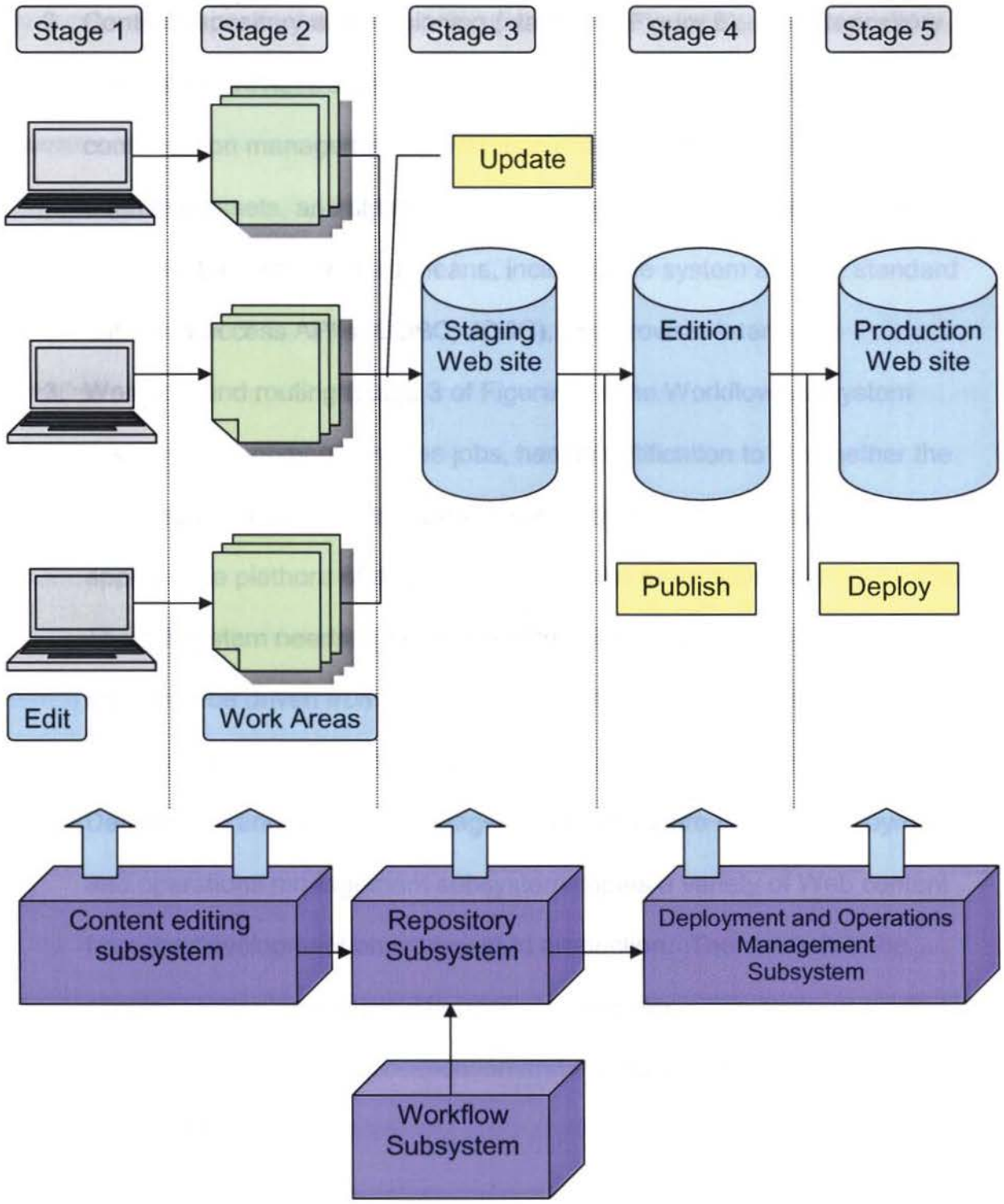

Figure 6. **Web content management system.**

2. Content repository and versioning (stage 3 of Figure 6): The Repository subsystem provides storage, access, retrieval, indexing, versioning, and configuration management of Web content. The content includes files, database assets, and structured assets (e.g., XML). Access to content is available through standard means, including file system access, standard database access API's (ODBC, JDBC), and browser interface.
3. Workflow and routing (stage 3 of Figure 6): The Workflow subsystem manages assignments, routes jobs, handle notification to tie together the activities of the many specialists required to create, edit, test, review, and approve the plethora of simple and composite asset types in the repository. The subsystem needs to be aware of the content repository to allow job actions to be driven from repository changes, and conversely to have job actions to cause repository changes.
4. Deployment and operations (stage 4 and 5 of Figure 6): The Deployment and operations management subsystem copies a variety of Web content from the development environment to production. There needs to be simple mechanisms to provide positive assurance when systems work properly, and immediate notification and escalation when it detects an error state.

2.11 Unified Modeling Language

The Unified Modeling Language (UML) has grown substantially over the years, with various diagrams supported such as use case, class, and package.

According to Rational.com (2002), UML is the international standard method or notation for object-oriented analysis and design. To effectively apply UML notation to develop a system model, system designers should draw guidelines for using methodological principles and procedures in a proposed system.

According to Gomaa (2000), Use Case diagrams describe a sequence of interactions between one or more users and the system as well as the external requirements of the system. It helps an analyst understand how a system should behave and gather requirements from the user's point of view.

Class diagrams depict the static view of a system, define the relationships between classes, and explain the operations of each class. There are three types of relationships between classes: 1) associations between two classes, which is referred to as a binary association and depicted as a line joining the two class boxes in the diagram; 2) aggregation and composition hierarchies describe whole/part relationships; and 3) generalization/specialization hierarchy describes superclass and subclass relationships.

Package diagrams are used to group model elements, for example, to represent a system or subsystem. For instance, one package representing the whole system may be decomposed into subsystems, where the subsystems are shown as nested packages within the system package.

CHAPTER 3

Methodology

3.1 Research Questions

This research developed a conceptual Web content management and personalization model for higher educational institutions. The model focused on user control and customization of Web content and the integration of functions (e.g., Opt-in E-mail) and components (e.g., Web content) in a Web environment. Based on one-to-one Web marketing strategy, the study developed user expectation guidelines for Web content management and determined the content, functions, components, and options needed for the model. The study used the Web site of School of Technology at Eastern Illinois University as the basis for examining the following four research questions:

1. Is there a need for building a Web-content management and personalization systems for higher educational institutions?
2. What are user attitudes and expectations about applying one-to-one Web marketing strategy to a Web site?
3. Can the content and services for a Web content management system be clearly identified?
4. What the one-to-one marketing strategy applies to the development of the Web content management and personalization model?

3.2 Research Approach

The general approach of the study was comprised of the following five steps:

Step 1: The researcher conducted a literature review related to the research questions and critical elements of Web content management and personalization model, including personalized Web sites, one-to-one strategy, types of personalization system and customization, user-centered design principles, and Web content management.

Step 2: Based on the literature review, the researcher identified survey questions to examine potential users' attitudes and expectations about applying one-to-one marketing strategy to the Web site. To collect data relevant to the objectives of this study, the researcher initially developed a structured instrument based on Cho's (2001) survey. The survey method is a useful technique for producing meaningful data and answering research questions (Babbie, 1998; Gay, 1996). While qualitative methods are good for providing additional support, the collection and quantification of data from a survey is more effective because it is cost effective and easy to analyze. Leedy (1997) also recommend the inclusion of one or more open-ended questions in the survey to get information that is even more useful.

Before the survey was administered, ten potential users pilot-tested it. In addition, to refine and finalize the survey items, the researcher consulted with three Technology professors, each of whom had experience in Web development and research in technology. After pilot-testing, the survey consisted of twenty-

five items and four sections to solicit information about student Internet usage, their satisfaction with current online services at the School of Technology, content and services that they are interested in using, and demographic information (see Appendix A). The majority of survey items required respondents to rate their opinion for an item on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree (see Figure 7).

Five-point Likert scale rating

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

Figure 7. **Example of Likert scale.**

Step 3: The researcher distributed approximately two hundred surveys to students enrolled in Eastern Illinois University's Technology programs. The researcher asked selected instructors in the School of Technology to distribute the surveys with an introductory letter and instructions to their students. Approximately two weeks were allotted for data collection. After surveys had been collected, the data were entered into a spreadsheet for analysis. Survey results helped identify student expectations regarding Web content and the application of personalization service to the Web site of School of Technology. They also provided guidelines for the development of a Web content management and personalization model.

Step 4: The researcher performed descriptive analysis to analyze the data. Responses to individual survey questions were tallied and the data compiled by percentage for the total group. The survey data helped answer the research questions, and formulated guidelines for Web content management and personalization.

Step 5: Based on the literature review and analysis of the study results, the researcher developed a conceptual Web content and personalization model. The model included one-to-one e-mail, a selection menu for the content, personal feedback forms, message boards, cookies, registration forms for Web site personalization, and customization menus for the content layout. The development of the model was based on the Unified Modeling Language (UML). According to Rational.com (2002), UML is the international standard method or notation for object-oriented analysis and design. The development of the model focused on user roles, analysis, and design aspects by using use case, class, and package diagrams.

CHAPTER 4

Results

4.1 Data Analysis and Findings

This section presents the survey results for four topic areas including demographics, general situation of School of Technology students' Internet usage and their satisfaction with online communication services, and services/features and Web site content students want on the Web site of the School of Technology. The topic areas are discussed in terms of the study's research questions.

The survey presented items that required various response types, such as categorical (e.g., "Yes" or "No", "Academic Major", etc.) and rating scale. A majority of survey items required respondents to rate statements on a 5-point Likert scale from "Strongly Agree" (5) to "Strongly Disagree" (1).

4.1.1 Demographics of the Sample

One hundred and twenty-one of 200 students completed the survey, of which thirty-four (28%) were female and eighty-seven (72%) were male. Seventy-two (59.4%) registered as on-campus students and forty-nine (40.6%) resided off-campus. As shown in Table 1, academic status for both on-campus and off-campus students ranged from senior to post-graduate levels. In total, full-time degree-seekers comprised the majority (99%) of survey respondents (see Table 1) with academic standings of undergraduate (52%), post-graduate

(33%), and non-Technology majors (17%) (see Table 2). Most respondents were between the ages of 21 and 23 and over 26 (see Table 3).

Table 1. Status of Students between On-Campus and Off-Campus

Status	On-Campus	Off-Campus
Freshmen	-	-
Sophomore	9.1%	-
Junior	13.2%	1.6%
Senior	32.2%	6.8%
Post-graduate	4.1%	32.2%
Others	0.8%	-
Total	59.4%	40.6%

Table 2. Student's Majors

Major	Percentage	Total Percentage
B. S. Industrial Technology	41%	
B. S. Career and Technology Education	8%	52%
B. S. Career and Organizational Studies	3%	
M. S. Technology Management	7%	
M. S. Career and Technical Education	3%	
M. S. Training and Development	14%	
M. S. Computer Technology	6%	
Graduate Certificate Program in Quality Systems	0%	31%
Graduate Certificate Program in Work Performance Improvement	1%	
Graduate Certificate Program in Computer Technology	0%	
Other (Non-Technology majors)	17%	17%
Total		100%

Table 3. Student's Age

Age Groups	N	Percentage
18-20 year old	14	12%
21-23 year old	48	40%
24-26 year old	17	14%
Over 26 year old	42	34%
Total	121	100%

4.1.2 General Situation of School of Technology Students' Internet Usage and Their Satisfaction with Online Communication Services

The survey items presented in this section attempt to answer the following two research questions, 1) *Is there a need for building a Web content management and personalization model for higher educational institutions?,* and 2) *What are user attitudes and expectations about applying one-to-one Web marketing strategy to a Web site?*. The first seven survey items identified the current state of School of Technology students' Internet use and their satisfaction with the School's online communication services. Figure 8 shows the amount of time on-campus and off-campus students spend on the Internet each day. All respondents use the Internet and most responded that they spend less than two hours on the Internet each day. Off-campus students spend more time on the Internet each day than on-campus students do.

Based on responses to the statement, *I visit the current Web site of the School of Technology,* 68.2% of respondents indicated that they had visited the School's Web site (see Table 4) and approximately 30% of them had never visited it. Interestingly, a much higher percentage (28.3%) of on-campus students responded that they never used the site compared to off-campus (3.5%) students. Half (50%) of the respondents indicated that they use the Web site less than three times per week.

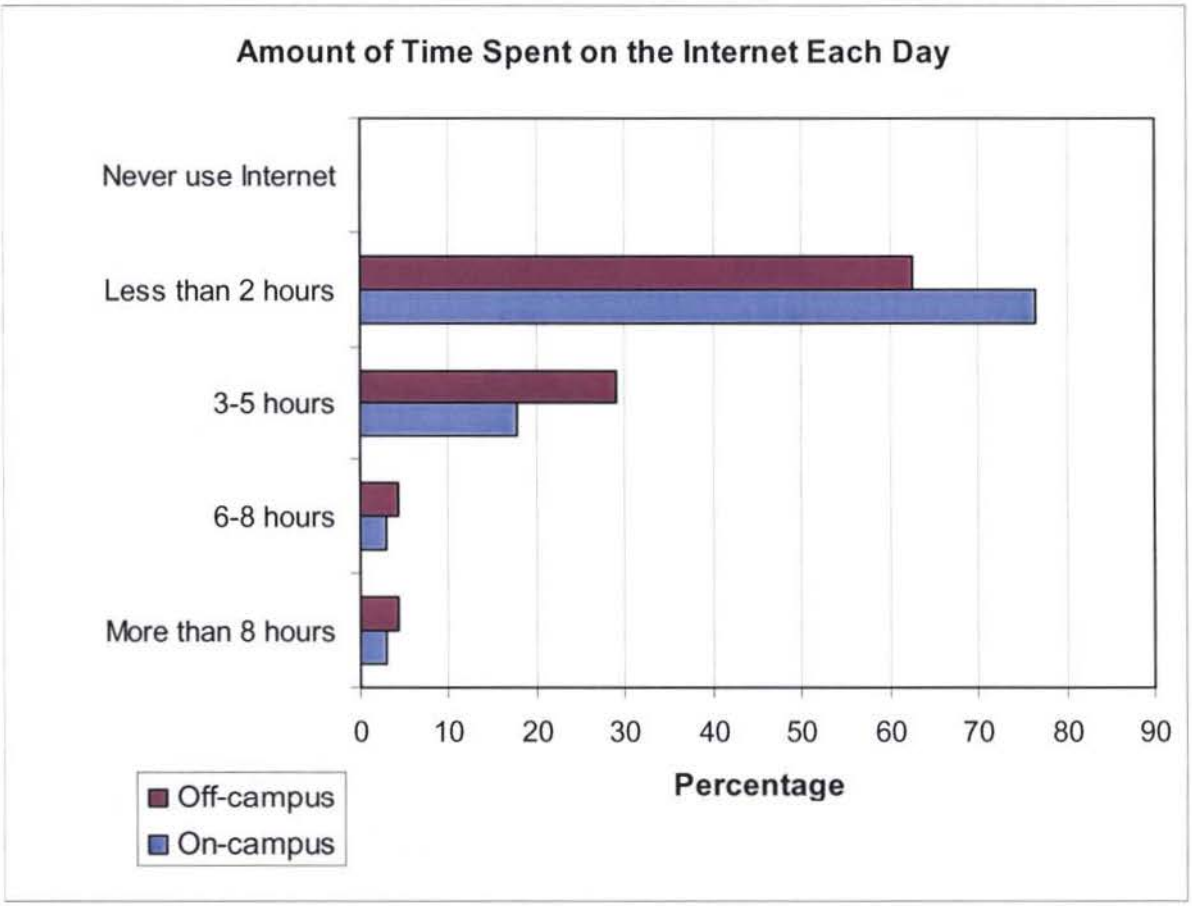

Figure 8. **Internet usage.**

Respondents' primary reasons for visiting the Web site include:

- reviewing information about courses and professors
- checking requirements pertaining to majors
- seeking general information about news and events, scholarships, class schedules, exam schedules, class projects and assignments, and job opportunities
- attempting to stay current with information
- viewing course outlines
- searching for class offerings

Table 4. School of Technology home page usage

Variable	On-campus	Off-campus	Total
4-6 times a week	-	0.8%	0.8%
1-3 times a week	5%	2.4%	7.4%
More than 6 times a week	4.1%	5.9%	10%
Less than 3 times a week	22.3%	27.7%	50%
Never use the Web site	28.3%	3.5%	31.8%

The statement, *I am satisfied with the Web site of the School of Technology* received a mean rating of M=3.2. (Note that the survey results for this item do not include 31.8% of respondents who indicated that they never use the Web site.) More than 35% of respondents either agreed or strongly agreed with it, 18.6% responded with a neutral rating, and approximately 15% respondents either disagreed or strongly disagreed with it (see Table 5). The reasons that 15% respondents cited for being dissatisfied with the site include problems finding information, insufficient content, infrequent updating, lack of personalization services, lack of interactive tools, poor and uninteresting Web design, and information not being useful. These findings suggest that a need for building a Web content management and personalization system exists.

Table 5. Satisfaction with the Current Web Site

Variable	Percentage
Strongly disagree	3.3%
Disagree	10.7%
Neutral	18.6%
Agree	30.6%
Strongly agree	5%
Total	68.2%

Note. This survey item does not include respondents who never use the Web site.

Two statements, *I have experience with Web sites that use personalization services, such as Amazon.com, MyExcite.com, and Yahoo.com*, (M=3.8) and *I find online personalization services useful?* (M=3.6) ascertained the experience respondents had with Web site personalization and their attitudes toward the usefulness of online personalization services. The mean ratings for these items suggest that respondents had experience with Web site personalization and they felt positive about the utility of online personalization services.

4.1.3 Web Site Services and Features

This section presents survey findings regarding the services and features that students want on the Web site. The survey items discussed in sections 4.1.3 and 4.1.4 attempt to answer the following two research questions: *Can the content and services for a Web content management system be clearly*

identified?, and 2) *What one-to-one marketing strategy applies to the development of the Web content management and personalization model?*

The majority of respondents (72.3%) responded positively to the statement, *Would you like to see a search engine in the Web site of the School of Technology?*. The statement, *Campus announcements appearing on the Web site of the School of Technology would not affect my use of the Web site*, received a mean rating of M=3.4. In response to it, a majority of respondents (46.2%) responded as "strongly agree" or "agree", approximately 23% of them responded as, "Strongly Disagree" or "Disagree", and 30.6% were neutral (see Table 6), which suggests that respondents would not be averse to campus announcements displaying on the Web site.

Table 6. Campus Announcements Would Not Affect My Use of the Web Site

Variable	Percentage
Strongly disagree	5.8%
Disagree	17.4%
Neutral	30.6%
Agree	21.5%
Strongly agree	24.7%

The survey presented a list of services categorized as Community Services, Campus lifestyle, and Academic that respondents identified as important to include on a Web site. The most popular items identified by a

majority of respondents include the following: course reviews written by students (82.6%), a job board (71.1%), a tutoring board (59.9%), an opinion/suggestion board (57.9%), and a used merchandise exchange board (54.5%) (see Figure 9).

Two statements asked respondents to identify features of personalization to include on the Web site. The statements, *I would like the Web site of the School of Technology to allow me to customize the information it displays based on my specific interests and needs* and *I would like to be able to control all content and/or links that I want displayed on the Web site of the School of Technology* received mean ratings of $\underline{M}$=3.8 and $\underline{M}$=3.5, respectively. For each of these statements, over 50% of respondents, responded as "Strongly Agree" or "Agree" (see Tables 7 and 8), suggesting that they want Web site customization and control over content based on their interests and needs.

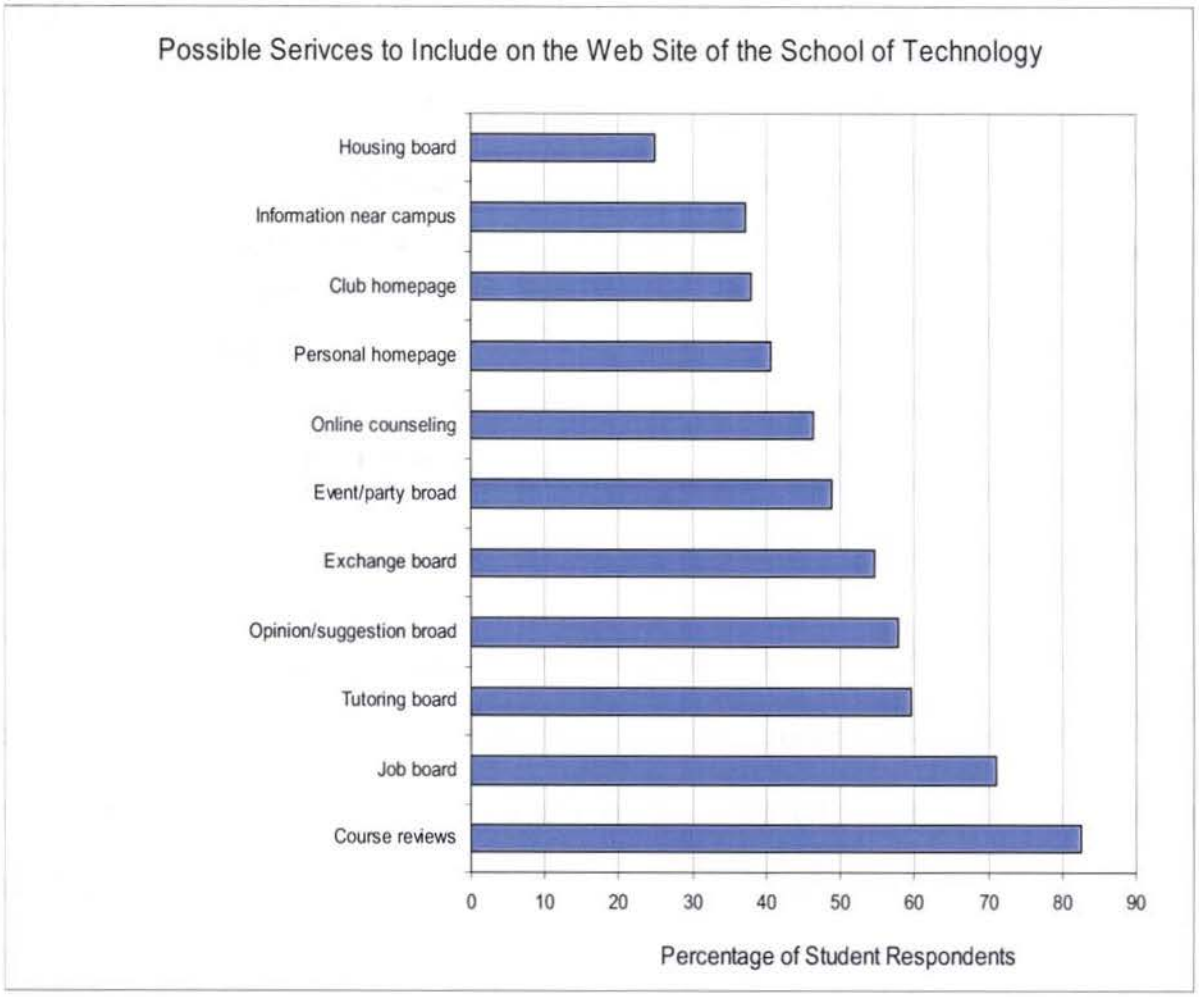

Figure 9. **Possible services to include on the Web Site of the School of Technology.**

Table 7. Customization of the Information Based on User's Specific Interests and Needs

Variable	Percentage
Strongly disagree	3.3%
Disagree	4.1%
Neutral	28.9%
Agree	35.5%
Strongly agree	28.2%

Table 8. Control All Content and/or Links the User Wants Displayed on the Web Site of the School of Technology

Variable	Percentage
Strongly disagree	5%
Disagree	9%
Neutral	32.2%
Agree	35.5%
Strongly agree	18.3%

The survey asked respondents if they would be willing to complete an online profile information form so the Web site can customize content and services to meet individual needs and interests. This item received a mean rating of M=3.5, and over 50% of respondents responded favorably to it with either "Strongly Agree" or "Agree" (see Table 9). Thirty-three percent of respondents were neutral about the statement, and 18.2% responded as "Disagree" or "Strongly Disagree". In addition, the survey presented two related statements, *I feel comfortable providing personal (name, e-mail, major, interest, etc.) information on the Web site of the School of Technology* (M=3.5) (see Table 10) and *I feel comfortable with my profile information being stored on my computer in the form of Cookies so that I do not need to enter a user-Id and/or password each time I visit the Web site of the School of Technology* (M=3.3) (see Table 11). To the former statement, 58.6% of respondents responded favorably with either "Strongly Agree" or "Agree", which indicates that they would feel comfortable providing personal information on the Web site. Twenty-three percent of

respondents were neutral about this issue and 18.3% responded unfavorably with either "Disagree" or "Strongly Disagree," indicating that they would be uncomfortable providing personal information on the site. To the latter statement, the majority of respondents (55.5%) indicated that they would feel comfortable with personal information being stored as Cookies on their computers by responding either as "Strongly Agree" (24.9%) or "Agree" (30.6%). Twenty-six percent of respondents were neutral about this issue and 18.9% responded unfavorably with either "Disagree" (14.1%) or "Strongly Disagree" (4.8%).

Table 9. Willing to Complete an On-Line Profile Information Form

Variable	Percentage
Strongly disagree	11.6%
Disagree	6.6%
Neutral	23.1%
Agree	35.5%
Strongly agree	23.2%

Table 10. Feel Comfortable Providing Personal Information on the Web Site of the School of Technology

Variable	Percentage
Strongly disagree	10%
Disagree	8.3%
Neutral	23.1%
Agree	38.8%
Strongly agree	19.8%

Table 11. Feel Comfortable about User's Profile Information Being Stored on User's Computer in the Form of Cookies

Variable	Percentage
Strongly disagree	4.8%
Disagree	14.1%
Neutral	25.6%
Agree	30.6%
Strongly agree	24.9%

The survey asked respondents about the cookie policy they typically used when browsing. Twenty-seven percent indicated that they did not know about Cookies and 26.5% responded that they did not know what their Cookie preferences were set to. Of respondents familiar with Cookies preferences, 14.9% always accept Cookies, 9.9% only accept Cookies from a site they browsed previously, 22.3% get warned before accepting Cookies, and 5% ignore/never accept Cookies. It is interesting to note that a majority of respondents feel comfortable about profile information being stored on their computers as Cookies despite that more than 50% of them were unfamiliar with Cookies or what their Cookie preferences were set to. It indicates that many respondents may not understand Cookies or Cookie preferences but will accept them for storing profile information.

To ascertain respondents' attitudes about up-to-date information or news related to their interests and needs being sent to their e-mail account

automatically (opt-in e-mail), the survey presented the following statement, *You may have purchased a book at Amazon.com and subsequently received e-mail informing you of new editions or books on related topics. I feel comfortable receiving up-to-date information or news related to my interests and needs to be delivered to my e-mail account automatically?* This statement received a mean rating of M=2.9. A high percentage (35.5%) of respondents did not feel comfortable receiving information by opt-in e-mail (see Table 12). The survey also presented the following statement regarding a personal feedback form, *The School of Technology's Web site should provide a personal feedback form with which I can get answers to my specific question(s) regarding graduate information, study programs, and other information related to Technology and the University,* which received a mean rating of M = 3.9 (see Table 13). Less than 6 percent of respondents answered as "Strongly Disagree" and "Disagree" to this statement.

Table 12. Receiving Up-to-Date Information or News to Be Delivered to User's E-Mail Account Automatically

Variable	Percentage
Strongly disagree	19.8%
Disagree	15.7%
Neutral	29.8%
Agree	28%
Strongly agree	6.7%

Table 13. Providing a Personal Feedback Form

Variable	Percentage
Strongly disagree	2.5%
Disagree	3.3%
Neutral	28.1%
Agree	38.8%
Strongly agree	27.3%

The survey presented two items that collected respondents' opinions about applying personalization services to the Web site of the School of Technology. The first item, *I think online personalization services should be applied to the Web site of the School of Technology* received a mean rating of M=3.6. The majority (54.5%) of respondents agreed or strongly agreed with the statement. Eleven percent of respondents disagreed or strongly disagreed with it and 34.7% responded as neutral (see Table 14). The second item, *If I could personalize the Web site of the School of Technology, I would be more inclined to use it* received a mean rating of M=3.5 (see Table 15). Compared to the first personalization statement, it had fewer respondents (48.8%) respond as "Agree" or "Strongly Agree" and slightly more (17.3%) responded with "Disagree" or "Strongly Disagree".

Table 14. Applying Online Personalization Service to the Web Site of the School of Technology

Variable	Percentage
Strongly disagree	5%
Disagree	5.8%
Neutral	34.7%
Agree	34.7%
Strongly agree	19.8%

Table 15. More Inclined to Use Online Personalization Service on the Web Site of the School of Technology

Variable	Percentage
Strongly disagree	4.1%
Disagree	13.2%
Neutral	33.9%
Agree	27.2%
Strongly agree	21.6%

4.1.4 Web Site Content

This section focuses on content that could be included on a Web site designed for students. The survey presented a list of possible content areas categorized by Campus information, Academic information, and Other. The Campus information category had 16 items (e.g., Athletics, Bookstore, etc.), the Academic information category contained 19 items (e.g., Admission, Class schedules, etc.), and the Other category had 4 items (e.g., Safety information,

University police, etc.). Respondents chose a frequency rating (Daily, Weekly, Monthly, Less than monthly, or Never) that indicated how often they would access each item. The researcher tallied the frequencies ratings for all items. To obtain a general sense of the content areas respondents want or would use on the Web site, the researcher examined, for each item, the percent of respondents who selected the "Never" frequency rating. Items having high percentages of "Never" ratings are less likely to be used and those with low percentages of "Never" ratings would be used. Table 16 presents the content areas with the percent of respondents choosing the "Never" rating.

Records and Registration received the lowest percentage of "Never" ratings (7.5%) followed by University News and Events (10.7%), Campus Directory (11.6%), Job Opportunities (13.2%), the University Bookstore (15.5%), Computer Laboratories (20.7%), Athletics (24%), Administrative Office (24.8%), and Financial Aid (24.8%), indicating that only a few respondents would never use these content areas. In other words, most respondents would use them.

In the academic category, Class Schedule (7.4%), Calendar (10.7%), Degree Programs and Options (13.2%), and Admissions (24.6%), received the lowest percent for the "Never" rating. Interestingly, a majority of respondents indicated that they would never use the Reading Center (52%), English Learning Center (52.9%), and Trio/Student Support Service (61.2%).

The Other category contained four items. Weather/Travel Conditions (15.7%) and Clubs/Student Information (29.7%) had the lowest percent of

"Never" ratings and Safety information (46%) and University Police (56%) had higher percentages of "Never" ratings.

Respondents indicated that they would use certain content areas more often than other areas. Frequently used content may be assigned to static content areas on the Web site. In other words, links to them will always be present to the user. Infrequently used content may be assigned to dynamic areas on the site, which means that the user can select content depending on interests and needs.

Table 16. Possible Content to Be Included on the Web Site of the School of Technology

Campus Information:	Never
Records and Registration	7.5%
EIU News and Events	10.7%
Campus Directory	11.6%
Job Opportunities	13.2%
Bookstore	15.5%
Computer Laboratories	20.7%
Athletics	24%
Administrative Office: President Office, Human Resources	24.8%
Financial Aid	28.8%
Transfer Information	39.3%
Health and Dining Services	41.4%
Hometown News (Charleston)	43.8%
Library Service	44.1%
Insurance	52.8%
Housing Service	53.6%
Minority Affairs	61.9%
Academic Information:	**Never**
Class Schedule	7.4%

Calendar (Academic)	10.7%
Degree Programs and Options	13.2%
Admissions	24.6%
Research	25.6%
Internship	28.9%
On Going Projects	28.9%
Faculty Background	29.6%
Catalog	29.8%
Policy	31.4%
Independent Study	34%
Writing Center	34%
Counseling Center	34.7%
Procedure	34.7%
Learning Assistance	38.5%
Learning Assistance Center	44.6%
Reading Center	52%
English Learning Center	52.9%
Trio/Student Support Service	61.2%
Others:	**Never**
Weather/Travel Conditions	15.7%
Clubs/Student Information	29.7%
Safety Information	46%
University Police	56%

4.2 Summary

The survey results identified answers to the research questions posed by the study. Based on the results, there is a need for building a Web content management and personalization model in the School of Technology and this opportunity may exist at other educational institutions. Most respondents expressed positive attitudes and expectations about applying one-to-one Web marketing strategy to the Web site of the School of Technology. The survey

results identified possible content areas, services, and features of one-to-one Web marketing strategy for the model. Chapter 5 provides a detailed discussion of findings and uses them to develop guidelines that serve as the foundation for building a conceptual Web content management and personalization model.

CHAPTER 5

Discussion and Conclusion

5.1 Research Questions and Answers

This section discusses the survey results and answers the research questions posed by the study.

Research question 1: "Is there a need for building a Web content management and personalization systems for higher educational institutions?"

Prior to answering this question, it is important to note that seniors and graduate students comprised a majority of the respondents with most being between the ages of 21 to 23 and over 26 years old. All of them had Internet experience, and more than 60% of them experienced Web site personalization, which they found useful (62% responded as "Strongly Agree" or "Agree"). This information suggests that survey respondents were capable of making mature and informed decisions.

The answer to the first research question is "yes." From the study results, it is reasonable to assume that there is a need for building a Web content and personalization model for higher educational institutions. There are two primary reasons to believe it, specifically for the School of Technology at Eastern Illinois University. It may be a need for other institutions as well. First, the survey results show that approximately 70% of respondents visited the Web site of the School of Technology and 14% of them expressed dissatisfaction with it. Some

survey respondents cited reasons such as difficulty finding information, insufficient content, and information not being useful as the sources of their dissatisfaction. Moreover, if the School of Technology applied online personalization services to its Web Site, more than 50% of respondents indicated that they would be inclined to use it. These findings suggest that many students use the School's Web site and a portion of them are dissatisfied with it. It is plausible that defining and implementing a Web development strategy based on personalization services will address many of the content and information access concerns expressed by students.

Secondly, the School of Technology does not provide a single-access point from which students can obtain Web content. The Web site of the School of Technology presents detailed information about Technology programs but it does not provide information from or links to other departments. If students visit the Web site, they must exit and go to the University Home page to obtain this information. The University's Web site has many unrelated sources and files located in different servers on campus. It also contains links to departmental Web sites, such as the School of Technology. A Web content management and personalization system would provide students one access point to all this content and allow them to personalize it dynamically.

Research question 2: "What are user attitudes and expectations about applying one-to-one Web marketing strategy to a Web site?"

Several survey items examined attitudes and expectations about applying one-to-one Web marketing strategy to a Web site. A majority (85%) of respondents had positive attitudes and expectations about one-to-one Web marketing strategy and less than 15% of them expressed negative attitudes about it. In addition, less than 10% of respondents indicated that they did not find online personalization services useful. The surveys also asked respondents to identify the features of Web site personalization they expect, such as a search engine, customization to arrange content based on user interests and needs, a built-in popup information window for campus announcements, an online profile information form, cookies, and a personal feedback form. The majority of respondents indicated that they would be comfortable with these features if the Web site included them. However, when asked about opt-in e-mail, the results showed that most respondents would be unwilling to accept information delivered automatically to their e-mail account. The statement about opt-in e-mail had the lowest mean ($\underline{M}$ = 2.9) of all survey items. Regarding opt-in e-mail, many Internet users get and are cautious about getting unsolicited e-mail. It is possible that respondents thought they would have no control over this personalization feature and vendors, marketers, etc. would e-mail them without their consent and so they rated it low. From this finding, it seems imperative to inform users how opt-in e-mail works or they will be disinclined to use it.

Research question 3: "Can the content and services for a Web content management system be clearly identified?"

Content

An efficient Web content management system manages and optimizes Web content and helps users as they define (for the system) their interests and needs. It can also deliver important content that is uniquely relevant to the user (Nakano, 2002). Because Web site personalization allows customization based on individual interests and needs, it is fundamentally important to solicit user input when identifying the content and services for a site. According to Kubie and Melhus's (1996), to reduce development cycle and failure risks, Web developers should design each component of a Web site based on user needs.

In this study, respondents provided useful information about the content and services for the Web site of the School of Technology. They identified a number of content areas of the University's site that need to be accessible from the School's site, some of which users would use more frequently than others. Eight potential high-use areas included: 1) records and registration, 2) class schedules, 3) degree programs and options, 4) the University bookstore, 5) University news and events, 6) weather/travel conditions, 7) job opportunities, and 8) campus directory. Based on this finding, the Web site of the School of Technology should make these content areas readily accessible to users by designating an area of the site as an access point to them. However, because individual interests and needs vary, the site should also allow for customization that permits users to access low-use content areas, if needed.

Services

The survey asked respondents to identify services for the Web site of the School of Technology. The services identified by respondents included: opinion/suggestion board, event/party board, used merchandise exchange board, job board, course reviews written by other School of Technology students, and a tutoring board. Survey findings indicate that respondents would use some services much more frequently than other services. For example, a high percentage of responses identified a job board (71.1%), course reviews written by other School of Technology students (82.6%), an opinion/suggestion board (57.9%), and a used merchandise exchange board (54.5%) as useful services. Given the results, developers should consider incorporating these service features on the site. It is important to note, however, that the services identified in the study are general in nature and they need to be more defined. For instance, while respondents identified a job board as useful, the functions and features of the board are unknown and require specification. In addition, the survey obtained useful information from users about site services and features but the results do not reflect the opinions of the School's administrators, faculty, or staff. Developers must consult with these individuals to obtain their views about services. School administrators, for example, may be disinclined to allow site customization that permits access to an event/party board even though almost half of the respondents expressed interest in it.

While some content areas and services are unique to Eastern Illinois University, many exist at other educational institutions. Thus, these findings can assist other educational institutions identify contents and services based on user interests and needs.

Research question 4: "What one-to-one marketing strategy applies to the development of the Web content management and personalization model?"

The majority of respondents indicated that they would feel comfortable with one-to-one marketing strategy being applied to the School of Technology Web site. Considering survey respondents' attitudes and expectations about one-to-one marketing strategy, the results provide recommendations for site features, services, and content, which Table 17 summarizes. The section presents several guidelines that define the personalization strategies for the Web content management and personalization model. The features, services, and content presented in Table 17 represent the groundwork with which the guidelines were developed.

Table 17. Features, Services and Content to Include on the Web site of the School of Technology

Features
Built-in popup window for campus announcements
Cookies
Customization menu
Online profile information form
Personal feedback form
Search engine
Services
Course reviews written by other students
Event /party board
Job board
Opinion / suggestion board
Tutoring board
Used merchandise exchange board
Static Content
University Bookstore
Class Schedule
Degree Programs and Options
University News and Events
Job Opportunities
Records and Registration
Weather/Travel Conditions

5.2 Guidelines for Designing Model

The following guidelines represent eleven statements that pertain to the development of a conceptual Web content management and personalization model. Each guideline contains a general statement and three priority levels (1-highest and 3-lowest) for each topic. In priority 1, Web developers must satisfy or address the statements in the level. In priority 2, Web developers should consider all the requirements of the statement. In priority 3, Web developers may consider all the requirements of the statement. The study formatted the guidelines based on the World Wide Web consortium standard guideline formats (www.w3.org, 1999).

Guideline 1. Provide a search engine on the Web site

The survey results indicate that a search engine should be included on the Web site. A search engine is the most commonly used method of finding a Web site or content related to a specific topic. It enables users to explore the contents of the entire database system residing on the server. Since a search engine assists users who have problems finding specific information, it should be located on a first page of the Web site, and easily accessible throughout it.

[*Priority 1*] A search engine must be included on the Web site to assist users who have problems finding information.

[*Priority 2*] A search engine should allow users to search information on the University's Web site.

[*Priority 3*] A search engine may allow users to search information on off-campus Web sites.

Guideline 2. Provide a customization menu for users to select content based on interests and needs

The School of Technology should apply a method of adaptive customization to its Web site personalization, which provides users choice settings to customize content displayed on the Web page (Hanson, 2000). Based on interest and need, users use a customization menu to select content delineated by section such as campus information, academic information, and other information. When users make selections from a menu, the system creates a content profile based on their specific choices. The system allows users to modify previous selections and content profiles.

[*Priority 1*] Through a customization menu interface, users must be able to select content options on the Web page based on their interests and needs. After users submit their content selection information, the database system creates and stores content profiles, which users can modify. On subsequent visits to the site, the system displays content based on the user's profile information.

[*Priority 2*] The general content customization menu should be separated into at least three sections that include campus information, academic information, and other.

[*Priority 3*] Within a section, an additional customization menu may be displayed so that users can select information that is more detailed.

Guideline 3: Provide a built-in popup window for campus announcements.

Hanson (2000) discussed a rule-based system that uses information collected from Web visitors to make educated guesses about special offers. The concept of rule-based systems may apply to this project. User profiles can be collected so that built-in popup information windows display on the Web site providing up-to-date information (e.g., campus and/or departmental announcements) to specific users. Web content contributors or developers can regulate content display based on user profile information. For example, using profile information, the site may attract the user's attention by displaying announcements or events that correspond to his or her interests.

[*Priority 1*] A built-in popup information window must be available to display up-to-date information (e.g., campus announcement, new course advertisements, etc.) on the Web site using user profile information.

[*Priority 2*] A built-in popup information window should contain a hyperlink that takes users to another Web page related to the specific information displayed in the popup window.

[*Priority 3*] In addition to using a built-in popup information window, Web developers can assign a location to display campus announcements or recommendations on the Web site based on the user's status or major.

Guideline 4. Provide an online profile information form.

Based on the survey results, the Web site should provide an online profile information form to users, so they can enter personal information (e.g., name,

address, phone number, status, major(s), e-mail address, login name, and password, etc.) as well as identify their interests and needs.

[*Priority 1*] Once users enter their personal information and choose a username and password, the system creates a user profile and stores it in the database server. After creating a profile, users can modify or update it.

[*Priority 2*] The system should integrate the content customization menu and the profile information form to generate content and user profiles simultaneously, which will increase the speed and efficiency of site personalization.

[*Priority 3*] The School of Technology may use existing student records and profiles to create initial user-IDs and passwords for each student in a user profile.

Guideline 5. Store cookies on a user's computer.

Transcend cookies is one method of storing a unique user-ID and password on a user's computer (Peppers and Rogers, 1999). Based on the survey results, it appears that respondents are not opposed to cookies being used as a means of storing profile information. After users enter personal information on the profile information form and select content choices from the customization menu, the system generates a cookie file on their computer that contains a user-ID and password. When users visit the site on subsequent occasions, the system reads the cookie file and automatically logs them on. However, two problems arise with the use of cookies that must be addressed. First, in public computer laboratories, students often use a different computer each day. Each time the student uses a different computer he/she will need to

log-on. Conversely, when using the same computer to log-on, the student only needs to enter a user-ID and password on the first visit to the site. Second, privacy issues may arise when users accept cookies on a computer in public setting. In a computer laboratory, for example, it is possible that once the cookie file is stored for a student, subsequent users of the computer could use his/her log-on to access the site.

[*Priority 1*] The system must use transcend cookies for site personalization to verify the identity of users and, once verified, provide automatic log-on.

[*Priority 2*] The Web site should explain how to use cookies and set cookie preferences.

[*Priority 3*] The users may be given an option to accept or ignore cookies on the Web site.

Guideline 6. Provide a personal feedback form.

Based on the survey results, Web site personalization should include a personal feedback form that allows users to type messages and send them to the e-mail account of the Web site contact person. A personal feedback form enables users to communicate with a contact person without having an e-mail account.

[*Priority 1*] A personal feedback form must allow users to input their messages directly from the Web site and deliver them to a site contact person's e-mail account or some other message repository.

[*Priority 2*] A personal feedback form should include an address book for the user to store e-mail account information.

[*Priority 3*] A personal feedback from may integrate with users' e-mail allowing them to log-on to an external e-mail account from the Web site.

Guideline 7. Provide an online community services.

Web site personalization should include message boards for online communications. From the survey results, popular topics for student message boards are course reviews written by other students, an event/party board, a job board, an opinion/suggestion board, a tutoring board, and a used merchandise exchange board. If these boards are appropriate to the site's mission and purpose, then separate message boards should be provide for each topic.

[*Priority 1*] A message board must be included on the Web site personalization that allows users to post and read messages. In addition, it should separate or categorize messages by topic such as a course reviews written by other students, an event/party board, a job board, an opinion/suggestion board, a tutoring board, and a used merchandise exchange board.

[*Priority 2*] A message board should contain users' names so that they can identify one another.

[*Priority 3*] A message board may allow users to create a new room for their own topics.

Guideline 8. Provide static content.

The survey results identified seven items for static content (see Table 17). Fewer than 15% of respondents indicated that they would not use each item and so they constitute the most popular content areas. Given this finding, the site should provide access to: 1) the University bookstore, 2) class schedules, 3) degree programs and options, 4) University news and events, 5) job opportunities, 6) records and registration, and 7) weather/travel conditions. The most popular or frequently used content topics can be assigned to static areas (non-customization) on the site with their links always being present to users. The Web site must also provide access to information currently on the School of Technology's site.

[*Priority 1*] Static content must be on the front page of the Web site for all users.

[*Priority 2*] The front page should designate a location to display static content. Users must be able to find the content easily.

[*Priority 3*] The Web site may provide access points to off-campus sites such as news and reference sources pertaining to study programs.

Guideline 9. Provide Web content for customization based on user's interests and needs.

The survey results identified 32 items for Web content customization (see Table 18). More than 15% of respondents indicated that they would not use each item and so they constitute the least popular content areas.

Table 18. Web Content for Customization

Web Content	
Administration office: president office and human resources	Faculty background
Athletics	Independent study
Campus directory	Internship
Computer Laboratories	Learning assistance
Financial aid	Learning assistance center
Health and dinning services	On going projects
Hometown news (Charleston)	Policy
Housing services	Procedure
Insurance	Reading center
Library services	Research
Minority affairs	Trio/student support service
Transfer information	Catalog
Admissions	Writing center
Calendar	Club/student information
Counseling center	Safety information
English learning center	University police

The least popular or infrequently used content topics can be user-assigned through a customization menu that allows users to decide the content links present on screen. A customization menu should separate content into at least three sections: campus information, academic information, and other information.

[*Priority 1*] A Web developer must put options in the customization menu that allows users to select the content based on their interests and needs.

[*Priority 2*] Selection of the content should be organized into at least three general catalogs including campus information, academic information, and other information.

[*Priority 3*] The Web site may not include any static content. It may allow users to customize all content based on their interests and needs.

Guideline 10. Provide a choice of an opt-in e-mail

Respondents rated opt-in e-mail low compared to other survey items, which indicates that they perceive it negatively. The site may include opt-in e-mail, but users need to control it (i.e., turn it on and off).

[*Priority 1*] Users must provide their e-mail address to receive information delivered by the opt-in e-mail system. They must be able to turn opt-in e-mail on and off.

[*Priority 2*] Users should be able to control the type of content delivered by opt-in e-mail.

[*Priority 3*] The personal information form may provide a selection indicating whether users want to receive opt-in e-mail.

Guideline 11. Display all the content on a single page.

Peppers and Rogers (1999) stated that Web site personalization should build on a single page and clearly display the personalized content to a specific user.

[*Priority 1*] The Web developer must build at least one template (a web page without any content) for the Web site personalization. A template is comprised of predefined layout formats for the Web page. When users log-on to the Web site, the personalized content will be retrieved from the system to the template.

[*Priority 2*] All personalized content should display on a single page.

[*Priority 3*] The Web site may display static and dynamic content.

5.3 Web Content Management and Personalization Model

The survey results and literature review form the basis for the development of the aforementioned guidelines for online personalization services. The guidelines constitute the initial foundation of the conceptual Web content management and personalization model. This section discusses the structure of the model based on the guidelines. The researcher used the Web site of the School of Technology as the structural basic for the model. The model focuses on: 1) an overall structure of the proposed Web site, 2) the registration of the Web site, 3) content layout, 4) structure customization, 5) a Web content management model, 6) a personalization model, 7) a personal feedback form, and 8) a message board. While the Web site of the School of Technology was used as a typical case example, the structure proposed by this model may be

applicable to other educational institutions. The model is presented in the Unified Modeling Language (UML) format.

5.3.1 Overall Structure of the Proposed Web Site

Figure 10 presents a package diagram of the overall structure of the personalized Web site. As shown, the home page has a link to the personalized page (My personalized page). The Web page includes a log-on screen, a search engine, a personal feedback form, a message board, cookie management, static content, dynamic (personalized) content, a built-in pop-up window, a link to change content, and a link to create user profiles. Under the log-on screen, the system contains an online personal information form for user personal information. After users fill out their personal information, they link to a customization menu and select content and/or links based on their preferences. The customization menu includes at least three kinds of information, campus information, academic information, and other information and it allows users to sign up for opt-in e-mail and set cookie preferences. After users submit their personalized information, the system creates user and content profiles.

A search engine and a page to display search results will be available to assist users find information. A personal feedback form enables them to input and receive messages. It contains a personal address book to store e-mail addresses. A message board contains at least six topics including a job board, course reviews written by other students, an opinion/suggestion board, a tutoring board, an event/party board, and a used merchandise exchange board.

The Web page contains two kinds of content: static and dynamic content. Static content displays on the Web page at all times for users. Dynamic (personalized) content displays on the page depending on user preferences. Users can change the content of the site with a customization menu. Figure 11 shows online personalization services provided to users on the site. They can view campus announcements in a built-in pop up window, search contents, or personalize contents based on interests and needs.

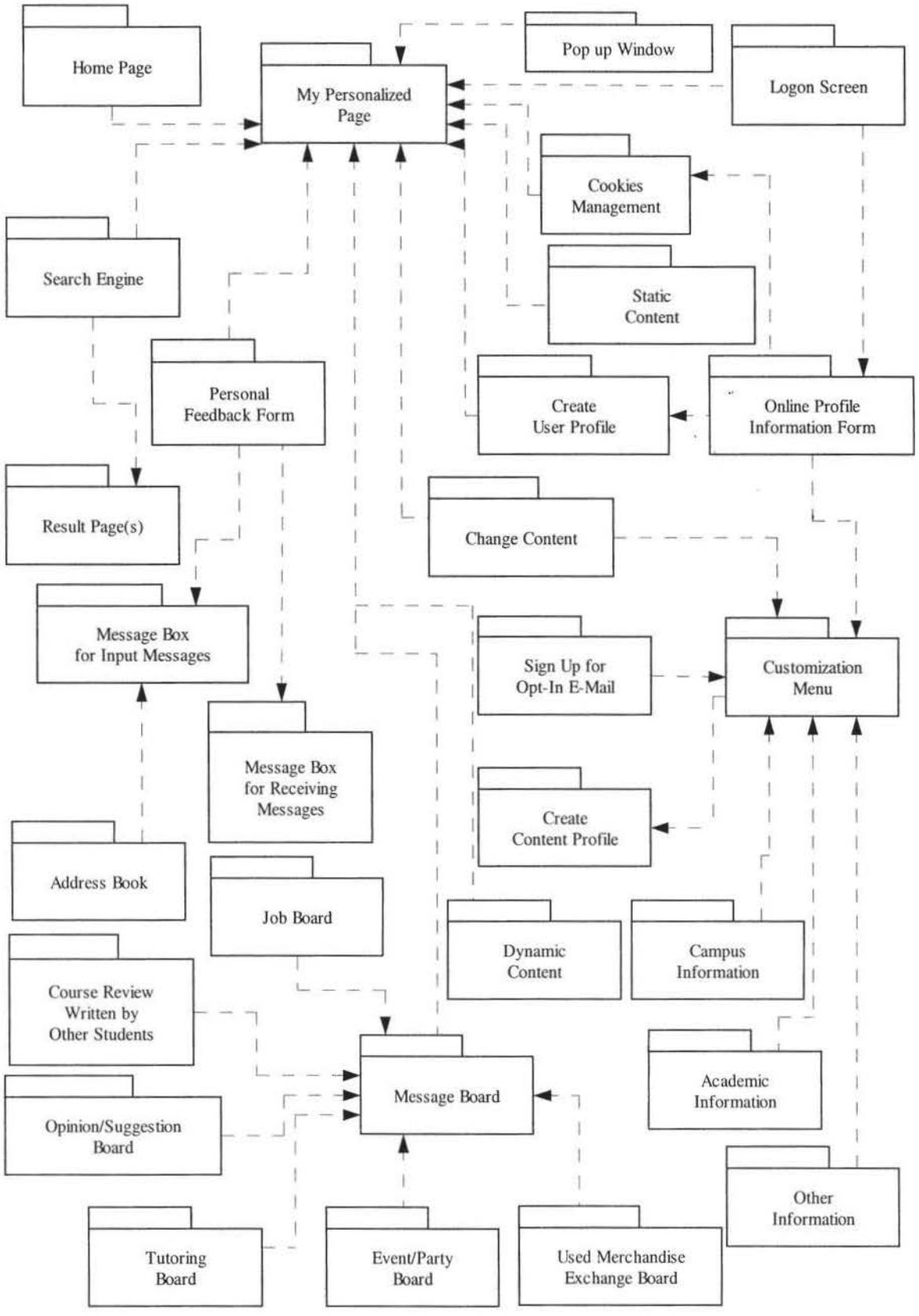

Figure 10. **An overall structure of the personalized Web site.**

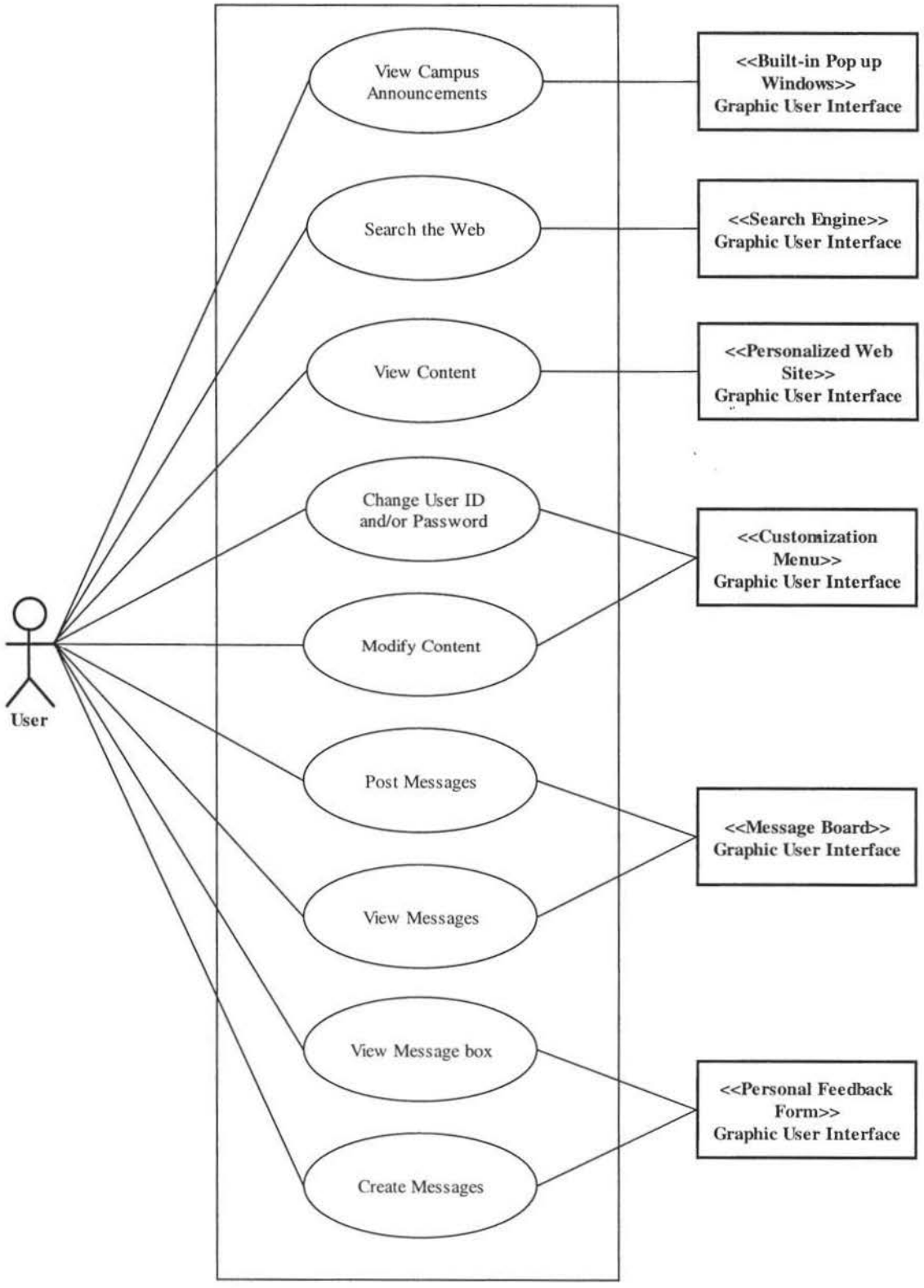

Figure 11. **Online personalization services on the Web site.**

5.3.2 Registration of the Web Site Personalization

To have access on the Web site, all users must have their own account. Figure 12 shows a use case diagram for the registration process of the Web site. As shown in Figure 12, the log-on screen includes three basic functions: 1) users input their password, 2) identification of cookies on the user's computer, and 3) creation of new user account.

If users have an account on the system and cookies on their computer, they log-on automatically. However, if the system cannot find the appropriate cookies on users' computer, it will require them to input their user-ID and password before entering the site. Once they submit a user-ID and password, the system checks user profiles in the database system. If the system validates users, it takes them to the site. Otherwise, it takes them to a page on which they can create a new account. Users must complete a personal information form, select the personalized content to display on the Web page, and/or sign up for opt-in e-mail.

When users submit personal information and content options, the system separates them into two profiles: a user profile for the personal information and a content profile for the content options. The system stores profiles in the database. In addition, to store information about users, such as user-ID and password, a cookie file gets stored on the user's computer. As a result, when users revisit the Web site, the system can identify the cookie file and automatically log them on to the system.

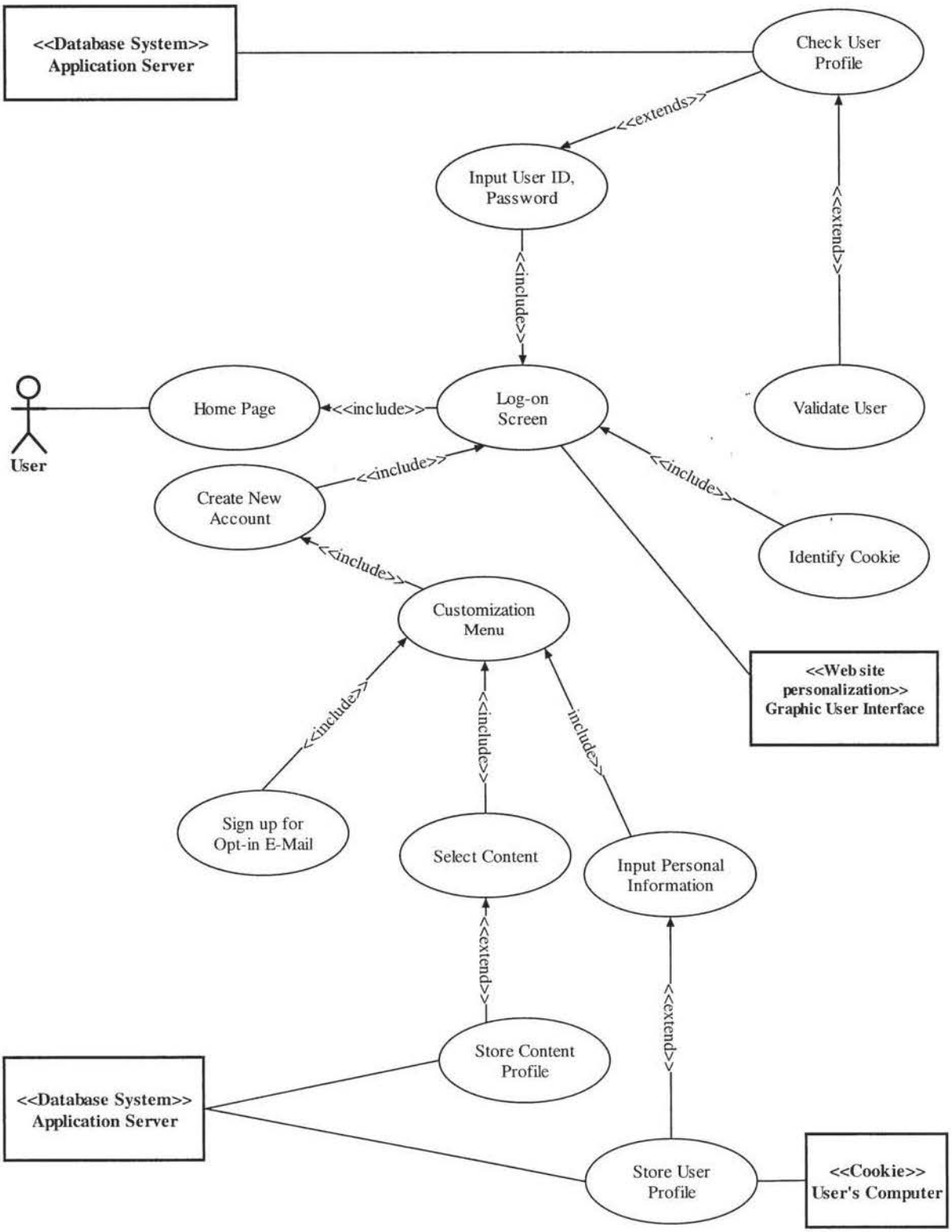

Figure 12. **Registration for the Web site personalization.**

5.3.3 Content Layout

Web site personalization should display all access points to content on a single page using a Web site template. Figure 13 presents a template for Web site personalization and static and dynamic (personalized) content layout. At the top of the layout is an instance of a *presentational* class, which is a location comprised of modeling elements such as texts and images. Site developers, for example, could assign the school's logo to this space.

Based on the survey results, the Web page should provide access to frequently used content areas or external sites, such as the University bookstore, class schedules, degree programs and options, University news and events, job opportunities, records and registration, and weather/travel conditions. The *button* classes below the *presentation* class can serve this purpose. A *button* class is a clickable area that has an action associated with it such as a link to another page. When users click a button, the browser displays the appropriate site.

Below *button* class, the left side of the layout contains a *text* class, which is a sequence of characters. The text class may provide information about users (i.e., name, major) and indicate that they are viewing their personalized content. Also on the left side of the layout is a *form* class. A *form* class requests information from the user who supplies it by typing into input fields. From the survey findings, the Web site should contain message boards and a personal feedback form that are accessible through links. When users click a link for a message board or personal feedback, they receive a page that allows them to

either input or view messages on a message board or to ask questions or send messages to a site administrator using the personal feedback form.

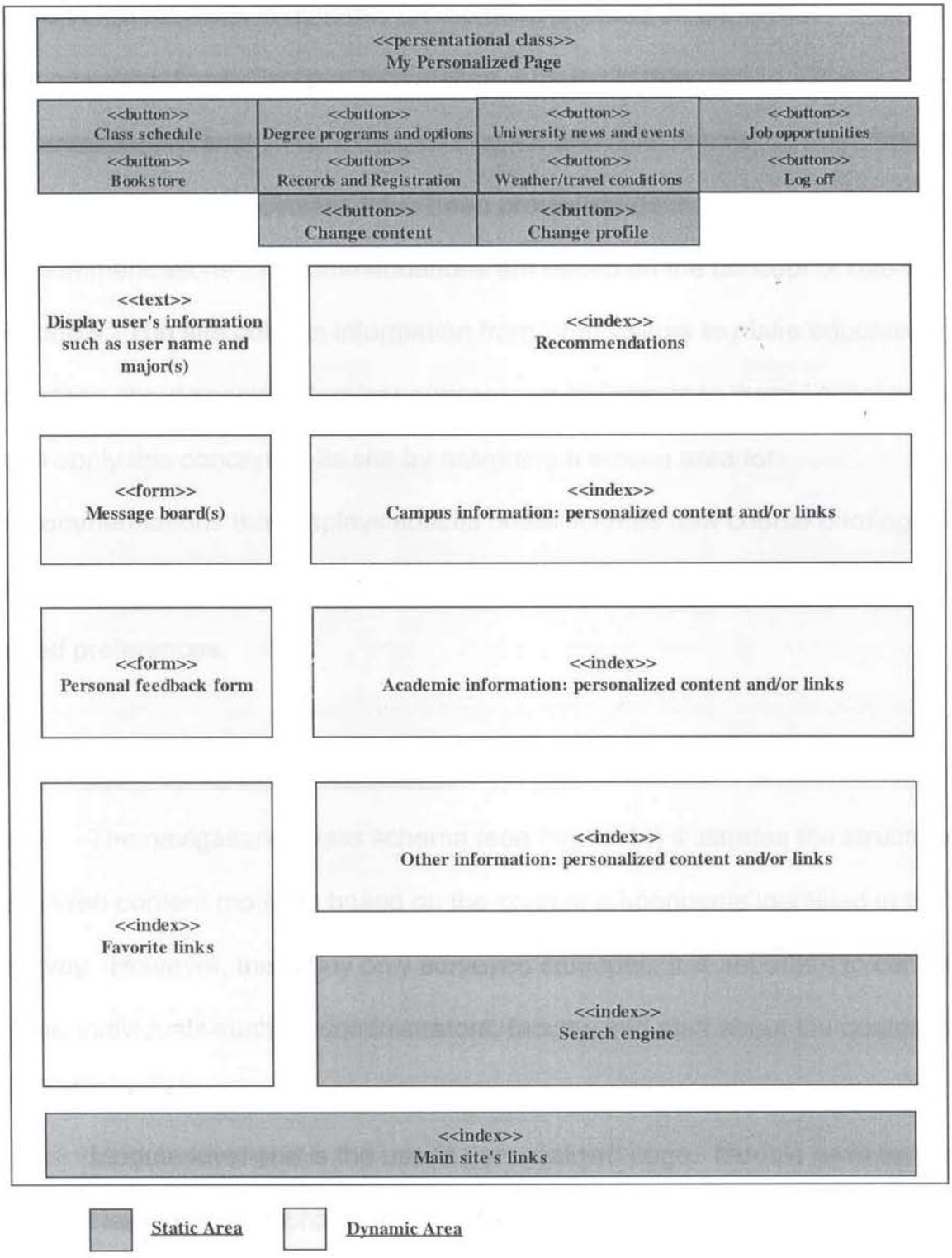

Figure 13. **Web site and content layout.**

The remaining areas on the template are *index* classes that display indexed items (i.e., text, links, or images) and/or sections. The model includes seven *index* classes in dynamic (personalized) areas on the layout: Recommendations, Campus Information, Academic Information, Other information, Favorite links, a Search Engine, and links to existing departmental content. All of these classes have been previously defined except Recommendations. Recommendations are based on the concept of rule-based systems. The site collects information from Web visitors to make educated guesses about special offers/announcements to present to them. A department can apply this concept to its site by assigning a screen area for recommendations that displays special offers such as new course offerings or departmental news based on the user's status (e.g., major) and interests and need preferences.

5.3.4 Structure Customization

The navigational *class* schema (see Figure 14) illustrates the structure of the Web content modules based on the content respondents identified in the survey. However, this study only surveyed students. It is important to consult other individuals such as administrators, faculty, and staff about the content to include on a site.

Module level one is the user's personalized page. Module level two is divided into three sections: Campus Information, Academic Information, and Other Information, with each module level sub-class having a different links. For

example, Campus Information provides access to the University bookstore, administrative offices, athletics, etc. and Other Information offers access to Club/Student Information, Safety Information, and University Police. Module level three allows more specification and personalization. Because many university departments develop their own content, the site can link to it instead of redeveloping it.

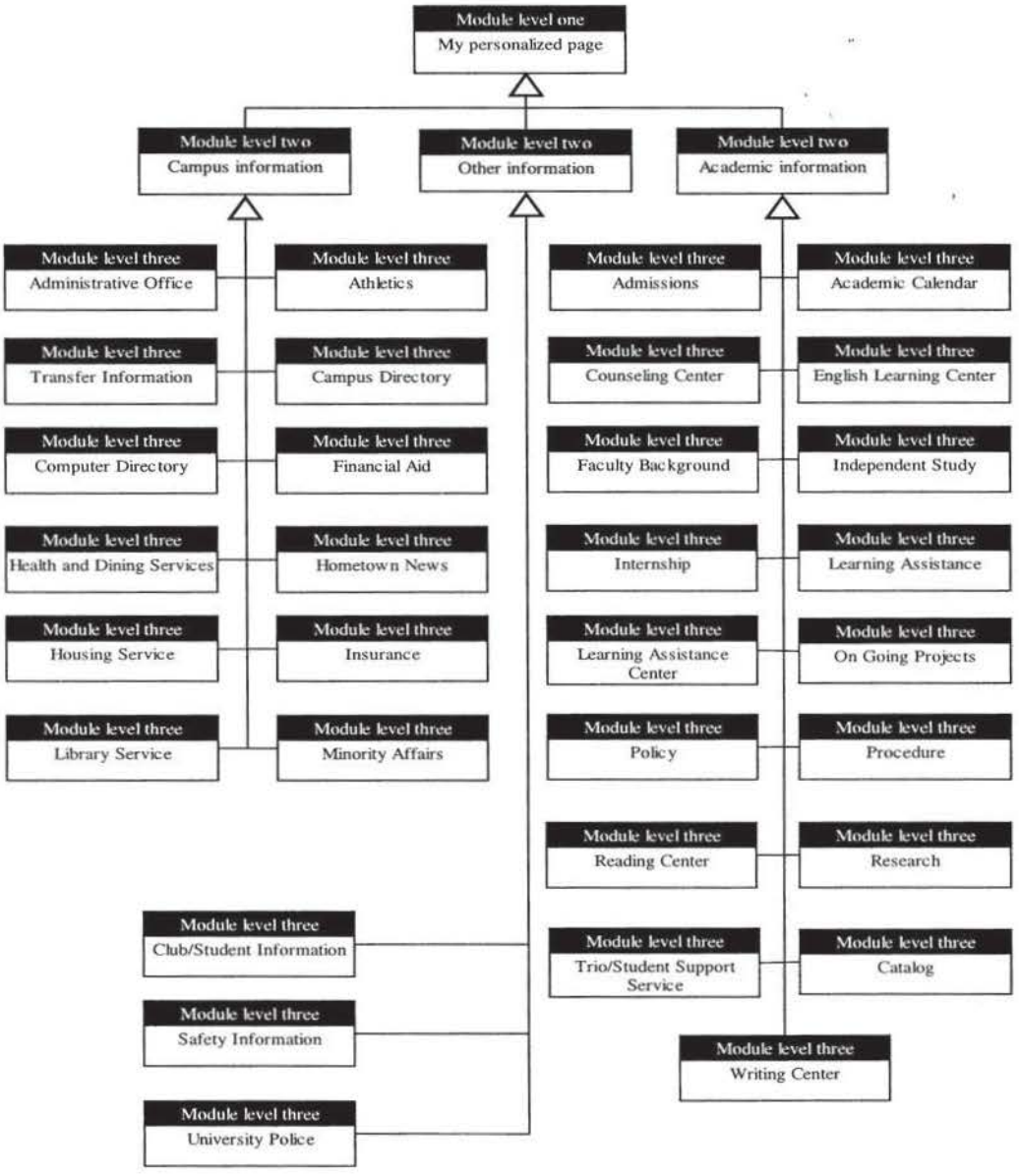

Figure 14. **Basic navigational schema for the Web content.**

5.3.5 Personal Feedback Form

Guideline 6 recommends that a personal feedback form be included on the Web site personalization. The form should allow users to enter messages into an HTML form and submit them through the Web site. Information on the form should include at least four elements: user name, receiver's e-mail address, subject, and message body. In addition, Web developers may consider including an address book that allows users to create and store their e-mail contact lists.

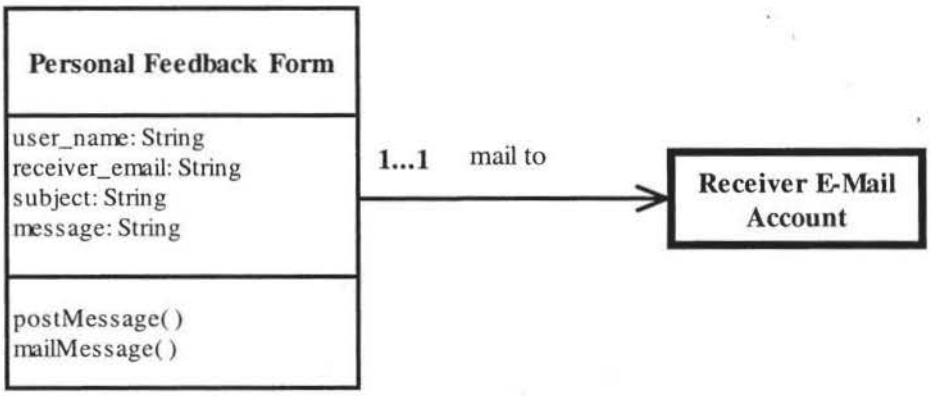

Figure 15. **A class diagram for a personal feedback form.**

Figure 15 presents a class diagram for the personal feedback form that illustrates a class, personal feedback form, and four attributes and types within the class including *user_name*, *receiver_email*, *subject*, and *message*. Data types for the form are String and there are two operations, *postMessage( )* and *mailMessage( )* that define what users can do on the form: posting messages and mailing messages. The middle of diagram, displays a value *1...1*on top of arrow, which signifies that there is a one-to-one relationship between the form and receiver's e-mail account. The form allows message delivery to one receiver's e-mail account at a time.

5.3.6 Message Board

Web site personalization should provide online community services. One method of online community services is a message board that allows users to post messages and view other's message on the board. Based on the survey findings, the majority of students indicated that they would like to have several message boards for different topics: 1) course reviews written by other students, 2) an event/party board, 3) a job board, 4) an opinion/suggestion board, 5) a tutoring board, and 6) a used merchandise exchange board. Figure 16 displays a diagram for a message board and its relationship with other message boards. Each board should include three elements: a user's name, a message box to create messages, and a message box to view messages posted by other students. Figure 17 provides an example of a job board to demonstrate the relationship between the message box and other boards' attributes and operations.

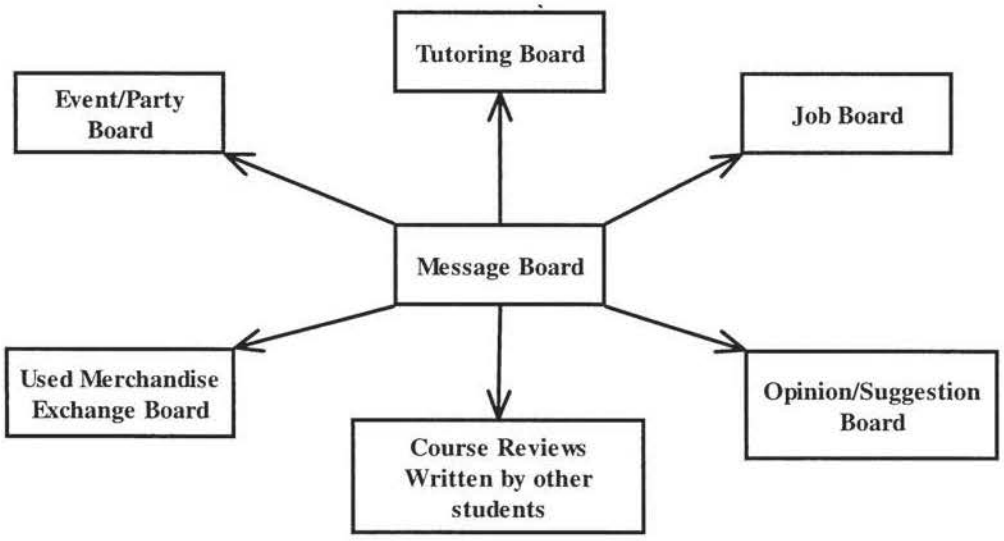

Figure 16. **Class and relationship between message board(s).**

As shown on figure 17, the *Message Board* class has six attributes with various types and operations. *Job Board* class has three attributes and types: *user_name* with *String*, *text_box* with *String*, and *posted_message* with *String*. The class also has three kinds of operations: *createMessage( )*, *submitMessage( )*, and *viewMessage( )*. The diagram represents that when users click on the link, it will take them to another message board that contains a specific topic, such as a job board. In a job board, users can: 1) input their name, 2) create messages that other users can view, and 3) view posted messages that were created by other users.

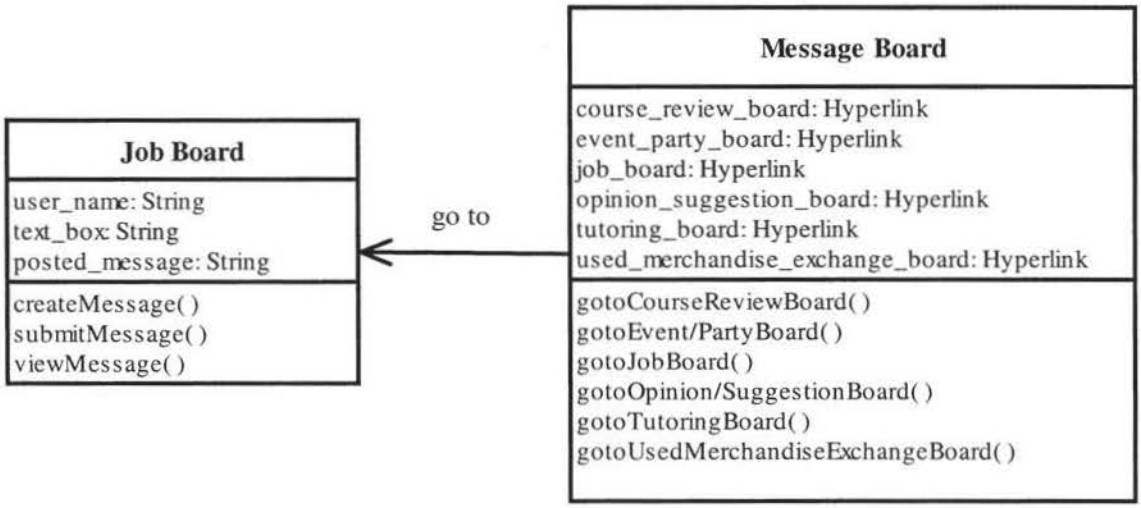

***Figure 17.* Attributes and operations within a message board.**

5.3.7 Web Content Management Model

Four subsystems comprise a Web content management system: 1) a Content Editing Management System consists of all the resources, processes, procedures, and people involved in developing and editing Web content; 2) a

Repository Management System includes all the hardware, software, and personnel resources for managing and storing Web content; 3) a Workflow Management System includes all the resources related to the Web site personalization, and 4) a Deployment and Operations Management System involves the resources needed to generate a user's personalized page (Nakano, 2002). Figure 18 illustrates a conceptual Web content management system model and the paths through which users and developers contribute content for Web site personalization.

The Content Editing Management System consists of two elements; the Web content contributor and the Web content (see Figure 18). For instance, individual departments on campus such as the Center for Academic Technology Support, the Library, and Housing Office have their own Web content contributors who develop and edit content on campus. After these contributors create and prepared content, they then manage it in a storage area within the Repository Management System. A component of the Repository Management System is configuration management that organizes content and configures files to formats compatible with Internet protocols, such as HTML. The files can then be uploaded to the database management system for the independent departmental Web Sites.

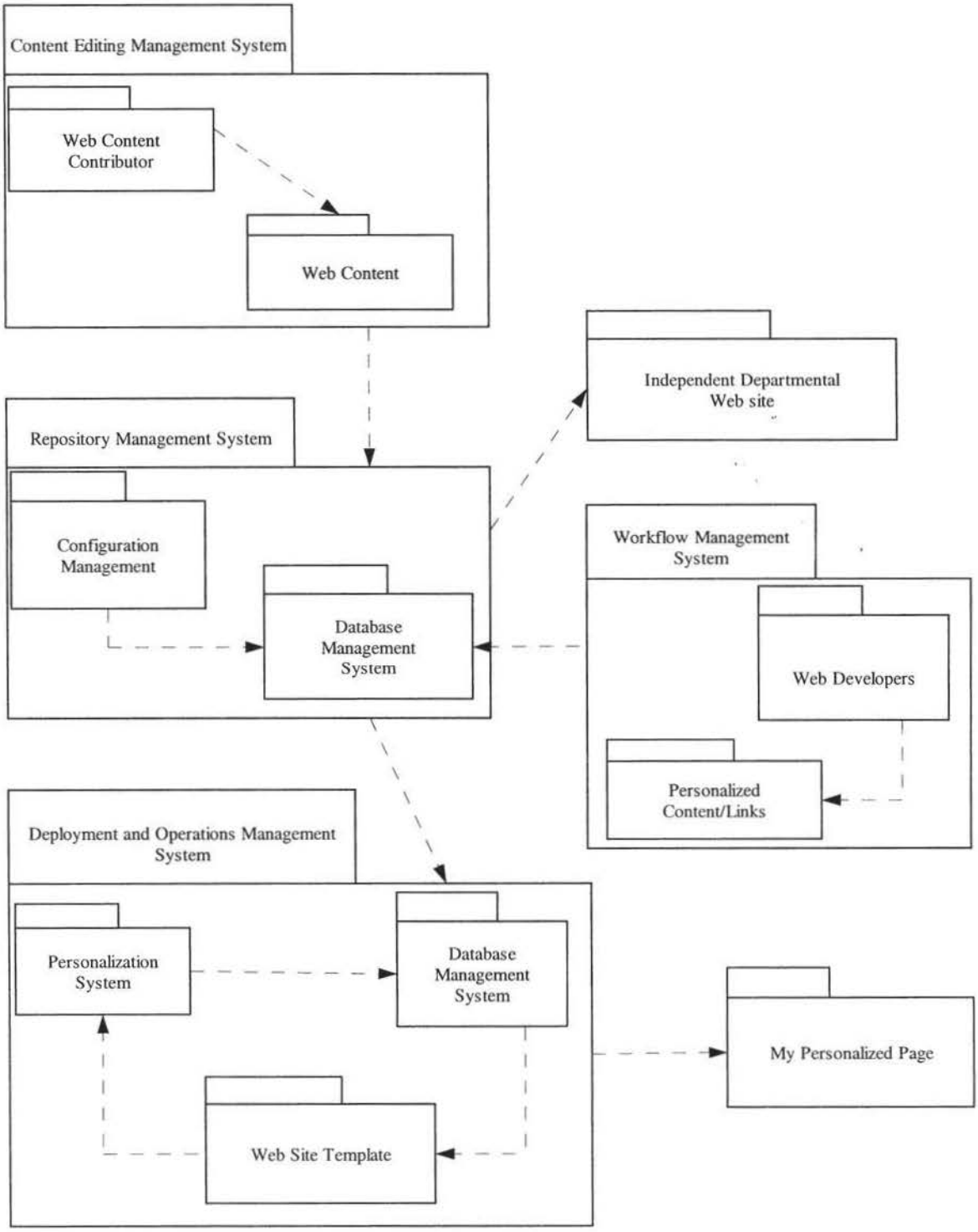

Figure 18. **A conceptual Web content management model.**

Personalized content represents content previously contributed from different departments to the Content Editing Management System (see Figure 15). To manage it properly, Web developers need to design and contribute personalized content and/or links through a Workflow Management System. This system allows for the creation, editing, testing, review, and approval of new personalized content. After developers process the content through the Workflow Management System, it can be stored in the database management system within the Deployment and Operations Management System. The Deployment and Operations Management System has three key elements for Web site personalization: 1) database system, 2) personalization system, and 3) the Web site template.

Figure 19 presents a detail illustration of the Deployment and Operations Management System. The system manages all the developed content and profiles for Web site personalization. The Database Management System houses and secures all developed content and profiles, which may include information about academic programs, links to external content areas as well as information about users' interests and needs. The Personalization System selects or filters content for a particular user before the Web site template retrieves and assembles it for display. The template presented in this conceptual model (see Figure 13) assigns screen locations for indexed static and dynamic (personalized) content for all users' personalized pages.

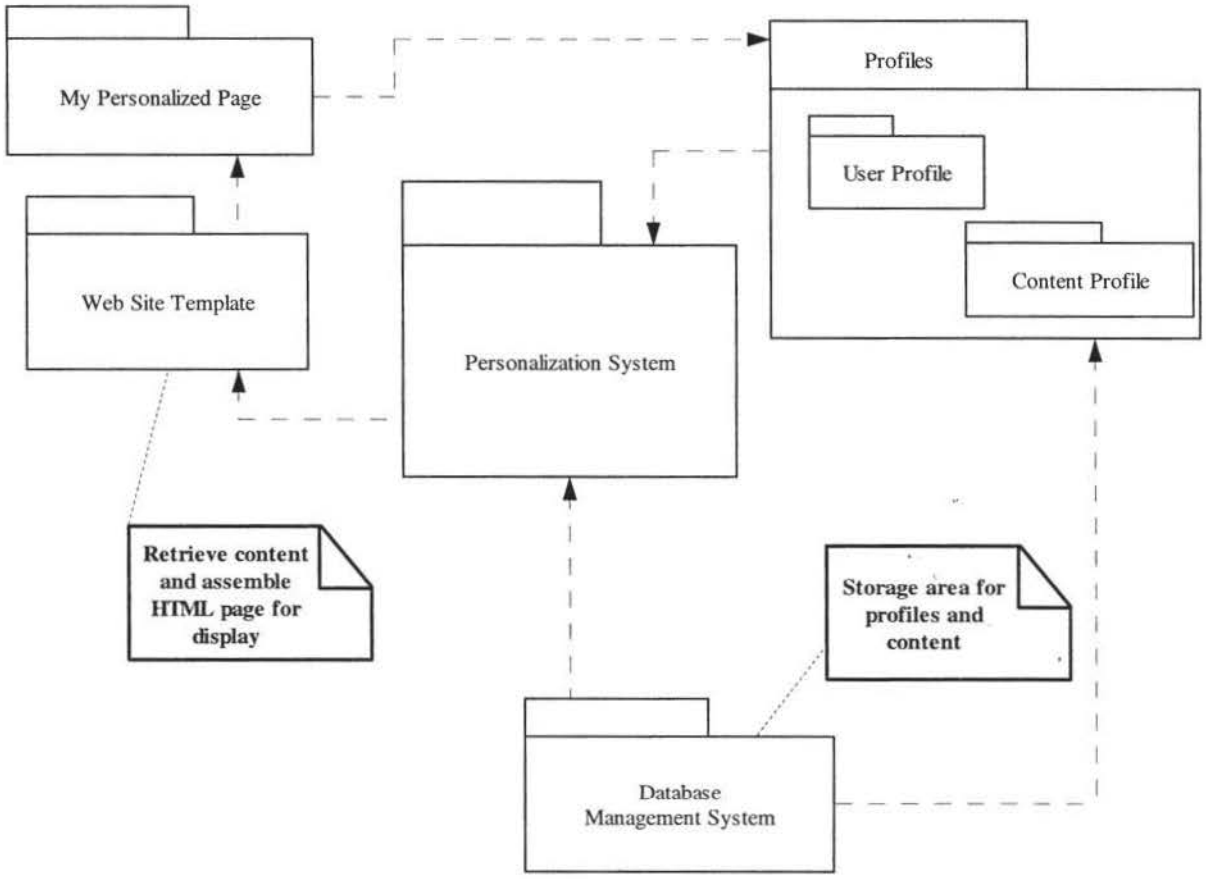

Figure 19. **Deployment and operations management system.**

5.3.8 Personalization Model

Two key elements of the Personalization System that need further elaboration are rules and filtering (see Figure 20). This project proposes a model that uses rule-based systems concepts to define personalization rules for selecting content for and making recommendations to users. A personalization rule is a way of setting user and content profiles, attributes, and values to make a Web site personalized (IBM, 2000). For example, in the system, student status can be represented with the variable *status_id*, that has six values, 1 for freshmen, 2 - sophomore, 3 - junior, 4 - senior, 5 - graduate, and 6 – transfer

students. If a user selected freshmen on the Web site, the system assigns the value of 1 to the variable *status_id* indicating freshmen status on his or her user profile. In addition, students may change their status when they have enough credit hours to reach another status. Web developers should consider developing a prompt or some form of an alert to confirm student's status at the beginning of each semester. With the prompt, users should also be able to change/update their status anytime they wish.

A method of rule-based system determines the content presented to users based on information it collects from them (Hanson, 2000). Accordingly, the proposed system uses personalization rules to identify the content and recommendations it provides each user. To set up personalization rules, Web developers need to assign the content and recommendations for different types of user. For example, if the system identified a user with a specific major (e.g., B.S. Industrial Technology), it would retrieve and display on the personalized page recommendations such as new course offerings related to that major. In addition, Web developers are able to control what personalized content to be retrieved in the system with different options on the customization menu. Based on the survey results, there are 32 options for the personalized content available on the customization menu in this proposed model (see Guideline 9, p.74).

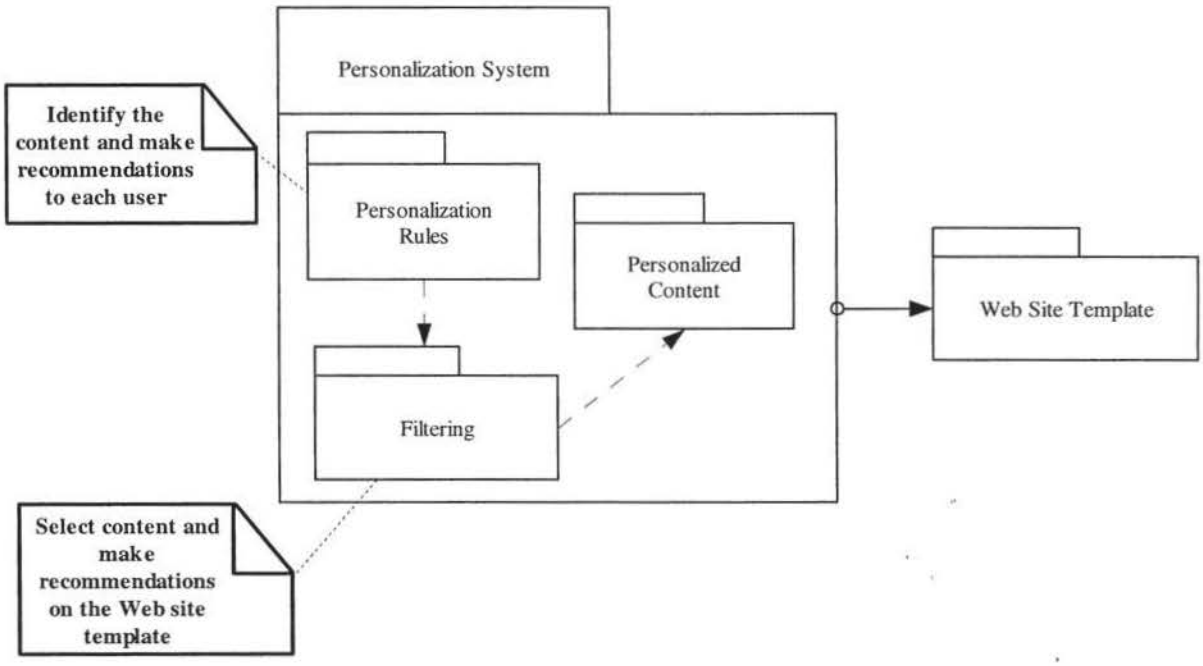

Figure 20. **Two key elements in personalization system.**

When developers design a Web site for personalization, they must first identify the personalized content of each user. They personalize content and/or links in the Workflow Management System, which contains all the resources (e.g., personalized content and/or links) related to site personalization. Figure 21 presents a database structure for the personalized content in the Workflow Management System. Developers could create two independent tables for the content and recommendations files and assign a unique ID to index files in their respective tables. For example, table 1 (*Content*) in Figure 21 contains files that store personalized content with *c_id* as a primary key to identify personalized content files, from 1 to 32. Table 2 (*Recommendations*) contains a primary key, *major_id,* to identify the recommendation content files for different majors from 1 (B.S. Industrial Technology) through 11 (other major).

Filtering is the second key element in the Personalization system. It determines what content and recommendation files the system retrieves for each user (oracle.com, 2001). Base on user and content profiles, the system proposed in this research project uses Adaptive Customization and query retrieval filtering techniques. Adaptive Customization provides the user choice settings to customize the content displayed on the Web page at any given time. The system creates user and content profiles, when a user sets up a new account. Figure 22 shows class and table structures for user and content profiles.

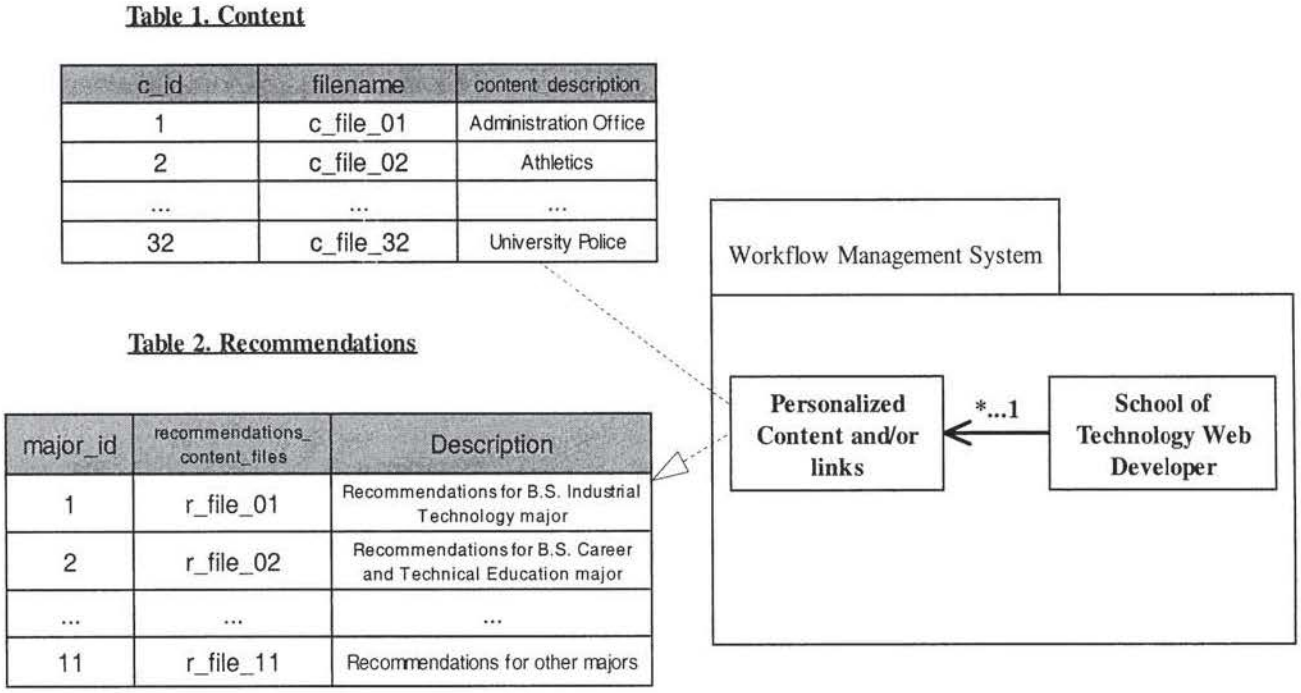

Figure 21. **Database structure for the personalized content.**

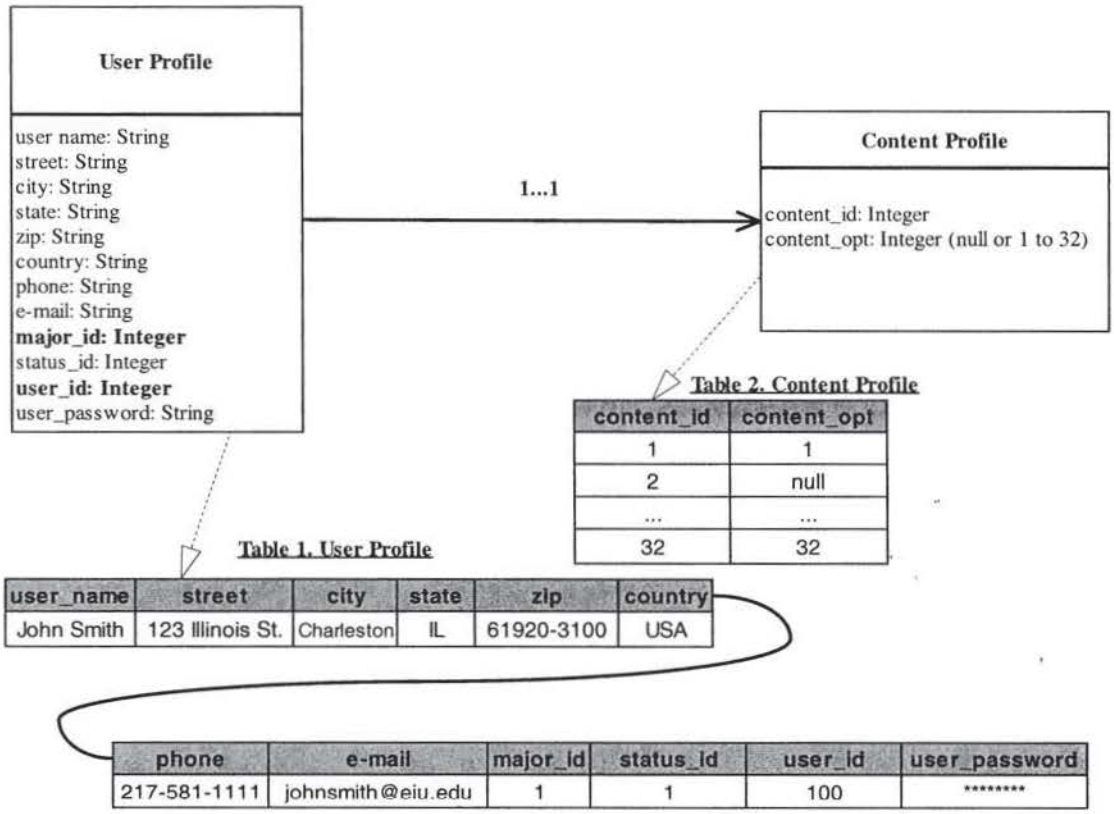

Figure 22. **Database structure for user and content profiles.**

In creating a content profile, a customization menu for personalized content will have a number of options for users. In Figure 22, the content options may be added or deleted in the *content profile* table. In the study, the survey identified 32 content options. The system should assign all data types (e.g., *content_id = 1 to 32)* for the content profiles as (null or 1 to 32) and give a unique identification for each option. For example, in table 2 (*Content Profile*) of Figure 22, the system assigned a 1 for *content_id = 1* and a 32 for *content_id = 32*, which indicates that the user selected these two options. Thus, if *content_id (1) = 1* and *content_id (32) = 32* represented Administrative Offices and University Police respectively, then the user selected these items as part of his/her

personalized content. In the same table, null (no value) for *content_id = 2* gets assigned in the content profile indicating that the user did not select content option 2 on the customization menu.

A user profile contains personal information (e.g., user-ID and password). For this project, *user_id* and *major_id* are key variables for filtering personalized content and recommendations. Schools or departments could use study programs as key variables. In this case, the School of Technology offers ten study programs for undergraduate and graduate students. Site developers can assign the variable *major_id* to the study programs with values from 1 to 11. The variable of major_id can be changed depending on the study program offering in the department. Values 1 through 10 represent the 10 study programs (e.g., B.S. in Industry Technology) and number 11 represents anything other than the ten programs. For example, as shown in table 1 of Figure 22, 1 represents the "B.S. in Industry Technology" major.

Using the *user_id*, *content_XX (from 01 to 32), and major_id* variables, Figure 23 illustrates how the query retrieval technique queries data files for filtering in the system. The query retrieval technique is a logical concept that uses a Relational Database Management System (RDBMS) to query indexed files from databases in different locations on the system (oracle.com, 2000). For example, suppose a user fills out his personal information for a new account and he/she selected a major of B.S. in Industry Technology. As shown in table 1 (*User Profile*) of Figure 23, the system assigned a *user_id* = 100 and *major_id* = 1 (B.S. in Industry Technology) on the first row of the *user profile* table. As

shown in table 2 (*Content Profile*) of Figure 23, the user also selected the content of Administrative Office and University Police, which the system defined and assigned the variables *content_id (1)* = 1 and *content_id(32)* = 32 in the *content profile* table. Furthermore, in table 4 (*Recommendations*) of Figure 23, the file (*r_file_01)* stores and indexes recommendations with a primary ID of *major_id = 1* in the *recommendations* table. The file *r_file_01* is set to display on the Web site personalization if the user selects the major of B.S. in Industry Technology.

To query indexed files for content and recommendations in the tables, the system requires an additional table referred to as the *personalized result set* table. The *personalized result set* table is a storage area or table for queried data. The table should include: 1) a *user_id* for identifying each user, 2) *r_file* variable to define content files for the recommendations based on major, and 3) *content_01* to *_XX* variables to define personalized content files. As shown in table 5 (*Personalized Result Set*) of Figure 23, the system retrieves personalized content based on the values of *content_id(1)* to *(32)* in the *content profile* table. For example, if the value of *content_id(1)* variable equals 1 in the *content profile* table, the system queries *c_file_01* in the *content* table (table 3) to the *personalized result set* table. The value of *major_id* in the *user profile* table determines the content for recommendations. The system retrieves recommendations based on the values (1 to 11) for the *major_id* variable. If the value of the *major_id* variable equals 1, then the system assigns the recommendations content file (r_file_01) in the *personalized result set* table.

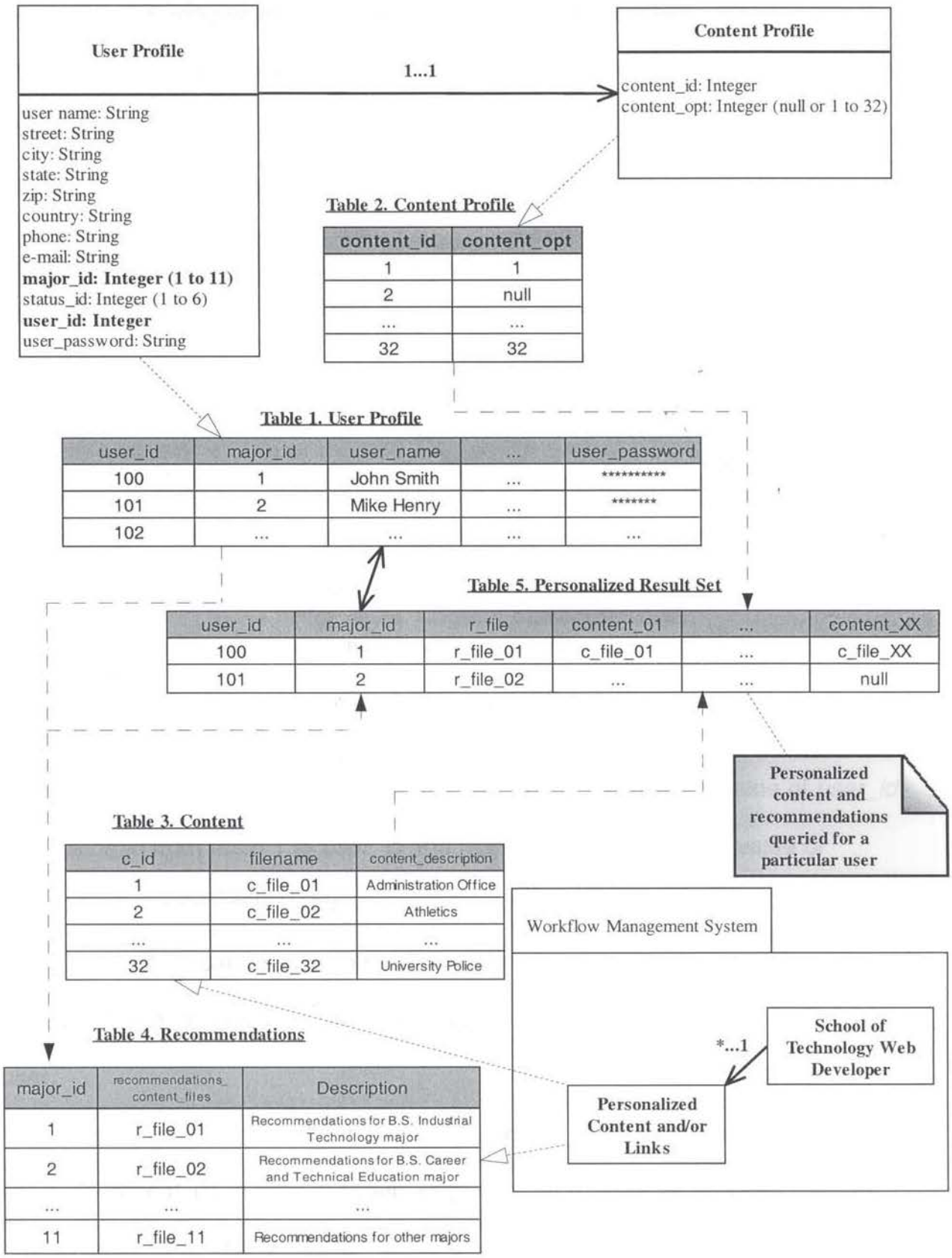

Figure 23. **Query retrieval technique for filtering.**

The following example illustrates how the tables in Figure 23 work and it introduces four logical statements about how to query the indexed values in the result set.

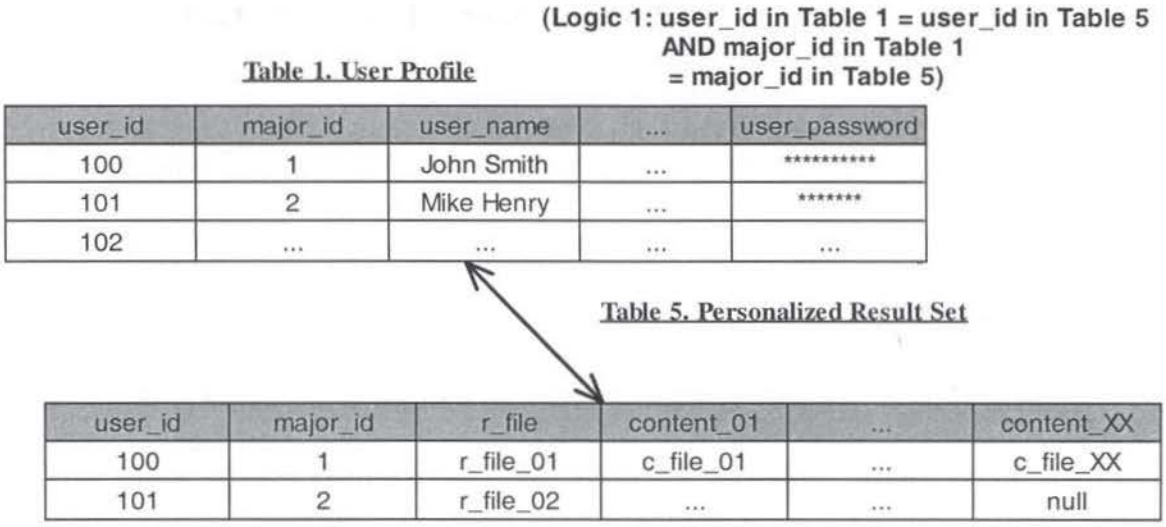

Figure 24. **Logical statement one.**

Table 5 of Figure 24 is a result set for storing queried values from table 1, table 2, and table 4. As shown in Figure 24, Logic 1 assigns the value of *user_id* and *major_id* from table 1 to *user_id* and *major_id* in table 5. The value of *user_id* in the *user profile* table is a primary key (having no duplicate value in the same column), because each user has only one personalized page. The value of *user_id* also identifies attributes (all values or data stored in a row) for each user.

As shown in Figure 25, the value of *content_id(1)* in table 2 equals 1. The value of *content_01* in table 5 should refer to *c_id_01* in table 3. Logic 2 shows how to apply "*IF...THEN...ELSE*" statements and reference the content files in the *content* table (table 3) to the *personalized result set* table (table 5). The

variable *c_id* in table 3 is an ID to identify the personalized content files and it refers to *content_01* to *_XX* in table 5 for the location of files. As shown in Figure 25, the value of *content_01* to *_XX* in the *personalized result set* table is based on the comparison of values between tables 2 and 3. For example, if *content_id(1)* = 1 in table 2, the system searches for the value of 1 in the *c_id* variable column in table 3. If the value of *c_id* matches the value of *content_id(1) = 1*, then the systems retrieves the *c_file_01* to *content_01* in table 5, meaning the user selected that option on a customization menu. However, if *content_id(1)* in the *content profile* table equals null and since the value of *c_id* is always numeric, the *c_id* and *content_id(1)* values will not match, meaning the user did not select that option on a customization menu. The system will not retrieve any value from the *content* table to the *personalized result set* table.

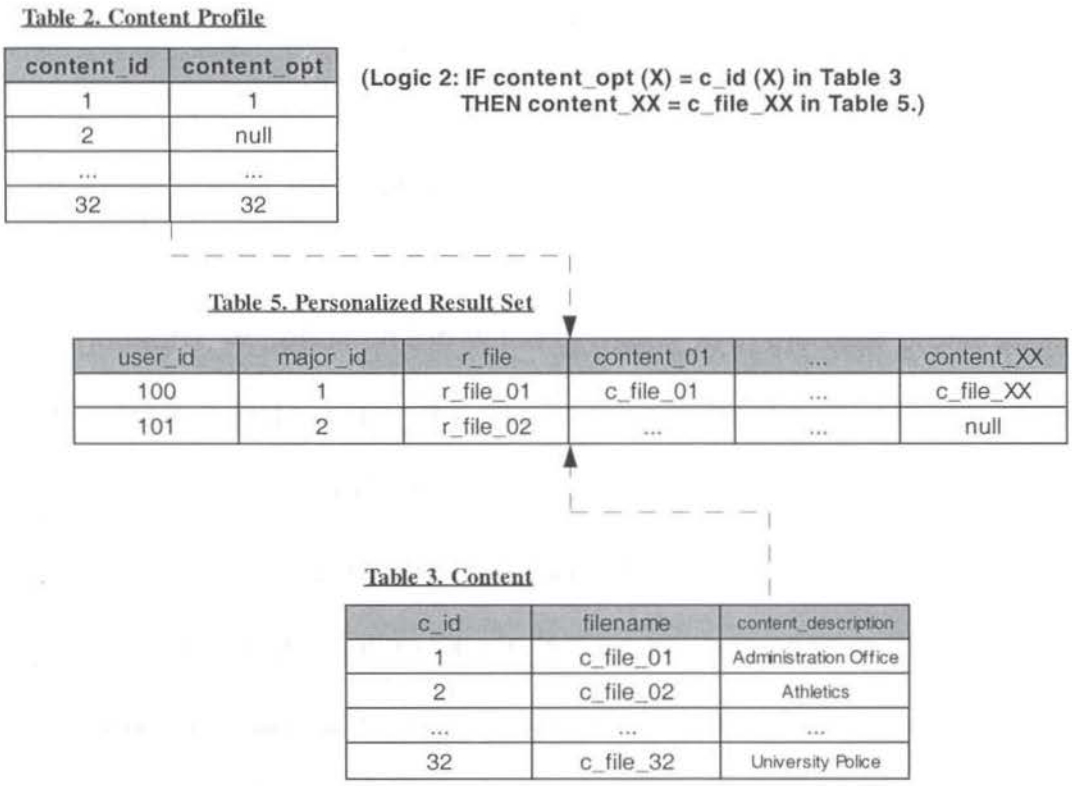

Figure 25. **Logical statement two.**

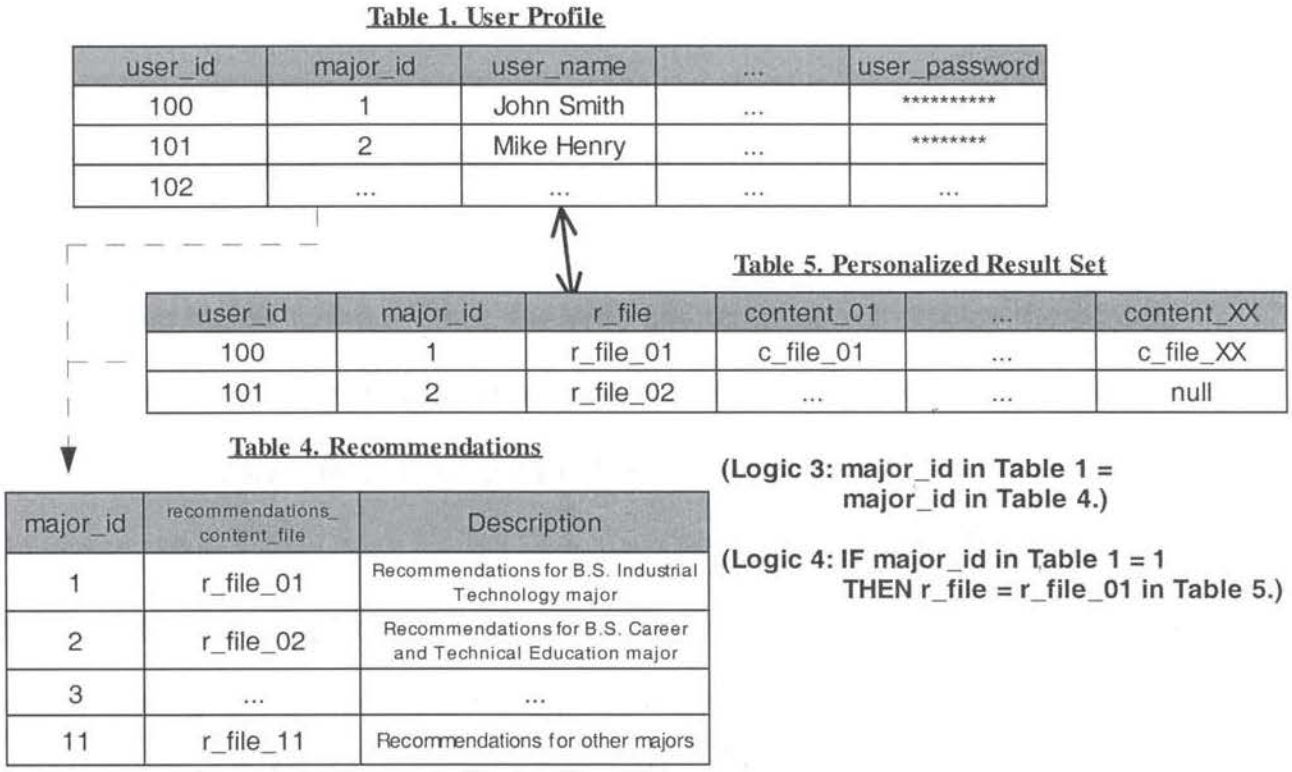

Figure 26. **Logical statement three and four.**

In a user profile, the user will need to specify his or her major. Querying the value of *r_file* in table 4 (*Recommendations*) of Figure 26 for the recommendations, depends on the value of *major_id* in the *user profile* table (table 1). In table 4, determining the files to query is based on indexing *major_id.* In this case, *major_id* = 1 and so it contains *r_file_01*. Logic 3, *major_id* in the *recommendations* table refers to *major_id* in the *user profile* tables. Logic 4 determines the recommendation files in table 4 to be queried in the *personalized result set* table. If *major_id* in table 1 (*User Profile*) equals 1, then Logic 4 sets that value to *major_id* in table 4 (R*ecommendations*). Thus, *r_file* in the

personalized result set table will retrieve the recommendations file, *r_file_01* from table 4.

After establishing the database in the result set in table 5, the table should contain three kinds of information: 1) a user-ID; 2) a major-ID; 3) recommendations for users with a particular major; and 4) personalized content. When users log-on to the system, the Web site template will display the content based on the personalized result set queried from the user profile, content profile, personalized content files, and content files for recommendations (see Figure 12).

5.4 Recommendations

Through a literature review and a survey of user needs, the study used the Web site of the School of Technology as a case example for developing a conceptual Web content management and personalization model for higher educational institutions. It is conceivable that other higher educational institutions may use the guidelines, concepts, and approaches presented in this research to guide their Web development efforts as well as define user interests and needs. Institutions that incorporate online personalization services into their Web applications may find the study results useful for identifying personalized content and services. It is plausible that incorporating the content and services identified as important by students may enhance communications and interaction and help students feel more connected to one another.

The study identified general content areas and services that are of interest to students. Such information is useful to design personalization services that

address user needs. However, while certain content areas and services may be of interest to students, they may be inappropriate for the site. Therefore, prior to implementing the proposed system's model, it is recommended that the study data be presented to and reviewed by the institution's administrators, faculty, staff, and other interested persons so that they may review and assess it and contribute to the system's design.

The study identified general services for Web site personalization that students want. Each service may have numerous features that influence users. Additional research is needed to define the attributes and functions of these services and understand how to integrate them within the personalization system. In addition, more inquiry is needed to understand how these services are use.

Finally, the study surveyed School of Technology's on and off campus students and it proposed guidelines and a conceptual model based largely on their feedback. Other higher educational institutions should apply a similar approach to define their potential users and their needs and interests. However, the survey results in this study only represent students' expectations and attitudes. Other types of users such as faculty and staff should be surveyed to better define the conceptual model and its components.

5.4 Conclusion

The study proposed a user-centered approach to guide the development of Web applications for higher educational institutions. From the study findings, there appears to be an opportunity to build a Web content management and

personalization system for the higher education entities. A majority of students use the School of Technology's Web site, some of whom expressed concern over it because of insufficient and infrequently updated information. They appeared receptive to personalization services, and such services may improve the site. Students at other schools will be open to personalization services, if it can be assumed that the individuals surveyed in this study are representative of students at other educational institutions.

This study collected data from users to make recommendations for the design of the site. In a general way, it defined the most popular and potentially the most frequently used content and services to include on the site and proposed guidelines to support the overall structure of a conceptual Web content management and personalization model. This research used principles of one-to-one Web marketing strategy and Web content management and personalization systems to guide the Web site personalization services and model recommended for higher educational institutions.

Most survey respondents had positive attitudes and expectations toward applying one-to-one strategy to the Web site. If the site had personalization services and features, students would be inclined to use it. Interestingly, while the literature points out that opt-in e-mail is an important one-to-one personalization strategy to include on a Web site, respondents in this study were disinclined to use it. Considering this finding, opt-in e-mail as a personalization option requires more study. In the study, participants may have perceived that opt-in e-mail opens them up to get unsolicited "junk" mail and therefore they

rated it low on the survey. However, the finding suggests that developers must inform users about opt-in e-mail and its characteristics before designing it into a site and expecting that it will be used.

Today, educational institutions worldwide are undergoing fundamental shifts in how they operate and interact with students on the Web. Traditionally the Web published static content with an electronic hyperlinked version of printed materials. It is now time to rethink the Web and view it as a flexible, active, and personalized content-based service environment that offers content and services that recognize an individual's interests and needs. To accomplish this, it is now time to rethink existing technology and infrastructure services and envision new models of information access, storage, and delivery that do not yet exist at many departments in higher educational institutions.

The services and content offered through a Web site should reflect the full range of activities of the departments: teaching, learning, research, public services, and so forth. However, not all of these activities are needed or of interest to every user. Concepts of one-to-one Web marketing strategy can expand the potential power of the Web for individuals through customization based on personal interests and needs. One obvious reason for applying one-to-one Web marketing strategy is to improve individual productivity by increasing the efficiency and effectiveness of information access and delivery to students. An exciting outcome of one-to-one Web marketing strategy is developing collaborative relationship between a department and its students. Finally, if done well, the new levels of functionality and performance provided through Web

personalization services will likely have a positive impact on students as well as the faculty and the department as a whole.

Bibliography

Babbie, E. (1998). *The practice of social research.* (8th ed). New York: Wadsworth Publishing Company.

BEA Systems, Inc. (2001) *Campaign manager for WebLogic.* Retrieved October 29, 2001, from http://www.bea.com

Beardi, C. (2001). Customer Relationship Management. *Advertising Age,* 2, 1-2.

Cho, S. G. (2001). *Business proposal: Georgetown campus portal.* Retrieved February 28, 2002, from http://www.

Direct Marketing Association. (2001). *E-mail marketing report 2001.* Retrieved November 1, 2001, from http://www.the-dma.org/index.shtml

Directechemerge.com (2001). B-to-B Internet Marketing: 7 strategies for success. Retrieve October 24, 2001, from http://www.directechemerge.com/Seminar500/res_cust_service.asp

Eastern Illinois University. (2001). *Graduate Catalog 2001-2002.* Charleston, IL: Eastern Illinois University.

Eastern Illinois University. (2001). Undergraduate Catalog 2001-2002. Charleston, IL: Eastern Illinois University.

Eastern Illinois University. (2001). *School of Technology home page.* Retrieved November 1, 2001, from http://www.eiu.edu/~tech/

Fichter, D. (2000). Head start: usability testing up front. *Online.* 3, 79-81.

Gay, L. (1996). *Educational research: competencies for analysis and interpretation.* (5th ed). Columbus, OH: Charles E. Merrill Publishing.

Geith C. and Wagner C. (March 30, 2000). *Preparing for Campus Portals Interview with Howard Strauss, Christine Geith, and Colette Wagner.* Retrieved February 28, from http://www.cren.net/know/techtalk/trans/portals_1.html

Gomaa, H (2000). *Designing concurrent, distributed, and real-time applications with UML.* New York: Addison-Wesley.

Gunn, E. P. (2000). Marketers keen on enriched e-mail. *Advertising Age.* 2, 12-13.

Hanson, W. (2000). *Principles of Internet Marketing.* Cincinnati, OH: South-Western College Publishing.

IBM.com (2000). Web site personalization. Retrieved February 14. 2002, from http://www.ibm.com/websphere/developer/zones.hvws

IBM.com (2002). Ease of use: user analysis. Retrieved February 14, 2002, from http//www-3.ibm.com/ibm/easy/eou_ext.nsf/Publish/594

Instone, K. (2000). Information architecture and personalization: an information architecture-based framework for personalization systems. Retrieved February 10, 2002, from http://www.argus-acia.com

Jiang, J. and Hsu M. (2000). E-commerce user behavior model: an empirical study. *Human Systems Management.* 12, 265-277.

Kleindl, B. A. (2001). *E-marketing: capitalizing on technology.* Cincinnati, OH: Thomson Learning.

Lazar, J. (2001). *User-centered Web development.* Sudbury, MA: Jones and Bartlett Publishers.

Leedy, P. (1997). *Practical research: planning and design.* (6th ed.). Upper Saddle River, NJ: Prentice-Hall.

Lynch, M (2000). *The Knowledge Web: university online part 3.* Retrieved February, 20, 2002 from http://www.ml.com/

Mack. A. M. (2000). Got E-mail? *Brandweek.* 3, 84-86.

Nakano, R. (2002). *Web content management: a collaborative approach.* Boston, MA: Addison-Wesley.

Oracle.com (2000). *Managing Web content.* Retrieved February, 2002 from http://otn.oracle.com/products/oracle8i/htdocs/cms/cmsdb.html

Oracle.com (2001). *The art of personalization: an Oracle white paper.* Retrieved March, 20, 2002. from http://technet.oracle.com/products/personalization/content.html

Ouimette, G. (1998). The one-to-one advantage. *Best's Review.* 2, 93-94.

Peppers D. and Rogers M. (1993). *The one-to-one future: building relationships one customer at a time.* New York, NY: Currency and Doubleday.

Peppers D., Rogers M., and Dorf R. (1999). *The one-to-one fieldbook: the complete toolkit for implementing a 1to1 marketing program.* New York, NY: Currency and Doubleday.

Peppers D. and Rogers M. (2001). *One-to-one B2B: customer development strategies for the business-to-business world.* New York, NY: Currency and Doubleday.

Rational.com (2002). *UML Resource Center.* Retrieved March 26, 2002, from http://www.rational.com/uml

Rohinson, T. (2000). Direct marketers get quite a response from the Web. *InternetWeek*. 5, 25-30.

Shaw M. J. and Gardner D. M. (2000). *Handbook on electronic commerce: product marketing on the Internet*. New York, NY: Springer.

Sterne J. (1998). *World Wide Web marketing*: *integrating the Web into your marketing strategy*. New York, NY: John Wiley & Sons, Inc.

Whitford, M. (2000). You've got mail. *Hotel & Motel Management*. 2, 34-35.

World Wide Web Consortium (1999). www.w3.com. Retrieved June 15, 2002, from http://www.w3.org

Yahoo.com (2002). MyYahoo.com. Retrieved March 21, 2002, from http://www.my.yahoo.com

Appendix A

Survey Questionnaires for Web Site Personalization Model

My name is Justin Ng. I am a graduate student in the school of Technology with an emphasis in Computer Technology. The following survey questions relate to my thesis. The title of my thesis is: Developing Web content management and personalization model using one-to-one strategy.

Web site personalization is an innovative Web technology that applies one-to-one marketing strategy to Web content management. For example, think of one Web page that serves as your "home base" and provides you access to a variety of services that you need or are of interest to you, such as your course information and schedule, campus announcements, or online counseling services. You can customize the information displayed on the Web page according to your interests and needs. This questionnaire attempts to determine the feasibility of developing a model for this personalized system for students in the School of Technology.

Your input is very valuable in providing guidance for the system design. Please complete the following 25 questions by circling one answer where indicated or writing information where blank spaces are provided. The entire survey should require no more than 15 minutes of your time. After you have completed all the questions, please return it to your instructor. I very much appreciate your participation in this project. If you should have any questions, or wish a summary of the results, about this research, please contact me (Justin Ng) by e-mail at yeepong@hotmail.com.

The purpose of this section is to identify the current state of School of Technology students' Internet usage and their satisfaction with School of Technology's online communication services (e.g., Web site, e-mail).

1. What is the average amount of time you spend on the Internet each day?

   a. More than 8 hours
   b. 6-8 hours
   c. 3-5 hours
   d. less than 2 hours
   e. Never use Internet

2. I visit the current School of Technology's Web site.

   a. More than 6 times a month
   b. 4-6 times a week
   c. 1-3 times a week
   d. Less than 3 times a month
   e. Never use the Web site

3. List the primary reasons you have for visiting the School of Technology's Web site.

   _____
   _____
   _____

4. I am satisfied with the School of Technology's Web site.

   Strongly Disagree 1 2 3 4 5 *Strongly Agree*

5. If you answered 1 (Strongly Disagree) or 2 (Disagree) in the previous question, what makes you dissatisfied, with the Web site?

a. Difficult to find information
b. Insufficient content
c. Infrequent updating
d. Lack of personalization services
e. Lack of interactive tools (e.g., e-mail, Chat room, Discussion boards, etc.) for student-to-faculty, student-to-student, and student-to-administrator communications.
f. Poor Web design
g. Information not useful
h. Web design not interesting
i. Other reasons, please explain.

_____
_____
_____

6. I have experience with Web sites that use personalization services, such as Amazon.com, MyExcite.com, and Yahoo.com.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

7. I find online personalization services useful?

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

The purpose of this section is to determine what services/features students want on the School of Technology's Web site.

8. Would you like to see a search engine in the School of Technology's Web site?

a. Yes

b. No

If yes, what features would you like to have on the search engine?

_____

_____

9. Campus announcements appearing on the School of Technology's Web site would not negatively affect my use of the Web site.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

10. The list below contains possible services that could be included on a Web site designed for School of Technology students. Please check all the items that you would use if they were available to you.

A. Community Services

_____ a. Chat rooms

_____ b. Opinion / suggestion board

_____ c. Event / party board

_____ d. Personal homepage

_____ e. Club homepage

_____ f. Online counseling

B. Campus lifestyle

_____ a. Used merchandise (books, furniture, and other items) exchange board

_____ b. Housing board

_____ c. Job board

_____ d. Information about restaurants and other stores near the university

C. Academic information

_____ a. Course reviews written by other School of Technology students

_____ b. Tutoring board

D. Other Information

_____

_____

11. The list below contains possible content that could be included on a Web site designed for School of Technology students. For each item, please indicate the frequency (Daily, Weekly, Monthly, Less than monthly, or Never) that you would use this information (check only one frequency for each item).

Campus Information:	Daily	Weekly	Monthly	Less than monthly	Never
a. Administrative Office: President Office, Human Resources					
b. Athletics					
c. Bookstore					
d. Campus Directory					
e. Computer Laboratories					
f. EIU News and Events					
g. Financial Aid					
h. Health and Dining Services					
i. Hometown News (Charleston)					
j. Housing Service					
k. Insurance					
l. Job Opportunities					
m. Library Service					
n. Minority Affairs					
o. Records and Registration					
p. Transfer Information					
Academic Information:	**Daily**	**Weekly**	**Monthly**	**Less than monthly**	**Never**
a. Admissions					
b. Calendar (Academic)					
c. Class Schedule					

d. Counseling Center					
e. Degree Programs and Options					
f. English Learning Center					
g. Faculty Background					
h. Independent Study					
i. Internship					
j. Learning Assistance					
k. Learning Assistance Center					
l. On Going Projects					
m. Policy					
n. Procedure					
o. Reading Center					
p. Research					
q. Trio/Student Support Service					
r. Catalog					
s. Writing Center					
Others:	**Daily**	**Weekly**	**Monthly**	**Less than monthly**	**Never**
a. Clubs/Student Information					
b. Safety Information					
c. University Police					
d. Weather/Travel Conditions					

12. I would like the School of Technology's Web site to allow me to customize the information it displays based on my specific interests and needs (e.g., my instructor information, my class schedules, etc.).

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

13. I would like to be able to control all content and/or links that I want displayed on the School of Technology's Web site.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

14. I would be willing to complete an on-line profile information (personal information, such as name, e-mail, major, interest, etc.) form so that the School of Technology's Web site can customize the content and services it displays to me based on my specific interests and needs.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

15. I feel comfortable providing personal (name, e-mail, major, interests, etc.) information on School of Technology's Web site.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

16. I feel comfortable about my profile information being stored on my computer in the form of Cookies so that I do not need to enter a User ID and/or password each time I visit the School of Technology's Web site?

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

17. Which of the following cookie policies do you primarily use when browsing? (Select all that apply.)

a. I don't know what a cookie is
b. I don't know what my cookie preference are set to
c. My preferences are set to always accept cookies
d. My preferences are set to only accept cookies from the same site I am browsing
e. My preferences are set to warn me before accepting cookies
f. My preferences are set to ignore/never accept cookies

18. You may have purchased a book at Amazon.com and subsequently received e-mail informing you of new editions or books on related topics. I feel comfortable receiving up-to-date information or news related to my interests and needs to be delivered to my e-mail account automatically?

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

19. The School of Technology's Web site should provide a personal feedback form with which I can get answers to my specific question(s) regarding graduate information, study programs, and other information related to Technology and the University.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

20. I think online personalization services should be applied to the School of Technology's Web site?

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

21. If I could personalize the School of Technology's Web site, I would be more inclined to use it.

Strongly Disagree 1 2 3 4 5 *Strongly Agree*

Demographic Information:

22. What is your gender?

a. Female
b. Male

23. What is your status?

a. Freshmen
b. Sophomore
c. Junior
d. Senior
e. Post-graduate
f. Others:_____

24. What is your age?

a. Under 18 years
b. 18-20 years
c. 21-23 years
d. 24-26 years
e. Over 26 years

25. What is your major?

a. B. S. Industrial Technology
b. B. S. Career and Technical Education
c. B. S. Career and Organizational Studies
d. M. S. Technology Management
e. M. S. Career and Technical Education
f. M. S. Training and Development
g. M. S. Computer Technology
h. Graduate Certificate Program in Quality Systems
i. Graduate Certificate Program in Work Performance Improvement
j. Graduate Certificate Program in Computer Technology
k. Others:_____

Thank you for your participation.

Appendix B

Statements and Mean Ratings for the Survey Results

The list below contains statements (no. 4, 6, 7, 9, 12, 13, 14, 15, 16, 18, 19, 20, and 21 on the survey questionnaires) and significant means (one is the lowest and five is the highest) for the survey results.

Statement	Mean
I am satisfied with the Web site of the School of Technology.	3.2
I have experience with Web sites that use personalization services.	3.8
I find online personalization services useful.	3.6
Campus announcements appearing on the Web site of the School of Technology would not affect my use of the Web site.	3.4
I would like the Web site of the School of Technology to allow me to customize the information it displays based on my specific interests and needs.	3.8
I would be willing to complete an online profile information form so that the Web site of the School of Technology can customize the content and services it displays to me based on my specific interests and needs.	3.5
I feel comfortable providing personal information on the Web site of the School of Technology.	3.5
I feel comfortable about my profile information being stored on my computer in the form of Cookies so that I do not need to enter a User ID and/or password each time I visit the Web site of the School of Technology	3.3
I feel comfortable receiving up-to-date information or news related to my interests and needs to be delivered to my e-mail account automatically.	2.9

The Web site of the School of Technology should provide a personal feedback form with which I can get answers to my specific question(s) regarding graduate information, study programs, and other information related to Technology and the University.	3.9
I think online personalization services should be applied to the Web site of the School of Technology	3.6
If I could personalize the Web site of the School of Technology, I would be inclined to use it.	3.6

The list below determines the frequency (daily, weekly, monthly, less than monthly, or never) for the use of possible content that could be included on a Web site designed for School of Technology.

Campus Information:	**Daily**	**Weekly**	**Monthly**	**Less than monthly**	**Never**
a. Administrative Office: President Office, Human Resources	1.6%	5.8%	18.2%	49.6%	24.8%
b. Athletics	6.6%	14%	14.9%	40.5%	24%
c. Bookstore	1%	5%	22.3%	56.2%	15.5%
d. Campus Directory	3.3%	24%	25.6%	35.5%	11.6%
e. Computer Laboratories	9.9%	21.5%	15.7%	32.2%	20.7%
f. EIU News and Events	17.4%	22.3%	22.3%	27.3%	10.7%
g. Financial Aid	1%	7.4%	24%	38.8%	28.8%
h. Health and Dining Services	5.8%	6.6%	10.7%	35.5%	41.4%
i. Hometown News (Charleston)	4.1%	14.9%	11.6%	25.6%	43.8%
j. Housing Service	1%	2.5%	10.7%	32.2%	53.6%
k. Insurance	1.7%	2.5%	15.7%	27.3%	52.8%
l. Job Opportunities	8.3%	29.8%	26.4%	22.3%	13.2%
m. Library Service	2.5%	19%	29.8%	25.6%	44.1%
n. Minority Affairs	1%	2.5%	9%	25.6%	61.9%
o. Records and Registration	2.5%	10.7%	42.1%	37.2%	7.5%
p. Transfer Information	1.7%	3.3%	17.4%	41.3%	39.3%

Academic Information:	Daily	Weekly	Monthly	Less than monthly	Never
a. Admissions	1%	5.8%	20.7%	47.9%	24.6%
b. Calendar (Academic)	3.3%	20.7%	37.2%	28.1%	10.7%
c. Class Schedule	5%	16.5%	31.4%	39.7%	7.4%
d. Counseling Center	1.7%	4.1%	13.2%	46.3%	34.7%
e. Degree Programs and Options	1.7%	8.3%	29.8%	47.1%	13.2%
f. English Learning Center	2.5%	2.5%	12.4%	29.8%	52.9%
g. Faculty Background	1%	2.5%	16.5%	50.4%	29.6%
h. Independent Study	1%	4.1%	14%	47.9%	34%
i. Internship	2.5%	8.3%	23.1%	37.2%	28.9%
j. Learning Assistance	1%	5.9%	18.2%	36.4%	38.5%
k. Learning Assistance Center	1%	5.9%	14%	35.5%	44.6%
l. On Going Projects	2.5%	9.1%	24.8%	34.7%	28.9%
m. Policy	2.5%	2.5%	15.7%	47.9%	31.4%
n. Procedure	3.3%	2.5%	16.5%	43%	34.7%
o. Reading Center	1.7%	2.5%	9.1%	34.7%	52%
p. Research	2.5%	9.9%	23.1%	38.8%	25.6%
q. Trio/Student Support Service	1%	5.8%	11.6%	31.4%	61.2%
r. Catalog	1.7%	4.1%	27.3%	37.2%	29.8%
s. Writing Center	2.5%	4.1%	12.4%	47%	34%

Others:	Daily	Weekly	Monthly	Less than monthly	Never
a. Clubs/Student Information	2.5%	20.7%	21.5%	25.6%	29.7%
b. Safety Information	1%	5%	14.9%	33.1%	46%
c. University Police	1%	3.3%	9.1%	30.6%	56%
d. Weather/Travel Conditions	26.5%	24.8%	9.9%	23.1%	15.7