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The Use of Public Web Portals by Undergraduate Students

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The Use of Public Web Portals by Undergraduate Students

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Dedication

This dissertation is dedicated to my parents, my brother, friends, and colleagues, whose support gave me the strength to persevere.

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The Use of Public Web Portals by Undergraduate Students

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The study explored how and why 144 randomly selected undergraduates' from a large university in the U.S. use public Web portals such as Yahoo! or MSN. Demographic and use variables regarding information about particular portal features were collected with a standardized questionnaire including open-ended and closed questions from June to October 2002. All but two respondents were users of public Web portals. A second phase consisted of eight tape-recorded focus groups with 42 participants. In addition, 39 individual follow-up interviews were conducted. The questionnaire data were analyzed using Chi-Square ($\alpha = 0.05$) to test hypotheses for statistical significance. The focus groups, interviews, and open-ended questions were content analyzed and identified a variety of problems that undergraduates faced using portals.

The study provides empirical data about undergraduates' characteristics, e.g., gender, major, classification, GPA, computer and network experience, times of portal use, and use of personalization in relation to the use of public Web portals and the

possession of personal home pages. The study sheds light on why and how undergraduates seek information on public Web portals, what they do on these sites, and reasons for using and not using portals and particular portal features.

According to the introduced *Popularity Index of Public Web Portals*, Yahoo! and MSN were the most popular portals, while searches, e-mail, world and national news were the most popular features for undergraduates using these sites. About 50% of the participants used personalization. Personalizers used portals to a greater extent and were satisfied. Lack of personalization and other factors were a reason for limited use of portals. Demographic variables such as gender, age, and major did not show statistical significance for the use of public Web portals, while use variables such as Internet access at home, frequency of portal use, and the possession of a personal home page showed significant relationships. Frequent redesign, privacy concerns, and unsolicited advertising were among reasons for limited use.

The study's results contribute to a better understanding of undergraduates' information needs and behavior on public Web portals. The findings have implications for libraries, universities, governments, Web content developers, and marketers.

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Chapter 1: Statement of the Problem

INTRODUCTION

The most influential information communication technology since the introduction of telephony and television is networked computing, especially as incarnated in the Internet. This network of networks based on the TCP/IP suite of standards has covered the globe since its original development by the U.S. Defense Department (ARPANET) in the late 1960s. The most influential breakthrough in Internet technology so far has been the development of the hypertext transfer protocol and, thereby, the World Wide Web (WWW) by Tim Berners-Lee at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland in 1989 (Cailliau, 1995; Lehnert, 1998). These developments, based on hypertext technology envisioned by Bush (1945) and Nelson (1965), facilitated the dissemination of growing amounts of information to a growing number of information seekers in a relatively user-friendly way. The numbers of Internet computers and users remain vague, but popular estimates indicate that there were more than 600 million users and 150 million host computers worldwide at the time of this study in 2002 (Internet Systems Consortium, 2003; Nielsen//NetRatings, 2002a; NUA, 2003). These numbers are growing every day.

Soon after the explosion of information sources on the Internet, we saw attempts to make these electronic sources categorizable and searchable for information seekers. Gopher became the most popular access tool for browsing through information resources in the pre-WWW era (Chang & Rice, 1993). Most of the early attempts to make information resources on the Internet more accessible, such as Wide Area Information Servers (WAIS), Archie, Veronica, and Jughead, were tools developed by computer scientists. Librarians also saw the necessity of providing finding aids for information

resources on the Internet starting in the mid-1980's. Good examples are Barron's and Mahe's *Library Guide*, Kovacs' *Directory of Scholarly and Professional E-Conferences*, or Yanoff's *Special Internet Connections* that were widely used in the Internet community. Many libraries also found ways to make their Online Public Access Catalogs (OPACs) available to the Internet community, and librarians conducted numerous studies of how users interact with these electronic resources (Hancock-Beaulieu, 1992; Markey, 1984).

The growing number of information sources on the WWW resulted in the mid-1990's in the appearance of new finding aids such as indexes, crawlers, spiders and worms which are often categorized as search engines (Yahoo!, AltaVista, Lycos, Excite, et al.). These finding aids, also called access tools, were developed by computer scientists except for the Yahoo! index originally developed by trained librarians. As these sites gained popularity some of them developed into Web portals.

Public Web portals, defined further below, such as Yahoo!, Netscape, Lycos, or Excite, built a large user base by enhancing access to sets of data on their sites. This enhanced access is mainly a result of offering multiple information resources (channels or modules) such as news, stock quotations, weather forecasts, search engines, e-mail access, and calendar functions on a single page that can be personalized or customized by individual users in order to better accommodate their individual information needs and preferences. Users are supposed to register once and to complete profiles with personal, geographic, and other information, e.g., favorite sports teams, preferences for stock quotations, and news categories. After having completed the registration, every time a user accesses the public portal site, information of personal interest is immediately available. Users can change their profiles and the modules as often as they want. Even the on-screen position of selected modules or colors can be arranged according to users'

preferences. The aim is to maintain and to increase the Web site's user base by satisfying users so that they come back more often resulting in more revenue from advertising and other sources. In this way, the "my" concept was born. Now, we have My Yahoo!, My Lycos, My Netscape, My Excite, My iWon, My MSN, and so on.

The study reported here used quantitative and qualitative research methods, and provides empirical data about the use of public Web portals by undergraduates in relation to their personal characteristics, for instance, educational level, gender, major, computer and network experience, information needs, and tasks. Furthermore, the study explored how and why undergraduate students use public Web portals, what they do on these sites, and reasons for the usefulness of portals and particular portal features. The research also investigated the relationship between the use of a personal home page and the use of public Web portals.

BACKGROUND OF THE STUDY

Many Internet users including undergraduate students heavily frequent public portal sites. For the purpose of this research, undergraduate students were defined as students at a university who take coursework toward the first academic degree (bachelor). The extent to which undergraduates use public Web portals or not, why they are inclined to use these sites or not, and what they do on these sites were the focus of this study. The study investigated undergraduate students' characteristics such as Internet experience, gender, classification (e.g., sophomore) and the possession of a personal home page in relation to their use of public Web portals. Furthermore, the study sheds light on how and to what extent undergraduate students use or do not use particular offerings and services on these sites and illuminates reasons for that information behavior.

The unique role of public Web portals as a major access point to information and services on the WWW and their popularity among millions of Web users can also be seen in the following publicly available use statistics and reports. Table 1.1 shows the top five global Web properties according to a report of the top 25 global Web properties by Nielsen//NetRatings (2002b) for March 2002. A property is defined as a consolidation of multiple domains and URLs owned by a single entity[1]. The property is the highest order entity since no company owns another in the table below. Unfortunately, Nielsen//NetRatings does not reveal why MSN (Microsoft Network) and Microsoft are listed separately or how the term *unique audience* is defined. With the exception of Microsoft's Web site, four of the top five Web properties in March 2002 were Web portals; these are sites that are not only frequently used but that provide access to a variety of information resources and services on a single page (see definition below).

Table 1.1: Top 5 Global Web properties for March 2002 (Nielsen//NetRatings)

Rank	Property	Unique Audience (users)
1	Yahoo!	137,845,506
2	MSN	124,885,229
3	AOL Time Warner	103,129,855
4	Microsoft	86,114,991
5	Lycos Network	71,588,781

[1] For example, Netscape Netcenter, a major portal site, was acquired by AOL Time Warner in 1998 and became part of the AOL Time Warner properties.

For the week of April 14 to 23, 2002, Nielsen//NetRatings (2002c) reported the following numbers for some portal sites in its U.S. top 25 Web sites by property.

Table 1.2: Selected Web properties for April 14 to 23, 2002 (Nielsen//NetRatings)

Rank	Property	Unique Audience (users)
1	AOL Time Warner	39,371,000
2	Yahoo!	34,864,000
3	MSN	33,546,000
7	Lycos Network	8,157,000
13	Excite Network	4,532,000

For July 2002, another media audience measuring company, comScore, reported the following levels of usage in its list of U.S. top 50 Internet properties (comScore Media Metrix, 2002):

Table 1.3: U.S. top 5 Internet properties for July 2002 (comScore Media Metrix)

Rank	Property	Unique Visitors
1	AOL Time Warner	97,995,000
2	MSN	89,819,000
3	Yahoo!	83,433,000
4	Google	37,460,000
5	Terra Lycos	36,173,000

Unique visitors, according to comScore, is the number of total users who visited the reported Web site at least once during the course of the report period. All unique visitors are unduplicated. Also in this count, four of the top five properties maintain a Web portal. Google was at that time a pure search engine that did not meet this study's definition of a public Web portal.

The high popularity of Web portals was also confirmed in a study conducted by Rozanski and Bollman (2000) who investigated the Internet use of 1093 randomly selected persons between July and August 2000. They found that 60% of Internet sessions included a visit to a portal. By contrast, other types of sites were visited far less frequently: consumers went to entertainment sites only 22% of the time they accessed the Web, news and information sites 20%, shopping sites 17% and sports sites 5%. Internet users also spent far more time at portals than anywhere else online--an average of 4.5 hours per month, three times more than they spent at shopping or entertainment sites. Virtually all users (98%) had visited a portal site at some point, compared with 80% who had visited entertainment or information sites, and 43% who had tried financial sites.

The use of computers for writing term papers or for searching databases has become as common as watching the news on TV for many of today's undergraduate students. While many search interfaces are supposed to be easy to use, librarians find that undergraduate students: (1) face problems in using them and (2) must be trained to use them successfully.

Numerous studies have investigated undergraduates' CD-ROM database searching (Allen, 1990; DiMartino, Ferms, & Swacker, 1995; Shaw, 1993) or their use of online catalogs (Connaway, Johnson, & Searnig, 1997; Fister, 1992) focusing on increasing students' computer literacy and improving systems' interfaces; some of this literature is discussed in Chapter 2. However, the extent of and factors that account for

undergraduate students' use and non-use of public Web portals had been unknown. It was also not clear which portal services undergraduates use and why, or what they do on these sites. To date, there has not been another systematic study of undergraduate students' use of public Web portals. This study was intended to fill this gap.

INTRODUCTION TO PUBLIC WEB PORTALS

Before proceeding it is necessary to define the term *Public Web Portal* for the purpose of this study. Internet portals such as Yahoo!, Netscape, AOL, MSN or Excite have become popular gateways to information available on the World Wide Web. Many users choose these portals for various reasons as a favorite starting point for information seeking on the Internet. Practitioners such as Web site developers and marketers are interested in how they can maximize the usefulness and effectiveness of their Web sites, with the goal of steadily increasing their popularity. Popularity is commonly measured by the amount of user traffic. This user traffic can be measured as the number of unique impressions (hits) on a particular site as displayed in Tables 1.1 to 1.3 above. A high number of unique impressions in a given period of time can result in higher advertising revenue for one site while this revenue will be lower for a site that has fewer unique impressions in the same time. In addition, very popular sites have a higher potential for marketers to tailor particular offerings to a larger audience. Every Web site has the potential to become a very popular site provided it makes services and information available that are useful to its intended audiences, and it offers these services and information in a user-friendly way.

These concerns are also of high interest to libraries, universities, schools, or governments that use the WWW. Only the institutions that offer their information and services in a user-friendly and effective manner will ensure the popularity of their sites

and accomplish their goals on the Internet. The best services and information offered will not reach an intended audience if they are not accessible. For instance, a directory of undergraduate students at a university Web site might not be found easily if it can be located only in a subdirectory such as Academics>Departments>People>Registration>Students>Undergraduates.

So what are the characteristics and functionalities of public Web portals besides popularity?[2] *Webster's New Universal Unabridged Dictionary* (1989, p. 1120) defines a portal as a "door, gate or entrance, especially one of imposing appearance, as to a place." Yahoo!, Netscape, Excite and others have established their reputation as the door or entry point to the Internet. Portals are like airports, train stations or shopping malls. They are concentration points we pass through on the way to some other destination (Teleen, 1999). Choi and Whinston (2000) define portals as virtual organizations that connect sellers and buyers, producers and consumers. They distinguish between horizontally organized portals and vertical portals. Horizontally organized portals such as Yahoo! provide users with links to various other sites, acting as directory services but expanding to other ancillary interactive services such as free e-mail accounts, chat and online messaging, news, and stock information, and top-level links to popular products such as travel and investment services. Vertical portals (also known as vortals) are, according to Choi and Whinston, narrowly-focused vendor sites that offer services for a specific product and provide integrated services from search to payment and delivery. Examples are dell.com or amazon.com. In contrast to horizontal portals, which seek to serve anyone and everyone with a portfolio of basic information, communication, and commerce services, vertical portals are more than just a content or transaction site. Instead, they focus on a particular content category, commerce opportunity, or audience

[2] A more detailed discussion of public Web portals is provided in chapter 2.

segment and provide a broad set of services tailored to the target opportunity. Recently, there has been a tendency of vertical portals to expand horizontally, i.e., to broader audiences, to increase the number of their visitors and to entice visitors to come back more often to their sites. This study focuses on horizontal portals because they are the ones widely used by a broad audience (see Tables 1.1 to 1.3). As it was revealed during the pilot tests for this study, a large number of undergraduate students use these portals although the pilot tests did not provide much insight into the extent of such use. The definitions above indicate that public Web portals offer important functionality to Web users. The easy log-on to the Internet through these portal sites can provide many Internet users with what they want to see when they start exploring the Internet further.

Yahoo! recognized early that it was critical for a portal to address a cognitive problem rather than only technical concerns. Yahoo! used librarians rather than computers to organize Web content in a hierarchy of categories following established classification schemes. Users realized that browsing an organized hierarchy of categories often provided better results than issuing a keyword search against the entire WWW. Due to the huge volume of data on the WWW, searches can provide the user with too many results. The user then has often to find relevant information within search results. On the other hand, the wanted information might not be found since search engines for the WWW cover only a portion of what is available on the Web. In February 1999, only 42% of the Web was indexed by major search engines (Lawrence & Giles, 1999). Another estimate states that the major search engines had only indexed about 6 billion of the 50 billion pages on the WWW in March 2004 (Handy, 2004). While patterns of Web use continue to evolve, there is still common agreement that no one single search engine covers all Web pages publicly available.

In July 1996, Yahoo! added the feature that has been potentially the most important factor in the popularization of the portal: *personalization*. This function enables users to create profiles of personal interests and to see information and services according to their preferences whenever they log on to the WWW. The result is a simple, automated, up-to-date view of a wide variety of online information corresponding to a user's interests without having to browse or to search all of the categories available. Only three months after the introduction of personalization, the Yahoo! audience had increased by 56% compared with the previous quarter (Plumtree Software, n.d.).

It is the My Yahoo! experience that many other portals have since adopted successfully and that provide the framework of the study reported here. Other publicly available portals have mimicked this "my concept" to a great extent. The research explored undergraduate students' information behavior on selected "my something" sites in relation to personal and use characteristics. In particular, Yahoo!, MSN, Netscape, Excite, AOL, Lycos, iWon and Go2Net were identified as public Web portals during the preparation phases and pilot tests for this study.[3] These sites not only meet the definition of horizontal Web portals of Choi and Whinston (2000), but they are also publicly available to the largest audience on the WWW without any restrictions. For this study, the researcher combined the definitions above to create the following working definition of *public Web portal*:

> A public Web portal is a site on the WWW that is intended to be an all-in-one entrée to the Internet publicly available to everyone. Not merely a search site but a site that provides everyone with Internet services and information such as e-mail, local and/or international news, stock quotations, guides, weather forecasts, and so on according to personal interests. These sites have to be available freely to everyone, i.e., without charge and free of future commitment.

[3] My Way, another public Web portal according to the researcher's definition, could not be considered for this study since it just emerged at the time the design of this study was finalized.

THE RESEARCH PROBLEM

The study reported here was prompted by the fact that many undergraduate students choose these sites as a starting point for their information seeking on the Internet. The general use data (see Tables 1.1 to 1.3) and the researcher's previous short surveys and pilot studies confirmed this assumption although most participants were undergraduate students in Internet classes at a large university in the southern U.S. who had been exposed to Internet use (but not necessarily to public Web portals) for several months. Almost all students in the pilot tests had used at least one public Web portal. While many undergraduate students used these public Web portals, the reasons for and the extent of use remained to be determined, and the effectiveness of the design of these sites for supporting undergraduate students' information behavior remained unclear. Public Web portals largely feature the same mix of offerings and services. The differences seemed to be in how well the sites integrate their offerings, the quality of the providers selected to deliver e-mail and other services, and the ease with which one can use and personalize the services. In addition, the brand name seemed to influence students' choices. However, in many instances, Web portal creators lack knowledge of a user's educational level, gender, computer and network experience or information needs, and the tasks in which a user might engage on a given Web site. Research has clearly shown the importance of these and other characteristics to students' use of and success with information technologies and information resources of all kinds (Bellardo, 1985; Huang, 1999; Jacobson & Fusani, 1992; Kibirige & DePalo, 2000; Palmquist & Kim, 2000; Todman, 2000). Only if Web developers and marketers have more knowledge of users as well as their characteristics and activities on a Web site, paired with appropriate design and information, will they be able to better meet the needs and the expectations of undergraduate students as users of these public Web portal sites. Otherwise,

undergraduates might not want to or not be able to take advantage of these new modes of information dissemination fully.

There is a rich body of literature about information seeking in electronic environments that provides several theories of information behavior. Library and Information Science as a discipline has a long tradition of research in information seeking behavior, information access and retrieval, and associated concerns such as recall, precision, relevance, and users' needs. Researchers in Library and Information Science (LIS) have developed various models of information seeking behavior to better understand users' interaction with information resources discussed further in Chapter 2 (Bates, 1989; Ellis, 1989; Krikelas, 1983; Kuhlthau, 1991; Wilson, 1999). The ultimate goal of all user studies research has always been to enrich the experiences of information systems users by making resources easier to access and to use. While these models are useful for describing general information seeking behavior, their global approach makes it difficult to explain the use of a particular set of Web sites by a particular group of users such as undergraduate students.

In addition, the literature on usability postulates multiple principles of effective interface design in electronic environments but has not rigorously investigated the use of public Web portals by undergraduate students. The literature on corporate portals is very large, but this literature focuses mainly on implementing enterprise portals that include intranets not publicly available, and, hence, this literature was only marginally useful to this study. Ideas concerning improved design effectiveness from the usability literature were, however, considered as long as they directly relate to developments that can also be applied to publicly available portals on the Web in general and to the use of these sites by undergraduate students in particular.

RESEARCH QUESTIONS AND METHODOLOGY

The idea for this research study originated from a class discussion about the use of personal home pages during which one student stated:

> Why do I need a personal home page when I can just go to a public Web portal and personalize it to the extent I find appropriate for my daily information needs? I probably wouldn't put much else on a home page except for some information about myself, my interests, and so on that I'd like the rest of the world to know about.

In the ensuing discussion most students recognized the differences between a personal home page that is in someone's full control regarding offerings and design and the use of a personalizable public Web portal that does not necessarily allow the rest of the Internet community to see someone's preferences or personal information. Some students, however, saw parallels between home pages and Web portals.

In subsequent discussions on the class newsgroup and in informal interviews with the students, at least two thirds of the students in class identified themselves as users of one or more public Web portals and gave numerous reasons for using these sites. These reasons ranged from not having a personal home page and not wanting to tell other people too much about personal interests or other information on the WWW to convenience and user-friendliness. It became obvious that a number of undergraduate students used public Web portals for a variety of reasons, and it also became clear that a more systematic investigation in this area of research was warranted.

This study explored undergraduates' use and lack of use of selected public Web portals by seeking to understand the students' information behavior on these sites applying quantitative and qualitative research methods. Previous research in the use of electronic media found statistically significant differences among students according to gender, classification (freshman to senior), and Internet experience and use. The study reported here, thus, examined these salient characteristics in relation to the use of public

Web portals. The pilot studies undertaken in preparation for the current study also indicated that undergraduates' demographic and personal use characteristics might influence their use of public Web portals.

Based on these assumptions this study addresses the following research questions:

1. What kinds of undergraduate students use public Web portals?
2. Which portals do undergraduate students prefer and why?
3. Why and how do undergraduate students use public Web portals?
4. What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?

The participants in the study were 144 undergraduate students at a large university in the southern U.S., including users and non-users of public Web portals. The 144 participants represent the sample frame of 431 undergraduate students contacted and are likely to demonstrate a wide array of characteristics that might be important to the use of public Web portals by undergraduate students in general.

The data collection activities, their purpose, the kinds of data received and the data analysis techniques used are summarized in Table 1.4. Data collection and analysis involved a combination of multiple quantitative and qualitative methods. In the first stage of the study, potential participants identified with the help of the administrative office for students affairs of the university were contacted in early June 2002 via e-mail and asked to complete an initial survey form on the Web (see Appendices A and B) to express interest in the study. In the next step a self-administered, printed questionnaire (see Appendices C and D) was mailed with a pre-paid return envelope to interested participants resulting in demographic and use data upon return. These data were analyzed using descriptive statistics and formal tests of hypotheses (Chi-Square at α =

Table 1.4: Summary of data collection activities, purpose, kind of data and data analysis technique(s) used (RQ = Research Question)

Data Collection Activity	**Purpose**	**Kind of Data**	**Data Analysis Technique(s)**
Written questionnaire	Collection of demographic and use information Answers to RQs 1-4	Closed and open-ended responses	Formal hypothesis testing Content analysis
Focus group interviews Audio-taping Field notes	Collection of naturalistic descriptions of information behavior and information choices Answers to RQs 2-3	Naturalistic responses	Transcription Member checking Content analysis
Personal Interviews	Soliciting participants' reaction to and clarification of questionnaire and focus group responses Answers to RQs 1-4	Naturalistic responses	Member checking Content analysis

0.05) as well as content analysis. Non-respondents were contacted repeatedly via e-mail up to four times until late August 2002 resulting in the final set of questionnaire data. In the next stage of the study, eight focus group interviews with 42 participants were conducted producing mainly qualitative data that were content-analyzed based on transcripts from audiotapes and field notes. In addition, 39 participants had individual follow-up interviews to clarify their responses in the questionnaire and/or in the focus groups as well as to answer additional questions regarding their opinions about the relationship of personal home pages and public Web portals and future developments in the portal arena. These data were also analyzed using content analysis. This combination of data collection and analysis methods was the basis for the attempt to paint a comprehensive picture of undergraduate students' use of public Web portals in general.

Quantitative and qualitative data about the undergraduate students' use of public Web portals, their preferences for particular sites and features, their reasons for and limiting factors of applying personalization, their reasons for not using personalization on public portal sites at all, and an analysis of possible relationships between personal home pages and use of public Web portals supplement the questionnaire data.

Among the study's chief findings were:

- All but two students were users of public Web portals.
- Yahoo! and MSN were the most popular public Web portals according to the *Popularity Index of Public Web Portals* introduced by the researcher, while searches, e-mail, world and national news, and weather forecasts were the most popular services (games and movie listings were highly popular for a small subset of respondents).
- Gender, academic major, classification, GPA, length of Internet use, self-rated Internet experience/skill level, length of portal use, duration of portal use during each access period, weekly hours of portal use, number of days of portal use per week, and the use of personalization were not statistically significant predictors for undergraduates' portal preferences. Reasons for portal preferences were reputation and brand name, familiarity, ease of use, accessibility, uniqueness of services, community, quality of content, and satisfaction although many participants used several sites for different purposes.
- Reasons for using public Web portals in general included reputation, familiarity, ease of use, accessibility, personal interests, community, personalization, and satisfaction. Technological barriers, the use of other resources and services, unsolicited advertising, feelings of information overload, and non-personalization were factors that limited undergraduates' use of public Web portals.

- Undergraduates' reasons for not using the personalization options on public Web portals were unawareness, lack of need/interest, lack of time, lack of use, anticipation of difficulties, limited access, and privacy/security concerns.
- While gender, major, classification, GPA, length of Internet use, length of portal use, duration of portal use during each access period, and the use of preferred portal away from home were not statistically significantly related to personalization, self-rated Internet experience/skill level, Internet access at home, weekly hours of portal use, number of days of portal use per week, and the use of preferred portal at home were. Personalizers were more active users of public Web portals, had Internet access at home and rated themselves more as "Expert" compared to those who did not personalize.
- Most personalizers found personalization easy to use relatively easy to detect on their preferred portal sites. They were satisfied with the results of personalization and had used this option at least once or twice during the three months before participating in the study.
- Gender, major, classification, GPA, length of Internet use, preferred portal, length of portal use, and duration of portal use during each access period did not show statistically significant results in relation to the possession of a personal home page. Respondents' self-rated Internet experience/skill level, Internet access at home, weekly hours of portal use, the number of days of portal use in a typical week, and the use of personalization options on public Web portals, however, did. The 26 students with personal home page were more likely to use public Web portals longer and more often and to personalize their portal views compared to those without personal home pages.

- According to undergraduates, the existence of a personal home page can influence the use of public Web portals and vice versa, but the two presentation forms have somewhat different underlying concepts.

SIGNIFICANCE OF THE STUDY

While the study of use and users of information systems represents a major domain of information science research, there has not been a study that describes the phenomenon of undergraduates' use of public Web portals more systematically. This study shows for the first time what kinds of undergraduates use or do not use public Web portals, why students are inclined to use these sites and to what extent, and what they do on these sites. This new knowledge will contribute to the larger body of research knowledge of information seeking and behavior on the WWW and expand the overall corpus of information science research. In particular, it can contribute to a better understanding of undergraduates' demographic and use characteristics as well as their motivations for using public Web portals and similar sites and services.

For the developers and administrators of public Web portals and other portal sites that offer a wide range of information and allow the use of personalization, this research should provide the opportunity of better understanding how undergraduate users see their own use of these new forms of information systems and what problems they face while using them. This better understanding could result in improved design of public Web portals and other portal-like systems and interfaces. Furthermore, it can lead to better interaction among the information content, the information system, and the undergraduate user. These topics are also of high interest for institutions such as libraries, universities, schools or government agencies that increasingly make information and services available on the WWW. Institutions that rely on information dissemination and services

on the WWW are more likely to attract their audiences and provide efficient services and information if those services and information are presented in a manner that considers the characteristics, motivations, and behaviors of users most likely to access the pages.

Developers of public Web portals and portal-like information systems might improve their users' satisfaction with the information services if they apply a more holistic approach to the users' information needs and behaviors. The results of the study, as explained further in Chapter 5, could increase systems' developers understanding and awareness of undergraduates' information needs and behavior on public Web portals and similar sites.

This study is intended to be a seminal contribution to a better understanding of undergraduate students' information behavior on public portal sites on the WWW and to a more accessible and functional design for undergraduate students in adaptive Web environments such as public Web portals.

This chapter introduced the research problem while providing a working definition of public Web portals, an overview of the central research questions, methods of data collection and analysis as well as the objectives and significance of the study. Chapter 2 examines related research about Web portals, theoretical models of information seeking behavior, undergraduate students' use of Internet resources, and usability studies on the WWW. Chapter 3 describes the sample method and procedures of data collection, the study's response rate, and data analysis methods. Chapter 4 presents the findings of the study based on quantitative and qualitative analyses. Chapter 5 provides an overview of the study's key findings and discusses some of the findings and data quality measures. Limitations of the research and suggestions for future research conclude the study.

Chapter 2: Related Research

INTRODUCTION

How people look for information in electronic environments has long been of interest to both information science researchers and system developers. Researchers have been interested in applying information science theories and concepts to the solution of practical problems, and developers have been interested in building better systems and better user interfaces to their systems. For this study, the researcher consulted a wide range of literature that could inform and position the study in a larger context. The review of related materials is highly selective since the concept of public Web portals is fairly new and investigations about the use of public Web portals by undergraduate students according to the definition above have not been reported to date. The review is organized into four parts:

- **Introduction to and basic concepts of Web portals**

This section provides more viewpoints found in the literature on Web portals in general and on public Web portals in particular. The purpose is to support the working definition of public Web portals stated above and to illustrate the apparent confusion in the literature about this new term.

- **Overview of selected theoretical models of information seeking behavior**

The section shows how models of information seeking evolved from a system-centered to a user-centered approach including some newer research techniques; some of which were used in this study.

- **Undergraduate students' use of Internet resources**

There is a large body of research that describes the use of Internet resources by undergraduates in general but not with particular emphasis on public Web portals. This

section illustrates some findings about undergraduates' Internet use reported with regards to gender, major, Internet experience, and activities.

- **Overview of usability studies with regard to the World Wide Web**

Since usability studies have been concerned with improvements to interface design it is useful to provide a short overview of this area as far as related to this study. Most usability studies are, however, more practical in nature and confront potential users with systems interfaces before they are implemented; the current study examines systems already in place.

These areas of inquiry shed some light on the phenomenon of public Web portals and their use by undergraduate students as the central research problem of the study. Due to the newness of the phenomenon under investigation, research reports found on the WWW were especially important.

INTRODUCTION TO AND BASIC CONCEPTS OF WEB PORTALS

In addition to Webster's definition of a *portal* as a "door, gate or entrance, especially one of imposing appearance, as to a place" (Webster's, 1989), numerous other definitions of *Web portals* include the terms *gateway*, *doorway pages*, *entry pages*, or *starting points*. A widely agreed-upon definition of the term *Web portal* cannot be found in the literature, however. The following descriptions of what the term *Web portal* can mean are not intended to contribute to the existing confusion about this term, and they are not all-inclusive. They are provided, instead, to illustrate the existing opinions and to emphasize common characteristics found in the literature that resulted in the working definition of *public Web portal* mentioned earlier:

> A public Web portal is a site on the Web that is intended to be an all-in-one entrée to the Internet publicly availably to everyone. Not merely a search site but a site that provides everyone with Internet services and information such as email, local and/or international news, stock quotations, guides, weather forecasts, and so on according to personal interests. These sites have to be available freely to everyone, i.e., without charge and free of future commitment.

The first definition found calls a *Web portal* a "Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and on-line shopping malls" (Webopedia, n.d.). Another Web-based dictionary explains *Web portal* as "a term, generally synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. There are general portals and specialized or niche portals" (Whatis.com, n.d.). Park (2000, p. 9) states simply that a *portal* "is a site that is intended to be an all-in-one entrée to the Internet" and writes that "typical services offered by portal sites include a directory of Web sites, a facility to search for other sites, news, weather information, e-mail, stock quotes, phone and map information, and a community forum." Cohen (1998) describes a *Web portal* as a "home base" or a place:

> [W]here you start your day on the Web, getting a little news, the scoop on what's happening online, and--if the portals have their way--it's the epicenter of your Web experience. You return there when you get lost. Your stock portfolio is there, and you can look for new and old friends to chat with online. You get your e-mail and build your personal home page there: The portal is your security blanket, your safety net, and your trusty guide to all things Web. (p. 100)

Authors of a report on Internet portals in Europe for Goldman Sachs Investment Research (Goldman Sachs, 1999) write:

> A portal, or an Internet/on-line service, by our definition, aggregates large numbers of recurring internet users and/or subscribers around specific types of service. Portals can be horizontal across lots of different categories and types of functionality …, or they can be vertically focused on a few areas, such as commerce in a given category (e.g. Amazon.com selling books). They can be either a gateway, or a destination, or both. (p. 3)

As in other sources, the authors also make a distinction between horizontal and vertical portals (explained above) and identify important characteristics for a successful Web portal, what they call the "six C's": Context, Content, Commerce, Communications, Connectivity, and Community. In this study, all portals were "trying to be strongly represented in all six areas."

Several authors do not see Web portals only as an entry point to the WWW but include the concepts of *personalization* and/or *customization* in their definitions of a Web portal. These concepts led to the "my-something" trend and allowed Web portals to make a user's experience more "sticky" by generating more repeat user traffic for their particular portal sites, resulting in more advertising revenue. The terms *personalization* and *customization* are often used interchangeably in the literature although some authors distinguish them.

Looney and Lyman (2000) point out that:

> At the most basic level, portals gather a variety of useful information resources into a single, "one-stop" Web page, helping the user to avoid being overwhelmed by "infoglut" or feeling lost on the Web. But since no two people have the same interests, portals allow users to *customize* their information sources by selecting and viewing only the information they find personally useful. Some portals also let you *personalize* your portal by including private information. (p. 30) [italics in original]

Looney and Lyman do not provide more insight into what they think personalization or customization is, but other authors are inclined to. The most striking problem with this user-centered design paradigm is that personalization and customization mean different things to different people. Bonnet (2001) states "personalization involves a process of gathering user-information during interaction with the user, which is then used to deliver appropriate content and services, tailor-made to the user's needs. The aim is to improve the user's experience of a service." Furthermore:

> Customisation occurs when the user can configure an interface and create a profile manually, adding and removing elements in the profile. The control of the look and/or content is explicit and is user-driven, i.e. the user is involved actively in the process and has control. In personalization, on the other hand, the user is seen as being passive, or at least somewhat less in control. It is the website that monitors, analyses and reacts to behaviour, for example, content offered can be based on tracking surfing decisions.

Her claims are supported by the often cited usability guru Jacob Nielsen when he states that "customization is under direct user control: the user explicitly selects between certain options (a 'portal' site with headlines from the *New York Times* or from the *Wall St. Journal*; enter ticker symbols for the stocks you want to track)" and that personalization "is driven by the computer which tries to serve up individualized pages to the user based on some form of model" (Nielsen, 1998a). However, Nielsen (1998b) also warns that more features add a risk to pages "being overwhelming and confusing."

Ketchell (2000, p. 176) writes that Nielsen "warns that personalization or customization cannot substitute for a good default design to greet first-time or occasional users, and that personalization must be extremely easy to set up or users will not take the time." According to her, Nielsen recommends that, rather than spending extensive resources on personalization, designers should run usability studies and structure the site according to the user's view of the world. Nielsen also stresses that good personalization requires the system to know a lot about the user.

Other authors usually do not make that distinction between customization and personalization but use only the term *personalization* by keeping the personal (user-centered) aspect of public Web portal use in mind (Instone, 2000; Kramer, Noronha, & Vergo, 2000; Lasica, 2001; Plumtree Software, n.d.).

The mixed use of the terms "personalization" and "customization" is a contradictory definition problem in the literature that makes it even more difficult to develop a clearly defined concept of a public Web portal. In the proposed study the term

personalization is the one user-initiated feature that is available on all the public Web portals under investigation according to the definition above. The concept of having the opportunity to personalize screen views best contributes to the proposed definition, and best distinguishes a *public Web portal* from any other site on the WWW that could also be called a portal in some other authors' views.

To summarize the review of the literature in this area, the following characteristics helped to develop the working definition of *public Web portal* for this study:

1. Entry/starting point for Internet users (including undergraduates) on the WWW
2. Large user base by allowing the user to apply personalization features according to personal information interests and needs
3. Access to a variety of features such as up-to-date information on personal email, daily information needs, community features (like chat rooms and other fora)
4. Publicly available to everyone who uses the Internet, i.e., not part of an intranet as might be typical for companies who are "hiding" internal information resources from the rest of the Internet community.

The researcher is aware that these characteristics and the definition of *public Web portal* as introduced above are not all-inclusive, but the previously offered definition is suitable for this study. The next section grounds the research in selected theoretical models of information seeking behavior as they are widely known to the LIS community.

OVERVIEW OF SELECTED THEORETICAL MODELS OF INFORMATION SEEKING BEHAVIOR

Many models of information seeking behavior from Library and Information Science or related disciplines have been developed in order to understand and to improve

users' system interactions with the overall goal of making these experiences more successful. In practice, however, many users spend a lot of time with these electronic systems until they find the information needed. Many give up and switch to another information source or leave their information needs unfulfilled due to a variety of reasons. Sometimes the information wanted is simply not there. At other times, the information is there but is unavailable because of poor system design. In addition, users might encounter cognitive or physical problems in using the system. If librarians and other information professionals want to improve their services to users in order to play a key role as information intermediaries in future, they will have to study the system/user information environment in-depth. Only by investigating the system user, and by doing research on how information seekers or information users utilize information systems to satisfy information needs in certain environments (including public Web portals), will librarians and the discipline be able to support the development and design of more effective and efficient information systems. There is a profound ensemble of user-based research and methods discussed briefly below. The models were selected since they are the most widely cited and known ones in information seeking behavior research. The discussion will illustrate how present research has shifted from a merely systems-centered point of view to a more user-oriented point of view in what is generally called user studies during the last four decades.

The Systems View in User Studies

Generally, research concerning users of electronic information systems has emerged from a systems-oriented approach to a more user-centered or user-oriented approach during the last 40 years (Dervin & Nilan, 1986). The systems-oriented approach treats users as passive retrievers of information, assuming no changes in the

users' behavior during the information-seeking process. The first attempts to investigate the performance of electronic retrieval systems can be traced back to Mortimer Taube's Uniterm experiments that were succeeded by the series of experiments done in the late-1960's which are also known as the Cranfield studies (Cleverdon, 1967; Cleverdon, Mills, & Keen, 1966). The relevance-based measures precision and recall were usually studied in experimental environments. These measures were used in order to determine the performance evaluation (outcome) of information retrieval systems. Recall relates to the ability of a system to retrieve relevant documents, and precision to its ability not to retrieve irrelevant documents. The overall finding was the inverse relationship of these two measures; as one increases, the other decreases. In the following decades, similar experiments based on the system view were extensively undertaken. Prominent among them were SMART (Salton, 1971), MEDLARS (Lancaster, 1968), STAIRS (Blair & Maron, 1985), and the series of experiments known as Text Retrieval Conferences (TREC) during the 1990's. The results gained are still very valuable concerning the performance testing of a given system.

However, it is still not precisely determined what relevance means to one user or to another in a particular information seeking situation, or how this characteristic could be measured more precisely. What is relevant for one user might not be relevant to the same user in another situation, or to other users. Due to the reductionistic viewpoint in this research that assumed a stable user with non-changing information behavior, other factors such as the users' psychological characteristics and changing information behavior across time and space seemed necessary to investigate, too. This prevailing weakness led to a more user-oriented approach during the last three decades in user studies.

The User-Oriented Approach in User Studies

The user-oriented approach is characterized by viewing individuals as constructive, active information seekers in a dynamically changing situation. It holds that systems should be designed according to appropriate analyses of the users and their psychological as well as societal roles in using systems and not vice versa. Among the central questions are the following. How and why do people use an information system? What factors influence the human-machine interaction?

Taylor (1968) was one of the first in LIS to explore reference services in a library setting from a more user-oriented view. In his seminal article on "Question-negotiation and Information-seeking in Libraries," he sought to understand the user's cognitive processes or internal behavior rather than the external. This paper is a milestone in user research because Taylor is focused on the user's part in addressing an information need. Taylor is widely acknowledged as one of the first researchers to demonstrate that the user might go through a series of states in information seeking, ranging from an uncertain state of knowledge to the development of a defined query related to that problem.

Dervin and Nilan's (1986) notion of the paradigm shift toward user-centered studies was confirmed by Hewins (1990) and Sugar (1995). The latter concludes that the user-centered approach now dominates research. Sugar distinguishes between (a) the cognitive approach, and (b) the holistic approach in user-centered studies which includes affective, psychomotor, and cognitive factors.

The Cognitive Approach

Cognitive user studies can be traced back to Belkin's (1980) theory of anomalous states of knowledge (ASK), the assumption that a person recognizes a deficiency or anomaly in her/his state of knowledge, and therefore will use an information retrieval

(IR) system. This ASK is converted into some communicable structure (i.e., a query) which is used to retrieve some information that might be appropriate to resolve the anomaly. The person goes through several stages until his/her information gap can be articulated and resolved appropriately. What might be important to know at a certain stage of information seeking might not be important at another stage, and new ASK's can evolve several times until the person decides that the anomaly has been resolved. The cognitive perspective concentrates on the relation between user and system and how users' needs are evolving by taking into consideration the users' inherent psychological characteristics and changing needs across time and space. Kolb's Learning Style Inventories or the Myers-Briggs type indicator are often used in these studies to determine personality types. The works of Allen (1991) and Borgman (1989) belong in this category.

The Holistic Approach

The holistic approach goes a step further by adding affective and psychomotor aspects of users to the research focus. Sugar (1995) finds two main types of studies in this area. One includes affective domain studies that focus on users' interests, values and emotions in the information seeking process. Societal and cultural factors such as economic situation or educational backgrounds are also closely related to these studies (Vygotsky, 1978). The works of Tenopir, Nahl-Jakobovits, and Howard (1991) and Kuhlthau (1993) are especially worth mentioning here. They found that users' search behavior is a conglomerate of affective, cognitive and psychomotor (or physical) domains. According to the research of Tenopir and her colleagues, the affective domain serves as the initiator or stimulus for the other two domains in the user's information seeking process. Carol Kuhlthau developed her theory of the information search process

(ISP) on the basis of Taylor's research on information needs and on the theories of the psychologist George Kelly (1963). The ISP has six stages that range from the initiation stage to the presentation stage in which the user completes the search process.

The other area identified by Sugar includes the sense-making approaches to IR based on Dervin's (1983) research that started in the early 1970's. This approach holds that users cannot be considered typical and that there is a discontinuity in the information seeking process. Sense-making consists of a set of theories and methodologies for assessing how people make sense of their environments and how people use information in the information-seeking process. Users typically move in a three-part cycle: situation-gaps-use (help). Information that is satisfying an information need at one moment may not be what is needed in the next moment. Thus, users experience gaps in knowledge when they move from a particular point in a time-space continuum. This user-oriented approach focuses on the situational and contextual aspects in IR. There is a need to focus on an individual's actions while using a system to identify patterns in users' behavior in order to determine how the user interface can be improved.

These studies demonstrate the shift in LIS research. The field has moved from the traditional reductionistic systems paradigm where quantitative analysis was the norm to a more naturalistic, qualitative viewpoint that includes the individual in an information-seeking context. Much of this research is indeed a product of the electronic information environment now available. In the past, users consulted the librarian who tried to determine what users needed. In the electronic (Internet) environment, users can search extensively without consulting the librarian. But will users find what they need? How helpful are personalization features in this "infoglut"? Also, different information systems are designed differently, and individual users must possess certain cognitive abilities, such as required in personalization, in order to receive the best results from the

system according to their information needs. The following section explains briefly some of the "newer" research techniques that have been used for quite some time in user studies. These particular techniques and methods (although not all were applied in this research) will illustrate how other researchers have recently approached investigations of users/systems interactions.

Newer Research Methods/Techniques

Studies in LIS apply numerous research designs and methods. In addition to quantitative research methods there has been increasing use of qualitative research methods. For example, Naturalistic Inquiry has become common in LIS user studies. Mellon (1990) was an early advocate in LIS for this qualitative research approach that comes from other social sciences. The central underlying idea is to collect data in natural environments, i.e., in real situations and settings in which information seeking behavior takes place. Participants in these studies are seen as "actors" by themselves, not observers, and research questions are examined by investigating participants' perspectives on their use of particular systems. Interviews and direct observation techniques characterize studies that belong in this category. These qualitative methods can yield broader explanations than experiments with highly controlled variables. Qualitative research is inductive (bottom-up) and seeks to find patterns and explanations during the research process. This inductive reasoning allows more flexibility and can lead to deeper insights into the user's information behavior than the quantitative or experimental approach.

Another technique for doing research developed relatively recently is Transaction Log Analysis: the unobtrusive recording of computer use statistics (keystrokes) and their analysis. This method is still evolving, and new software to record these data is

developed constantly. While it cannot provide any useful data about the user's internal states by itself, this method can complement other recording mechanisms such as audio- or video recording (Palmquist & Kim, 1998).

Verbal protocol analysis is another method applied in user studies. Users are instructed to "think aloud" while performing certain activities (Branch, 2001). These think aloud protocols are used to determine users' cognitive processes and sequences as well as their emotional states and motivations that occur in the information seeking process. Fidel (1988) used this method and transaction log analysis to identify the mental processes of professional searchers using bibliographic databases.

Focus group interviews, another form of qualitative research, have not become as common in user studies or the LIS literature, but they are also documented in the LIS literature recently (Chase & Alvarez, 2000; Curran, Bajjaly, Fehan, & O'Neill, 1998; Young, 1993).

Usability studies constitute another area of user studies and are explained in more detail below. These kinds of studies are usually conducted in the context of commercial software development primarily to identify interface design flaws. The goal is increased user-friendliness. One particular usability analysis technique is the "cognitive walkthrough" which focuses on the ease of learning a system. Cognitive walkthroughs normally involve novice users and the evaluation of each of their actions in performing a task sequentially. The goal is to produce an intuitive system, i.e. one as self-explanatory as possible that makes it easy to achieve a desired outcome associated with a particular action (John & Mashyna, 1995; Palmquist & Kim, 2000).

Summary

In sum, the research on users' information behavior has provided many valuable research methodologies, techniques, and results so far, but there is not really a singular, coherent view of the information seeking process. It is clearly important to apply user studies and research techniques that focus on the user rather than on the system in order to improve the design of information systems. Furthermore, it is important to adopt new analysis and research methods such as focus groups that can result in a better understanding of why systems are not as effectively designed as they might be. Information systems can be designed more effectively only if present research methodologies are refined and systems designers investigate and develop systems based on their users' needs. More research needs to be done to examine how users retrieve and interpret information through information systems (like public Web portals) and how they can use these systems most successfully. Too many aspects of the user-system interaction are still not very well understood. Increased interdisciplinarity in user research seems to be highly desirable if we want to understand our clients better. One important group of clients is the relatively well-defined group of undergraduate students, the focus of the study reported here.

UNDERGRADUATE STUDENTS' USE OF INTERNET RESOURCES

The literature about the use of Internet resources and services has mushroomed during the last six or seven years. Undergraduate students, the target population of this study, however, have been the focus of relatively few research studies. Instead, we find numerous studies involving, for instance, novices and experts (Lazonder, Biemans, & Wopereis, 2000), children (Bilal, 2000; Hirsh, 1999), graduate students (Wang, Hawk, &

Tenopir, 2000), university staff and faculty (Bruce, 1998), or other groups. In other studies we can see undergraduate students mixed with graduate students or faculty.

In a computer-administered study of Sheffield University students' perceptions of the Internet and its use, Ford and Miller's (1996) most important findings related to gender differences. Using a five-point Likert scale questionnaire, they found that female students were unable to find their way around the Internet effectively, often getting lost and feeling not in control. Females also found the Internet to be too unstructured and large and searching it too difficult and uncertain. Generally, they did not find the Internet enjoyable and used it only when they had to. Male students, however, seemed more likely to accept the irrelevant in search for the relevant and generally enjoyed using the Internet. Older students, suffering from information overload and anxiety, were aided by the Web's graphical approach, and older and female students used the Internet for work rather than for personal interest.

R. A. Wilson (1997), while conducting small focus groups, investigated how 73 full-time undergraduate students from five liberal arts colleges in Pennsylvania used the Internet for course-related research, and what reasons for such use or non-use were. Her findings indicated that the Internet was used primarily for e-mail, course research, and entertainment purposes. Non-users had no reason to use the Internet and did not know how to access or locate information. Almost all students reported difficulties with searching. No gender differences were discovered regarding comfort using the Internet, but some differences occurred accross academic levels and college campuses.

A study by Perry, Perry, & Hosack-Curlin (1998) used a survey to investigate whether age of university students and Internet use was related. The more than 500 participants in this study were students at three regional universities. Among the variables measured were numbers of students using the Internet, numbers of hours online

per week, type of computers used, the use of e-mail, and use of the Internet to obtain information. A survey was administered to the students during their regular scheduled classes and collected by the instructors. The findings showed a rather consistent range of 40% to 50% of the students in all age groups using the Internet at least once a week. The range of hours of Internet use per week was also found to be generally invariable across age groups. Those students over 26 were twice as likely to use their own computer than a university computer. The finding for the percentage of students who use e-mail regularly was also consistent across age groups (80%). More than forty-eight percent (48.3%) of the students indicated they regularly obtained information over the Internet. Students' perceptions of the Internet were also fairly consistent across all age groups: 95% of the students disagreed with a statement that the Internet was a passing fad. These findings indicate that age alone does not create major differences in Internet use among university students.

McFadden (1999) reports a study that was focused on the nature of students' Internet use in an on-campus lab at an unspecified major state university. Six computers were randomly selected in an open access computer lab comprised of 67 computers. Web hits from each of the six computers were analyzed. Overall, there were 2,310 hits: General (i.e. course activities, research, personal interest) = 47%, Mail = 28%, Chat = 13%, Search = 6%, Sports = 6%, Course Sites = 4%, News = 1%, Sex = 1%. A related finding is that 191 18-44 year old undergraduate students who were never married and who completed an anonymous 28-item questionnaire designed to assess their attitudes toward and involvement in use of the Internet to find a mate revealed that friendship, not romance or sex, was their primary goal of using the Internet. Other findings included that over 60% of these respondents were successful in establishing an online friendship (Knox, 2001).

The Internet has been a male-dominated technology since its beginnings, but a number of studies have reported that the gap between the numbers of men and women online has disappeared in recent years. Published research results with regard to gender differences among undergraduate students, however, are contradictory. Sherman et al. (2000) investigated three cohorts of undergraduates totaling 889 students in 1997, 1998, and 1999. The cohort comparisons revealed gender differences in five Internet activities (e-mail, WWW, Usenet, Multiuser dungeons, and chat groups) with no substantial lessening of these differences over time. With the exception of e-mail usage, males used Internet sources more often and had more positive attitudes about their experiences than did females.

Weiser (2000) confirms the existing gender gap but attributes several differences to differences in age and Internet experience. Results showed that males use the Internet mainly for entertainment and leisure, whereas woman use it primarily for interpersonal communication.

John Lubans (2000) of Duke University has conducted a number of annual studies concerning undergraduate students' use of the Internet. In his studies (now with over 700 student participants) Lubans found that students use the Internet in multi-faceted ways for information seeking and finding, and that their use of the Internet is diverse and on the increase. Lubans also confirms differences in what men and women do on the Internet. E-mail communication was the most mentioned application by men and women. Many women mentioned using bookmarks and bookmarking information, staying current and connected with what is happening in the world (news), using online notes for courses, consulting course Web pages, job and career searching, and starting research papers on the Web. Men mentioned searching or "looking up information on the fly," using the

Internet as the first resource for information, using class Web pages (much more so than women in the study), keeping up with the news, and listening to music.

Summary

Access to the Internet has become nearly ubiquitous in higher education in the U.S., and for undergraduate students in particular. The literature reviewed has shown that there has been some research into undergraduate students' use of Internet resources. The above studies have contributed to a better understanding about how undergraduate students use Internet resources, but they did not explicitly seek to understand undergraduates' use of public Web portals. This study, in contrast, was designed to fill this gap.

OVERVIEW OF USABILITY STUDIES WITH REGARD TO THE WORLD WIDE WEB

Usability and some of its methods have been mentioned above. For the reported study, it was necessary to look at the literature of usability studies with regard to the WWW. Although usability is not the focus of this research study, the body of usability literature could inform the design of the study vis-à-vis design problems that might influence undergraduates' use of public Web portals. A number of questionnaire items (see Appendix D) were inspired by usability studies reported in the literature.

Usability for the Web grew out of the software development discipline of Human Computer Interaction (HCI). In general, usability is a method that addresses the relationship between tools and their users. In order for a tool to be effective, it must allow intended users to accomplish their tasks in the best way possible. The same principle applies to computers, Web sites, and other software. In order for these systems

to work, their users must be able to employ them effectively. The key to Web site usability is ensuring that the site is both useful and usable for the intended audience. Usability is not a very new idea, but its application to the Web is relatively new. Palmquist (2001) writes:

> The term "usability" in proximity to the term "user" emerged in the mid-1980s as the user-centered approach to systems design began to develop. Early, in that period, usability often referred to the testing of written communication (e.g., documentation, owner's manual, etc.) that focused on software operation.…The testing of a software product's interface became a stronger application in the 1980s when it became apparent that testing a software product with actual users could improve customers' satisfaction and hence the profitability of the final product. (p. 125)

Although often not clearly labeled as applying usability methods, a number of studies involving concepts such as heuristic evaluation, efficiency of use or design effectiveness of Web sites could be included in the category of usability studies (Levi & Conrad, 2001; Nielsen & Mack, 1994).

For many in the field, the concept of usability can be traced back to Jakob Nielsen, former head of Human Factors Research at Sun Microsystems. Nielsen was probably the first to make a strong case for the cost-saving consequences of usability redesigns by calculating that he saved Sun $10 million annually by offsetting the time employees spent going through the Sun's Web pages daily before he redesigned them (Head, 1999). He founded the "discount usability engineering" movement for quick, inexpensive improvements to interfaces, and he has established several usability methods, including heuristic evaluation, which involves judging the compliance of an interface with recognized usability principles (heuristics). Nielsen (1993, p. 26) identified the following components, or attributes, of usability:

- *Learnability*: The system should be easy to learn so that the user can rapidly start getting some work done with the system.

- *Efficiency:* The system should be efficient to use, so that once the user has learned the system, a high level of productivity is possible.
- *Memorability*: The system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again.
- *Errors*: The system should have a low error rate, so that users make few errors during the use of the system, and so that if they do make errors they can easily recover from them. Further, catastrophic errors must not occur.
- *Satisfaction*: The system should be pleasant to use, so that users are satisfied when using it; they like it.

Most usability tests measure three aspects of a design: (1) Effectiveness: accuracy and completeness with which users achieve specified goals; (2) Efficiency: resources expended in relation to the accuracy and completeness with which users achieve goals; (3) Satisfaction: freedom from discomfort, and positive attitudes toward the use of a product based on typical users executing typical tasks (McGillis & Toms, 2001).

One approach of usability testing, also called the formal or traditional method, comes from classical scientific methods. This approach involves the development and testing of formal hypotheses in experiments often using randomly selected samples of participants. This method seeks to obtain measurable results about whether research hypotheses are statistically significant or not.

Another approach, more informal, relies on gathering qualitative data about users' interactions with a particular site when they are given specified tasks to complete. This approach has become increasingly popular since it can be timesaving and cheaper than conducting experiments with a larger number of participants, and the testing methods are easy to learn and apply. In addition, it was found that (1) four or five respondents reveal

80% of usability problems and (2) additional participants are increasingly less likely to reveal new difficulties (Virzi, 1990, p. 291.). In practice, there is often a mix of both formal and informal kinds of approaches.

What constitutes a usable Web site, however, is the subject of ongoing discussion. But there is a general agreement that a usable Web site is one that is accessible, appealing, consistent, clear, simple, navigable and forgiving of users' errors. If users get frustrated on a site they will use another one and probably not return. These aspects of usable design of Web pages are critical not only for commercial sites that may lose clients and business due to a design that is confusing or difficult to use, but also for any other sites. For example, Spool (1997) reports that users were able to find the correct answers to test questions only 42% of the time. When they used an on-site search engine, their success rate was only 30%. In tasks where they used only links, however, users succeeded 53%t of the time.

In the past, libraries have been reluctant to conduct usability studies because librarians have not traditionally seen themselves as designers of information systems. The WWW has helped change this attitude since librarians have become more involved in designing systems that are usable, that work well and easily for their clients. A number of case studies reported in the LIS literature are evidence of this change (Benjes & Brown, 2001; Chisman, Diller, & Walbridge, 1999; Dickstein & Mills, 2000; Feldman, 1999; McGillis & Toms, 2001; McMullen, 2001; Mitchell, Davidson, & Branch, 2001). Norlin and Winters' *Usability Testing for Library Web Sites: A Hands-on Guide* (2002), the first monograph entirely dedicated to usability for library Web sites, is further evidence.

Librarians and other information professionals plainly need to maximize Web sites' usability. After all, access to information is our business. As libraries continue to

purchase more online resources and offer more Web-based services, access and usability must be even considered more fully. We cannot fulfill our mission as librarians until we do our best to ensure that the tools and resources we offer are available in the most usable manner to the largest audience possible. By investigating other popular and widely used sites on the WWW such as public Web portals librarians can actually gain a lot of expertise and knowledge that can make them equal partners with usability specialists and Web site developers when it comes to functional design.

Summary

Usability studies have gained prominence in the Web user research literature in recent years. There is no doubt that the ensemble of methods applied in usability studies, such as heuristic evaluation, cognitive walkthrough, prototyping, or focus groups, has helped to improve the accessibility and usefulness of many information resources available on the WWW. Even more, no serious research study targeting users and the use of Web sites can neglect results and activities from usability studies. The importance of usability studies indisputable even though it is still a rather new discipline relying on empirical tests with often surprising and sometimes contradictory results that will have to establish a more scientific or theoretically grounded base.

Usability studies cannot rely only on somewhat "subjective" checklists, such as Nielsen's heuristics, for accessible and usable Web interface design although many of these checklist items are commonly agreed on. The problem with usability studies according to Baecker, Grudin, Buxton, and Greenberg (1995) is that:

> [M]any empirical studies of interactive computer use have no theoretical orientation. Data is *[sic]* collected, but no underlying model or theory of the process exists to be confirmed or refuted. Such a model or theory would be very useful because with many design decisions there are too many alternative

> proposals to test by trial and error. A strong theory or performance model could reduce the set of plausible alternatives to a manageable number for testing. (p. 573)

These present shortcomings of usability studies, however, were not seen as a reason to exclude any valuable activities or testing principles from this area while designing this study. As mentioned, experiences from the usability area were partially applied in the development of this study's questionnaire (Appendix D) and focus group guide (Appendix E) although this study's focus was not on usability testing.

Chapter 2 introduced and reviewed literature and theories that the researcher found related to and informing his research approach used in the study reported here. It needs to be mentioned again that there has not been any systematic investigation of undergraduates' information behavior on public Web portal sites to date, and that this study, for the first time, took a closer look on the information behavior of undergraduates' on public Web portals and their use of these sites also in relation to personal home pages. Chapter 3 presents the study's design and methodology including the response rate. Chapter 4 outlines the results of numerous descriptive and inferential statistics about respondents' demographic and use variables in relation to using public Web portals and personal home pages. It also includes the results of content analysis of open-ended questionnaire items, focus group meetings, and personal interviews that informed and supported the study's findings. Chapter 5 summarizes the study's key findings and discusses some of these findings, data quality measures, limitations of the study, and suggestions for future research activities.

Chapter 3: Study Design and Methodology

INTRODUCTION

The purpose of this study was to explore undergraduates' use of selected public Web portals. It aimed to understand students' information needs and behavior on these sites applying quantitative and qualitative research methods. The goals of the study were to (1) show what kinds (with regards to selected demographic and use variables) of undergraduates use or do not use public Web portals, (2) examine why undergraduate students use or do not use these sites and particular features, (3) assist practitioners such as Web developers and marketers in their goal to increase the popularity and usefulness of a site and its information and services, and (4) contribute to information literacy of undergraduates in adaptive Web environments. The study addressed the following research questions as discussed in Chapter 1:

1. What kinds of undergraduate students use public Web portals?
2. Which portals do undergraduate students prefer and why?
3. Why and how do undergraduate students use public Web portals?
4. What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?

This chapter will present the development of the study's research design, data collection instruments, sampling and recruitment of participants, data collection and analysis procedures.

DEVELOPMENT OF THE RESEARCH DESIGN

As mentioned in Chapter 1, the study originated from a class discussion about the use of personal home pages during which one student referred to his use of a public Web portal. Following this incident, numerous class discussions, focus groups, and personal interviews informed the refinement of research questions and data collection instruments. The researcher became aware that the use of public Web portals by undergraduates is a rather complex phenomenon that is not very well-researched nor well-understood. It also became obvious that research in this area could not be based solely on quantitative or qualitative paradigms but rather on a combined or mixed-methodology research design (Cresswell, 2003) to extend breadth of the inquiry (Greene, Caracalli, & Graham, 1989). This study included the exploratory, multi-faceted, iterative research design described below.

Class discussions and informal interviews resulted in the creation of a self-administered and standardized questionnaire containing closed and open-ended questions, and in the development of a focus group guide. Both data collection instruments were first tested with undergraduates enrolled in an Internet class at a large university in the Southern U.S. in the year 2000 and were refined in subsequent semesters according to the emerging research questions and to changes on several public Web portals until the start of data collection. While it was the original intention to focus only on users of these sites, it became evident that it was necessary to study non-users as well to get a better picture of undergraduates' use of public Web portal sites in general. The participants in the pilot tests could not be deemed representative of a larger group of undergraduates for at least the following reasons:

1. Students had been heavily exposed to the Internet as a result of the class and public Web portals had been covered briefly in class.

2. Students' characteristics such as classification (mainly sophomores and seniors), gender (mainly male), and Internet experience (predominantly long-time users) seemed skewed when compared to the larger population of undergraduates more generally.

For these reasons there is no detailed discussion of the results of the pilot tests here. The pilot tests, however, helped the researcher to define the study's research questions and to improve the data collection instruments.

The 56 participants in the pilot tests were asked to time how many minutes it took to fill complete the questionnaire, to mark items or instructions that were unclear, and to make additional comments. It took most students 20 to 35 minutes to complete the questionnaire depending on the number of questions answered and how detailed their responses were to open-ended questions. There were only a few comments concerning unclear items or instructions that were considered in revisions for the final version of the instrument (Appendix D). This step was critical since students might not be willing to respond to lengthy and time-consuming questionnaires that might contain terms they do not understand. The researcher made changes regarding the wording of several questions. More specifically, a number of questions involving time and use of personalization were re-phrased and re-organized.

The focus group method was new to the researcher at the beginning of the pilot tests but was selected because of its advantages such as speed, transparency, interaction flexibility, and open-endedness (Gorman & Clayton, 1997). Berg (2001, p. 111) calls focus groups a method "to learn through discussion about conscious, semiconscious, and unconscious psychological and socio-cultural characteristics and processes among various groups." This technique has proven to be an excellent way to collect "one-shot" data in a setting where "certain groups of interest … may remain available for study only

for limited amounts of time." Morgan (1998, pp. 12-13) points out that focus groups are particularly useful for "exploration and discovery," to "discover new insights," and to "investigate contexts in which … participants operate." Each focus group consisted of four to eight students and was facilitated by the researcher and his assistant. Focus groups were tape-recorded, and notes were taken during the interviews as well as immediately after the discussions. Tapings were, at the beginning, of questionable quality because of a low volume level, but this problem was solved subsequently using a room microphone. Videotaping was used in one focus group but with rather dissatisfying results since some participants felt obviously uncomfortable and distracted. Some groups were more outgoing than others, but the focus groups not only helped the researcher to become more comfortable with this research technique but also helped clarify some emerging themes with regard to public Web portal users. Also, as a direct result of the focus groups from the pilot tests the researcher found it very useful to have a computer with Internet connection available during the meetings for this study since a few students during the pilots found it obviously easier to show while on the portal sites what they could not put into words so easily otherwise. The following section of the chapter outlines sampling and recruitment of participants for this study.

SAMPLING AND RECRUITMENT OF PARTICIPANTS

As mentioned above, the participants in the pilot studies were unlikely to be representative of the overall population of undergraduate students. To ensure representativeness in the study as a whole, the following sampling process was used to recruit participants for the research. The sampling was designed to maximize the researcher's resources as well. Approval for the use of human subjects had been received

by the university's Institutional Review Board for the Protection of Human Subjects several weeks prior to the beginning of data collection.

Based on the assumption that the population of undergraduate students at the research site is not different from the population of undergraduate students in the U.S. in general, a stratified random sample of 431 undergraduate students was chosen with the assistance of the university's Student Affairs Office database (the sample frame) in mid-May 2002. The sample was stratified according to the following variables: full-time undergraduate status (registered for at least 12 credit hours during long semesters), gender, age, classification (freshman to senior), and major. Further stratification variables were place of residence (only students with a local address) and registration for the summer (only students registered also for at least one summer session) since it would have been not feasible to invite students for focus groups and follow-up interviews who did not live in close approximation of the research site during the summer. The sample was likely to include users and non-users of public Web portals as well as undergraduates who use personalization and others who do not. This procedure helped to guarantee external validity (generalizability) of the results. Other data quality measures are discussed in more detail in Chapter 5. The information in the sample included students' names, mailing addresses, phone numbers, and e-mail addresses. Babbie (2004, p. 208) describes a similar stratification emphasizing the utility of this approach when financial resources are limited.

The first invitation to participate in this study (Appendix A) was sent via e-mail to the 431 students on June 11, 2002. Students were assured of confidentiality and they had the opportunity to contact the researcher directly by e-mail or to complete a short response form on the WWW (Appendix B) within seven days expressing their interest in participating in the study. Students who expressed willingness to participate in the study

received the questionnaire (Appendix D) and other instructions (Appendix C) together with a prepaid return envelope by regular mail immediately. The researcher contacted those students who had not replied but had a working e-mail address up to four times until late August 2002 resulting in the set of 144 usable questionnaires by the end of data collection on October 28, 2002. The number of responses and their distribution over time are described in more detail below. Table 3.1 summarizes the initial three stages and activities in the recruitment of participants.

Table 3.1: Summary of the initial stages and activities in recruitment of participants

Stage	**Activities**
I	Identification of participants and their e-mail and mailing addresses Invitation to the study by e-mail providing choice to reply via e-mail or initial contact form on the WWW
II	Mailing of questionnaire, instructions, and prepaid return envelope to participants who expressed interest in participation in stage I
III	Collecting questionnaire responses and scheduling of focus groups and individual follow-up interviews based on students' consent

Quite often, stages overlapped since, for instance, some students who expressed interest in the study right after the initial invitation returned the questionnaire only after several weeks, while others delivered their completed questionnaires personally when they came to a focus group or to an individual follow-up interview. A small number of non-responding participants confirmed the receipt of the materials during the researcher's follow-ups by e-mail or telephone but claimed to have lost them. In most of these cases, the researcher mailed the materials again. However, at least three of those students took advantage of the study's Web site that contained all materials except for the prepaid return envelope in Portable Document Format (pdf) for easy download.

RESPONSE RATE

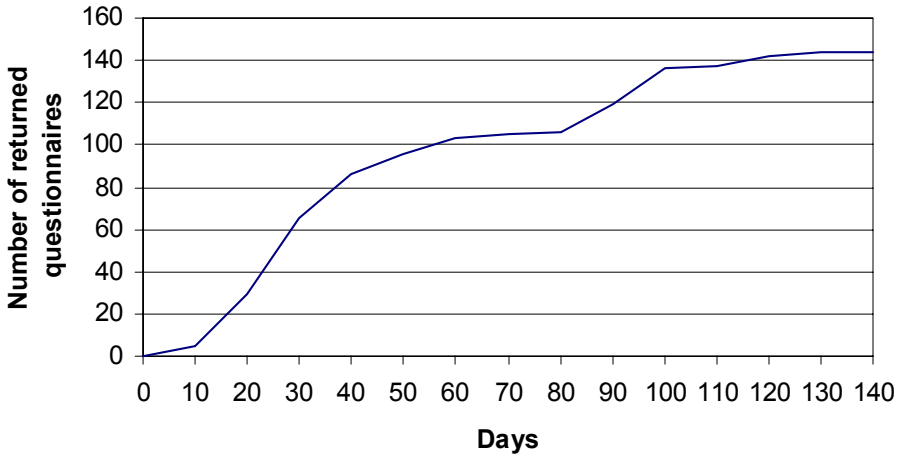
As stated above, the researcher obtained a random stratified sample of 431 undergraduate students for this study with the assistance of the university's Students Affairs Office and contacted these students via e-mail (Appendix A). Of the 431 potential respondents in the sample frame, 15 were unreachable due to invalid e-mail addresses. Two students replied and stated that they were no longer affiliated with the university (there might be some other unknown cases), reducing the target sample frame to 414. At the end of data collection after 140 days in late October 2002, 201 students had completed either the initial contact form (Appendix B) or replied directly by e-mail, and 144 usable questionnaires were received. These 201 responses include 34 students who expressed a desire not to participate and 23 students who expressed interest in participation but whose questionnaires were incomplete or not received at all. The initial response rate for this study was 48.6% (201 of 414), and the reply rate of usable questionnaires was 33.8% (144 of 414).

Figure 3.1 shows the daily cumulative response rate of usable questionnaires received via mail from the beginning of data collection on June 11, 2002, until the end on October 28, 2002. Considering the obvious delay between students' initial intent to participate in the research and receipt of their completed questionnaires via mail, Figure 3.1 shows clearly that the initial request to participate in the study and the first two follow-ups sent via e-mail on days 10 and 20 generated two thirds or 96 of the overall 144 usable questionnaires up to day 50 in early August 2002.

The third follow-up sent on day 40 of the study generated some new replies in the next few days, but the number of replies returned as a result of this request was relatively

low. It needs to be noted that the third follow-up was sent at the end of the first and at the beginning of the second summer session of the university's academic year 2002. Several

Figure 3.1: Daily cumulative number of returned usable questionnaires



respondents at that time expressed interest in the research but indicated that they would not be able to participate in the research before the start of the new semester in late August 2002 due to their workload or vacation plans. In total, 105 usable questionnaires had been received when the fourth and final follow-up was sent via e-mail on day 77 of data collection in late August 2002. The result was a new wave of replies particularly during the following two weeks, but the number of replies returned was lower compared to the first four requests for participation in the study. Up to day 100 of data collection in mid-September 2002, 136 of the 144 usable questionnaires were returned, and only 8 more arrived during the remaining data collection through the end of October 2002.

Following initial analyses of the questionnaire data as well as the six focus groups and 26 individual follow-up interviews conducted until early September 2002, the researcher decided to stop the request for participation in the study after the fourth

follow-up since a point of data saturation was reached and remarkably new material compared to previous research endeavors did not emerge. However, two more focus groups and thirteen additional individual follow-up interviews were conducted until late October 2002. Overall, it is difficult to say how many undergraduates might have been unable to express interest in participating in this study by completing the initial Web-based contact form as a result of personal discomfort with completing Web-based forms, or their overall limited use of the Internet. It is also not known how many undergraduate students never received or read the invitation due to e-mail filtering by their service providers. Two participants with Hotmail addresses reported that they received the invitation in their folder for bulk messages. However, the number of students with Hotmail addresses in the sample frame was quite low. Follow-ups were sent to them individually.

Traditional research literature states that response rates to invitations for participation in studies like this one can be rather low. For this reason the following incentives were chosen to stimulate higher participation in the study. All participants had the opportunity to be involved in the three stages of data collection explained below. Participants had a chance to win at least one of 20 gift certificates for BestBuy, Circuit City, and other businesses in the local area with a face value between $10 and $50 each depending on their degree of participation in the study. Participants who returned only the questionnaire had one chance to win one of these certificates, while participants who also attended one of the focus groups had two chances to win a prize. Participants who also appeared at a follow-up interview had three chances during the drawing that was conducted by the researcher's assistant once the collection of data was complete. While the researcher does not know how much these incentives contributed to students' willingness to participate in the study, it seems clear that these incentives influenced the

reply rate of usable questionnaires (33.8%) and participation in focus groups and follow-up interviews.

The researcher would like to point out that it became clear during the process of questionnaire collection that all but two respondents were users of public Web portals. To find and recruit more non-users of public Web portals for this study, the researcher posted more than 200 advertisements in form of flyers (Appendix E) offering a cash incentive for participation in this study in highly frequented areas on campus and in the university's neighborhood in late August and again in mid-September 2002. Overall, only thirteen potential participants replied via the Internet or telephone within two weeks of the postings. However, none of them qualified as a non-user of public Web portals according to initial interviews via e-mail or telephone since they had all used at least one of the public Web portals for e-mail, Web searching, or other purposes. Some students actually initiated contact using e-mail accounts at Yahoo! or AOL.

Since data collection consisted of three phases, a description of response rate for this study cannot be limited simply to usable questionnaires received (phase 1) but needs to include also a description of the participants' willingness to be contacted for focus groups (phase 2) and for brief individual follow-up interviews (phase 3). Item 23 of the questionnaire (see Appendix D) asked respondents if the researcher might contact them for focus groups and follow-up interviews and the best way to establish such contact. Overall, 100 of the 144 respondents (69.4%) expressed interest in being contacted via e-mail or telephone for phases 2 and 3 of the research. Table 3.2 provides information about the respondents' willingness to be contacted for focus groups and follow-up interviews according to gender, age, major, classification, and GPA based on the total number of usable questionnaires received (N=144). The following results are noteworthy:

Table 3.2: Respondents' willingness to be contacted for focus groups and follow-up interviews by gender, age, major, classification, and GPA

	Number of respondents willing to be contacted (N = 100)	Number of all respondents (N = 144)	Overall % of respondents willing to be contacted
Gender			
Male	43	59	29.9
Female	57	85	39.6
Age			
Under 18	2	2	1.4
18 – 23	87	125	60.4
24 - 30	10	15	6.9
31 – 39	1	2	0.7
Major			
Natural Sciences	31	42	21.5
Social Sciences	43	66	29.9
Arts & Humanities	23	31	16.0
Other	3	5	2.1
Classification			
Freshman	19	20	13.2
Sophomore	12	18	8.3
Junior	16	27	11.1
Senior	50	75	34.7
Other	3	4	2.1
GPA			
Less than 2.00	3	3	2.1
2.00 – 2.49	4	10	2.8
2.50 – 2.99	23	36	16.0
3.00 – 3.49	32	51	22.2
3.50 – 4.00	32	38	22.2
None	6	6	4.2
Total	100	144	69.4

- Given the sample distribution by age, the large majority of responding students willing to be contacted were between 18 and 23 years old (87 out of 125), while no respondent in the sample was older than 39 (row omitted in all subsequent tables).
- Almost all responding freshmen (19 out of 20), but only a bit more than half of the juniors (16 out of 27), two thirds of the sophomores (12 out of 18), and two thirds of the seniors (50 out of 75) were willing to be contacted.
- All respondents with a GPA lower than 2.00 (3 out of 3) and with none (6 out of 6), but only about half (4 out of 10) of those with a GPA between 2.00 and 2.49, and four fifths (32 out of 38) with a GPA between 3.50 and 4.00 were willing to be contacted.

All of the 100 participants who stated interest in phases 2 and 3 of the research were contacted several times during the process of data collection. However, several participants dropped out during that time, did not appear at focus groups (phase 2) despite their confirmation, or were available for only either phase 2 or phase 3 of data collection. Overall, 42 students participated in the eight focus groups, and 39 individual follow-up interviews were conducted up to the end of data collection in late October 2002. Noteworthy is that the two non-users of public Web portals expressed interest in being contacted in question 23, but a focus group with non-users was infeasible due to this low number. One of the non-users agreed to an individual interview (see description and analysis in Chapter 4). Only 34 respondents participated in both focus groups and individual follow-up interviews, while eight respondents participated solely in one of the focus groups, and another five (including one of the non-users of public Web portals) participated in only an individual follow-up interview. This is also a result of the data collection procedure that allowed participants to complete either phases 2 or 3 depending

Table 3.3: Participants in focus groups and follow-up interviews by gender, age, major, classification, and GPA

	Number of participants in focus groups	Number of participants in follow-up interviews	Number of participants in both
Gender			
Male	21	22	18
Female	21	17	16
Age			
Under 18	1	0	0
18 – 23	33	31	26
24 - 30	7	7	7
31 – 39	1	1	1
Major			
Natural Sciences	19	17	15
Social Sciences	13	12	11
Arts & Humanities	9	9	8
Other	1	1	0
Classification			
Freshman	5	5	4
Sophomore	6	7	5
Junior	5	5	4
Senior	24	20	19
Other	2	2	2
GPA			
Less than 2.00	0	1	0
2.00 – 2.49	2	3	2
2.50 – 2.99	10	9	9
3.00 – 3.49	13	12	11
3.50 – 4.00	14	12	10
None	3	2	2
Total	42	39	34

on personal preferences and availability. In other cases, focus groups were infeasible due to low numbers of participants, and only individual follow-up interviews could be conducted. Tables 3.3 and 3.4 display the numbers of students who participated in focus groups and follow-up interviews by gender, age, major, classification, GPA, personal home page, and personalization.

Table 3.4: Participants in focus groups and follow-up interviews by personal home page and personalization

	Number of participants in focus groups	Number of participants in follow-up interviews	Number of participants in both
Personal Home Page			
Yes	8	8	7
No	34	31	27
Personalization			
Yes	22	18	17
No	20	21	17
Total	42	39	34

Worth mentioning are the following results:

- While the number of female respondents willing to be contacted for focus groups and follow-up interviews was higher than those of their male counterparts (see Table 3.2), the actual number of female participants in focus groups and follow-up interviews was slightly lower than the number of male participants.
- While the number of students in the Social Sciences who expressed interest in being contacted for phases 2 and 3 of the study was the highest compared to other

majors (see Table 3.2), their actual number was remarkably lower but second only to participants from the Natural Sciences.

- The number of sophomores who participated in phases 2 and 3 was almost equal to the number of participants who identified themselves as freshman or juniors despite the higher number of the latter two expressing their willingness to be contacted (see Table 3.2).
- None of the students with a GPA of less than 2.00 took part in the focus groups, but one participant completed a follow-up interview.

THE THREE PHASES OF DATA COLLECTION AND INITIAL DATA ANALYSIS

As previously mentioned, phase 1 of data collection consisted of the return of the completed self-administered questionnaire. To ensure further confidentiality the researcher assigned each questionnaire a unique response number upon receipt. Initial coding and data analysis with regard to use and non-use of public Web portals as well as the use of personalization on public Web portals were performed immediately after return of the questionnaires.

The eight focus groups with a total of 42 participants (phase 2) and the 39 individual follow-up interviews (phase 3) were scheduled based on respondents' consent and availability. Tape recordings from focus groups and individual follow-up interviews were transcribed for further analysis by the researcher. The researcher scheduled the focus groups several weeks in advance depending on room availability. Participants received an invitation to the focus groups by e-mail at least 14 days in advance. In addition, the researcher sent confirmed participants a short reminder two or three days before the meetings. Most focus groups took place in the evening, but two meetings were scheduled at earlier times during the day to accommodate respondents' preferences.

Depending on the number of participants and their engagement in the discussions, focus groups lasted between 55 and 90 minutes. The researcher ensured the availability of a computer with Internet connection during the focus groups and provided refreshments to make participants feel as comfortable as possible. All focus groups were tape-recorded based on students' permission and used a semi-structured focus group guide (Appendix F). The scheduling of the focus groups turned out to be more challenging than anything else during data collection since a number of respondents did not show up despite their confirmation for several reasons. One meeting had even to be cancelled entirely since only three of seven confirmed participants showed up, and a focus group was impossible due to this low number. The researcher, however, conducted individual interviews with the three students present, and one of them was actually also available for the next scheduled focus group meeting. While most of the focus groups were administered by the researcher alone, the researcher took notes during as well as right after the meetings. This procedure turned out to be the most helpful during the several rounds of iterations of content analysis later since a number of themes described and discussed in Chapter 4 had already emerged.

The 39 individual follow-up interviews were also scheduled according to participants' prior consent and as much as possible to their individual availability. Some interviews took place in the researcher's office, at different locations on campus, and in participants' residences. Most individual follow-up interviews involved the clarification of answers in the questionnaires and of focus group comments that participants had made. All individual interviews included a question about participants' thoughts regarding the relationships of the use of public Web portals and personal home pages as well as a question regarding their thoughts about the future of developments in public Web portals

in general. The researcher took notes and tape-recorded these interviews for later transcription.

Again, the three phases of data collection overlapped in time depending on participants' responses to one of the invitations sent out via e-mail and their availability for and willingness to participate in phases 2 and 3 of the research. Data coding and analysis were usually started right after the completion of any of these three collection phases. Table 3.5 provides a summary of the three phases of data collection including their objectives, the researchers' activities, and data collection instruments used throughout this study.

Table 3.5: Summary of the three phases of data collection objectives, activities and data collection instruments used for analysis

Phase	**Objectives**	**Activities**	**Data Collection Instruments**
1	Data Collection Data Analysis	Administer questionnaire Perform quantitative analysis of questionnaire responses and start qualitative analysis of open-ended items	Questionnaire
2	Data Collection Data Analysis	Schedule and conduct focus groups Start compiling notes and transcribe tapes Analyze transcribed focus groups Finalize coding schemes	Focus group guide Focus group notes Audiotapes and transcripts
3	Data Collection Data Analysis	Schedule and conduct personal interviews Continue with data analysis activities from phase II Solicit participants' reactions to initial analysis (member checking)	Interview questions and notes Audiotapes and transcripts

The researcher contacted all focus group participants as well as interviewees upon completion of the transcripts to ensure higher data quality. This technique is called member checking. Overall 21 participants agreed to meet with the researcher for a short discussion of his interpretations again, while others had moved or could not be reached for other reasons.

The three phases of data collection overlapped each other and overlapped transcription, initial coding and initial data analysis described in the next section.

DATA ANALYSIS PROCEDURES

This study used descriptive statistics, statistical inference, and content analysis as major data analysis techniques to answer the four research questions. The questionnaire (Appendix D) had 28 items including open and closed questions, judgments on Likert and other rank scales, and yes/no items. Questions 1 to 7 and 22 to 28 asked for responses about participants' general Internet use and demographic characteristics. All respondents answered these questions. Questions 8 to 14 and 21 asked users of public Web portals for information about the use of their preferred sites and about tasks they carry out on these sites. All but the two non-users completed these items. Questions 15 to 20 asked students who had also used personalization on public Web portals to assigns ranks regarding their experiences and satisfaction with personalization and particular personalization features. Overall, 66 respondents completed these items.

Upon receipt of all the questionnaires, the researcher entered all but the data from the open-ended questions into the data editor of SPSS 12.0 based on the codebooks in Appendix G. This procedure allowed the researcher to easily calculate frequency distributions and cross tabulations of the entire sample (N = 144), sub-samples of users of public Web portals (N = 142), and of users of public Web portals who used the available

personalization options (N = 66). In essence, the researcher used three data files for descriptive statistics and formal hypothesis testing. In the beginning, the researcher calculated a number of Chi-Square tests by hand, but calculations became more complex and complicated, and the researcher used the assistance of the Research Consulting Group at the University of Texas at Austin to analyze the data using Chi-Square. Although meetings were usually limited to one or two hours per week over several months, this assistance proved to be very valuable in particular for data recoding, collapsing and interpretation of the findings.

Content analysis involved the identification of emerging themes and identification of their similarities and differences in all three phases of data collection. Open-ended questions, transcripts of tape-recordings from focus groups and individual interviews, and the researcher's notes were the basis for the content analysis in this study. Answers to open-ended questions were transcribed and grouped according to emerging themes. In particular, the transcription of the tape recordings of focus groups and interviews was a very time-consuming and work intensive procedure but helped the researcher to detect possible themes. This procedure generated over 160 pages of transcripts. The researcher listened to the tapes and read the transcripts several times comparing them with his personal notes. During these analysis activities the researcher marked emerging themes with different colors on paper. These marked paragraphs were later cut out and sorted by research questions and themes together with printouts of the open-ended answers of the written questionnaire.

Although not mutually exclusive, the themes that emerged reflected the manifest content of respondents' comments. Most challenging was the coding of multiple responses from the same respondent to ensure that the numbers of occurrences reported were correct. Some students partially repeated in focus groups or follow-up interviews

what they had already written in some of the open-ended items of the questionnaire. In addition, it was important to clearly distinguish between the themes that emerged about respondents' use of public Web portals in general and those that emerged from use of a particular site. The researcher organized and analyzed the themes at first according to the research questions, in particular to RQs 2 to 4. Tables were used to sort the themes according to the research questions, and the occurrences of themes were counted. The content analysis spanned the entire time of data collection and analysis and reflects the researcher's increasing knowledge of the research topic. While it needs to be emphasized that all data collection activities contributed to addressing the research questions (with the exception of RQ 1), the findings from the content analysis were used mainly to complement and support the statistical analysis. The results of the content analysis played an important part in addressing the research questions, in particular when statistical analysis did not result in statistically significant relationships between variables.

SUMMARY

This chapter discussed the design and execution of a study about the use of public Web portals by undergraduate students at a large university in the Southern U.S. The study sought to determine possible differences in undergraduates' demographic and use characteristics with regard to the use of these sites as well as in relation to the use of personal home pages. In addition, it was intended to investigate and explain reasons for use and non-use of public Web portals in general as well as for preferences for particular portals and personalization features. Chapter 4 expands on the activities described above and provides detailed findings from the quantitative and qualitative data analysis.

Chapter 4: Study Results

INTRODUCTION

After having outlined the study in general, reviewed relevant literature, and described the methodological design and considerations of data collection and analysis, Chapter 4 reports this study's major findings. Particular statistical calculations are described more fully in Appendices H and I.

The research described here aimed to answer the following four research questions:

1. What kinds of undergraduate students use public Web portals?
2. Which portals do undergraduate students prefer and why?
3. Why and how do undergraduate students use public Web portals?
4. What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?

The chapter reports the findings of the data collection and analysis methods described in Chapter 3 and reflects on that chapter's results. Please see also Table 1.4 for data collection activities, purpose and kinds of data as well as data analysis techniques used. While most of the chapter is concerned with the use of public Web portals by undergraduate students, there is also a brief discussion of the participants who identified themselves as non-users of public Web portals.

Chapter 4 is generally structured according to the four research questions of the study. While the data collection activities yielded a massive amount of data, this chapter concentrates on only the most important results with regards to the research questions

that framed the study as a whole. Therefore, not all results can or should be reported here, and findings that do not contribute to answering the research questions specifically are not discussed here. For example, there is no detailed analysis of the students' general comments about public portal sites in questions 22 and 24 since these questions were included only to allow for additional remarks, and to see whether the respondents' ideas about public Web portals met the researcher's definition. In addition, resource limitations and space constraints dictated against further exploration of several topics.

The chapter begins with demographic and use variables that the sample reported in questions 1 to 7, and 25 to 28 of the self-administered questionnaire (see Appendix D) to answer RQ 1. To answer RQ 2, the next section includes descriptive statistical summaries of the responses to question 8 (N = 142), formal hypothesis tests and data from focus groups and follow-up interviews. The chapter proceeds with findings related to RQ 3 starting with descriptive statistics and formal hypothesis tests based on respondents' answers to questions 9 to 12, 14 to 18 and 20. Furthermore, the chapter reports on the content analysis of questions 13 and 19 as well as from focus groups and follow-up interviews relevant to RQ 3. The chapter concludes with findings derived from formal hypothesis tests and content analysis of focus groups and follow-up interviews related to RQ 4.

CHARACTERISTICS OF UNDERGRADUATE USERS AND NON-USERS OF PUBLIC WEB PORTALS (RQ 1)

As previously stated, RQ 1 asked: "What kinds of undergraduate students use public Web portals?" Despite the fact that there was no indication of non-users of public Web portals in the pilot tests, the study was designed to investigate also possible non-

users of these sites and reasons for such behavior to provide a more comprehensive picture of undergraduates' behavior. It is also that there was response bias in the pilot tests since almost all participants were students in an Internet course taught by the researcher and had therefore been exposed to Internet use as a result of the course's subject. Data to explore RQ 1 included particularly answers to items 1 to 7 and 24 to 28 of the self-administered questionnaire as well as the content analysis of the individual interview with one of the non-users of public Web portals to describe the rather rare phenomenon of non-use as much as possible. These demographic and use characteristics were selected since previous research has shown that they might influence users' information seeking behavior in electronic environments.

In general, the use of public Web portals by undergraduate students was nearly ubiquitous. Of the 144 respondents, an overwhelming majority of 142, or 98.6% of the sample, identified themselves as users of public Web portals in item 7 of the questionnaire, while only two students (1.4%) had not used any of the sites under investigation. This result generally confirmed the outcome of the pilot tests and was reaffirmed by the inability to find more non-users of public Web portals following the distribution of advertisements around campus during data collection. Tables 4.1 to 4.3 summarize demographic background and information about technical expertise of the participants and help to contextualize the data analysis throughout this chapter.

Demographic Background

The ratio of male to female students in the sample was almost 2:3, with the former accounting for 41% of the sample, and the latter 59%, with one non-user in each group.

The overwhelming majority of students surveyed, including the two non-users, were between 18 and 23 years old (86.8%), 10.4% between 24 and 30, 1.4% under 18,

and 1.4% between 31 and 39 years of age. No participant was older than 39 years. This was not a surprise since 18 to 23 year olds dominated at the research site. However, as a result of this outlier, the researcher decided to exclude the demographic variable age from hypothesis testing because a combination of students who fell into the group of 18 to 23 years of age with other age groups seemed not useful. All hypothesis tests showed no statistically significant results. Instead, the other, more evenly distributed demographic variables were used.

Table 4.1 shows that the majority of participants, or 45%, pursued a degree in Social Sciences, while 29.2% studied in Natural Sciences, and 21.5% in Arts and Humanities (including one non-user in each of the latter two). A slight minority of 3.5% of the participants was undecided, or did not pursue a degree at the time of data collection. The very few instances of double majors were coded according to the major indicated first in the questionnaire. For example, a student majoring in Government/Spanish was coded as Social Sciences.

Surprisingly, over half of all students surveyed were seniors (52.1%, including one non-user), while 18.8% classified themselves as juniors. The third largest group was comprised of freshmen (13.9%, including one non-user), followed by sophomores (12.5%), and others (2.8%). It can be assumed that seniors were more responsive than others because they were either more interested in the research topic in general or they were more susceptible to this kind of research due to prior experiences in other studies.

One senior actually stated: “I am glad to help out since I had to conduct research with participants last semester and I know how difficult it can be to get enough people if you don’t pay them. Besides that I always like to learn something new for my future research with people.” Another senior wrote in question 24: “I think this is a great research topic. I am really looking forward to seeing what others have to say and what

Table 4.1: Number of users and non-users in the sample by gender, age, major, classification, and GPA; N = 144

	Number of users	Number of non-users	Total (% of Total)
Gender			
Male	58	1	59 (41.0)
Female	84	1	85 (59.0)
Age			
Under 18	2	0	2 (1.4)
18 – 23	123	2	125 (86.8)
24 - 30	15	0	15 (10.4)
31 – 39	2	0	2 (1.4)
Major			
Natural Sciences	41	1	42 (29.2)
Social Sciences	66	0	66 (45.8)
Arts & Humanities	30	1	31 (21.5)
Other	5	0	5 (3.5)
Classification			
Freshman	20	0	20 (13.9)
Sophomore	17	1	18 (12.5)
Junior	27	0	27 (18.8)
Senior	74	1	75 (52.1)
Other	4	0	4 (2.8)
GPA			
Less than 2.00	3	0	3 (2.1)
2.00 – 2.49	10	0	10 (6.9)
2.50 – 2.99	36	0	36 (25.0)
3.00 – 3.49	50	1	51 (35.4)
3.50 – 4.00	37	1	38 (26.4)
None	6	0	6 (4.2)
Total	142	2	144 (100)

you find out. Keep me posted."

Table 4.1 displays that 35.4% of the respondents reported a GPA between 3.00 and 3.49, while 26.4% had a GPA between 3.50 and 4.00, 25.0% a GPA between 2.50 and 2.99, 6.9% a GPA between 2.00 and 2.49, and 2.1% a GPA lower than 2.00. Some students did not want to disclose their GPA, or did not have one since they had just entered the university. This group contributed 4.2% to the sample.

Technical Knowledge

In terms of technical knowledge, respondents were asked to provide information about their preferred browser and operating system, Internet access, length of Internet use, and the existence of a personal home page. In addition, students were asked to rate their overall skills in using the Internet and in doing business of any kind online. Tables 4.2 and 4.3 below summarize the answers to questionnaire items 1 to 6.

Versions of Microsoft's Internet Explorer (IE) accounted for 81.3% of the preferred browsers, while Netscape accounted for 13.9%, and other browsers for 4.9%. Of the seven students who indicated another browser, four used AOL, two Opera, and one Mozilla.

The distribution of preferred operating systems (OS) was similar. Versions of Microsoft Windows were preferred by 90.3% of the respondents, while 6.9% preferred Macintosh, and 2.8% another operating system. The four respondents in the last group used flavors of Linux as their preferred OS. Among them was one of the non-users of public Web portals for whom Netscape was the preferred Web browser. The dominance of Microsoft products was no surprise since Windows was thought to be installed on more than 90% of personal computers, and IE had presumably about 95% of Web browser share in 2002 (Wikipedia, n.d.).

Table 4.2 shows that 86.1% of the respondents surveyed were able to access the Internet at home, while 13.9% were unable to do so (including one non-user). The answers of the latter group were checked against their answers regarding the locations of

Table 4.2: Number of users and non-users in the sample by preferred browser, preferred operating system (OS), Internet access at home, and Internet access away from home; N = 144

	Number of users	Number of non-users	Total (% of Total)
Preferred Browser			
IE	116	1	117 (81.3)
Netscape	19	1	20 (13.9)
Other	7	0	7 (4.9)
Preferred OS			
Windows	129	1	130 (90.3)
Macintosh	10	0	10 (6.9)
Other	3	1	4 (2.8)
Access at Home			
Yes	123	1	124 (86.1)
No	19	1	20 (13.9)
Access away from Home			
Yes	142	2	144 (100)
No	0	0	0 (0.0)
Total	142	2	144 (100)

portal use in question 9. The researcher found discrepancies in three cases and contacted the participants by telephone or e-mail to clarify their answers. On the other hand, all respondents were able to access the Internet away from home. Multiple answers were possible and provided in the explanation field in questionnaire item 3 that asked

participants to specify where they access the Internet away from home. The answers were content-analyzed by the researcher, and the following categories of locations emerged: university in general (78 responses), campus libraries and computer labs (99 responses), work (38 responses), friends' and family's residences (30 responses), public libraries (11 responses), restaurants (4 responses), and anywhere possible (4 responses). These categories are by no means mutually exclusive, but they emphasize the importance of university facilities for respondents' access to the Internet.

As illustrated in Table 4.3, the students who participated in the study demonstrated generally very high familiarity with the Internet. There is no reason to believe that non-participants were systematically different because Internet use has become common not only at the university but also at the pre-university educational level. Questionnaire item 4 asked how many years respondents had been using the Internet. Of the total sample, 111 students (77.1%) indicated that they had 4 years or more of Internet experience, while 23 (16.0%) indicated that they had at least 3 years of Internet experience. These two groups comprised 93.1% of the sample. Seven respondents (4.9%, including one non-user) reported that they had at least 2 years of Internet experience, while two (1.4%) indicated at least 1 year of Internet experience. One student (0.7%) had used the Internet for less than 1 year.

Students rated their skills in using the Internet and to do any kind of business online according to four levels in question 5. Slightly more than a fourth (27.1%) of the respondents rated themselves as "Expert," while three fifths (60.4%) reported their skills as "Very good," 10.4% as "Still learning," and 2.1% as "Beginner." That is, 87.5% of students rated themselves as having at least very good skills in using Internet services and in doing business of any kind online.

Table 4.3: Number of users and non-users in the sample by length of Internet use, self-rated Internet experience/skill level, and existence of a personal home page; N = 144

	Number of users	Number of non-users	Total (% of Total)
Length of Internet Use			
Less than 1 year	1	0	1 (0.7)
1 year – less than 2 years	2	0	2 (1.4)
2 years – less than 3 years	6	1	7 (4.9)
3 years – less than 4 years	23	0	23 (16.0)
4 years and more	110	1	111 (77.1)
Experience/Skill Level			
Expert	39	0	39 (27.1)
Very good	85	2	87 (60.4)
Still learning	15	0	15 (10.4)
Beginner	3	0	3 (2.1)
Personal Home Page			
Yes	26	0	26 (18.1)
No	116	2	118 (81.9)
Total	142	2	144 (100)

Question 6 asked students if they have a personal home page and what they use their home page for. This question was included early in the questionnaire for two reasons:

1. One student's remarks during a class initiated the research study, and RQ 4 below addresses differences between students with and students without a personal home page regarding the use of public Web portals.
2. The possession of a personal home page is an important part of the description of the technical knowledge of the sample, and it was unknown how many

undergraduates in the sample had a personal home page. Almost all participants in the pilot tests had a personal home page.

As shown in Table 4.3, only 26 (18.1%) of the students surveyed had a personal home page, while a majority of 118 (81.9%) did not. All students with a personal home page were also users of public Web portals. It needs to be mentioned that twelve other participants had originally marked "yes" in question 6 asking about personal home pages. However, initial analysis of the open-ended part of question 6 that asked respondents to specify purpose and use of their personal home pages revealed that some had not fully understood the concept of a personal home page when they completed the questionnaire. For instance, some of the participants elaborated in question 6 on their use of the university's home page or other pages that showed up when they started their browser. Students with questionable answers were contacted via e-mail or telephone to clarify their responses. On the other hand, several students provided even the addresses of their personal home pages allowing the researcher to explore the intended purpose and use of students' personal home pages in more detail. The answers in the open-ended section of question 6 were content-analyzed by the researcher. Multiple answers were possible. The following categories of purpose and use were created after three rounds of analysis: personal information (12 responses), professional or biographical information (10 responses), course work (6 responses), link collection (5 responses), online journal (4 responses), and recreational information (4 responses). Also these categories are not mutually exclusive but reflect the purpose and use of students' personal home pages in a more standardized form. A detailed description of participants with personal home pages is under RQ 4 below.

Analysis of Non-Users

While non-use of public Web portals was a very rare phenomenon among undergraduate students in the study, this section describes findings based on responses that the two non-users reported. With this low number of responses from non-users, detailed comparisons of users with non-users of public Web portals were simply impossible. Nevertheless, in an attempt to shed at least some light on the rare phenomenon of non-use of public Web portals by undergraduate students in the sample, the following analysis is included. At first, a summary of the two students' demographic background and technical knowledge according to their answers in the written questionnaire is provided followed by a description of an interview that was conducted with one of them.

Both students were between 18 and 23 years of age and able to access the Internet from labs or one of the libraries on campus when away from home. Furthermore, the two non-users of public Web portals did not have personal home pages and rated their skills of using the Internet or to do any business online as "Very good." Table 4.4 summarizes differences in demographics and technical knowledge of the two non-users.

In general, there are no remarkable differences that set the two non-users apart from the rest of the students surveyed. Interesting, however, is that respondent 144 reported a shorter length of Internet use compared to the majority in the sample, and that respondent 143 belonged to the group of students with no Internet access at home. In addition, respondent 143 belonged to the minority of participants in the sample with regard to preferred browser and operating system.

Table 4.4: Summary of selected characteristics of non-users of public Web portals

	Respondent 143	Respondent 144
Gender	Male	Female
Major	Natural Sciences	Arts & Humanities
Classification	Senior	Sophomore
GPA	3.50 – 4.00	3.00 – 3.49
Preferred Browser	Netscape	IE
Preferred OS	Linux	Windows
Access at Home	No	Yes
Length of Internet Use	4 years and more	2 years – less than 3 years

To better illustrate and understand possible differences and reasons for the non-use of public Web portals by undergraduate students the following summary of the interview with respondent 143 is provided. The interview took place in the respondent's studio apartment on October 16, 2002 and lasted 45 minutes.

At first, the respondent was probed by the researcher about non-use of the public Web portals under investigation. The respondent mentioned that he had used Hotmail as e-mail service briefly. This response sounded troublesome since it could have meant that respondent 143 would not qualify as non-user for this study. However, the respondent went on and explained that he had not used Hotmail since it had been purchased by Microsoft and became part of the MSN portal in 1998. One of the next questions by the researcher asked the respondent how long he had used the Internet and for what reasons. The respondent answered that he had used the Internet probably since his junior year of high school but that he did not use e-mail much than. He used the AltaVista search

engine to conduct research for class assignments only. When asked about his experience with this search engine, the respondent judged it as pretty good at the time but remarked that he does not know if the site still exists because he had switched to Google and was using this search engine exclusively at the time of the interview. When probed about the use of messenger services or games the respondent referred to family members using these services but stated clearly that he had not used any of those. He added that he would probably communicate more via the Internet if his friends and family lived away. When asked about sites that he visits regularly, the respondent pointed out that he uses the university's Webmail service, news sites such as those of CNN and the *New York Times*, but that he does not use a computer or the Internet every day due to feelings of information overload, unwanted e-mails and advertising as well as his more task-oriented use of the Internet in general. The respondent stated:

> Maybe, I am old-fashioned or something. I really don't like constantly interacting with the computer or to do that every day. I mainly just use it when I have to. I am probably more like the older professors in our school who do not use e-mail very often. It does not appeal to me. Portals sound like something you have to be committed to in order to use them. That's high maintenance and work. If something seems to be high maintenance or time-consuming it just annoys me. I think that is probably the main reason why I do not do Web portals. I do not feel that e-mail is an essential part of my life. If suddenly e-mail does not work anymore, I do not feel I have lost that much. It's all that information overload. The main way of getting my news and other information is by other means. In case of news it's by reading the *New York Times*. After 11 p.m. they post tomorrow's *New York Times* online. So, sometimes at night when I am still in the lab, I read what will be in the paper the next day. I like that. Although I like to check CNN, ESPN and the *New York Times* on the net when I have a little break, I do not consider it such an essential part of gaining knowledge. My primary source is actually reading the paper copy of the *New York Times* for about one hour every day, and I think I know enough about what's going on after that. I think I do not need any other source for news and that's another reason why I have not done portals.

Asked to explain what he meant by information overload the respondent went on:

> There is so much useless stuff on the Internet. For instance, the *New York Times* now has these terrible ads that come out over the screen and it is not a new window that you could close. It just stays there and you have to wait until it goes away. That's a contributing reason why I don't like to use the Internet as much as other people. I do not like all the commercial things they are throwing at you. I mean I have bought books at Amazon because it is convenient and cheaper. That's a site I am pretty happy with because of that. I bought most of my textbooks from there. I usually go there only at the beginning of the semester and around Christmas.

During the discussion of registration procedures on sites like that provided by the *New York Times* the respondent mentioned that he had signed up with his real personal information at the *New York Times* site when he was younger but that his privacy concerns and fears of a possible flood of unsolicited e-mails as a result of registration with any other sites on the Internet that require registration had grown. In addition, he stated:

> I think if I had to summarize why I also do not do portals, I would say that I view it actually as somewhat of a burden whenever I have to sign up for one of these things. It's a commitment and I really do not like that. I do not know why but it is the same reason why I do not like to check my e-mail very often, and I do not have a strong dependence on e-mail or the Internet in general. So, it is simply not necessary, and I view it as more stuff to worry about, i.e., passwords, sign-up and checking it all the time. I cannot figure out any better way to explain it than that.

From some of the statements it could be assumed that respondent 143 held a rather negative attitude about the Internet. However, his final remarks during the interview painted a somewhat more balanced picture when he said: "It is very important to have this communication and information tool since it has simplified a lot of communication but there is that information overload and it has become so commercialized. A lot of the stuff out there is a little bit of a turn-off, though."

The other non-user, respondent 144, was unfortunately not available for an interview but wrote in the open-ended part of question 7 as reasons for not using public Web portals: "I know that other people use these sites probably a lot but I am fine with

the sites that I am using and I am not on the Internet each and every day. I might look into these sites later but I simply do not know why I should do so right now. I am pretty satisfied with what I am using on the Internet now."

Respondent 143 wrote in the same item of the questionnaire the following:

> I have no need for a portal. My use of the Internet is mainly for research. I use Google to search for what I need. So, a portal seems to be rather somewhat useless to me. What's their point? Just a lot of links and services organized on one or two pages? Well, I might give it a try, but I do not use the Internet every day, and it is not so hard for me to type in cnn.com or nyt.com.

It became clear that both non-users did not feel a need for using a public Web portal since they did not use the Internet as often as their peers and were somewhat satisfied with other Internet services and resources they had at their disposal. Although respondent 143 did not have Internet access at home, there was no indication that this situation contributed to his non-use of public Web portals, while behavioral patterns such as his personal Internet use, information overload, and privacy concerns together with dislike for sign-up procedures, unsolicited e-mails and advertising can be seen as contributing to his non-use of public Web portals.

Worth mentioning is that both non-users expressed an interest in future use of public Web portals that was obviously triggered by participation in the study. While the researcher conducted member checks several weeks after data collection, respondent 143 had actually become a user of one of the public Web portals and stated:

> I am quite happy that you brought these portal sites to my attention. Some days after our interview I registered with Yahoo! but did not use anything real except for my name. I am still using my other sites but it's also somewhat cool to have all these game scores and other news on the portal site and more information just a click away from there. Believe it or not but I actually go there whenever I'm on the net now.

PORTAL PREFERENCES (RQ 2)

The second research question aimed to answer which public Web portals undergraduate students preferred and what the reasons for these preferences were. Data to explore these topics included responses to questionnaire items 8 and 13 as well as notes from focus groups and follow-up interviews. In addition, hypothesis testing was conducted to see what relationships, if any, there might have been between students' characteristics and location of use of public Web portals and students' portal preferences. The researcher tested a number of other variables in relation to preferred public Web portals, but those results are under RQ 3 and 4 below.

Question 8 asked students to assign preference ranks for the portal sites they had used and to indicate if they use these sites at home and away from home. Since there were nine portal categories, preferences could rank from 1 (highest preference) to 9 (lowest preference). Most students had used only one or two portal sites and consequently assigned only one or two preference ranks. The category "Other" was included for two reasons:

1. The researcher wanted to see if he had missed any public Web portals that undergraduate students used.
2. Since a mail questionnaire was used and not all respondents might have understood how public Web portals were defined for this study, this category allowed some flexibility.

As one might expect, eight students included Google or another site in this category. Three of them assigned Google the highest preference rank, while one student indicated another site as highest preference. In order to code responses from 9 (highest preference) to 1 (lowest preference) for the statistical software package used, the researcher reversed the rank scale of the questionnaire.

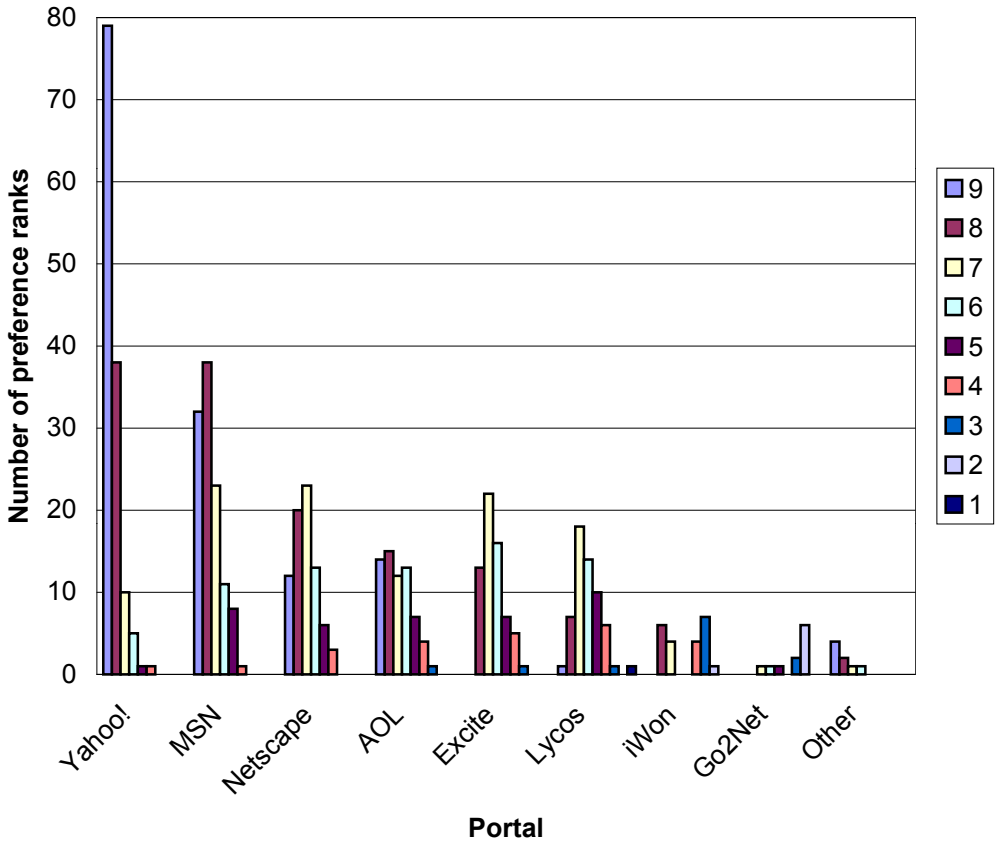
Table 4.5: Number of preference ranks by public Web portal (9 = highest preference, 1 = lowest preference); N = 142

	9	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Yahoo!	79	38	10	5	1	1	0	0	0
MSN	32	38	23	11	8	1	0	0	0
Netscape	12	20	23	13	6	3	0	0	0
AOL	14	15	12	13	7	4	1	0	0
Excite	0	13	22	16	7	5	1	0	0
Lycos	1	7	18	14	10	6	1	0	1
iWon	0	6	4	0	0	4	7	1	0
Go2Net	0	0	1	1	1	0	2	6	0
Other	4	2	1	1	0	0	0	0	0
Total	142	139	114	74	40	24	12	7	1

Table 4.5 and Figure 4.1 display the distribution of preference ranks by public Web portal. Please note that multiple answers were possible. However, each respondent ranked at least one site. Therefore, only the first column of Table 4.7 displays the answers from all 142 respondents who were users of public Web portals in this study, while 139 respondents (second column) ranked two portals, 114 respondents (third column) three portals, and so on.

Table 4.5 and Figure 4.1 illustrate that 79 respondents (55.6%) preferred Yahoo! over 32 (22.5%) who preferred MSN, followed by 14 (9.9%) who preferred AOL, 12 (8.5%) who preferred Netscape, 4 (2.8%) who preferred another site, and 1 respondent (0.7) who preferred Lycos. No participant indicated Excite, iWon, or Go2Net as portal of first choice. This looks somewhat different for the second highest preferences. Of the

Figure 4.1: Histogram of the number of preference ranks by public Web portal; N = 142



139 respondents who had experience with a second portal, 38 (27.3%) marked each either Yahoo! or MSN, 20 (14.4%) Netscape, 15 (10.8%) AOL, and 2 (1.4%) another site. Interesting is not only that 7 students (5.0%) selected Lycos as their second portal preference, but also that 13 students (9.4%) marked Excite, and 6 (4.3%) iWon because Excite and iWon were not represented in the first column. Go2Net did also not make this column but appears for the first time in column 3 of Table 4.8 as one of the third ranked portal choices.

While Table 4.5 provides students' preference ranks for public Web portals, it also displays as a side effect how many students had used a particular site (row numbers

of preference ranks by portal), and--as explained above--the number of public Web portals used by the number of respondents (column totals).

The Popularity Index of Public Web Portals

Yahoo! was not only the most preferred public Web portal by 79 respondents in the ranking in this study but also the one that 134 respondents provided a ranking for, i.e., 94.4% of all portal users in this study had used it. MSN was ranked by 113 respondents (79.6%), Netscape by 77 (54.2%), followed by 66 (46.5%) who had experience with AOL. Although Excite was not among the highest ranked portals in column one of Table 4.8, 64 students (45.1%) were presumably using it. This total was even higher than the number for Lycos that was ranked by 58 students (40.8%) despite the fact that Lycos was among the most preferred portals in Table 4.5. Rank scores for iWon were provided by 22 students (15.5%), while 11 (7.7%) selected Go2Net, and--as previously mentioned--8 respondents (5.6%) another site.

Table 4.6 below shows the absolute numbers of rank scores, their minimum and maximum, means, and standard deviations by public Web portal. The means were calculated to reflect all rank scores that students provided for each portal to show a more comprehensive picture of the popularity of public Web portals used by undergraduate students in this study. The researcher calls this measure the *Popularity Index of Public Web Portals (PIPWP)*. This measure is introduced to take into consideration all rank scores provided by participants in item 8 of the written questionnaire and to report all scores in a feasible and easy way.

As one can see, Yahoo! (mean = 8.39) was indeed the most popular public Web portal among the students surveyed. The scores ranged from a minimum of 4 to a maximum of 9, and as previously shown in Table 4.5 most students assigned high ranks

Table 4.6: Absolute number of rank scores, minimum and maximum, mean and standard deviation (SD) by public Web portal; N = 142

	N of Ranks	Minimum	Maximum	Mean	SD
Yahoo!	134	4	9	8.39	0.92
MSN	113	4	9	7.64	1.24
Netscape	77	4	9	7.13	1.31
AOL	66	3	9	7.00	1.58
Excite	64	3	8	6.44	1.24
Lycos	58	1	9	6.09	1.46
iWon	22	2	8	5.23	2.28
Go2Net	11	2	7	3.27	1.85
Other	8	6	9	8.12	1.12

for this site. Of the 134 participants who ranked Yahoo! at all, 117 (87.3%) selected this public Web portal in the top two preferences.

While the category Other (mean = 8.12) ranked second, it needs to be noted again that this category is misleading. It is mainly made up of a few students who ranked Google or another site relatively high, but Google and the other suggested sites did not meet the researcher's definition of a public Web portal in this study. Actually, of the eight scores with a minimum of 6 and a maximum of 9 in this category, six (75%) fell into the two highest preference ranks. The category Other was included in the *PIPWP* here since it was part of the study's design. But it was listed at the end in Table 4.5 since it does not reflect results for one of the public Web portals as defined in this study, and it should be eliminated from future endeavors in this area of research.

Like Yahoo!, Mircrosoft's MSN portal (mean = 7.64) had also a large number of rank scores with a minimum of 4 and a maximum of 9. Of the 113 participants who ranked MSN, 70 (61.9%) selected this portal as one of their two highest ranked sites.

Netscape (mean = 7.13) had also a minimum rank score of 4 and a maximum rank score of 9 but was ranked by 77 respondents only. Of those, 32 (41.6%) provided scores for this portal in the top two preference rankings.

The minimum score for AOL (mean = 7.00) was 3, and the maximum score 9 which indicated already a wider dispersion of rank scores that is evident among the less popular public Web portals in the *PIPWP*. AOL was ranked by a total of 66 respondents, and 29 (43.9%) respondents indicated this site as one of their two most preferred public Web portals. While this percentage value was slightly higher than the one for Netscape in the top two preference ranks, the overall mean for AOL was lower due to a wider dispersion of rank scores compared to Netscape.

As previously mentioned, Excite (mean = 6.44) did not receive a top preference ranking, but thirteen (20.3%) of 64 respondents indicated that Excite was among their top two preferred public Web portals. Scores for Excite ranged from a minimum of 3 to a maximum of 8.

Lycos (mean = 6.09) on the other hand, was among the top public Web portals for one respondent and second for seven others. This means that eight (13.8%) of the 58 respondents who ranked Lycos selected this portal as one of their top two public Web portals. Lycos showed the widest dispersion among all sites in this study with a minimum of 1 and a maximum of 9.

Similarly dispersed were the rankings for iWon (mean = 5.23) that had scores from a minimum of 2 to a maximum of 8. Of the 22 respondents who provided rank scores for this site, no one assigned it a top ranking, but six selected iWon second

resulting in 27.3% for the top two preferences. While iWon ranked higher among the top two preferences compared to Excite and Lycos, the overall mean for iWon was lower due to a higher number of lower preference scores, a fact that emphasizes the utility of using the mean of all scores of a particular category as indicator in the *PIPWP*.

As displayed in Table 4.6, Go2Net (mean = 3.27) was the least popular public Web portal in this study with a minimum rank of 2 and a maximum rank of 7. Although eleven respondents ranked this site overall, none of them ranked it as one of the top two preferred public Web portals. Compared with the other sites, Go2Net seemed to be hardly known among participants in this study and was never mentioned during phases 2 and 3 of data collection despite the fact that it met the researcher's definition of public Web portals.

In sum, the *Popularity Index of Public Web Portals (PIPWP)* as introduced and illustrated by the researcher in this study has proven to be a good measure to determine overall preferences of public Web portals by undergraduate students since it considers all of the respondents' rankings across a portal category.

Relationships of Preferred Public Web Portals and Demographic and Use Variables

The researcher used Pearson's Chi-Square (χ^2) tests to determine if there were any statistically significant relationships between selected demographic and use variables and the public Web portals that respondents preferred at the significance level of $\alpha = 0.05$. In other words, the researcher tested numerous null hypotheses to see if there was a 95% chance that a statistically significant relationship existed between variables or if relationships between the variables are likely to have occurred by chance alone. The first set of hypothesis tests reported in this section relates to students' preferred public Web portals and selected demographic and use variables as reported in Tables 4.1 to 4.3

above. Due to space constraints and the large number of hypotheses tested in this study, the researcher does not list all the hypothesis statements in detail. However, the following statement can serve as an example for other null hypotheses (H_0) that the researcher used with different variables in this study as described throughout the rest of Chapter 4:

H_0: preferred public Web portals for males = preferred public Web portals for females, $\alpha = 0.05$.

In other words: "There is no statistically significant relationship at $\alpha = 0.05$ between gender and undergraduates' preferred public Web portals." If the calculated Chi-Square values were higher than the critical values under the corresponding degrees of freedom (df) in the Chi-Square table, the null hypothesis had to be rejected, and a statistically significant difference between the variables at $\alpha = 0.05$ was found. Table 4.7 lists the critical values of Chi-Square for degrees of freedom between 1 and 4 since no larger degrees of freedom were encountered during the Chi-Square tests in this study. Please note again that Chi-Square tests were also used to determine if there

Table 4.7: Critical Values of Chi-Square for df between 1 and 4

df	**0.05**	**0.01**
1	3.841	6.635
2	5.991	9.210
3	7.815	11.341
4	9.488	13.277

were statistically significant relationships at $\alpha = 0.05$ between other variables described in this chapter further below. In general, the described procedure remained the same.

The statistical software package used in this study (SPSS 12.0) provided calculated values for Chi-Square that could be compared to tabled values found in most statistical books and values for p (the probability score). Also these calculated p values for Chi-Square provided information about whether Chi-Square tests identified a significant result or not. If the p value of a particular test was less than 0.05, the null hypothesis had to be rejected.

While the Chi-Square test allows a researcher to determine if a relationship between variables is likely to exist in a population, it does not provide any information about how strong the relationship is. Thus, it is useful to provide measures of effect size. This study used the phi (ϕ) coefficient for 2x2 contingency tables and Cramérs's V as a more general form of the phi coefficient for tables with more rows or columns as effect size measures for the strength of the relationship between variables (Garson, 2005; Kinnear & Gray, 2000; Lockhart, 1998). These measures can range from a value of 0 (complete independence) to 1 (complete dependence). According to Cohen (1988), ϕ = 0.1 can be interpreted as a small effect size, ϕ = 0.3 as a medium effect size, and ϕ = 0.5 as a large effect size. Appendix H displays the Ch-Square calculations and contibency tables.

One generally accepted "rule of thumb" regarding the reliability of Chi-Square tests is that, if no more than 20% of expected frequencies fall below 5 and no expected frequency is less than 1, the calculated Chi-Square value will be reasonably close to the actual probability. To meet this requirement the researcher combined several variable categories into meaningful and theoretically defensible new variable categories. For instance, in the case of preferred portal, the original nine categories in this variable were combined (collapsed) to the three new categories: Yahoo!, MSN, and Other based on the data collected. In some other cases, such as in major or GPA in Tables 4.8 to 4.10,

Table 4.8: Summary of Chi-Square tests of preferred portal related to gender, major, classification, GPA, length of Internet use, and self-rated Internet experience/skill level

	N	Calculated Values	Significant at α = **0.05**
Gender	142	$\chi^2 = 0.509$, df = 2, p = 0.775	no
Major	137[4]	$\chi^2 = 1.536$, df = 4, p = 0.820	no
Classification	142	$\chi^2 = 0.793$, df = 2, p = 0.673	no
GPA	136[5]	$\chi^2 = 4.515$, df = 4, p = 0.341	no
Length of Internet Use	142	$\chi^2 = 4.481$, df = 2, p = 0.106	no
Experience/Skill Level	142	FET = 1.715 , p = 0.810	no

the researcher usually excluded a category with very small frequencies entirely since it did not seem meaningful or defensible to combine it with other categories in the same variable. Whenever this procedure still resulted in more than 20% of expected frequencies below 5, Fisher's Exact Test (FET) was used instead. Please note that this test does not calculate a degree of freedom but an exact p value.

Table 4.8 summarizes the Chi-Square tests that the researcher conducted to see if there were relationships between preferred public Web portals and respondents' gender, major, classification, length of Internet use, and self-rated Internet experience/skill level. Please see also the corresponding contingency tables (H.1 to H.6) in Appendix H. In all six cases the researcher failed to reject the null hypothesis. There were no statistically significant relationships between respondents' preferred public Web portals and respondents' gender, major, classification, GPA, length of Internet use, and self-rated

[4] Portal users with no Major (N=5) excluded.
[5] Portal users with no GPA (N=6) excluded.

Internet experience/skill level in this study. However, since Chi-Square, like other tests of statistical significance, is highly dependent on sample size, a larger sample might yield different results.

Relationships of Use of Preferred Public Web Portals at Home and Away from Home

As described above, all respondents had Internet access away from home, and 123 users of public Web portals had Internet access at home, while 19 did not. Question 8 asked participants to indicate if they used their preferred portals at home and away from home. It is obvious that the nineteen participants without Internet access at home could access their preferred portal only away from home. However, having Internet access at home and away from home does not necessarily mean that respondents used their preferred public Web portals at both locations.

Of the 123 users of public Web portals who also had Internet access at home, 119 indicated that they use their preferred portal at home. Four students used their preferred portal exclusively away from home despite the fact that they had Internet access at home. One of them stated during the follow-up interview: "I have an older computer and a slow connection at home. I do not surf the Web at home. I just check my e-mail and do my homework. It's just too slow for Yahoo! and for the Web." Another student who used Yahoo! and Excite frequently said:

> I do not use it at home because I share our computer with my housemates, and I don't want them to be able to read my e-mail in case I forgot to sign out. It's because of the cookies the portals set. If I had my own computer I wouldn't mind. That's not a problem in school. When I leave the computer in the lab no one can read my stuff since they have to sign in to the computer with their own university ID and they won't be able to see my stuff.

On the other hand, 97 of the 123 respondents with Internet access at home indicated that they use their preferred portal away from home, while 26 accessed it exclusively at home. This means that, of the 142 users of public Web portals in this study, 93 (65.5%) accessed their preferred portal at home and away from home, while 26 (18.3%) did so exclusively at home, and 23 (16.2%) only away from home.

Chi-Square was used again to determine whether there were any statistically significant relationships between respondents' location of public Web portal use and respondents' preferred public Web portals. In addition, students' characteristics and location of use of their preferred public Web portal were analyzed. Tables 4.9 and 4.10 summarize the findings.

Table 4.9: Summary of Chi-Square tests of use of preferred portal at home related to preferred portal, gender, major, classification, GPA, length of Internet use, and self-rated Internet experience/skill level

	N	**Calculated Values**	**Significant at α = 0.05**
Preferred Portal	142	$\chi^2 = 1.239$, df = 2, p = 0.538	no
Gender	142	$\chi^2 = 0.790$, df = 1, p = 0.779	no
Major	137[6]	$\chi^2 = 1.183$, df = 2, p = 0.554	no
Classification	142	$\chi^2 = 5.227$, df = 1, p = 0.022	yes
GPA	136[7]	$\chi^2 = 0.067$, df = 2, p = 0.967	no
Length of Internet Use	142	$\chi^2 = 0.198$, df = 1, p = 0.656	no
Experience/Skill Level	142	$\chi^2 = 0.027$, df = 2, p = 0.987	no

[6] Portal users with no Major (N=5) excluded.
[7] Portal users with no GPA (N=6) excluded.

No statistically significant relationships were found between the use of preferred public Web portals at home and respondents' preferred portal, gender, major, GPA, length of Internet use, and self-rated Internet experience/skill level. Please see also the corresponding contingency tables (H.7 to H.13) in Appendix H. However, the researcher found a statistically significant relationship between the use of the students' preferred public Web portal at home and respondents' classification ($\chi^2 = 5.227$, df = 1, p = 0.022). The calculated Chi-Square value is equal to 5.227, higher than 3.841, the significance level at $\alpha = 0.05$ for 1 degree of freedom. The effect size is $\phi = 0.192$ which is according to Cohen's convention small to medium. As Table H.10 in appendix H shows, seniors were less likely to use their preferred public Web portals at home. Curious about this result, the researcher took a closer look on Internet access at home and found that, of

Table 4.10: Summary of Chi-Square tests of use of preferred portal away from home related to preferred portal, gender, major, classification, GPA, length of Internet use, and self-rated Internet experience/skill level

	N	**Calculated Values**	**Significant at α = 0.05**
Preferred Portal	142	$\chi^2 = 2.352$, df = 2, p = 0.309	no
Gender	142	$\chi^2 = 0.075$, df = 1, p = 0.784	no
Major	137[8]	$\chi^2 = 0.100$, df = 2, p = 0.951	no
Classification	142	$\chi^2 = 0.057$, df = 1, p = 0.811	no
GPA	136[9]	$\chi^2 = 0.594$, df = 2, p = 0.743	no
Length of Internet Use	142	$\chi^2 = 0.932$, df = 1, p = 0.334	no
Experience/Skill Level	142	$\chi^2 = 3.236$, df = 2, p = 0.198	no

[8] Portal users with no Major (N=5) excluded
[9] Portal users with no GPA (N=6) excluded

the nineteen users of public Web portals without Internet access at home, about three fourths (15) were seniors (see Table I.1 in Appendix I).

Table 4.10 summarizes the test results for the use of preferred public Web portal away from home. No statistically significant relationships were found between the use of preferred public Web portal away from home and respondents' preferred portal, gender, major, classification, GPA, length of Internet use, and self-rated Internet experience/skill level. Please see also the corresponding contingency tables (H.14 to H.20) in Appendix H.

Reasons for Public Web Portal Preferences

While the statistical tests provided not much insight into why undergraduate students preferred some public Web portals to others, open-ended question 13 and other data collection activities give some reasons for such preferences. Although question 13 asked students to indicate why they use public Web portals in general, a number of respondents referred clearly more to their preferred sites than to their reasons for using public Web portals in general.

After combining those answers with comments from focus groups and follow-up interviews, the researcher conducted several rounds of content analysis, and the following themes emerged to illustrate why respondents preferred some public Web portals to others:

- Reputation and brand name (everyone uses and knows it)
- Familiarity (used this site first)
- Ease of use (fast, user-friendly interface)
- Accessibility (reliable, mainly free, always available)

- Uniqueness of services (particular resources such as music, videos, games) Community (chat, messenger service, groups)
- Quality of content (up-to-date news, other good information)
- Satisfaction (good search engine results, overall satisfaction).

The themes are by no means mutually exclusive but were created to illustrate the most stated reasons for respondents' public Web portal preferences in this study. The researcher provides the minimum counts of occurrences for each theme based on the number of respondents and not purely on the number of occurrences during data collection activities to prevent duplication. Many answers and statements often contained multiple themes. A small number of students who participated in phases 2 and 3 of data collection mistakenly referred in question 13 to their reasons for preferring a particular public Web portal rather than to their reasons for using public Web portals in general. By all means, the researcher tried to eliminate duplicate answers and statements with regards to one of the themes by the same respondents during the coding process. The aim here is to provide deeper insight into what respondents had to say. Most themes occurred at least nine times and were reported by different students in question 13, the focus groups, and during personal follow-up interviews. The following findings are based on content analysis of the data that resulted from these data collection activities, and students' specific comments are included. Respondents' preferred public Web portals are indicated in parenthesis as long as they are not obvious in the comments.

Reputation and Brand Name

As with many other products in today's economy, reputation and brand name of public Web portals seemed to play an important role in undergraduates' preferences. At least 27 respondents referred to either reputation or brand name as reasons for preferring

and using a particular public Web portal. While a number of students used several portal sites for different purposes, each student indicated at least one preferred public Web portal, and comments such as the following were common:

> I am pretty sure that everyone has seen or heard these silly commercials for Yahoo! on TV. While I have been using Yahoo! much longer than that, I am pretty sure that they got a lot of people hooked-up through this. It did not take long and MSN came out with these commercials with that butterfly in their logo colors or whatever it is. I am in advertising and I just think that they did a good job in brand name recognition. I haven't seen or heard anything from the other portals although you can meet that Lycos dog on other Web sites.

Another student said during a follow-up interview: "I think that most people I know use Yahoo! although I also know some who use MSN and AOL. I basically use Yahoo! all the time because everyone in my family and many of my friends use Yahoo! also. My mom told me that if you cannot find something in Yahoo! than it is probably not there or very shady." Asked what the respondent meant by "shady," she said: "I mean it's probably not good information or information from sites that Yahoo! would not have because of that, and Yahoo! would probably not have information that is not trustworthy." Yet another student expressed during one of the focus groups: "I think I use Yahoo! more often than others because I've heard good things about it in the past and have not had any problems with it." Also during a focus group one student said: "I do not really have a favorite portal but from the ones I know I'd say I like Yahoo! best because that's what I think of the Internet and when I do a search. I remember that was the first one that advertised a lot on TV." Another student stated during the same focus group: "I guess I like Yahoo! best for no better reason. It got a big name. They have nice commercials and a good reputation as far as I know. I don't think they would be that big otherwise with all these millions of users."

Despite other reasons for preferring a particular public Web portal to others, Yahoo! and MSN had clearly both created a high reputation among undergraduate

students and an easier to recognize brand name compared to other players in this area. While AOL is obviously also a well-recognized brand name in today's Internet environment, and has probably pumped millions of dollars into advertising, it was interesting that none of the undergraduates made any reference to AOL as their most preferred public Web portal with regard to reputation and brand name in this study.

Familiarity

Familiarity with a particular public Web portal was the preference reason for at least 21 students in this study. While some participants had changed their preferred portal site once or several times during the time they had been using the Internet, most participants still used the site they started with when they took their first steps on the Internet. Typical were comments such as the following:

- "In the beginning, I did not have my own computer and I used Yahoo! to check my e-mail anywhere. I am just used to it now." Yahoo! was the first site that I used when I started using the Internet. So, I am used to it."
- "Yahoo! is probably my favorite one because they do not have so many ads there and I simply got used to it. They also haven't changed so much and I can usually find what I am looking for when I am on that site."
- "AOL is just what I am familiar with, or, what I am used to using. It's just that my parents subscribed to AOL, and I have been using it for a long time."
- "I use portal sites because I don't know much about other sites, and since I was first introduced to Yahoo! I've got used to it so much that I don't want to search for anything else. I check the mail, weather, news, horoscope, and health info there everyday."

- "Another thing I would like to add is that in the years I have used Yahoo! it has not changed very much. And MSN has changed, and I had always problems to get used to their changes. Whenever this happened I was pretty much lost at the beginning. So, with Yahoo! I always know where everything is because it does not change very often."
- "I guess I got used to it. I also started with MSN and I did not like some of the other sites so much. I am also used to the navigation. And everything that makes my life easier is a good think."
- "I feel a lot better using Yahoo! than any of the other ones. It's just that I know it and that I have used it for quite some time. I started also with Netscape but I stuck to Yahoo! since I found there what I liked and wanted."
- "Netscape is set as my home page. I've never bothered to change it. When I am looking for very general information I go through Netscape. If I want to search for something that I cannot find on Netscape, I usually use Google, Yahoo!, and sometimes Excite."

As some of the comments indicate, consistency of design and the long-term development of personal use habits contributed to this theme. Respondents were usually introduced to one of the public Web portals by friends and family or in high school, and got used to them despite the fact that some respondents used or experimented with other portal sites later.

Ease of Use

Ease of use was expressed by at least sixteen respondents as reason to use a particular public Web portal compared to others in this study. While there was hardly any respondent who expressed major problems in using public Web portals in general, a

number of participants reported concerns with regard to privacy when having to register at portal sites or problems due to frequent changes in design of the portals they were using. Quite characteristic in this category were comments such as the following:

- "I use Yahoo! because it is an easy way to locate things or information on the Internet quickly. I think I use it more often than others because it is simple and you do not have to read the manual to use it. It's just easy to use and I like that."
- "I like Yahoo! because it is easy to use and very popular. It has also been more consistent than others and I can usually find what I am looking for. It also has not changed so much during the last years, and I like that I can find what I am looking for all the time, and that I do not have to get adjusted to changes like on MSN."
- "As far as my experience goes Yahoo! has provided me with the easiest service. True, I still have my AOL account but I am seriously making the shift to my new account at Yahoo! I've always used the search engine there but not much else until recently. I just like it because it is so easy to find information there."
- "Using Yahoo! is the easiest and best way for me to keep caught up on news, find info for class assignments, and stay in touch with my family and friends. It's just very easy to use and to navigate. They also do not change their site so often as others do."
- "I'd say Yahoo! is the best one because it is user-friendly and has lots of things that you probably cannot find so quickly on one page otherwise. I think Yahoo! loads also faster on my computer than MSN or Excite."
- "My Hotmail is easier to check than the university's account. That's why I use MSN. Often, after I exit I read also the articles on MSN that they direct me to."
- "I tried to use AOL and that was just expensive and it did not work so well. It was really more confusing than anything. So, I think MSN is a lot simpler. It's

really easy to find your way around, and I guess that's the reason why I use MSN more than others. It also works pretty fast and keeps up with all my needs. MSN also comes up when I open my browser."

While the researcher found fewer instances with regard to "Ease of use" than originally anticipated, this theme was clearly present among respondents' reasons for choosing one portal rather than another.

Accessibility

Another theme for students' portal preferences that evolved after several rounds of content analysis was "accessibility." For this study, "accessibility" was defined as having the ability to reach and use a public Web portal and its services. At least 21 students reported this as a compelling reason for using their preferred public Web portals in question 13 or during focus groups and follow-up interviews. Examples include comments such as the following:

- "The site I use most is AOL because they are my provider. But, I also like Yahoo! because of games and e-mail. Yahoo! is also mainly text-based and they have not changed their design so much in recent years. It's just easy to access, always available, easy to navigate, and easier to use than other sites."
- "My preferred portal site is MSN. MSN just came with my computer basically. They gave me free Internet access for some time, and I decided to stick with that."
- "With Hotmail I can read my e-mail from anywhere without complicated set-ups. It does not matter if I am at home, or at my parents house, or somewhere else."
- "I like to use Netscape because it is readily available at work and at school. It's also very reliable."

- "I use many portals because I use Yahoo! everywhere but my parents have Netscape and AOL and my grandparents have MSN. Depending on where I am, I use what's easily available there."
- "I do not have a computer at home. When I need to use one I go to someone else's house, or, I go to the library and Yahoo! is usually also available there since it is public."

While one respondent mentioned a relationship to his Internet service provider concerning accessibility to his preferred public Web portal, the majority of respondents clearly referred to easy access independent from a particular service provider, and more clearly to the possibility of using public Web portals and their services wherever they had access to the Internet. One respondent called this kind of ubiquitous access "portability."

Uniqueness of Services

There were at least 27 students who somehow expressed that they were using a particular public Web portal due to either unique services or to services on a particular site that could not be matched with regard to quality or content by similar services on other portal sites. One student wrote in question 13: "I use portals for games, communication, and collaboration. When I am working with a group on a project, we can use features on Yahoo! to communicate or to share files. I also don't know of any other site that has such a large customer base to play games with." The response to question 13 from another student read: "I have been to other sites to play games, but they don't have as interesting games to play as Yahoo!" And yet another student said during one of the focus groups: "The games and the groups are the reasons why I use Yahoo! most of the time. My fraternity has a group on Yahoo! and I go there every other day. I

also used to play around with iWon trying to win a little money, but I haven't used it for quite some time. I also use the local information."

The comments from two other students during one of the focus groups were as follows: "I use Netscape to do research for papers and to read the news. I also look up movies, concerts, and other local events. It's better than buying the newspaper" and "I like Yahoo! because of the music and videos that they have at Launch. Besides news and sports, I usually also check for airfares on that site. I also have a Hotmail account with MSN, and I use AOL messenger. They have all their advantages and disadvantages and I use whatever I just need. I also like that Yahoo! has so many options you can pick from when you personalize." In addition, one respondent stated during a follow-up interview: "I use the finance section at Yahoo! a lot for work to check stock quotes on my company and our competitors. They have really good information there and research articles that you cannot get that easily otherwise." Another one said: "I am on Yahoo! for news updates and financial information mostly. I use Yahoo! finance to make my portfolio easy to check. I also play dominoes regularly." Two other students expressed during the follow-ups the following reasons for their preferred public Web portals this way: "I like Yahoo! better than MSN since Yahoo! gives you more storage space and you do not have to sign-in every 30 days. I do not know much about the other sites but my Hotmail fills up with spam quickly, and I have to delete it all the time to keep the account." The other student said: "One reason why I use Yahoo! is that it is also available in Chinese. They have also other languages that I don't speak, but I use the Chinese Yahoo! although you need to have that font installed on your computer to be able to read it."

Community

The existence of and the belonging to a particular community that was enabled and facilitated by a public Web portal accounted as preference reason for at least 22 participants in this study. Community was loosely defined as engaging in activities with at least two other persons on public Web portals. Students' comments that emphasize community as a reason for preferences were as follows:

- "I like MSN best since most of my friends use the MSN messenger, and I use Microsoft products most of the time anyway. MSN is just there whenever I start my PC and besides of all the bad things I've heard about Microsoft, I like what they have to offer and how easy they have made my life when I use the Internet."
- "I use Yahoo! most of the time since I like there entertainment information and games. I also use the messenger to communicate everyday with my friends and family. Since they are on Yahoo! I am also on Yahoo! I could not use another messenger to communicate with them."
- "I joined several groups and communities on MSN and I have even made some friends there. It's just a place I can go to if I'm bored and I usually find someone I know there."
- "I usually just navigate through and check the information. However for AOL, I use it for messenger, and for Yahoo!, I play games and use their auctions to purchase things."

Discussion groups, multiplayer games, and messenger services facilitated a sense of community that made students use particular portals more than others. While messenger services do not run on a particular portal site, they are usually closely connected to their parent sites by providing direct links to a selection of portal services.

Quality of Content

Although there were numerous students in this study who expressed that they rather liked to visit sites such as, for instance, cnn.com, espn.com, or nyt.com for news information needs or more specialized sites for other services that are also available on public Web portals, at least nine participants mentioned that they prefer a particular public Web portal due to quality of content. These students were particularly satisfied with up-to-date information in one ore more of the news sections, with financial and travel information, and with the TV guide. One student (Yahoo!) said during a focus group: "Since I have stocks I have a vested interest in knowing how they perform. While the stocks are displayed with some delay, I like their financial information since it is free and you can get excellent background information about companies and their stocks." Another focus group participant stated:

> I like to read the news headlines and you can also see how recent this is. Yahoo! serves as a kind of substitute for other media for me. I have all the national, local, international, and sports news there, and I think they do a good job. Of course, there are plenty of more specialized news sites on the Internet but I like that I can just read the headlines from so many different areas I am interested in on one page. If something seems interesting, I just click on it and read the full story. The stocks are also quite good compared to other sites, and the TV guide is even better than what you might find in printed resources since they have links to movies and other programs there.

One respondent (Yahoo!) wrote in question 13:

> Besides of searching, e-mail, and news, I use it because of the travel information. They have great information about so many destinations just one or two clicks away. I have also gotten some really good deals and booking online seems to be much cheaper. Whatever I read about a place that I visited later was very helpful and usually also very correct and honest. They don't lie like some other travel sites I've tried.

While quality of content was also a concern for some other participants in this study who felt that, for instance, some of the news headlines on public Web portals were somewhat sensational to catch the reader's eyes, or, that the information in some portal modules was

not as up-to-date compared to what they found on more specialized sites, quality of content and overall satisfaction with it was clearly a reason for preferring one particular portal to another or even to more specialized sites for a number of students in this study.

Satisfaction

Of course, not all respondents were satisfied with using public Web portals, a fact that will be described more below. However, overall satisfaction with a particular public Web portal or with particular services on a site was the major preference reason for at least 32 respondents in this study. While satisfaction includes aspects related to the other themes illustrated above, it was included here since a number of students did either not elaborate further on their responses or stated reasons that did not clearly fit one of the other themes. Comments ranged from simple ones such as "I am just very happy with Yahoo! and its services and I could not imagine the Internet without it." over "I have personalized Yahoo! and Excite and I use both for different purposes. But I've always liked what I can find there, and I've never had a problem using these sites. Why should I use other portals?" to "I played with some of the portals out of curiosity since my friends and family members use all different sites. However, I stuck with Yahoo! and Lycos. While most people I know use probably Yahoo! and I am happy with it, I am also quite happy with Lycos so far because I like their colors, and I've made some good friends there." Other students referred clearly to their satisfaction with search engine results and how these are displayed. One student wrote in response to question 13: "I use Yahoo! the most and I do not know whether it is because I like it, or, because I have used it from the start. I like their format when you type in something and search for it and how it comes up. I think they limit it to 20 per page, and on others there are as many as there fit on one page."

The following comments by one student during a follow-up interview summarize the complexity of preference reasons for public Web portals by undergraduates best. The student said:

> My overall experience with portals has been very good. I mean the main reason that I use them is for e-mail. Apart from that, I use them for searching for information mainly on Yahoo! and Excite. I have also used MSN because of Hotmail and their messenger. I think I like some of the things better on certain sites than on others because I've used them for a longer time, or they meet my needs better than other sites. They have all advantages and disadvantages. I mean, Yahoo! and Excite are definitely fast although MSN is sometimes slow to get in and might have too much clutter on the page. The e-mail services are quite good, and they are free although Hotmail has too much spam. Apparently, there is some problem with MSN. I use their messenger a lot but I received strange messages in Hotmail and even one that had a virus on it after I started using the messenger. … I also received messages in Spanish and I do not know why. I also like the option that you can change the font and other things while you are composing a message. I find that kind of stuff very attractive. It's also very reliable and usually always running. Most of the portals are also easy to navigate through. If you were ever to search something on it, it is very organized and provides good categories. I am very impressed with Yahoo! It's also the site I think I used first when I started using the Internet. Yahoo! and Internet were like synonyms. The front page on MSN has also lots of good articles like news and what the best car to buy, or, how should you make your résumé. However, Yahoo! is like my childhood.

Although the themes above might already reflect to a certain degree on undergraduates' reasons for using public Web portals in general as discussed in the next section of Chapter 4, the researcher identified and included these themes to answer why undergraduates in this study preferred certain public Web portals to others based on the questions that have been reported so far as well as on content analysis of other data collection activities. Despite the fact that each student could mark only one public Web portal as most preferred one in question 8, some of the comments show that a number of students did not only have more than just one reason for choosing a particular portal rather than another, but also that students liked to use different sites for different purposes.

Table 4.11 below provides a quick summary of the researcher's findings related to RQ 2 described above.

Table 4.11: Summary of undergraduates' preference reasons for particular public Web portals

Preference Reason	Verbal Description	N
Reputation/Brand Name	everyone uses and knows it	27
Familiarity	used this site first	21
Ease of Use	fast service, user-friendly interface	16
Accessibility	reliable, mainly free, always available	21
Uniqueness of Services	particular resources such as music, videos, games	27
Community	chat, messenger service, groups	22
Quality of Content	up-to-date news, other good information	9
Satisfaction	good search engine results, overall satisfaction	32

While this section of Chapter 4 has provided answers to what undergraduates' preferred public Web portals were and why, the next section focuses on why undergraduate students use public Web portals in general and how they use these sites in particular. Following the presentation of findings from content analysis of question 13 and respondents' remarks from focus groups and follow-up interviews regarding general reasons for using public Web portals and factors that contribute to limited use, the researcher reports selected demographic and use variables of participants who applied and did not apply personalization compared to all users of public Web portals in this study (N = 142) as a basis for further discussion and hypotheses testing. Findings from data collection activities beyond phase 1 are woven in as deemed appropriate by the

researcher. As an extension of results reported above the reader will also find results from hypotheses tests with regard to reasons for undergraduate students' public Web portal preferences as long as they are based on questions 9 to 12 and 14 including data that have not been previously reported. Most of the following section of Chapter 4 reports, however, the findings with regards to public Web portal users who personalized their portal view versus those who did not since the researcher judged the use of personalization on public Web portals by undergraduate students as a major differentiating quality with regards to the utilization of what public Web portals had to offer also in comparison to possible similarities to personal home pages (RQ 4) at the time of data collection. Responses from personalizers (N = 66) about their personalization behavior and satisfaction with personalization outcomes (questions 15 to 18) as well as their preferences for particular features on public Web portals (questions 19 to 21) and findings regarding students' thoughts about public Web portals and personal home pages conclude the section.

REASONS FOR UNDERGRADUATES' USE OF PUBLIC WEB PORTALS AND ANALYSIS OF THEIR USE OF THESE SITES (RQ 3)

The third major research question of this study asked why and how undergraduate students use public Web portals. Before looking into factors that seemed to limit use of portals, the researcher would like to report the major reasons for undergraduates' use of public Web portals in general. The researcher is aware that the themes identified are not mutually exclusive but rather complementary to themes that appear elsewhere. Overall, it needs to be mentioned that most respondents reported multiple reasons for use or limited use of public Web portals in many open-ended questions as well as during focus groups and individual follow-up interviews.

Undergraduates' Reasons for Using Public Web Portals

Question 13 asked: "Why do you use portal sites? (Please be as detailed as possible)." As previously mentioned a number of students did not clearly distinguish between the use of public Web portals in general and the use of their preferred public Web portals in particular. It is this indifference that made it somewhat challenging to establish themes for undergraduates' reasons for using public Web portals in general. There is no doubt that reasons for preferring a particular portal to others had implications for using public Web portals in general and vice versa. That is, a student who prefers Yahoo! to other sites because of its reputation and brand name uses public Web portals in general probably largely also for this reason. The researcher found that the following themes were most prevalent for undergraduates' use of public Web portals according to answers in question 13 and to content analysis of material generated in the other phases of data collection:

- Reputation (There are so many others who use portals.)
- Familiarity (Portals are what I started with on the Internet.)
- Ease of use (It's fast, user-friendly, and easy.)
- Accessibility (I can use e-mail and other things from any place.)
- Personal interests (I use it for news and entertainment.)
- Community (I meet other people in the messenger and games.)
- Personalization (It's cool to have everything on one page.)
- Satisfaction (Great service and I would not want to miss this.).

While some of these themes occurred also in the analysis of participants' preferences for particular sites above, uniqueness of services and quality of content were not reasons for the use of public Web portals in general. On the other hand, personal interests and the availability and use of personalization were clearly mentioned as reasons for using public

Web portals in general. The recurrence of some themes in this section emphasizes their importance for undergraduates' use of public Web portals in this study.

The researcher provides the minimum number of occurrences for each theme based on those answers that clearly referred to the use of public Web portals in general, i.e., previously counted answers concerning particular sites were excluded. Duplicate answers by the same students were again eliminated through crosschecking the answers of question 13 with transcripts of focus groups and follow-up interviews. It needs to be mentioned that eleven respondents chose not to answer question 13, and that numerous others simply stated tasks that they accomplished on portal sites without further elaboration. Because of the limited amount of detail provided in numerous respondents' statements, in many cases it was difficult to determine the specific reasons for using public Web portals in general.

Reputation

Reputation was not only a reason for preferring one public Web portal to others as discussed in RQ 2 but also clearly a reason to use portal sites in general for at least seventeen respondents in this study. While brand name was probably also somewhat a reason for portal use in general, the researcher excluded those occurrences since it is his opinion that brand name had closer associations with preferences for particular sites.

Respondents' written comments were as simple as "I use it because everyone else does," "Because they are well-known and have lots to offer" or "They are common and popular." Others wrote: "I have heard good things about portals and I know that many people use them. Portals are all over the Internet and in the news," or "I don't know of many other sites that I use regularly and that have so many things that I find useful. They are also free. Whenever I need to know something portals are the first sites that come to

my mind." One student made the following comment during a focus group: "I help immigrants to get familiar with the Internet, and I usually use portals first to get them acquainted with the Internet. It's just because so many other people here use it and I think they should, too." This relationship of high reputation and thinking of new Internet users was also expressed during a different focus group by another student who said: "Portals are widely known and I have had only good experiences with the ones I have used. Whenever I introduce someone new to the Web I show them portals since they are easy to use, free, and always up and running. Now, my parents and my little sister use these sites and I think it was the best way to get them on the net." As shown in these examples, public Web portals had high reputation and popularity among undergraduate students in this study. Interesting was that some participants introduced even other new Internet users to public Web portals since these sites had a high reputation in their eyes.

Familiarity

Familiarity was another recurring theme. Comments of the fourteen respondents who identified this reason for using public Web portals in general were similar to those included in this theme under reasons for public Web portal preferences in RQ 2 above, although not focused on a particular site. Characteristic were comments such as these:

- "When I started with the Internet in high school portals was what I used first. It was just a new whole world to explore and portals were a kind of springboard for that. Although I use also other pages these days I still like to go to portals for quick information and searches."
- "It helps me find what I am looking for. It is the best and only way I know how to find my way around the Internet. It is like a compass for the Internet."

- "Because I have used portals for a long time. They have good things and I use them because they have what I need. I also have my e-mail on a portal and that makes me use it at least once every day."
- "I've never thought about why I use these sites. They are just there and I know about them. I guess it has simply become part of my life. It's like using a phone or driving a car. Once you got used to it and find it useful you don't want to miss it anymore."

Also the students who identified this theme had been obviously introduced to public Web portals when they started using the Internet. As indicated, this aspect might have resulted in personal use habits that had a formative influence on participants' long-term use of the Internet in general. Some undergraduates had developed such familiarity with the Internet and portal sites in particular that they could not imagine their lives without them anymore.

Ease of Use

Like the previous two themes, ease of use was another reoccurring theme. At least seventeen respondents wrote or said something that clearly referred to this theme. There were also critical remarks during all three phases of data collection with regard to clutter on portal pages, information overload, privacy concerns when registering and using portal sites, or unsolicited advertising on portal sites in general. Many students, however, found portal sites in general and particular sites easy to use. This ease of use was a compelling reason for using these sites. Representative comments included:

- "I find it easy to use different Internet resources from one Web site."
- "I use these sites because I do not know other ways to get to all this information any easier."

- "I am not very skilled in using the Internet and I find these sites easy to use."
- "Easy to navigate, best way to search for something, user-friendly interface."
- "I only use two or three portals regularly but I think I use them because they are self-explanatory. I don't recall any problems while using them and I do not even know if they have help pages. They probably do, but I never had to use them."
- "I would say that most of the portals are just easy to use when it comes to navigation and presentation. I've always found what I was looking for when I used portals. True, some are better than others but I think it depends also on what you are looking for. I just find them easy to use."

As previously stated, the researcher was surprised that he did not find more responses that clearly exhibited this theme. On the other hand, the themes discussed are by no means mutually exclusive, and all notions that included a mention of convenience were, for instance, coded under accessibility below.

Accessibility

Accessibility as defined above was a recurring theme but nevertheless an important reason to use public Web portals in general for at least fourteen respondents in this study. The majority of statements coded into this theme mentioned convenience although there were others as illustrated in the following comments:

- "They are easy to access and very common."
- "I use these sites because they are just convenient to use and it does not matter from where."
- "To make it short I'd say that convenience is the reason why I use portals."
- "Portals are simply convenient for me. Provided I sign in I can use them from any place and even if I don't, searches and other things are still there for me."

- "I use them because I cannot think of any other tool on the Internet that has what I need each day so conveniently available on one page. I assume it is convenience why I use these sites so often."
- "Because they are so convenient. Easy to access. All what I want on a regular basis for my personal information needs."
- "I believe the convenience factor is the most important reason why I use portals. I don't know about other people but it's just convenient for me to have access to all the information on one page."

Since the notion of convenience seemed somewhat vague, it was not used as a separate theme. Four of the respondents who mentioned convenience as a reason in question 13 participated also in a focus group or a follow-up interview which allowed them to clarify their written responses. Interesting was that all four seemed to equate convenience not only with accessibility but also with other themes that were related to their use of public Web portals in general. One student said in a focus group: "It's just convenient to have all you want to see on one page if you personalize. That's what I meant." Another one said: "I like my view after personalization and I am happy with this since I do not have to look on all the stuff I do not want to see there." And another participant recalled: "It's convenient but even more if you personalize portals. They can have a lot but it depends on how you use it and on what you really need." The fourth student stated: "By convenience I meant that the content is easy to reach and quite plain. It's there and it is easy to select what you are interested in provided they have it. It's just convenient and I do not know other sites that do this so easily for users on the Internet."

Personal Interests

Personal interests was included as a reason for using public Web portals in general since the development of this theme allowed the researcher to report the numerous answers to question 13 that only contained respondents' tasks or preferred portal features without elaborations rather than other reasons for using public Web portals.

Overall, at least 33 students listed features they use or tasks they accomplish on portal sites. Many provided common sense reasons for using public Web portals such as search engines, e-mail, news, weather forecasts, stock information, horoscopes, et al., while others simply mentioned their tasks or preferred portal features without any further explanation. The researcher decided against the inclusion of detailed comments that could support this theme as a reason for using public Web portals in general because often there was no explanation of why participants use particular features or services or why they accomplish certain tasks on portal sites. Many returned questionnaires coded for this theme just listed under question 13 something like mail, searches, weather, news, music, stocks, et al. Responses such as the following example were quite common although many were shorter and did not use sentences: "I use portals because I like to read the news, horoscopes, e-mail and other information that is there. I use it because I am just interested in these things."

Many participants whose responses contributed to this theme did not participate in phases 2 or 3 of data collection, hence were not available to clarify or further elaborate on their answers. The researcher must critically admit that question 13 could have been phrased somewhat differently by emphasizing actual reasons for portal use and by making it clearer that the focus of this question did not lie on particular features or tasks because these were subject of other questions. Nevertheless, personal interests made up

the majority of reasons for using public Web portals in general among all themes created, and the large number of occurrences of this theme justifies its inclusion.

Community

Fourteen respondents mentioned community as another recurring theme in this study as the reason to use public Web portals in general. As described in RQ 2, community was loosely defined as engaging in activities with at least two other persons on public Web portals. The researcher would like to mention that the majority of respondents were not inclined to disclose their online activities with other persons too much although some mentioned multiplayer games, groups, messenger, personals, and chats. The following comments are included to illustrate the researcher's findings:

- "I use the sites for groups and games a lot. I do not know of any other sites than the portals that offer games and have such a large user base."
- "Chat, online radio and multiplayer games are the reasons why I use portals. You can meet and play with people from around the globe. I've made some online friends. First we met in a chat or during a game but now I have them in my messengers and we can see each other when we are online. I just like to talk to people and sometimes they helped me with homework or other things."
- "Games, games, games. That's my major reason for using portal sites. I don't care about the news and other things. It's games. Portals have the best user base if you want to play games with others. I got really good in chess recently. What they have with all these other people is unbeatable compared to anything else in this league."
- "I use portals because of groups and the messengers a lot. Actually, I met some cool people here after I met them online."

The sense of having developed a kind of community spirit with other users of public Web portals facilitated by services available at portal sites as well as the large number of users seemed to have a major impact on undergraduates' use of public Web portals in general.

Personalization

This theme was not so evident for undergraduates' portal preference but clearly present among undergraduates' reasons for using public Web portals in general. The reader is also encouraged to consult the sections below that report results from hypothesis tests and other findings with regards to the use of personalization on public Web portals by undergraduate students. Personalization constituted a major reason for using public Web portals in general for at least twelve respondents in this study. Typical for this theme were the following comments:

- "It's great to be able to personalize. It keeps everything in order. As far as any more detail goes, there isn't really any. Portals to me are just very simple sites to setup and to be able to check things I need."
- "Look at e-mail and instant messenger. To have quick access to varied resources and many types of information on one page after using that personalization thing. That is why I use these sites."
- "I use portals because I can tell them what I'd like to see there. Wouldn't use the sites if that would not be available there."
- "Personalization? I found this really cool and worthwhile. It took me quite some time to figure out after I started using portals but they all have it and I like it. It's just cool that they allow you to get rid off unwanted content. I have now what I like to see and what interests me most. Just great!"

- "I was scared to use personalization and it was not as easy and rather time-consuming. But, I am glad I did since I would not want to use the portals without this anymore. They would not be as useful as they are now."

As mentioned above, all public Web portals under investigation had personalization available. But the availability of personalization did not influence participants' choices with regard to any particular public Web portal. While a little bit more than half of all participants did not use personalization (76 of 142), it was interesting to see that personalization was a compelling reason for using public Web portals in general for some undergraduate students.

Satisfaction

Last but not least the theme of satisfaction occurred often during the analysis of undergraduates' reasons for using public Web portals in general compared to preference reasons for a particular site. Of the 142 users of public Web portals in this study, at least 21 stated satisfaction as a reason for using public Web portals in general. Students' statements such as the following support this theme:

- "Because I am very satisfied and they are very efficient. The information to me is very reliable. If I want to know current info, portal sites are my first option to go to."
- "To get information easier and quicker. They have good choices there. I like what they have there."
- "I use these sites because they are typically reliable (speed, uptime). They also have a certain consistency so they don't change the layout often. I am pretty satisfied with the ones I know."

- "I usually always find want I want there. If I don't find it on one portal I try another. I like it that they have so many options although it could probably also be confusing for someone new. Overall, I am just satisfied with what they make available. I just don't like the ads but I guess they need to make money somehow since their services are free."
- "I use them because I have had good experiences with portals and I usually find what I need. The only thing I am not so happy with is the advertising. But it's still better than having to pay for their services."
- "Just great stuff they have there and I cannot complain. They give me what I need to know on a daily basis. I am just pretty happy with all that I can find there and I would not want to miss that."

While numerous students expressed dissatisfaction with advertising on public Web portals in all phases of data collection, many acknowledged advertising as a necessary evil. There is no doubt that a relatively large number of respondents used public Web portals because they were simply satisfied with what these sites had to offer to them. Although there might be additional reasons for the use of public Web portals by undergraduate students in general, the researcher is quite confident that he identified the most prevailing reasons that made undergraduates use public Web portals in general.

One student in this study summarized the ensemble of reasons for undergraduate students' use of public Web portals in general quite briefly and to the point by writing in response to question 13:

> Instant communication, instant feedback from other users possible via messenger, fast, reliable, free, somewhat consistent over the years, satisfying search results, accessible from more than one computer, user-friendly, good information sources (news, stocks etc.), rich community, adaptable interface, simply convenient. I would recommend portals to everyone who uses the Web.

Table 4.12 below summarizes the researcher's findings of undergraduates' reasons for using public Web portals in general including verbal descriptions for each theme and the minimum number of occurrences in this study.

Table 4.12: Summary of undergraduates' reasons for using public Web portals

Reason for Using Portals	Verbal Description	N
Reputation	There are so many others who use portals.	17
Familiarity	Portals are what I started with on the Internet.	14
Ease of Use	They are fast, user-friendly, and easy to navigate.	17
Accessibility	I can use e-mail and other things from any place.	14
Personal Interests	I use it for news, entertainment, stocks etc.	33
Community	I meet other people in the messenger and games.	14
Personalization	It's cool to have everything on one page.	12
Satisfaction	Great service and I would not want to miss this.	21

While the previous section discussing RQ 3 provided some insights into why undergraduate students use public Web portals in general, the following section describes briefly some factors that seem to have limited their use based on comments from focus groups and individual follow-up interviews.

Factors Limiting Undergraduates' Use of Public Web Portals

The major research questions do not specifically address factors that limit undergraduates' use of public Web portals, but the researcher would like to report the

following most prominent factors as they became obvious during the course of data collection and analysis:

- Technological barriers
- Use of other resources and services
- Unsolicited advertising
- Information overload
- Non-personalization.

This short list of factors is by no means all-inclusive but they are described briefly because they were evident in multiple responses. These factors contribute to a more comprehensive picture of how undergraduate students use public Web portals and why some of them did not use these sites to a larger extent.

Technological Barriers

At least eighteen participants expressed that they did not use public Web portals as often as they would like to because of slow Internet connections and older computing equipment at home. One student said:

> It just takes too long until I have all the information on the screen on my older PC with modem. It takes even longer on MSN than on Yahoo! and the more pictures and pop-ups there are the longer I have to wait. It's just no fun. I usually go there only if I have to. On the other hand, it is much faster on campus but I do not have so much time for portals when I am in the library.

Similarly another respondent stated: "I would use them more often and longer if I had a faster connection at home. It's just too slow and I am not that patient." Interesting was, however, that at least two other students said that they did not use public Web portals so often anymore because they had upgraded to faster equipment since they had been starting to use these sites. One of them said:

> Initially I used them when I had a slow connection and I just liked getting all the information without going to other Web sites. It used to be interesting for me like two or three years ago. But, I lost interest as soon as I got broadband connection. I could go to the sites I wanted the information from. Another reason why I do not use portals so often anymore is that they often did not give me the specific information I wanted. Portals just had one source of business news or tech news. I wanted a broader range of sources and that's another reason why I stopped using them. I mean I liked to have everything together but it was not enough for me.

Slow equipment seemed to be a double-edged sword. It limited the use of public Web portals for a number of participants, but it was also an inhibiting factor for at least two others who lost interest in public Web portals after they had upgraded to faster equipment.

Use of Other Resources and Services

The use of other Internet resources and services for more specific information needs is visible in the previous statement. Other students made comments such as the following:

- "I think portals are definitely good for beginners. But I probably don't use them as often anymore since I use other search engines like Google and also more specialized sources I know of."
- "I think what happened for me is that I just go to specific sites these days. I mean portals are still good but I do not use them that often anymore. I often just type in the URL because I know where I want to go."
- "Some of their news headlines seem more sensational and that's why I use other sites if I really want to know what's going on."
- "Portals do a lot of things but maybe they do not one thing really well. It is just mainly a service were they have a lot of services together. If they have it than it's nice but if not … I usually go to a lot of sites for specialized interests anyway. I

guess also with organization you cannot satisfy each and everyone if you try to put so much on one site. For me, portals are just convenience. If I need it I go there."

- "I think it is a little bit like the following when it comes to content on portals. I would not go to Wal-Mart or Sears to buy a computer. I go to a computer store. I want it to have more knowledge. For anything specialized you also go to a site that you would think to have more knowledge. Portals are fine for quick information and a general overview. But I know other more specialized sites for many things because I have been on the Internet long enough."

Knowledge about other information resources and services had clearly a limiting influence on the use of public Web portals by at least 22 respondents who had been using the Internet and other services for a longer time, and therefore discovered sites that met their information needs better. While the majority of respondents in this study were quite satisfied with the quality of content on their preferred portal sites, some students desired more in-depth information as well as a larger variety of news and content providers on public Web portals in general.

Unsolicited Advertising

About one third of the participants (45 students) quite vocally expressed their dislike of unsolicited advertising in the form of pop-up banners and e-mail messages during the three phases of data collection. Some students accepted pop-up banners as a necessary evil on public Web portals since they realized the trade-off between free service and advertising. Although the reasons for receiving unsolicited e-mail might vary and portal providers cannot necessarily be held responsible for this downside of the Internet, only few students in this study were willing to accepted unsolicited messages as

a necessary evil. Unsolicited advertising was indeed even a reason not to use portal sites anymore for a number of students, or to use them only with a new portal login name. The following statements support the researcher's assertions:

- "I like portals but I hate all these pop-ups there. I always have to click that little x so that they go away. Sometimes I don't go to portals at all because I am tired of this."
- "That advertising was getting on my nerves. I hardly used MSN anymore because of that until recently. I just installed a so-called pop-up blocker and it seems to work so far. I just don't know what to do about the spam in my Hotmail account. Maybe I need to get a new ID but that probably won't help me too long and I also do not want to have all my friends let know about this in case I decide to go that way."
- "I think I see both sides. Sometimes I see the quality news source and sometimes I see that bad commercialized total industry fluff source. Oh, you are just trying to sell me something. I mean they need to stay in business. I just think it downgrades their whole portal because everything gets a bad taste."

Several public Web portal providers addressed the problem of unsolicited e-mails by providing filtering mechanisms that seem to have reduced the flood of unsolicited messages in students' mailboxes at least somewhat although the mechanisms are still far from perfect. One student said: "That spam is horrifying. Although I can now set several levels for security in Hotmail, I might also miss important messages from friends because the software decided that it was spam even though it wasn't." Unsolicited advertising in form of e-mail (spam) on public Web portals seemed to be an ongoing source of complaints that limited use of these sites by numerous respondents in this study remarkably. While the majority of respondents did not stop their use of public Web

portals because of spam, there seemed to be a considerable number of students who were at least close to that. The researcher found at least four students who had stopped using public Web portals entirely, while at least 28 others mentioned that they do not use portals so often anymore because of advertising annoyances. These numbers seemed to be somewhat alarming.

Information Overload

Aspects of information overload as a limiting factor for using public Web portals were expressed by at least nine participants in this study. Respondents usually expressed feelings of being overwhelmed with all the content that is available on the default pages of public Web portals. The researcher found the following comments quite typical:

- "I also have a complaint. When you first open some of these portals they put so much information on you that I just sometimes say: 'Forget it! I am going somewhere else.' I mean if you just sit there and look on all that information that comes up on that first page and it scrolls like forever down, it's almost too much. They want to try to meet every single person's need and they are really intimidating to some users and scaring them away."
- "I do not think that portals are too complicated but they might be overwhelming for beginners because some of them are too cluttered. I am not a beginner and I don't think they are for beginners only but I also had my problems with making it so that they are useful to me."
- "Don't get me wrong. I like to use portals in general but I still have not successfully managed to have Yahoo! so that it shows me everything I want to see there. It's just so overwhelming what they have there. It's a lot which is also

good. Some people might like it that way but for me it is really difficult to pick easily what I'd like to have and I am still working on this."

- "I just think that they could have organized their front page better. I mean if I had not personalized, I would not see a lot of things that are available. Not everyone probably has a personalized page and I think just the default page could be more organized with easier navigation. It's somewhat overwhelming at first."

While feelings of information overload were quite evident among some participants, the researcher would like to point out that these feelings were mainly expressed by respondents who had either not used personalization at all, or quite unsuccessfully in their own words, or by those participants who found personalization difficult.

Non-Personalization

As shown above, information overload was directly related to non-personalization that was another limiting factor for at least 21 respondents' use of public Web portals. The following two statements also emphasized this theme:

- "One thing I do not like is all the clutter I might get. They have already so much there and I am afraid that it will get worse when I change something. That's why I stay often with the dedicated sites. I also have experimented with personalization once but I found it still too cluttered and not very appealing. Maybe I did something wrong."
- "I had never heard of personalization before this study but I have to say I like it. It's actually designed to make the page user-friendlier. It was a little bit confusing at the beginning but once I figured it out I removed stocks and other things that I am not interested in and added things I found available. I like it much better now and it is not so cluttered. I simply do not have to see what I

don't want there. I think I will use it more often from now on. Thanks for bringing this to my attention."

The reader is encouraged to take a closer look at the ensemble of reasons for non-personalization on public Web portals by undergraduate students that are discussed in more detail below.

Table 4.13 provides a brief summary of the factors that limited undergraduates' use of public Web portals found in this study.

Table 4.13: Summary of factors limiting undergraduates' use of public Web portals

Limiting Factors	Description	N
Technological Barriers	Old computing equipment; slow connection at home	18
Use of Other Sources	Specialized in-depth sources; need for variety	22
Unsolicited Advertising	Pop-up banners; e-mail	45
Information Overload	Clutter; too many options on default page	9
Non-Personalization	Lack of awareness; no success with personalization	21

Following these explanations of reasons for using public Web portals in general as well as limiting factors for public Web portal use by undergraduate students, most of the remaining sections of Chapter 4 report the researcher's findings with regard to the use of public Web portals by students who personalized their public Web portal experience (personalizers) compared to those who did not (non-personalizers). Furthermore, the results from data analyses regarding students who maintained a personal home page on the WWW and those who did not will be reported.

Demographic and Use Variables of Personalizers and Non-Personalizers of Public Web Portals

The researcher considered the use of the personalization options on public Web portals an integral part of portal use that could potentially enrich undergraduates' experience on these sites in general. However, no other study to date has investigated demographic and use variables of undergraduate students who do or do not personalize of public Web portals. Tables 4.14 to 4.17 display demographic and use variables of personalizers and non-personalizers based on questions 1 to 12, 14 and 25 to 28 as basis for further discussion.

As the tables show, of the 142 users of public Web portals in this study 66 (46.5%) indicated in question 14 that they had used the personalization options on public Web portals compared to 76 (53.5%) who had not. Please note that some values in the tables were rounded by the statistical software package that was used. The researcher finds the following findings worth mentioning:

- While there were not only more female than male participants in this study, there were also slightly more female (36 or 25.4%) than male participants (30 or 21.1%) who had used personalization. However, as Table 4.14 shows, the number of males who personalized was slightly higher than those who did not, while the number of females who personalized was lower than those who did not.
- While the number of personalizers in all other classification categories was slightly lower compared to non-personalizers, there were slightly more freshmen who used personalization than those who did not.
- Of the 66 personalizers, 63 (44.4%) had Internet access at home, while only 3 (2.1%) did not. Furthermore, of the 123 users who had Internet access at home, the 63 personalizers slightly outnumbered the 60 non-personalizers (42.3%).

Table 4.14: Number of users who personalize and who do not by gender, age, major, classification, and GPA; N = 142

	Number of users who personalize (% of 142)	Number of users who do not personalize (% of 142)	Total (% of 142)
Gender			
Male	30 (21.1)	28 (19.7)	58 (40.8)
Female	36 (25.4)	48 (33.8)	84 (59.2)
Age			
Under 18	2 (1.4)	0 (0.0)	2 (1.4)
18 – 23	55 (38.7)	68 (47.9)	123 (86.6)
24 - 30	8 (5.6)	7 (4.9)	15 (10.6)
31 – 39	1 (0.7)	1 (0.7)	2 (1.4)
Major			
Natural Sciences	21 (14.8)	20 (14.1)	41 (28.9)
Social Sciences	29 (20.4)	37 (26.1)	66 (46.5)
Arts & Humanities	14 (9.9)	16 (11.3)	30 (21.1)
Other	2 (1.4)	3 (2.1)	5 (3.5)
Classification			
Freshman	11 (7.7)	9 (6.3)	20 (14.1)
Sophomore	8 (5.6)	9 (6.3)	17 (12.0)
Junior	10 (7.0)	17 (12.0)	27 (19.0)
Senior	36 (25.4)	38 (26.8)	74 (52.1)
Other	1 (0.7)	3 (2.1)	4 (2.8)
GPA			
Less than 2.00	3 (2.1)	0 (0.0)	3 (2.1)
2.00 – 2.49	4 (2.8)	6 (4.2)	10 (7.0)
2.50 – 2.99	14 (9.9)	22 (15.5)	36 (25.4)
3.00 – 3.49	26 (18.3)	24 (16.9)	50 (35.2)
3.50 – 4.00	14 (9.9)	23 (16.2)	37 (26.1)
None	5 (3.5)	1 (0.7)	6 (4.2)
Total	66 (46.5)	76 (53.5)	142 (100)

Table 4.15: Number of users who personalize and who do not by preferred browser, preferred operation system (OS), Internet access at home, length of Internet use, and self-rated Internet experience/skill level; N= 142

	Number of users who personalize (% of 142)	Number of users who do not personalize (% of 142)	Total (% of 142)
Preferred Browser			
IE	56 (39.4)	60 (42.3)	116 (81.7)
Netscape	7 (4.9)	12 (8.5)	19 (13.4)
Other	3 (2.1)	4 (2.8)	7 (4.9)
Preferred OS			
Windows	61 (43.0)	68 (47.9)	129 (90.8)
Macintosh	4 (2.8)	6 (4.2)	10 (7.0)
Other	1 (0.7)	2 (1.4)	3 (2.1)
Access at Home			
Yes	63 (44.4)	60 (42.3)	123 (86.6)
No	3 (2.1)	16 (11.3)	19 (13.4)
Length of Internet Use			
Less than 1 year	0 (0.0)	1 (0.7)	1 (0.7)
1 year – less than 2 years	1 (0.7)	1 (0.7)	2 (1.4)
2 years – less than 3 years	3 (2.1)	3 (2.1)	6 (4.2)
3 years – less than 4 years	10 (7.0)	13 (9.2)	23 (16.2)
4 years and more	52 (36.6)	58 (40.8)	110 (77.5)
Experience/Skill Level			
Expert	29 (20.4)	10 (7.0)	39 (27.5)
Very good	31 (21.8)	54 (38.0)	85 (59.9)
Still learning	5 (3.5)	10 (7.0)	15 (10.6)
Beginner	1 (0.7)	2 (1.4)	3 (2.1)
Total	66 (46.5)	76 (53.5)	142 (100)

Table 4.16: Number of users who personalize and who do not by preferred portal, length of portal use, duration of portal use each time accessed, and weekly hours of portal use; N = 142

	Number of users who personalize (% of 142)	Number of users who do not personalize (% of 142)	Total (% of 142)
Preferred Portal			
Yahoo!	43 (30.3)	36 (25.4)	79 (55.6)
MSN	12 (8.5)	20 (14.1)	32 (22.5)
Netscape	4 (2.8)	8 (5.6)	12 (8.5)
AOL	5 (3.5)	9 (9.2)	14 (9.9)
Lycos	0 (0.0)	1 (0.7)	1 (0.7)
Other	2 (1.4)	2 (1.4)	4 (2.8)
Length of Portal Use			
Less than 3 months	1 (0.7)	6 (4.2)	7 (4.9)
3 months – less than 6 months	1 (0.7)	1 (0.7)	2 (1.4)
6 months – less than 9 months	0 (0.0)	5 (3.5)	5 (3.5)
9 months – less than 12 months	3 (2.1)	1 (0.7)	4 (2.8)
12 month and more	61 (43.0)	63 (44.4)	124 (87.3)
Duration of Portal Use			
Less than 5 minutes	9 (6.3)	13 (9.2)	22 (15.5)
5 minutes – less than 10	10 (7.0)	18 (12.7)	28 (19.7)
10 minutes – less than 20	17 (12.0)	25 (17.6)	42 (29.6)
20 minutes – less than 30	17 (12.0)	13 (9.2)	30 (21.1)
30 minutes and more	13 (9.2)	7 (4.9)	20 (14.1)
Weekly Hours of Portal Use			
Less than 1 hour	5 (3.5)	25 (17.6)	30 (21.1)
1 hour – less than 2	10 (7.0)	29 (20.4)	39 (27.5)
2 hours – less than 3	15 (10.6)	13 (9.2)	28 (19.7)
3 hours – less than 4	17 (12.0)	7 (4.9)	24 (16.9)
4 hours and more	19 (13.4)	2 (1.4)	21 (14.8)
Total	66 (46.5)	76 (53.5)	142 (100)

Table 4.17: Number of users who personalize and who do not by number days of portal use per week, use of preferred portal at home, and use of preferred portal away from home; N = 142

	Number of users who personalize (% of 142)	Number of users who do not personalize (% of 142)	Total (% of 142)
Days of Portal Use per Week			
1	1 (0.7)	7 (4.9)	8 (5.6)
2	1 (0.7)	11 (7.7)	12 (8.5)
3	2 (1.4)	10 (7.0)	12 (8.5)
4	6 (4.2)	18 (12.7)	24 (16.9)
5	17 (12.0)	14 (9.9)	31 (21.8)
6	14 (9.9)	9 (6.3)	23 (16.2)
7	25 (17.6)	7 (4.9)	32 (22.5)
Use Preferred Portal at Home			
Yes	61 (43.0)	58 (40.8)	119 (83.8)
No	5 (3.5)	18 (12.7)	23 (16.2)
Use Preferred Portal away from Home			
Yes	53 (37.3)	63 (44.4)	116 (81.7)
No	13 (9.2)	13 (9.2)	26 (18.3)
Total	66 (46.5)	76 (53.5)	142 (100)

- The numbers of users who rated themselves as "Expert" were also interesting. As Table 4.15 displays, of the 39 users in this category, 29 were personalizers, 10 non-personalizers.
- Table 4.16 shows that, of the 79 users who preferred Yahoo!, 43 (30.3%) were personalizers compared to 36 (25.4%) non-personalizers. On the other hand, of the 32 users who preferred MSN, 20 (14.1%) were non-personalizers and12 (8.5%) personalizers.

- Table 4.16 indicates that more personalizers than non-personalizers spent at least 20 minutes on their preferred public Web portal during each access period, while more non-personalizers than personalizers did so for less than 20 minutes.
- Similarly, more personalizers than non-personalizers used their preferred portal for at least 2 hours in a typical week, while more non-personalizers than personalizers did so for less than 2 hours.
- As Table 4.17 shows, there were also more personalizers than non-personalizers in this study who used portals sites for 5 or more days in a typical week, while there were more non-personalizers than personalizers who did so for 4 days or less. The researcher found a mean of 4.8 days of portal use per week (SD = 1.79).
- Of the 119 participants who used their preferred portal at home, a majority of 61 (43.0%) applied personalization compared to 58 (40.8%) who did not. And, of the 23 participants who did not use their preferred portal at home, only 5 (3.5%) were personalizers compared with 18 (12.7%) non-personalizers.

Before reporting results from hypothesis tests of selected demographic and use variables in relation to personalization, the researcher would like to revisit RQ 2 briefly and discuss additional hypothesis tests regarding undergraduates' portal preferences.

Relationships of Preferred Public Web Portals and Use Variables Revisited

As previously shown, the researcher did not find statistically significant relationships at $\alpha = 0.05$ between selected demographic and use variables and preferred public Web portals, except for classification and use of preferred portal at home. Tables 4.16 and 4.17 above include data from questions 9 to 12 and 14 that had previously not been reported. As mentioned earlier, the researcher conducted hypothesis tests using Chi-Square at $\alpha = 0.05$ with other variables in relation to preferred public Web portal.

Table 4.18 below displays the results of these Chi-Square tests relating preferred public Web portal to length of portal use (question 9), duration of portal use each time accessed (question 10), weekly hours of portal use (question 11), number of days of portal use per week (question 12), and use of personalization (question 14).

Table 4.18: Summary of Chi-Square tests of preferred portal related to length of portal use, duration of portal use each time accessed, weekly hours of portal use, number of days of portal use per week, and personalization; N = 142

	N	Calculated Values	Significant at α = 0.05
Length of Portal Use	142	FET = 0.097, p = 1.000	no
Duration of Portal Use	142	$\chi^2 = 5.056$, df = 4, p = 0.282	no
Weekly Hours of Portal Use	142	$\chi^2 = 1.856$, df = 2, p = 0.395	no
Days of Portal Use per Week	142	$\chi^2 = 2.540$, df = 4, p = 0.637	no
Personalization	142	$\chi^2 = 4.552$, df = 2, p = 0.103	no

While the majority of respondents had used Yahoo! for at least 12 months, spent at least 20 minutes during each access period there, accessed Yahoo! 5, 6 or 7 days in a typical week, and had personalized myYahoo!, the researcher failed to reject the null hypotheses at $\alpha = 0.05$. As with the previously tested demographic and use variables, there were also no statistical significant relationships at $\alpha = 0.05$ between respondents' preferred public Web portals and length of portal use, duration of portal use each time accessed, weekly hours of portal use, days of portal use per week, and use of personalization. Please see also the accompanying contingency Tables H.21 to H.25 in Appendix H. However, as illustrated above, the other data collection activities provided

a number of reasons for undergraduates' portal preferences based on analysis of qualitative data.

Relationships of Personalization and Demographic and Use Variables

The researcher used Chi-Square at $\alpha = 0.05$ again to determine if there were statistically significant relationships between personalization and selected demographic and use variables. Table 4.19 below displays the findings of these tests based on some of the variables reported in Tables 4.14 and 4.15 above.

There were no statistically significant relationships between personalization and gender, major, classification, GPA, and length of Internet use. The researcher found statistically significant relationships between personalization and self-rated Internet experience/skill level ($\chi^2 = 16.859$, df = 2, p = 0.000), and Internet access at home ($\chi^2 = 8.305$, df = 1, p = 0.004). Cramér's V is equal to 0.345, or according to Cohen's convention, medium to large in the first case, and ϕ is equal to 0.242, or small to medium, in the latter one. For more information see also Tables H.26 to H.32 in Appendix H.

As displayed in Tables H.31 and H.32, personalizers were more likely to have rated themselves as "Expert," and to have Internet access at home. Unfortunately, the researcher did not find any comments from students during content analysis to support the statistically significant relationship between self-rated Internet experience/skill level and use of personalization directly, i.e., none of the students expressed that they used personalization on their preferred public Web portal because they thought they were experts or vice versa. However, some of the themes described under reasons for not using personalization below support this statistically significant relationship in a somewhat indirect way.

Table 4.19: Summary of Chi-Square tests of personalization related to gender, major, classification, GPA, length of Internet use, self-rated Internet experience/skill level, and Internet access at home

	N	Calculated Values	Significant at α = 0.05
Gender	142	$\chi^2 = 1.084$, df = 1, p = 0.298	no
Major	137[10]	$\chi^2 = 0.539$, df = 2, p = 0.764	no
Classification	142	$\chi^2 = 0.292$, df = 1, p = 0.589	no
GPA	136[11]	$\chi^2 = 1.848$, df = 2, p = 0.397	no
Length of Internet Use	142	$\chi^2 = 0.124$, df = 1, p = 0.725	no
Experience/Skill Level	142	$\chi^2 = 16.859$, df = 2, p = 0.000	yes
Internet Access at Home	142	$\chi^2 = 8.305$, df = 1, p = 0.004	yes

On the other hand, the statistically significant relationship between personalization and Internet access at home was not only indirectly supported by participants' comments regarding lack of access as a reason for not using personalization as discussed below, but also directly by the following two statements that respondents made during the focus groups. One student pointed out:

> Well, I use AOL as my provider and they just show me what they have according to my information when my family registered with them. I also put certain other things there meanwhile that do not necessarily interest the rest of my family. But, I find it there whenever I use AOL from home. I think I see this only when I use AOL to go on the Internet and I like that they have it there for me. Whenever I use a computer in the library I do not see this information unless I log in at AOL from there.

[10] Portal users with no Major (N=5) excluded.
[11] Portal users with no GPA (N=6) excluded.

Another student remarked during the last focus group that he used personalization only because he "wouldn't use it without Internet access at home just for convenience and practical reasons." He continued to say that in his opinion he "could for sure do it also from any other place in the world with Internet access but that's not how most people probably use it." When asked to elaborate on his remarks in response to comments from other focus group participants who did not use personalization the student said:

> Well, you might have your own reasons for not using it the way I do. Maybe, some of you have not used it. One of you doesn't even have Internet access at home and I can hardly imagine this. Anyway, I like it the way it is and I do not have any other problems with it. But I like it best from my own computer at home since these are my settings and they are there for me. They are also quite convenient. I have just used it that way for quite some time now but only from home. That's just how I use it and if you don't than you should look into it provided you have your own computer. I mean I really don't use it personalized at other places that often although I have. I think it's just that I have roadrunner and access from home.

Another round of Chi-Square tests included variables that are reported in Tables 4.16 and 4.17 above. The findings of this round of tests are summarized in Table 4.20 below and the corresponding cross tabulations can be found in Tables H.33 to H.38 in Appendix H. The researcher did not find statistically significant relationships between personalization and length of portal use, duration of portal use each time accessed, and use of preferred portal away from home. However, as displayed in Table 4.20 the researcher found statistically significant relationships between personalization and weekly hours of portal use ($\chi^2 = 29.757$, df = 1, p = 0.000), days of portal use per week ($\chi^2 = 28.528$, df = 2, p = 0.000), and use of preferred portal at home ($\chi^2 = 6.753$, df = 1, p = 0.009). Cramér's V is equal to 0.52 (large) in the first case and 0.448 (medium to large) in the second one. For use of preferred portal at home the effect size ϕ is equal to 0.218 or small to medium according to Cohen's convention. Like Tables H.35 to H.37 show, personalizers were more likely to spend 3 hours and more as well as 6 and 7 days on portal sites during a

Table 4.20: Summary of Chi-Square tests of personalization related to length of portal use, duration of portal use each time accessed, weekly hours of portal use, number of days of portal use per week, use of preferred portal at home, and use of preferred portal away from home; N = 142

	N	Calculated Values	Significant at $\alpha = 0.05$
Length of Portal Use	142	$\chi^2 = 2.898$, df = 1, p = 0.089	no
Duration of Portal Use	142	$\chi^2 = 5.728$, df = 2, p = 0.057	no
Weekly Hours of Portal Use	142	$\chi^2 = 29.757$, df = 1, p = 0.000	yes
Days of Portal Use per Week	142	$\chi^2 = 28.528$, df = 2, p = 0.000	yes
Use Preferred Portal at Home	142	$\chi^2 = 6.753$, df = 1, p = 0.009	yes
Use Preferred Portal away from Home	142	$\chi^2 = 0.159$, df = 1, p = 0.690	no

typical week than non-personalizers. In addition, personalizers were more likely to use their preferred portal at home.

Weekly hours of portal use and number of days of portal use per week were not the subject of data collection activities in phases 2 and 3 of the research, and the researcher did not detect any comments to support the statistically significant relationships between those two variables and personalization. However, participants who used personalization spent more time on public Web portals during a typical week.

While Internet access at home did not automatically include the use of students' preferred public Web portal at home as shown above, most students who used personalization also had Internet access at home and used their preferred portal there. Although quite similarly to the students whose statements supported the previously reported statistically significant finding of Internet access at home and the use of

personalization, the researcher found the following comments to support the significant relationship between use of preferred portal at home and personalization. One focus group participant expressed the following:

> I mainly use Yahoo! in the personalized modus at home since I don't want to sign in all the time. I am just too lazy and don't like to do this on other computers. It's just there whenever I go on the Internet at home and it has what I want to see and what they offer. I don't know what other people think or do, but I believe that this personalization thing suits you best if you have your own PC at home and if you use your site from there. It's also more convenient this way. And as I said, I hardly sign in there on other machines.

Another student replied during the same focus group:

> I agree. I would probably not use my site so often as I do, or probably even not at all anymore, if it weren't for the convenience that it offers when I use it at home. I also do not like to register all the time because I guess I am also too lazy for that. It's not that I could not remember my ID and password but I am simply too lazy to do it. And why should I since it is there unless I shut my PC down? I have roadrunner and it's always on, anyway. I agree with her that it is more useful to use it from your own computer at home than elsewhere. I think I also sometimes sign in when I am on campus but that's not so often, and only if I need to find something quick that I have there and that cannot wait until I am back home.

Yet another focus group participant made the point by simply saying: "I like myYahoo! but only from home. I use Yahoo! also for searches and e-mail when I am in the lab or in the library but I do not care if it is personalized and I do not even look on myYahoo! I just do the searches and access my e-mail account."

Overall, the researcher found it worthwhile to investigate demographic and use variables in relation to the use of personalization on public Web portals. Since there was no statistically significant relationship between personalization and duration of portal use each time accessed, the researcher concludes that personalizers also accessed their preferred public Web portal more frequently.

Reasons for Not Using Personalization

As previously shown, of the 142 users of public Web portals 66 personalized their portal view, while 76 did not take advantage of this option. The researcher found previously that users' Internet experience/skill level, Internet access at home, weekly hours of portal use, days of portal use per week, and use of the preferred portal at home showed statistically significant differences at $\alpha = 0.05$. Question 14 asked respondents if they had used the personalization option on their preferred public Web portal as well as to describe briefly reasons for not using personalization. The following section is mainly based on content analysis of the open-ended part of question 14 and on comments from focus groups. Again, the researcher ensured during the coding process that duplicate answers and statements from respondents who participated in the focus groups were eliminated through cross-examination of the focus group transcripts with the answers in the questionnaires. The goal of this section is to reflect on what students had to say and what the minimum number of occurrences of each theme was.

Although not necessarily a reason for not using personalization on public Web portals, it should be pointed out that eleven students wrote in question 14 that they either had not understood what personalization meant, or that they had never heard of it. Students' answers were as simple as "I don't know," and "I don't have any idea," or "Never heard of it." However, one respondent made it clearer by including the following under additional comments in question 24: "I do not quite understand what personalization means in the questionnaire and I wished this would have been explained better somewhere." Another wrote there: "Sounds all cool but I had never heard of personalization and looked it up. I am still not quite sure what you exactly mean but I am sure that I've never used it." While it remains unknown how many of the respondents who stated "no" in question 14 encountered a definition problem with the term

personalization, the researcher would like to emphasize that it is not uncommon that a certain number of respondents in mail questionnaires have comprehension problems. This study's questionnaire had undergone several pre-tests, and it would have been impossible to provide respondents with a list of definitions of all the terms used. Nevertheless, the majority of respondents in this study understood what *personalization* entails.

While some of the following themes echo factors that limited public Web portal use as well as reasons for non-use of public Web portals by undergraduate students in general, the researcher found the following themes for not using personalization on public Web portals most common:

- Unawareness (I did not know that it is there.)
- Lack of need/interest (I am happy without it.)
- Lack of time (I never found time to do it.)
- Lack of use (I do not use portals that often.)
- Anticipation of difficulties (I think it is probably difficult to do.)
- Limited access (I don't have my own PC at home.)
- Privacy/security concerns (I do not want them to see my interests.).

Some answers contained more than just one reason for not using personalization and were coded separately from each other.

Unawareness

Unawareness of availability of personalization was stated by at least seventeen portal users in this study as a reason for not taking advantage of this option. Typical were the following comments:

- "I mean I have been using the same site for three years which is Yahoo! Unfortunately, I did not really know that you can personalize. Maybe I did not see it. I guess it also shows that I really did not pay much attention to it except of what I really want to do. I really don't waste my time."
- "I have not used it because I did not know that it was available. Maybe I did not care enough but it also was not brought to my attention before this study."
- "I have not personalized my page because I did not know about it, or what it was until now. It sounds interesting, and I might look into it if there are not too many pop-ups."
- "I found the personalization option while I was working on the questionnaire. I never realized that it was there before though. However, I don't think that I will use it because I like the fact that there are a lot of options available without it."
- "I did not customize until about two weeks ago when I answered your questionnaire. I never paid attention to this. It was not too difficult but now I have it there."

While a number of students had obviously never seen this option on their preferred public Web portal, it was interesting to discover that participation in this study made some others aware of the personalization option. The researcher was unable to determine how much this "learning effect" contributed exactly to the actual number of non-personalizers as reported for question 14. An analysis of the returned questionnaires revealed that at least six respondents seemed to have changed their original answer to question 14 from "no" to "yes." Four of them left their original explanation for not using personalization in the open-ended part of question 14 but continued to answer questions 15 to 21. The researcher counted all respondents who had changed their original answer to "yes" and continued with questions 15 to 21 as personalizers of public Web portals.

Lack of Need/Interest

Lack of need for or interest in personalizing was clearly stated by at least eleven respondents in this study as illustrated by the following remarks:

- "Personalization never occurred to me and I did not spend the time on that because they have my information and the weather and the other information are enough for me. At least the weather is always there when I get in."
- "The main page has all options I utilize and need to successfully navigate the Web."
- "I am not interested enough in the features which personalization offers. I am not into sports, stocks etc. I also do not have much knowledge of all the portal sites."
- "I do not see a need. It's fine the way it is."
- "I do not have the time or desire to spend much time on the Internet for other things than e-mail and brief searches. So, I have been fine without it."
- "I haven't found it necessary to personalize. I can still get all the information I want without it."
- "I've never felt that it was necessary. When I use the Internet, I always have a defined purpose/goal. There are enough distractions as is. If I personalized a portal it would create more distractions. It would probably take longer to find what I was looking for."
- "Although I have personalized Yahoo! and I put pretty much everything in there that interests me and that was available I do not sign in all the time when I use it. Often I just go with the default because I think that gives me all I need to know."

A number of portal users were clearly not interested in personalization due to their use of portals, limited information needs, or satisfaction with the offers on the default page of their preferred public Web portal. One wrote: "I think the sites have already enough to

offer without personalization. You actually have to scroll down to see all that's there. That's enough for me and I do not need more. My screen is full enough without personalizing it." While the researcher does not intend to judge respondents' information interests and needs, it became clear that a number of respondents did not understand the potential benefits of applying personalization; that is they did not knew enough about personalization and the opportunity to make their screen view more personal according to their personal interests and needs.

Lack of Time

As already slightly indicated in some of the previous comments, lack of time appeared to be another reason for not using personalization. Overall, the researcher found at least eleven instances of this theme. There is no doubt that it takes a certain amount of time to make the "my-experience" on public Web portals more personal. Lack of time as a reason for not using personalization is illustrated by the following students' responses:

- "I guess I just never got around to it. I've gotten so far what I wanted to find that I never took the time to make it more personal or easier to use."
- "I've tried it but I have not had time to set it up fully."
- "I don't use the Internet for pleasure. I only get on for specific searches. I don't wish to waste time personalizing options."
- "I simply didn't take the time. I get use enough from the general option."
- "I am busy enough with all my coursework and I do not have time to play with personalization. I do not see the point and I do not want to waste time on something I might not need."

While non-personalizers seemed to clearly know that a certain amount of time is required to apply personalization, and some students--though somewhat unsuccessfully--had even tried personalization, from the researcher's point of view this group of students needs to be made more aware of the benefits that personalization can have for them on the long-term when using public Web portals. The researcher's opinion is also supported by findings from personalizers described below. In fact, the use of personalization on public Web portals was seen as actually timesaving by numerous personalizers once they had used it.

Lack of Use

Lack of use of public Web portals was also more clearly indicated as a reason for not using personalization in this study than, for instance, unawareness. The following comments for not using personalization on public Web portals came particularly from those users of public Web portals who also reported lower times and frequencies of portal use in questions 9 to 12. The researcher found at least fourteen students who expressed lack of use as a reason for not using personalization. Quite typical were the following comments:

- "I mean I am not very experienced on the Internet, and I use it not nearly as often as others. My dad just got a PC and has already everything personalized. I do not use the portals so much because of security issues. I just don't. I use other sources more than the computer, or the Internet. I just have not personalized because I do not use the portals enough to bother with that."
- "It's probably not so difficult to do but I do not use the Internet and portals so often and I have a dial-up modem only."

- "That stuff does not interest me. I do not use it often enough to use the personalized options. I am just busy enough with the rest I am doing on the Internet"
- "I don't spend enough time online to worry about personalizing. I can get everything without personalizing anything."

Also here, some of the other themes for not using personalization are echoed in the comments but the researcher included this theme since he found it prevailing among reasons for not using personalization based on the material gathered during data collection. While lack of use is obviously directly related to limited time that students spent on these sites, it also explains to a large degree the absence of personalization by this group of respondents. Besides some other reasons for not using personalization, this group simply did not spent enough time on public Web portals to either see that personalization was available, or to feel that it was beneficial for them.

Anticipation of Difficulties

At least twelve non-users of personalization indicated they anticipated possible difficulties doing it at all, or problems with the computers they were using at the time of data collection. Students wrote or said:

- "It does not seem easy enough to do it with little to no benefit to me."
- "I do not think that it is worth all the trouble. It's not very easy. I have tried it once but I got frustrated because of all the questions they asked. Never tried it again."
- "Personalization seemed to be quite difficult and time-consuming when I tried it. I did not want to screw up what I have been using and I stopped at one point in time while I was trying to make use of this."

- "It's probably not worth doing it since I always use different computers and whatever I pick will probably be gone when I use a different computer the next time I go there."

While the majority of users of personalization indicated that they found it actually easy to do (see below), the non-personalizers in this group seemed clearly afraid of doing something that would change their computer settings, or they feared that the personalization settings would not be available anymore when they use their preferred public Web portal at a different computer. These fears are, however, largely unfounded and can be attributed to not having understood the concept of personalization on public Web portals entirely.

Limited Access

Limited access is not equal to limited use of public Web portals although there are numerous parallels since access opportunities might influence use. At least ten respondents reported reasons for not using personalization that can be related to limited access. One student wrote in question 14: "I do not have Internet at home and I do not like to sign in all the time. I have so many different passwords. I mean if I had my own PC with Internet access I would probably do it. Without that, at least I feel, it would not be a good thing for me." Another one stated there: "Because I do not use the Internet at home personalization is more time-costly for me. I do not want to have to set it up all the time and that's why I am not using it." Yet another one wrote: "I guess such personalization makes sense only if you use it on your own computer since it will be lost when I use a shared computer at the university. I don't have my own computer. That's why I see little or no point in bothering with it."

Also some of these comments show that a number of students did not seem to have fully understood the concept of personalization. That means personalization does not depend on the computer that is used--although it might to a small extent--but rather on the willingness and need to sign in to public Web portals regardless of computer type and location of portal use.

Privacy/Security Concerns

While at least fifteen respondents mentioned privacy or security concerns as reasons for not using personalization on public Web portals, the majority of personalizers did not share these concerns that much during the focus groups in which privacy was discussed. The following statements describe non-personalizers' major concerns:

- "I don't personalize because a lot of the portals require you to register and provide information about yourself. I don't like that because of the situation that it brings."
- "I have not personalized. When it comes to personal information I try to keep it at a minimum. I do not want them to know anything that I do not want them to know. Another reason is that I have not had the time to do that."
- "I do not like it and I think it is not safe."
- "As I said earlier, I do not feel so comfortable with registration and that is the reason why I have not personalized. I do not know what they are going to do with my information."
- "I do not want to release information about myself too much, but also do not use it consistently enough to care if it says 'Welcome Julia!' I do not find personalization endearing. I also do not use my computer at home consistently enough to personalize."

- "I am worried about security issues. Even when I started I was concerned about it and I generally used only false data. The thing is you cannot be careful enough to avoid identity theft. Sometimes you might use your name, your birthday, or even your horoscope, and the combination of this might reveal your social security number, and probably a lot of other information. That's a whole set of trial and error. Portals might be different but you never know who might get your information."
- "I do not personalize portals because I do not want to deal with passwords or user IDs. I use whatever is there and applicable."

The researcher was quite pleased to discover that a number of students were critical users of the Internet in general and of public Web portals in particular. A small number of personalizers admitted the use of false data during registration that still allowed them to use personalization while protecting their privacy to a certain extent. However, other participants acknowledged that the full benefits of personalization can be gained only by registering with real personal information. In particular students who used public Web portals also for purchasing airline tickets and other goods stated that it would not have helped them to falsify their registration data since they would not be able to complete transactions successfully otherwise. As with many other services there seems to be a trade-off between using a free service and the complete protection of privacy. Although all public Web portals have terms of use and a privacy policy, some students in this study were suspicious about the application of these governing rules and hence did not use personalization.

The following statement by one participant who had used personalization prior to the study characterizes the complexity of reasons for not using personalization quite aptly:

> I do not use portals that often anymore. I think I have moved past this point and I use other services and sites. When I used Excite I had it personalized with my stock ticker, news and other things. It was not national news but more local or state news. It was definitely a time-saver and very handy after I had gone through all the hassle of setting it up. I probably would not do it again also because of that and all the information that is required to personalize. But I stopped using Excite when I changed jobs. I had my own computer before. When I came here I did not have this anymore but I have to use whatever is available. When you have your own computer you do not have to keep logging on to Excite. You have your cookie set. I do not like to log in every time I use a computer. I have to know so many other passwords and numbers. But, I do not use it anymore because it is not convenient if you have to switch computers all the time. I am probably also busier these days and don't have so much time to use the Internet. I usually just go where I have to go and that's it.

Later, during the discussion of privacy and security aspects on public Web portals, the student continued:

> It's a good point but you are probably only totally protected if you do not use them at all. As I said, I would not use personalization anymore if I had to register at another site. Unless there is a really compelling reason I am not going to give out that kind of information again, especially not to Yahoo! or to MSN. I really do not feel they respect privacy. They are providing a free service and they need to make some type of revenue because of that free service. I do not get any spam mail anymore because I do not give out important information anymore. I liked Excite when I had it personalized but I do not use it anymore. Also, who reads all the rules that they ask you to accept when you register. I never went through it and I do not anyone else who did. You either want to use it or you cannot use it at all if you disagree with their terms.

While these comments reflect probably not all reasons for not using personalization on public Web portals by undergraduate students that the researcher discovered in this study, they touch many of the themes previously described either directly or indirectly.

Although there might be additional reasons for not applying personalization on public Web portals for undergraduate students, the researcher feels that the major obstacles were identified and analyzed above. The goal was to identify and to describe the most common reasons for not personalizing public Web portals. Table 4.21 below

provides a summary of these reasons, their verbal description for coding purposes as well as their minimum number of occurrence in this study.

Table 4.21: Summary of undergraduates' reasons for not using personalization

Reason	Verbal Description	N
Unawareness	I do not know that it is there.	17
Lack of Need/Interest	I am happy without it.	11
Lack of Time	I never found time to do it.	11
Lack of Use	I do not use portals so often.	14
Anticipation of Difficulties	I think it is probably difficult to do.	12
Limited Access	I don't have my own PC at home.	10
Privacy/Security Concerns	I do not want them to see my interests.	15

In sum, the researcher found several reasons for not using personalization on public Web portals. Some themes support and illustrate previous statistical findings, but the researcher discovered additional reasons that were not explained or described by previous hypothesis testing. The analysis of reasons for not using the personalization option on public Web portals yielded noteworthy results that should allow portal developers to draw conclusions in their efforts to better tailor personalization on public Web portals for undergraduate students. The next section of Chapter 4 will describe findings based on the answers of the 66 respondents who personalized their public Web portal view.

Analysis of Use of Personalization and Preferences of Personalization Features

After describing undergraduates' reasons for not applying personalization on their preferred public Web portals the following section describes findings with regard to personalizers as reported in questions 15 to 21. Due to the relatively small number of personalizers (N = 66) the researcher has decided to report only selected descriptive statistics and some comments from respondents. Efforts to apply Chi-Square or one-way ANOVA for hypothesis testing yielded only results that were not meaningful.

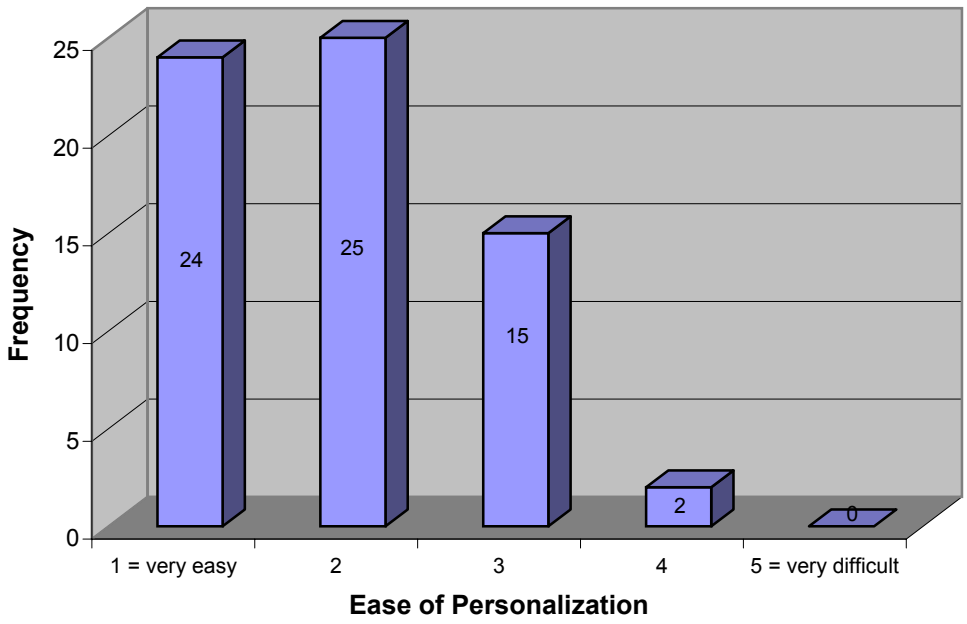
Ease of Personalization

Question 15 asked personalizers of public Web portals to rate how easy personalization was on their preferred public Web portals from 1 (very easy) to 5 (very difficult). Figure 4.2 below displays the results.

Of the 66 respondents, 24 (36.4%) found it very easy, and 25 (37.9%) easy to personalize their preferred public Web portals. That is, 49 (74.3%) of all personalizers of public Web portals found it at least easy to use the personalization option on their preferred public Web portal, while 15 students (22.7%) found it neither easy nor difficult, and only 2 (3.0%) found it somewhat difficult. No respondent indicated that it was very difficult to use personalization (mean of 1.92, SD 0.85).

This finding is somewhat contrary to the reasons for not using personalization that at least twelve non-personalizers previously stated since three fourth of personalizers found personalization at least easy to use. Basically, the majority of those respondents who personalized their portals found personalization easy or very easy to use after they had become familiar with this option. One student said during a focus group: "Personalization is a good thing since I do not have to see all that other clutter I am not interested in. It made me definitely use Yahoo! more and I am very glad that some

Figure 4.2: Ease of personalization (1 = very easy, 5 = very difficult); N = 66



genius developed it that way." Another one said:

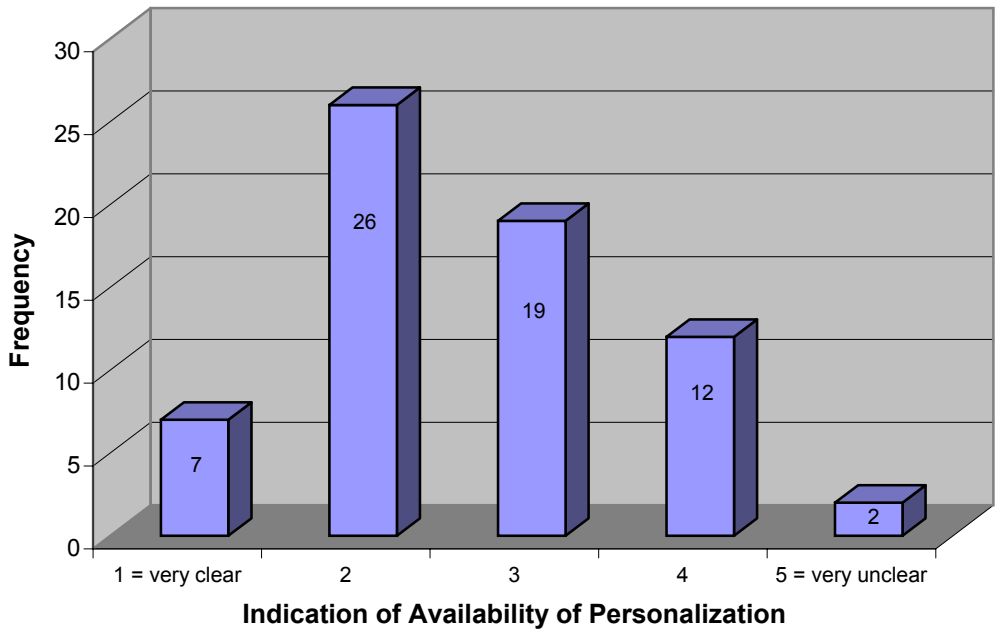
> "I would probably not use portals without personalization. This can be improved but I am happy and thankful that they offer it. I am also glad that I started playing with it since it has become so useful to me whenever I turn on my PC. It's just what I use for my daily information needs, and I found it not difficult at all after I did it."

Still another one wrote in question 13: "I use portals because I can personalize them easily to a certain extent and I do not have to see on my screen all the other crap that does not interest me and that made it so cluttered before I started to personalize." One respondent who did not take part in phase 2 of data collection stated during a more extensive individual follow-up interview: "I like that personalization thing although I have used it only on Yahoo! and on Excite since these are the portals I use. At first, it seemed to be difficult to do, and I was wondering what they want but after I did it I found it rather easy to do and also beneficial when I used these sites afterwards."

Indication of Availability of Personalization

The next question (16) asked personalizers how they would rate the initial (default) page of their preferred public Web portal in terms of how clearly it indicated the availability of personalization on a scale from 1 (very clear) to 5 (very unclear). Figure 4.3 displays the responses to this question.

Figure 4.3: Indication of availability of personalization on default page (1 = very clear, 5 = very unclear); N = 66



While seventeen students who did not use the personalization option on public Web portal stated that they were unaware of this option because they had never seen it, seven personalizers (10.6%) indicated that this option was very clearly indicated on their preferred public Web portal, followed by 26 (39.4%) who indicated that this option was at least clearly available there. In other words, half of the personalizers stated in question 16 that the personalization option was at least clearly available to them. In addition, 19

respondents (28.8%) did not find the availability of personalization clearly nor unclearly indicated, 12 (18.2%) found it unclear, and 2 (3.0%) found it very unclear to see this option on the default page of their preferred public Web portals. The researcher found a mean equal to 2.64 (SD = 1.00) for the indication of availability of personalization.

Although half of all personalizers found this option at least clearly indicated on their preferred public Web portal, it was obviously not so easy to find for the rest of them, as it was for some other portal users who did not use personalization in this study.

Three students made comments about the indication of availability of personalization on the default page of their preferred public Web portal in questions 13 and 19 as well as during a follow-up interview. One student wrote:

> "I am using portals because I found the personalization option after several years of using Yahoo! without that. I just never really saw it before I took some more time and played with it. Who the heck knows what personalization is? Anyway, after playing around with it I found it very useful."

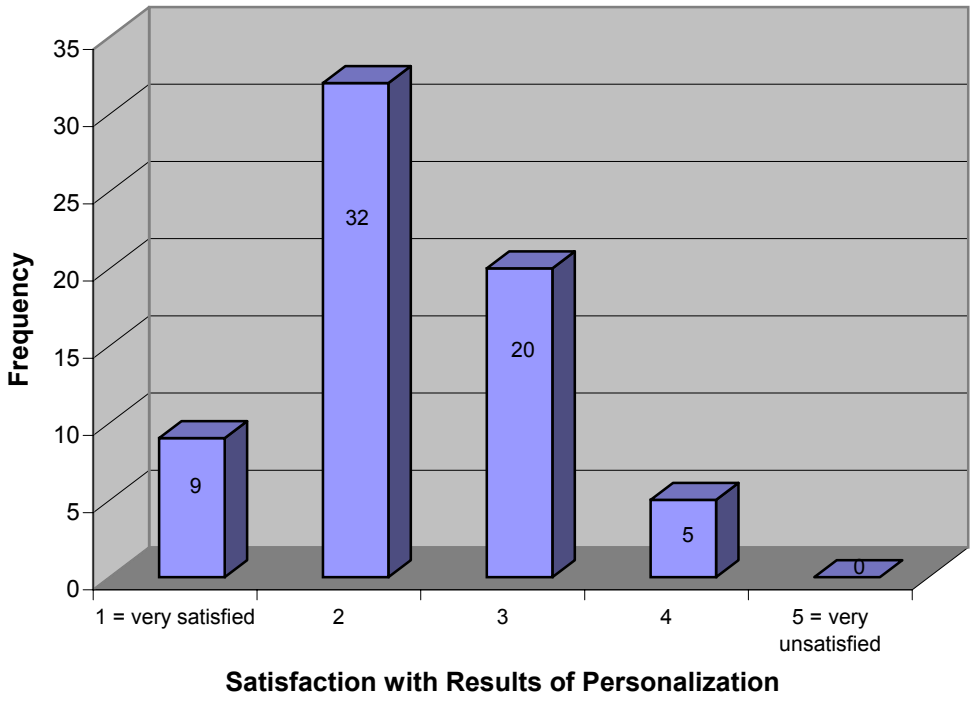
Another student said during a follow-up interview: "You know what? I did not see the personalization thing before I got the questionnaire and used MSN again. I liked how I could change things to more what interests me. But I swear I never realized that it was there before you asked me about this." And yet another student wrote in question 19: "I like that I can select from what they have to offer under MyYahoo! It's generally a good thing but it took me quite some time to figure it out. Though I am glad I did." Overall, portal developers should try to make personalization options more visible if they want more undergraduates to take advantage of them.

Satisfaction with Results of Personalization

While investigating the use of personalization by undergraduates on their preferred public Web portal, the researcher asked participants in question 17 to provide a

rating of how satisfied they were with the results of personalization on a scale from 1 (very satisfied) to 5 (very unsatisfied). Figure 4.4 presents the findings from this question.

Figure 4.4: Satisfaction with results of personalization (1 = very satisfied, 5 = very unsatisfied); N = 66



Overall, nine personalizers (13.6%) were very satisfied and 32 (48.5%) at least satisfied with the outcome of the personalization results on their preferred public Web portal. That is, a majority, 41 respondents (62.1%), was at least satisfied with the results. A considerable number, 20 respondents (30.3%), were neither satisfied nor unsatisfied, and 5 respondents (7.6%) stated that they were rather unsatisfied with the results of personalization. No student indicated complete dissatisfaction with the outcome of personalization, with a mean of 2.32, SD = 0.81.

Students made the following comments about satisfaction with results of personalization during the focus groups: "I am actually quite pleased with what I have on my computer now, and it was easier than I thought. But, it does not always look or feel like I want it to when I try to move some boxes to the top or to the side. This could be improved although I do not know how." Another one said: "I like it since it is more useful with personalization. I just don't like it that sometimes you find the same headlines under different news boxes, or that there isn't more to chose from. I am missing cricket scores for example."

Table 4.22: Minimum and maximum, mean, and standard deviation (SD) for ease of personalization, indication of availability of personalization on default page, and satisfaction with results of personalization; N = 66

	Minimum	Maximum	Mean	SD
Ease of Personalization (1 = very easy, 5 = very difficult)	1	4	1.92	0.85
Indication of Availability of Personalization on Default Page (1 = very clear, 5 = very unclear)	1	5	2.64	1.00
Satisfaction with Results of Personalization (1 = very satisfied, 5 = very unsatisfied)	1	4	2.32	0.81

Problems with layout after personalization were also expressed by one of the five respondents who were unsatisfied with the results of personalization:

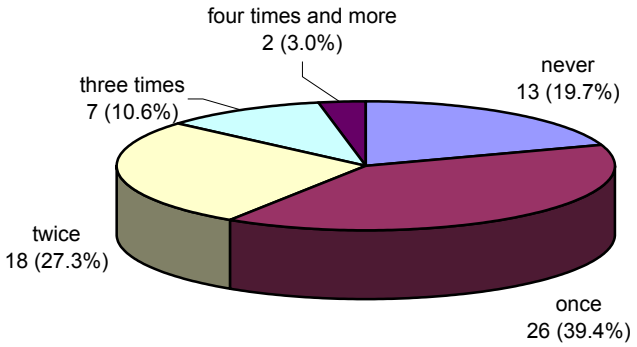
> I believe the idea of personalization is highly commendable but I don't like it that there isn't more freedom to arrange content that they make available. Why can I only have a certain number of boxes there or there and not do more? I have played with it several times but I am still not satisfied with how it looks now. It's much better and also more functional than it was before but I just wished I could design it more like a home page.

This layout limitation is another factor that Web portal developers might want to look into more seriously when targeting their offers to undergraduate students in particular. Although the majority of personalizers were satisfied with the results of personalization, 37.9% were neutral or unsatisfied. Table 4.22 above summarizes some of the findings from questions 15 to 17.

Change of Personalization during Last Three Months

Of interest to the researcher was also how often respondents had changed their personalization features during the last three months. Figure 4.5 shows the frequency of changing personalization on respondents' preferred public Web portal according to answers to question 18.

Figure 4.5: Change of personalization during last three months; N = 66



Of the 66 respondents, 13 (19.7%) answered that they had never changed their personalization (at least not during the last three months), while 26 (39.4%) stated that

they had done it once, and 18 (27.3%) marked twice. In addition, seven students (10.6%) indicated that they had changed the personalization on their preferred public Web portal three times, and two students (3.0%) had done it at least four times during the last three months before completing the questionnaire. That is, two thirds of the respondents (66.1%) had changed their personalization once or twice. The mode is equal to 2. One student wrote in question 13: "I think I use the Internet more now because I've personalized and more things to read. I have more topics that I want to read about and it is now more worthwhile to spend time online." Another one stated there: "I changed it only twice since I wanted to monitor the weather in a different city that my parents were visiting, and I included some stocks that we got meanwhile."

While one fifth of the respondents (19.7%) indicated "never" in question 18, it does not necessarily mean that they had never changed their personalization at all. However, they had not done so during the last three months before completing the questionnaire and it remains unknown how often, if at all, they might have changed their personalized portal view earlier. The next section describes preferences for certain personalization features as reported in questions 19 to 21.

Preferences for Personalization Features

Item 19 of the questionnaire asked respondents who had used personalization on public Web portals to describe briefly what their preferred selections were and why. Of the 66 personalizers, 15 did not provide an answer but referred instead to their answers to questions 13, 20, and 21. This question as well as question 21 was included to allow respondents to elaborate more on their answers in question 20 but also on their reasons for using personalization features in general. Most respondents indicated in questionnaire items 19 or 21 exactly this, while others added related comments throughout the

questionnaire, or even next to closed-ended items 15 to 18 and 20. The major reasons for personalizers' preferred features on public Web portals can be summarized as follows:

- Personal interest (news, weather, horoscopes and other information; having fun)
- Community (chat and games)
- Communication (e-mail and messenger)
- Personal need (searches and other information for classes).

While these categories describe the reasons for undergraduates' preferred personalization features best, they are by no means mutually exclusive. The major goal of questions 19 and 20 was to get an idea how appealing particular offerings were to personalizers of public Web portals. Although each of the above themes was found at least seven times, the researcher decided not to report exact counts of occurrences for each theme to prevent vague interpretations of individual reasons that were sometimes not so clearly stated. Such comments included, for instance, the following:

- "I like to personalize myYahoo! because I can see easily what I am interested in and what I need every day. I have world and national news there but also the horoscope, the weather for several places and the stocks. I also like to find out if I received any new messages right after I sign in."
- "I do not sign in every time I go to the portal. Sometimes I just need to do a quick search for some homework. However, when I want to read my mail and the news, or if I have time for a game with other people I do so. I guess that's what I like there and why I personalized it."
- "Sports scores and headlines are my favorite selections because I like to know about all the sports news and the weather so that I simply know what's going on."
- "Honestly, I prefer e-mail, chats, searches, and TV listings most on the portal I am using. It's so convenient that it is all on one page whenever I go there."

- "I use the messenger in Yahoo! a lot. It also tells me if I got new mail and it allows me to use games and to see news and weather forecasts without having to go to the actual page on Yahoo!. It's just what I selected during personalization but it's also in the messenger tabs. That's what I use and need most of the time."
- "Weather, sports updates, world news and technology news. These are the biggest topics that affect my life. I'm not going into further details as I feel there is nothing left to say."
- "E-mail notification, latest news, and games it's all I need. No particular other reasons!"
- "Stocks, news, mail, weather, horoscope, searches. That's all I check on Yahoo! for now."
- "I prefer a lot of the selections my portal has but in particular searching, mail, groups, technology and world news, personals, travel information, TV listings, auctions and sometimes I also like to read the horoscope for fun. I guess these are the things that interest me most and that's why I have them there on my personalized page. And I also like to play games sometimes because it's a good way to meet other people on the Internet."

While some of the reasons that participants provided support the themes above, other reasons where more vaguely stated, if at all.

More insights into the extent of preferred personalization features provided the answers to question 20 that asked respondents to indicate rankings on a scale from 1 (very appealing) to 5 (not at all) for features that the researcher found available on all of the sites under investigation during the pre-tests and during the preparation of the questionnaire. In addition, students were allowed to add up to three other features although these were not available on all public Web portals in this study. Similarly to the

procedure described for the *PIPWP* introduced earlier in this chapter, means were used as preference indicators for portal features. The answers were coded in opposite rank order compared to how they appeared in the questionnaire, i.e., from 5 (very appealing) to 1 (not at all) to allow the researcher to indicate higher means for higher preferences.

Table 4.23: Number of scores, minimum and maximum, mean, and standard deviation (SD) by appeal of portal features (5 = very appealing, 1 = not at all); N = 66

Feature	N of Scores	Minimum	Maximum	Mean	SD
E-mail	66	1	5	**4.26**	1.30
Chat	66	1	5	2.70	1.59
Calendar	66	1	5	2.70	1.45
Internet searches	66	1	5	**4.55**	0.83
Bookmarks	66	1	5	2.94	1.41
Weather	66	1	5	**3.95**	1.13
Horoscope	66	1	5	2.27	1.45
Stocks	66	1	5	2.67	1.56
National news	66	1	5	**4.15**	0.98
Local news	66	1	5	3.80	1.18
World news	66	1	5	**4.18**	0.96
Business news	66	1	5	3.21	1.46
Sports news	66	1	5	3.38	1.55
Technology news	66	1	5	3.26	1.23
Entertainment news	66	1	5	3.44	1.23
Travel information	66	1	5	2.80	1.20
Health information	66	1	5	2.97	1.26
TV listings	66	1	5	2.45	1.36
Games	11	1	5	4.00	1.09
Instant messenger	5	3	5	3.60	0.89
Movie listings	3	4	4	4.00	0.00
Personals	4	3	4	3.25	0.50
Discussion groups	3	3	4	3.33	0.58
Maps	5	3	5	4.00	1.00

Table 4.23 describes the absolute number of scores, minimum and maximum, mean, and standard deviation for personalization features. While each respondent (N = 66) ranked all the features provided in the questionnaire, the researcher included a number of other features in the table provided they appeared at least three times in the questionnaires. Other features not included in the table although respondents ranked them usually as very appealing in question 20 are shopping, classifieds, parenting information, CD and movie reviews, auctions, personals, software downloads, automobile information, yellow pages, and currency converter.

As displayed in Table 4.23, Internet searches (mean = 4.55, SD = 0.83) was the most appealing personalization feature to the 66 personalizers in this study, followed bye-mail (mean = 4.26, SD = 1.30), world news (mean = 4.18, SD = 0.96), national news (mean = 4.15, SD = 0.98), and weather forecasts (mean = 3.95, SD = 1.13). The means for these features are displayed in boldface in Table 4.26 above. Other features rated by all personalizers had lower means. Table 4.23 also shows that games (mean = 4.00, SD = 1.09, N = 11), movie listings (mean = 4.00, SD = 0.00, N = 3), and maps (mean = 4.00, SD = 1.00, N = 5) were quite appealing to personalizers, too. However, a far smaller number of students provided rank scores for these features in question 20. These findings were supported by students' open-ended answers during which Internet searches, e-mail, and different news categories were indeed the most frequently mentioned features.

USE OF PUBLIC WEB PORTALS BY UNDERGRADUATE STUDENTS WITH AND WITHOUT PERSONAL HOME PAGES (RQ 4)

The last major research question of this study attempted to determine what differences, if any, there were regarding the use of public Web portals between students with personal home pages and those without. As previously stated, only 26 (18.1%) of

the 144 respondents had a personal home page in this study, while almost all students in the pilot tests had such a page on the WWW. Both non-users of public Web portals did not have a personal home page. However, since they could have had a personal home page regardless of their use of public Web portals, their responses were included in some of the descriptions that are related to the entire sample below, while other descriptions and hypothesis tests used the subset of the 142 respondents who used public Web portals resulting in slightly different overall percentages.

The following findings are based on in-depth analysis of the answers to question 6 of the relatively small portion of respondents with personal home pages. Their demographic and use variables are compared to responses to questions 1 to 5, and 25 to 28 for the entire sample (N = 144), and to the answers to questions 8 to 12 for the actual users of public Web portals (N = 142). In addition, results from focus groups and individual follow-up interviews are included.

Relationships of Demographic and Use Variables of Students with Personal Home Pages Compared to all Respondents

Tables 4.24 and 4.25 below summarize descriptions of the students with personal home pages compared to the entire sample according to selected demographic and other use variables (some values were again rounded by the statistical software package used). The first columns give the numbers of students with personal home pages and their percentages of the total. The second columns provide the numbers of students without personal home pages and their percentages of the total, while the third columns show the total numbers of students for each variable and the corresponding percentages.

Table 4.24: Number of students with and without personal home pages in the sample by gender, age, major, classification, and GPA; N=144

	Number of participants with home page (% of 144)	Number of participants without home page (% of 144)	Total (% of 144)
Gender			
Male	13 (9.0)	46 (31.9)	59 (41.0)
Female	13 (9.0)	72 (50.0)	85 (59.0)
Age			
Under 18	0 (0.0)	2 (1.4)	2 (1.4)
18 – 23	21(14.6)	104 (72.2)	125 (86.8)
24 - 30	4 (2.8)	11 (7.6)	15 (10.4)
31 – 39	1 (0.7)	1 (0.7)	2 (1.4)
Major			
Natural Sciences	5 (3.5)	37 (25.7)	42 (29.2)
Social Sciences	16 (11.1)	50 (34.7)	66 (45.8)
Arts & Humanities	5 (3.5)	26 (18.1)	31 (21.5)
Other	0 (0.0)	5 (3.5)	5 (3.5)
Classification			
Freshman	1 (0.7)	19 (13.2)	20 (13.9)
Sophomore	5 (3.5)	13 (9.0)	18 (12.5)
Junior	5 (3.5)	22 (15.3)	27 (18.8)
Senior	14 (9.7)	61 (42.4)	75 (52.1)
Other	1 (0.7)	3 (2.1)	4 (2.8)
GPA			
Less than 2.00	2 (1.4)	1 (0.7)	3 (2.1)
2.00 – 2.49	2 (1.4)	8 (5.6)	10 (6.9)
2.50 – 2.99	6 (4.2)	30 (20.8)	36 (25.0)
3.00 – 3.49	8 (5.6)	43 (29.9)	51 (35.4)
3.50 – 4.00	8 (5.6)	30 (20.8)	38 (26.4)
None	0 (0.0)	6 (4.2)	6 (4.2)
Total	26 (18.1)	118 (81.9)	144 (100)

Table 4.25: Number of students with and without personal home pages in the sample by preferred browser and operating system, Internet access at home, length of Internet use, and self-rated experience/skill level in using online services; N=144

	Number of participants with home page (% of 144)	Number of participants without home page (% of 144)	Total (% of 144)
Preferred Browser			
IE	23 (16.0)	94 (65.3)	117 (81.3)
Netscape	2 (1.4)	18 (12.5)	20 (13.9)
Other	1 (0.7)	6 (4.2)	7 (4.9)
Preferred OS			
Windows	23 (16.0)	107 (74.3)	130 (90.3)
Macintosh	1 (0.7)	9 (6.3)	10 (6.9)
Other	2 (1.4)	2 (1.4)	4 (2.8)
Access at Home			
Yes	26 (18.1)	98 (68.1)	124 (86.1)
No	0 (0.0)	20 (13.9)	20 (13.9)
Length of Internet Use			
Less than 1 year	0 (0.0)	1 (0.7)	1 (0.7)
1 year – less than 2 years	0 (0.0)	2 (1.4)	2 (1.4)
2 years – less than 3 years	1 (0.7)	6 (4.2)	7 (4.9)
3 years – less than 4 years	3 (2.1)	20 (13.9)	23 (16.0)
4 years and more	22 (15.3)	89 (61.8)	111 (77.1)
Experience/Skill Level			
Expert	12 (8.3)	27 (18.8)	39 (27.1)
Very good	14 (9.7)	73 (50.7)	87 (60.4)
Still learning	0 (0.0)	15 (10.4)	15 (10.4)
Beginner	0 (0.0)	3 (2.1)	3 (2.1)
Total	26 (18.1)	118 (81.9)	144 (100)

Noteworthy are the following results:

- Surprisingly, respondents with personal home pages were equally distributed by gender, i.e., thirteen respondents in each group. Together about 18% of all respondents maintained a personal home page on the WWW.
- Freshmen made up nearly 14% of all participants and only one of them had a home page, while the group of sophomores had five home page owners even though sophomores comprised only a little more than 12% of all participants.
- All respondents with personal home pages had Internet access at home.
- Like the majority of participants in this study, the majority of students with personal home pages (22 out of 26 or 15.3% of the total) had used the Internet for at least 4 years.
- None of the students with personal home pages thought that they were a "Beginner" or "Still learning" with regard to using the Internet and to do any kind of business online, while fourteen students (9.7% of the total) rated their experience/skill level as "Very good," and twelve (8.3% of the total) considered themselves to be "Expert."

The researcher used Chi-Square at $\alpha = 0.05$ again to see if there were statistically significant relationships between possession of a personal home page and selected demographic and use variables as indicated by the respondents. Table 4.26 below summarizes the findings from these tests.

Gender, major, classification, GPA, and length of Internet use were not statistically significant with regard to possession of a personal home page. However, the tests found statistically significant relationships between possession of a personal home page regarding respondents' self-rated Internet experience/skill level ($\chi^2 = 8.453$, df = 2, $p = 0.015$), and Internet access at home ($\chi^2 = 5.118$, df = 1, $p = 0.024$). Cramér's V is

equal to 0.242 in the first case, and ϕ is equal to 0.189 in the latter one, or small to medium according to Cohen's convention. Please see also Tables H.39 to H.45 in Appendix H for more information.

Table 4.26: Summary of Chi-Square tests of personal home page related to gender, major, classification, GPA, length of Internet use, self-rated Internet experience/skill level, and Internet access at home

	N	Calculated Values	Significant at α = **0.05**
Gender	144	$\chi^2 = 1.069$, df = 1, p = 0.301	no
Major	139[12]	$\chi^2 = 2.743$, df = 2, p = 0.254	no
Classification	144	$\chi^2 = 0.040$, df = 1, p = 0.842	no
GPA	138[13]	$\chi^2 = 0.532$, df = 2, p = 0.766	no
Length of Internet Use	144	$\chi^2 = 1.019$, df = 1, p = 0.313	no
Experience/Skill Level	144	$\chi^2 = 8.453$, df = 2, p = 0.015	yes
Internet Access at Home	144	$\chi^2 = 5.118$, df = 1, p = 0.024	yes

As Tables H.44 and H.45 in Appendix H show, respondents with personal home pages were more likely to have rated themselves as "Expert," and to have Internet access at home compared to those without personal home pages.

Although respondents' Internet experience and skill level as well as Internet access at home were not addressed directly during the focus groups and personal interviews, a number of students acknowledged that creating and maintaining a personal

[12] Students with no Major (N=5) excluded.
[13] Students with no GPA (N=6) excluded.

home page requires a higher skill level, or a different set of skills, than necessary for just using the WWW, and that having Internet access at home is an advantage, or even a necessity for maintaining a personal home page. One respondent stated during a follow-up interview:

> I can see some relationships between a public Web portal and a home page but it all depends on what you use them for, in particular your home page. I probably used public portals more when I did not have a home page but I use my home page also for different things. It also depends on how sophisticated and capable you are. These days, it is just easy to work on my home page whenever I like and I am making it prettier and more functional every week.

Another student said:

> Well, I do not have a home page since I don't know how to make one. Although I would probably have some of the information on my home page that's available on Yahoo! I would also use it for more personal things. I guess one of the reasons I use portals is that I don't know how to make a home page, and I do not have Internet access at home to work on this all the time.

And yet another participant expressed the need of a different set of skills for creating a home page by saying: "I'd like to have a home page but I do not know how to do this. I like portals since they have what I need, and I don't think that I would be capable of doing these things on my home page." This theme was echoed by the following remarks from a different student who said: "I can imagine that a home page could somewhat substitute a Web portal for some people but you need to be very skilled in HTML, and probably more. If you want to make your home page very attractive and functional it takes a lot of knowledge and time to do that."

Relationships of Use Variables of Students with Personal Home Pages Compared to Users of Public Web Portals

Tables 4.27 and 4.28 below describe use data of students with personal home page compared to all users of public Web portals (some values were again rounded by the

statistical software package used). Also in these tables, the first columns give the numbers of students with personal home pages and their percentages of the total (N = 142). The second columns provide the numbers of students without personal home pages and their percentages of the total, while the third columns show the total numbers of students for each variable and the corresponding percentages. Worth mentioning are the following results:

- Like the majority of all portal users the majority of students with personal home pages had used public Web portals for at least 12 months. Of the 26 students with personal home pages, 24 or 16.9% of the total, fell into this category. One student (0.7% of the total) reported 9 months but less than 12 months and another 3 months but less than 6 months of portal use.
- Of the 26 students with personal home pages, 9 (6.3% of the total) reported at least 3 hours but less than 4 hours they spent on their preferred site every week followed by 6 respondents (4.2% of the total) who indicated at least 4 hours of portal use in a typical week. Five respondents (3.5% of the total) reported less than 1 hour per week, four students (2.8% of the total) 2 hours but less than 3 hours, and two (1.4% of the total) who indicated at least 1 hour but less than 2 hours they spent on portal sites in a typical week. That is, 15 of the 26 students with a personal home page, or 10.5% of all portal users, spent at least 3 hours per week on these sites compared to 11, or 7.7%, who used portal sites less than 3 hours.
- Students with personal home pages used portal sites at least six or seven days in a typical week. In particular, 8 students (5.6% of the total) each reported 6 or 7 days of portal use in a typical week, while 4 students (2.8% of the total) reported 4 days, and 3 (2.1% of the total) either 3 or 5 days of portal use in a typical week.

Table 4.27: Number of students with and without personal home pages by preferred portal[14], length of portal use, duration of portal use each time accessed, and weekly hours of portal use; N = 142

	Number of participants with home page (% of 142)	Number of participants without home page (% of 142)	Total (% of 142)
Preferred Portal			
Yahoo!	17 (12.0)	62 (43.7)	79 (55.6)
MSN	5 (3.5)	27 (19.0)	32 (22.5)
Netscape	1 (0.7)	11 (7.7)	12 (8.5)
AOL	1 (0.7)	13 (9.2)	14 (9.9)
Lycos	0 (0.0)	1 (0.7)	1 (0.7)
Other	2 (1.4)	2 (1.4)	4 (2.8)
Length of Portal Use			
Less than 3 months	0 (0.0)	7 (4.9)	7 (4.9)
3 months – less than 6 months	1(0.7)	1 (0.7)	2 (1.4)
6 months – less than 9 months	0 (0.0)	5 (3.5)	5 (3.5)
9 months – less than 12 months	1 (0.7)	3 (2.1)	4 (2.8)
12 month and more	24 (16.9)	100 (70.4)	124 (87.3)
Duration of Portal Use			
Less than 5 minutes	5 (3.5)	17 (12.0)	22 (15.5)
5 minutes – less than 10	6 (4.2)	22 (15.5)	28 (19.7)
10 minutes – less than 20	7 (4.9)	35 (24.6)	42 (29.6)
20 minutes – less than 30	5 (3.5)	25 (17.6)	30 (21.1)
30 minutes and more	3 (2.1)	17 (12.0)	20 (14.1)
Weekly Hours of Portal Use			
Less than 1 hour	5 (3.5)	25 (17.6)	30 (21.1)
1 hour – less than 2	2 (1.4)	37 (26.1)	39 (27.5)
2 hours – less than 3	4 (2.8)	24 (16.9)	28 (19.7)
3 hours – less than 4	9 (6.3)	15 (10.6)	24 (16.9)
4 hours and more	6 (4.2)	15 (10.6)	21 (14.8)
Total	26 (18.3)	116 (81.7)	142 (100)

[14] Excite, iWon, and Go2Net are not listed since they were not among the most preferred public Web portals (see also Table 4.8).

Table 4.28: Number of students with and without personal home pages by days of portal use per week, and personalization; N = 142

	Number of participants with home page (% of 142)	Number of participants without home page (% of 142)	Total (% of 142)
Days of Portal Use per Week			
1	0 (0.0)	8 (5.6)	8 (5.6)
2	0 (0.0)	12 (8.5)	12 (8.5)
3	3 (2.1)	9 (6.3)	12 (8.5)
4	4 (2.8)	20 (14.1)	24 (16.9)
5	3 (2.1)	28 (19.7)	31 (21.8)
6	8 (5.6)	15 (10.6)	23 (16.2)
7	8 (5.6)	24 (16.9)	32 (22.5)
Personalization			
Yes	17 (12.0)	49 (34.5)	66 (46.5)
No	9 (6.3)	67 (47.2)	76 (53.5)
Total	26 (18.3)	116 (81.7)	142 (100)

- While the overall number of portal users who personalized their portal view was much lower than the number of those who did not, the number of portal users with personal home pages who used personalization was higher compared to those who did not. Of the 26 students with personal home pages, about two thirds (17 or 12% of the total) also personalized their portal view compared to nine students (6.3% of the total) who did not.

The researcher used Chi-Square tests again to determine if there were statistically significant relationships between possession of a personal home page and preferred portal, length of portal use, duration of portal use each time accessed, weekly hours of portal use, number of days of portal use per week, and the use of personalization. Table

4.29 below summarizes the test results. The accompanying contingency tables H.46 to H.4.51 can be found in Appendix H.

Table 4.29: Summary of Chi-Square tests of personal home page related to preferred portal, length of portal use, duration of portal use each time accessed, weekly hours of portal use, number of days of portal use per week, and personalization; N = 142

	N	**Calculated Values**	**Significant at α = 0.05**
Preferred Portal	142	$\chi^2 = 1.304$, df = 2, p = 0.521	no
Length of Portal Use	142	$\chi^2 = 0.714$, df = 1, p = 0.398	no
Duration of Portal Use	142	$\chi^2 = 0.709$, df = 2, p = 0.701	no
Weekly Hours of Portal Use	142	$\chi^2 = 9.941$, df = 1, p = 0.002	yes
Days of Portal Use per Week	142	$\chi^2 = 7.128$, df = 2, p = 0.028	yes
Personalization	142	$\chi^2 = 4.573$, df = 1, p = 0.032	yes

No relationships were found between possession of a personal home page and preferred public Web portal, length of portal use, and duration of portal use each time accessed. The researcher found a statistically significant relationship between possession of a personal home page and weekly hours of portal use ($\chi^2 = 9.941$, df = 1, p = 0.002). Users of public Web portals with personal home pages were more likely to use public Web portals for three hours and longer in a typical week compared to those without personal home pages. The researcher also found a statistically significant relationship between possession of a personal home page and number of days of portal use per week. In particular, students with personal home pages were more likely to use their preferred public Web portal on six or seven days in a typical week ($\chi^2 = 7.128$, df = 2, p = 0.028),

while users of public Web portals without personal home pages spent fewer days on their portal sites. In addition, there was a statistically significant relationship between possession of a personal home page and personalization ($\chi^2 = 4.573$, df = 1, p = 0.032). Users of public Web portals who had a personal home page were also more likely to personalize their Web portal view compared to those without personal home pages. Effect sizes for these tests are again small to medium according to Cohen's measures.

These results support the researcher's previous findings to the extent that students with personal home pages indicated a higher self-rated Internet experience/skill level and seemed to use public Web portals also to a greater extent than those who used public Web portals less frequently and did not personalize. To explore these findings further, here is what some respondents with personal home pages wrote or said during data collection:

- "I have a personal home page but I also use these portal sites extensively. It's just that I use them for different things and that I cannot have all the content on my home page as up-to-date as the portal sites like Yahoo! have it. It's somewhat a different thing but I spend a lot of time on Yahoo! and on my home page. I use them both for somewhat different purposes."
- "Well, I think there is a different concept involved. At least I use them for different purposes when I look anything up. I expect the portals to have and to provide me with up-to-date information, while my home page has only information about me and links to resources I use often in a more static way."
- "Generally, I think I spend too much time on the Internet but I have also easy access from home and why should I not take benefit of that. I am paying for that. So, I use MSN and others and also my home page because I know I have links also there to the stuff that I am interested in. Once in a while I even find good

links on MSN or other sites, and if I think it is any good I will also link it on my home page."

- "I personalized myYahoo! and I like it a lot although it does not allow you as much freedom for certain things that one could do on a home page Anyway, I am happy with what I can do there, and I even included their search engine on my home page."
- "I guess I am on 24 hours and seven days a week. I just cannot imagine living without the net. I have my home page and I am working on it constantly but the portals do things with their background technology that I cannot beat since I am not so savvy when it comes to that. Home page is fine but portals provide services I cannot find in that quality elsewhere, and I do not think I could do this by myself."
- "I am spending a lot of time on Yahoo! since it allows me to be in touch with a bunch of people I probably would not have met with my home page alone. I spend a lot of time online but it's because of the relationships I could form with strangers in the past. Having a home page about me is always helpful once I allow them more access to who I am, or, what I am doing with my live and what I deem important in live."

As one can see in these comments a number of students clearly saw relationships between the use of public Web portals and the use of personal home pages. The next section of this chapter describes respondents' thoughts about these relationships in more detail.

Students' Thoughts about the Relationship between Public Web Portals and Personal Home Pages

While only 26 of the 144 respondents in this study maintained a personal home page on the WWW, the researcher would like to reflect on what some students had to say about the relationship between public Web portals and personal home pages. As indicated above, respondents who used public Web portals and maintained a personal home page at the same time were more likely to use portals than those without in terms of weekly hours of portal use and number of days of portal use in a typical week. Since there was not a statistically significant difference between the time respondents with home pages spent during each access period on public Web portals and the time spent by respondents without personal home pages, the researcher concluded that respondents with home pages accessed public Web portals more frequently during a typical week than those without. In addition, they were more likely to use the personalization option available on public Web portals. The researcher will report statements that will shed light on how undergraduates in this study viewed the relationship between public Web portals and personal home pages. The relationship between public Web portals and personal home pages came up during two of the eight focus groups and was also a subject during individual follow-up interviews. As shown in Table 3.4, only seven students of the 34 who participated in the focus groups as well as in the follow-up interviews maintained a personal home page compared to 27 students who did not. On the other hand, of the 42 participants in the focus groups and of the 39 participants in individual follow-up interviews, 8 participants in each of these data collection activities had a personal home page. Participants without personal home pages in the individual follow-up interviews were asked hypothetically if and what kind of relationships they see between personal home pages and the use of public Web portals.

Analysis of respondents' answers to questions 13, 19, 21 and 22 as well as comments from focus groups and individual follow-up interviews revealed that about half of the respondents with a personal home page and about two thirds of the students without saw a possible coincidence of their use or possible use of personal home pages and their use of public Web portals. The major differentiating theme was the use and purpose of personal home pages. As previously described, the researcher found in question 6 the following categories and occurrences for respondents' use and purpose of personal home pages that were not mutually exclusive since some of the respondents with home pages used their individual Web presence for multiple purposes:

- Personal or biographical information (12 responses)
- Professional information (10 responses)
- Course work (6 responses)
- Link collection (5 responses)
- Online journal (4 responses)
- Recreational information (4 responses).

Comments from participants without personal home pages in the individual interviews regarding their possible uses or purposes of a personal home page were content analyzed based on these themes and a combination of these answers with those themes found from participants with personal home pages earlier provided the following results:

- Personal or biographical information (28 responses)
- Professional information (21 responses)
- Course work (10 responses)
- Link collection (17 responses)
- Online journal (8 responses)
- Recreational information (13 responses).

Another provocative point was the rather sharp increase in personal or biographical information, professional information, link collection, and recreational information after combining the themes of actual uses and potential uses of personal home pages. These themes clearly contributed to the number of participants who saw connections between the use of public Web portals and personal home pages. While some students in this study indicated that they did not see a need for a personal home page while maintaining also a personalized public Web portal at the same time or vice versa, a slight majority of students who had a home page and even more of those participants without said during focus groups or follow-up interviews that they would use both sites in complementary ways for similar but also different purposes according to personal information needs and sophistication in designing home pages. Many students in this study indicated clearly the existence of different underlying concepts between the two forms of sites on the WWW while acknowledging certain parallels at the same time as illustrated by the following statements:

- "I think they are different concepts. The portals do all the work for you. What do you need a home page for if you don't want others allow access to yourself and your personal interests or professional goals?"
- "That's the whole point of having a public portal personalized so that you get that information without having to do anything. Click here is what you need. Home page is more for showing the rest of the world what I can do and what I am interested in. Maybe someone will offer me a job since I have my CV there."
- "I think your student was somewhat right. If you use your home page just as a collection to services that are also available on portals to a certain extent than there is no need for a personal home page. However, if you use your home page also for other things that you deem interesting to everyone else and with

information that the portals cannot match, than a home page is somewhat useful about your personal details for the rest of the world. I guess it all depends on what you want to do or can do on your home page and what you would like the rest of the world know about yourself. They cannot see what you have personalized on a portal because this is for your own use but they could see other information on a home page."

- "I probably would prefer my home page because I have links to sites that I frequently use. I see a connection. But some of what I have are just links to portal sites since they do all the job for me that I could not do in terms of up-to-date news and other things. I use both of them but portal sites more since they have what I am interested in on a daily basis. I have these links on my home page but portals are better when it comes to more recent information. My home page is about me and my family and my interests and my resume but I could not match the information on Yahoo! or MSN when it comes to me or information about me. I use them both more or less equally for different things."
- "Why would I need a home page? It would be about me, my family, my goals for the future, and I would also try to show what I have accomplished in classes so far. However, it would be probably more of an advertising thing for myself than convenience for me when I use the portals. I think they are different although I can also see similarities. It's just that others cannot see what you like to use on portals but they can see who you are and what you are interested in or what you have done in your life so far if you put that on a home page. It's somewhat different but closely related. It just depends on who can see what or what you do on your home page on the Web. Just different audiences."

As previously shown, there were statistically significant relationships between the existence of personal home pages and some use variables of portal users in this study. However, because of different underlying concepts regarding audiences for personal home pages and personalizable public Web portals these two forms of WWW sites cannot be compared per se without further investigation. A number of respondents in this study saw connections between the use of public Web portals and the existence of a personal home page for personal use, but these connections were clearly based on individuals' comments and not on statistically significant findings only. Although the majority of participants in this study saw parallels between using public Web portals (personalized and not) and the maintenance of a personal home page on the WWW, the extent of this possible relationship could only be further investigated in a different study.

The results of this study have indeed revealed for the first time some very interesting findings that could and should be explored further during subsequent studies in this area of information behavior research on public Web portals or on similar sites. The scope of these studies should not necessarily be limited to the information behavior of undergraduate students on public Web portals. The researcher hopes that findings from this study will influence and guide other researchers' endeavors in applicable ways toward the exploration and improvement of existing and planned portal sites in education, government, and the private sector to make publicly available Web portals more useful, user-friendlier, and more accessible also to undergraduate students.

Chapter 5 summarizes the study's key findings and discusses some of them as well as data quality measures. Limitations of the research and of its results and suggestions for future research conclude the study.

Chapter 5: Summary and Discussion

INTRODUCTION

The goal of this study was to provide an initial understanding of undergraduates' information behavior on public Web portals such as Yahoo!, MSN, Lycos, or Excite. By exploring this previously uninvestigated information behavior, this study aimed to provide a comprehensive picture of undergraduates' use and non-use of public Web portals including the students' demographic and use variables, motivations, preferences for particular sites and features. The understanding of undergraduates' information behavior at public Web portals can be instrumental in the user-centered design and in the improvement of public Web portals and portal-like information systems. As this study's findings indicate, numerous undergraduates faced problems at public Web portals or did not use them to the fullest extent possible for a variety of reasons.

The researcher used a quantitative and qualitative design and methodology to address the following four broad research questions:

1. What kinds of undergraduate students use public Web portals?
2. Which portals do undergraduate students prefer and why?
3. Why and how do undergraduate students use public Web portals?
4. What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?

The study's stratified random sample included 144 undergraduate students who studied at a large university in the Southern U.S. during summer and early fall 2002. Data collection instruments comprised a questionnaire with closed and open-ended items, a focus group moderator's guide, transcripts of tape recordings from focus groups and interviews, and the researcher's personal notes. Data analysis included descriptive and

inferential statistics and the identification of themes using content analysis in relation to the study's research questions.

This chapter summarizes the study's key findings, discusses data quality measures used and comments on some of its most evocative findings. The chapter also addresses limitations of the study and outlines future research directions.

SUMMARY OF KEY FINDINGS

This study has uncovered a number of important themes that go beyond the four major research questions but pertain to the research topic. The following selected key findings are provided in the order of the major research questions of the study reported as a foundation for subsequent discussion of some of its findings. The reader should also refer to the more detailed descriptions of results in Chapter 4 and its interpretations above as well to the appropriate calculations in the appendices.

RQ 1: What kinds of undergraduate students use public Web portals?

- The use of public Web portals by undergraduate students was almost ubiquitous in this study. Only two students of the study's 144 respondents did not use these sites, and additional activities to recruit more non-users of public Web portals were unsuccessful.
- While users and non-users of public Web portals did not show remarkable variations in selected demographic and use variables, the majority of respondents in this study were between 18 and 23 years of age, mainly very familiar with using the Internet, and had Internet access at home. All participants had Internet access away from home.

- Based on the responses from two participants not using public Web portals could be attributed to lack of need, satisfaction with and use of other resources, personal information behavior, feelings of information overload, privacy concerns, discomfort with sign-up procedures as well as fears of unsolicited advertising.

RQ 2: Which portals do undergraduate students prefer and why?

- Yahoo! and MSN were the most popular public Web portals for undergraduates in this study based on the *Popularity Index of Public Web Portals (PIPWP)* introduced by the researcher.
- The researcher did not find statistically significant relationships using Chi-Square with regard to selected demographic and use variables about the use of preferred public Web portals at home and away from home with the exception of classification related to the use of preferred public Web portal at home. Seniors were less likely to use their preferred public Web portal at home since a clear majority of users without Internet access at home fell into this category.
- Hypothesis testing using Chi-Square did not reveal statistically significant relationships between preferred portals and gender, major, classification, GPA, length of Internet use, self-rated Internet experience/skill level, preferred portal, length of portal use, duration of portal use during each access period, number of days of portal use per week, or the use of the personalization option.
- Reputation and brand name, familiarity, ease of use, accessibility, uniqueness of services, community, quality of content, and satisfaction were the most important reasons for undergraduates' preferences for using a particular public Web portal although many used several sites for different purposes.

RQ 3: Why and how do undergraduate students use public Web portals?

- Similarly, reputation, familiarity, easy of use, accessibility, personal interests, community, personalization, and satisfaction were the most prevailing reasons for undergraduates' use of public Web portals in general.
- Factors that limited the use of public Web portals were technological barriers, the use of other resources and services, unsolicited advertising, feelings of information overload, and non-personalization.
- Reasons for non-personalization of public Web portals were unawareness, lack of need/interest, lack of time, lack of use, anticipation of difficulties, limited access, and privacy/security concerns.
- Respondents' gender, major, classification, GPA, length of Internet use, length of portal use, duration of portal use each time accessed, and use of preferred portal away from home did not show statistically significant results with regard to the use of personalization according to Chi-Square tests.
- Self-rated Internet experience/skill level, Internet access at home, weekly hours of portal use, days of portal use per week, and use of preferred portal at home were statistically significant with regard to the use of personalization on public Web portals. Portal users who personalized were generally more active users of public Web portals, had Internet access at home and rated themselves more as "Expert" than those who did not personalize.
- While the majority of personalizers on public Web portals indicated that the personalization options on their preferred site were easy to use and relatively easy to detect on the portals' default pages, a smaller number of personsalizers had doubts about this. The majority of personalizers in this study expressed a relatively high level of satisfaction with personalization outcomes and had used

the personalization options on their preferred public Web portals at least once or twice during the last three months prior to data collection. Others might have not used this option during this time period because they were satisfied with their personalization results before and had no need for changes.

- The most appealing personalization features of the 66 personalizers in this study were Internet searches, e-mail, world and national news followed by weather forecasts and other features. Also games, movie listings, and maps were quite appealing but for a smaller number of participants.

RQ 4: What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?

- Respondents' gender, major, classification, GPA, length of Internet use, preferred portal, length of portal use, and duration of portal use each time they accessed a portal site were not statistically significant with regard to the possession of a personal home page. The researcher found, however, statistically significant relationships between the existence of a personal home page and respondents' self-rated Internet experience/skill level, Internet access at home, weekly hours of portal use, the number of days of portal use in a typical week, and the use of personalization options on public Web portals. That is, students with a personal home page seemed to use public Web portals longer and subsequently more often and were more likely to personalize their portal experience than those without a personal home page.
- Although only 26 of all portal users also maintained a personal home page on the WWW in this study, findings from students with a personal home page and those who imagined having one indicated that about half of the students with personal home pages and about two thirds without saw connections between the use of a

personal home page and the use of public Web portals while acknowledging different underlying concepts and audiences of these two forms of Web sites. Before addressing some of the most evocative findings of this study in comparison to some studies and concepts that informed this research as reviewed in Chapter 2 of this study, the researcher would like to discuss data quality measures that guided the planning and execution of the study reported here.

DATA QUALITY MEASURES

Data quality was of great concern for the researcher during all phases of the planning and execution of this study. These concerns were especially important to the multi-faceted research design used. As Cresswell (2003, p. 174) points out "the idea of combining qualitative and quantitative approaches in a single study owes much to past discussions about mixing methods, linking paradigms to methods, and combining research designs in all phases of a study."

Since the researcher used quantitative and qualitative methods in this study, the following sections outline some quality measures based on the notions of *validity* and *reliability*. Validity "refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration" (Babbie, 2004, p. 143). In other words, it is the degree to which a procedure really measures what it proposes to measure. Reliability refers to the degree to which "a particular technique, applied repeatedly to the same object, yields the same result each time" (Babbie, 2004, p. 141). Both criteria originate from traditional quantitative research. A great number of researchers using qualitative methods have established parallel or analogous evaluation criteria based on validity and reliability, and they are discussed as well.

The researcher followed appropriate procedures for quantitative and qualitative methods as described in, for example, Babbie (2004), Berg (2001), Cresswell (2003), Greenbaum (1998), Gorman and Clayton (1997), Krueger (1988), Lincoln and Guba (1985), Powell (1993), and Tesch (1990). It is also worth mentioning that the researcher remedied discrepancies in participants' answers that were detected during crosschecking of their written and oral responses right away by contacting participants via telephone or e-mail. In other cases, duplicate answers were carefully eliminated, and answers out of scope due to obvious misunderstandings on the respondents' site were handled with great diligence during data coding and analyses. The researcher believes that findings of this study can be generalized to undergraduates in the U.S. more widely because random stratified sampling was used to determine participants in the study. The size of the sample frame was based on a table for determining sample sizes from a given population found in the traditional literature on research methods (Powell, 1993, p. 75).

Data Quality Measures in Quantitative Research

The first phase of the study's data collection was conducted using the standardized questionnaire containing closed and open-ended items. The findings of the questionnaire are likely to be valid since the questionnaire items were generally able to reveal what they were designed to measure: participants' demographic and use variables and behaviors using rating scales, categorical scales, and rank-ordered scales. The questionnaire underwent several pretests to remove ambiguity and to fine-tune questions. As explained in Chapter 4, only open-ended question 13 evinced some unexpected results since a number of students referred mistakenly to their preferred public Web portals rather than to public Web portals in general (see below). This problem was, unfortunately, not detected during pilot tests. Furthermore, validity of the results from

the questionnaire was achieved through comparison of respondents' answers to different closed and open-ended questions (e.g., questions 3 and 8) that related to the same topic.

The researcher conducted all statistical tests and necessary data recoding using SPSS 12.0 with assistance of an expert from the Research Consulting Group of the University of Texas at Austin whose knowledge and expertise were also quite valuable during the interpretation of the statistical findings in this study. Use of such a statistical consultant also increases confidence in the validity of the study's findings.

The results are likely to be reliable since such instruments obtain similar results when repeated following the same procedures, employing the same types of participants, and analyzing the data in a similar manner.

Data Quality Measures in Qualitative Research

The second and third phases of data collection of this study consisted of focus groups and individual interviews. Following the transcription of the tape recordings, the researcher content analyzed the data from these phases, as well as the naturalistic responses to the open-ended questionnaire items. Since some students repeated in focus groups or follow-up interviews partially what they had already stated in the open-ended items of the questionnaire, the researcher exercised great care during the coding and counting of the occurrences of these responses to prevent overrepresentation of these respondents in the results reported in Chapter 4. As previously mentioned, the responses to open-ended question 13 required extraordinary diligence during content analysis since some students referred clearly to their preferred public Web portal and not to public Web portals in general. As is well known, the major problem in naturalistic inquiry is to establish the trustworthiness of results. Tesch (1990) writes:

> Qualitative research is to a large degree an art. The question of its validity does not depend on replicable outcomes. It depends on the employment of a data "reduction" process that leads to a result that others can accept as representing the data. The result of the analysis is, in fact, a representation in the same sense that an artist can … create an image of a face that we would recognize if we saw the original in a crowd. The details are lacking, but a good "reduction" not only selects and emphasizes the essential features, it retains the vividness of the personality in the rendition of the face. In the same way a successful qualitative data reduction … presents us with an image that we can grasp as the "essence," where we otherwise would have been flooded with detail and left with hardly a perception of the phenomenon at all. (p. 304)

Nevertheless, the validity of qualitative research can be assessed in several ways. The most basic level is *face validity*. Do the results look valid? Typically, focus groups have high face validity, which is due in large part to the credibility of participants' responses. In focus groups, people open up and share insights that may not be available from questionnaires or interviews. For this study, the focus group guide was pilot tested and improved after four meetings prior to the study that allowed the researcher to hone his moderating skills. Some of the focus groups during this study were livelier than others, but participants were ensured absolute confidentiality. It was the researcher's impression during the focus groups as well as during the interviews that students' comments were honest and reflected their personal experiences and opinions and not what they thought the researcher wanted to hear.

Another level of validity is *descriptive validity* that refers to "factual accuracy of the account as reported by the qualitative researcher" (Johnson, 1997, p. 282). To ensure descriptive validity the researcher used *member checking*, i.e., he conducted additional interviews with 21 participants in focus groups and/or interviews to check for accuracy of their responses as and the credibility of the researcher's summaries and interpretations.

The researcher established *trustworthiness* of the findings by using multiple data collection and analysis methods to enrich his understanding of undergraduates' use of public Web portals. This process is called *triangulation* and leads to higher credibility of

a study's results (Erlandson et al., 1993). Triangulation is also a means of enhancing a study's *transferability* to other settings (Marshall & Rossman, 1989). Furthermore, the researcher established credibility of the research results by presenting the questions, methods and selected results periodically to two doctoral colleagues. This process is called *peer debriefing* and helps "to keep the inquirer honest" (Lincoln & Guba, 1985, p. 283). They reviewed the results of the researcher's initial content analysis and reinforced his opinion about the themes generated.

Reliability in terms of *reproducibility* (a qualitative analogue to reliability) of the study is probably hard to achieve since "in qualitative research no two scholars produce the same result, even if they are faced with exactly the same task" (Tesch, 1990, p. 304). However, in order to make the study as reproducible as possible to any researcher the following materials are in the appendices:

- Invitation letter
- Screenshot of initial contact form
- Questionnaire and letter mailed with questionnaire
- Advertisement for recruitment of additional non-users
- Focus group moderator's guide
- Codebooks.

The inclusion of these materials aims to reduce concerns about reliability of the findings and should assist other researchers in similar research endeavors. The reader should keep in mind that this study investigated a new, unexplored phenomenon and that ready-made data collection instruments did not exist.

COMMENTARY ON SELECTED FINDINGS

The researcher cannot review or discuss all of the study's numerous findings in detail. Space and time constraints dictate against such a procedure. However, in this section of Chapter 5 the researcher would like to discuss briefly some of the study's most evocative findings that relate to previously reported studies with regard to Internet use by undergraduate students and to theory that informed this study. The researcher would like to emphasize that most of the findings presented in this study are a result of investigating undergraduates' information behavior at public Web portals for the first time and that no comparable data exist.

Ford and Miller's (1996), Weiser's (2000) and Sherman and her colleagues' (2000) findings about a gender gap in using the Internet was not confirmed by this study. The participants in this study did not show any statistically significant differences by gender in the use of public Web portals generally nor in using particular portal sites or portal features. The participants in this study also did not display statistically significant gender-based differences in using the personalization features on public Web portals, nor did they show statistically significant gender differences in maintaining a personal home page. In fact, there were overall more female than male respondents who personalized their portal views, and, while the number of female participants was overall slightly higher in general compared to male participants in the overall number of respondents (85/59), ownership of a personal home page was equal in terms of absolute numbers (13 each). Other demographic and use variables such as age, educational level, major, or GPA also did not reveal any statistically significant findings with regard to the use of public Web portals in general, preferred public Web portals in particular, or the possession of a personal home page based on the undergraduates' responses in this study. On the other hand, the study found statistically significant differences among the

participants by previously uninvestigated use variables such as Internet access at home, length of portal use in a typical week, the use of personalization on public Web portals and the possession of a personal home page.

Although age was a variable that played an important rule in the studies conducted by Perry et al. (1998) and Kuhlthau (1991), the rather homogenous age distribution of participants in this study age was not considered for inferential statistical analysis since new or remarkable results seemed unlikely.

The primary use of public Web portals by undergraduate for searches, e-mail and other features as found in the study reported here echoes Wilson (1997), McFadden (1999) and Lubans (2000). These studies all indicate a high use of e-mail, searches, and other communication features on the sites relevant in their studies. While they were investigating only a small group of mainly undergraduate students, their pioneering studies of students' use of the WWW informed this study a great deal.

One useful model in information behavior research that informed the design of the study is Kuhlthau's widely cited *Information Search Process* (1993). Her model is based on empirical studies involving college students' experiences searching library catalogues. While the study reported here has many implications for Kuhlthau's model, the researcher will comment on two.

Kuhlthau and others have demonstrated the importance of *affect* in information behavior. Her findings indicate that uncertainty characterizes many information problems, particularly in early stages. For example, numerous students in this study expressed feelings of being overwhelmed by the content of public Web portals, echoing Kuhlthau's description of anxiety. The concept of satisfaction also leads to a second finding of the study reported here that intersects with Kuhlthau's model.

The six stages of Kuhlthau's model, Task Initiation, Topic Selection, Topic Exploration, Focus Formulation, Resource Collection and Presentation are all clearly visible in the personalization activities on public Web portals. The important difference between this study and Kuhlthau's model is that this research looked at undergraduates' naturalistic behavior and that the researcher did not impose "queries."

As this study has shown many undergraduates used several public Web portals for a variety of reasons such as reputation/brand name, familiarity, ease of use, accessibility, uniqueness of services, community, quality of content, and satisfaction. The complexity of preference reasons that the study revealed is an aspect that portal developers need to consider. Several participants used multiple portal sites because they felt either more satisfied with a particular service on one site than another or a service was unique on a site and not available elsewhere.

While most students found their preferred portal sites easy to use, there were numerous critical remarks about public Web portals throughout all phases of data collection. This criticism focused mainly on feelings of information overload, cluttered design, privacy concerns when registering and using portal sites, or unsolicited advertising on portal sites in general. Although portal sites are not all equal the results of this study suggest that portal developers should seriously consider the following improvements on their sites in general to improve undergraduates' portal experience:

- Simplification of sign-up and login procedures
- Reduction of available content on default sites to reduce information overload and wait time
- Simplification and increase of the transparency of use policies
- Reduction of unsolicited advertising and implementation of improved mechanisms for customer protection

- Increase in the number of available options and improvement of design freedom after personalization
- Improvement of awareness of existing personalization option and its benefits.

The results of this study indicate that only 66 of the 142 portal users applied personalization and that personalizers were generally more active users of public Web portals. Non-personalization seemed to contribute remarkably to the limited use of public Web portals by undergraduate students. While personalizers found the personalization option relatively easy to detect on their preferred portal site, non-personalizers were often not even aware of this option. Thus, if portal developers want to maximize the use of their sites they need to increase the awareness of the personalization option and explain its benefits better. This could be done through improved site design as well as through other means such as a program that rewards portal users for using personalization.

LIMITATIONS OF THE STUDY AND OF ITS RESULTS

It is important to view the study's results in the context of the study's objectives and the procedures applied to meet these objectives. The objective was to explore undergraduates' information behavior on public Web portals and reasons for this behavior. Due to the dynamic nature of the Internet, some of the public Web portals in this study have not only changed in content and design but now also provide services based on newer technologies such as RSS (Real Simple Syndication) feeds that were not available at the time of data collection. The researcher had observed numerous changes since the beginning of the pilot tests in the year 2000. In addition, other public portal sites had completely vanished during the pilot tests or moved away from the concept of public Web portals as used in this study. For instance, AltaVista, Disney's Go, and NBCi

limited or removed the personalization options or other services such as e-mail entirely. As a result these sites did not become part of the study. The least popular public Web portal in this study, Go2net, removed the personalization option in early 2004. MyAOL has been closed to the public meanwhile and is available only to subscribers, i.e. these sites no longer meet the researcher's definition of a public Web portal. On the other hand, new public Web portals such as for instance MyWay[15] have emerged that could not be considered for the study reported here. Although not calling their product MyGoogle but "Personalized Home Page," Google, the darling of search engines, announced in May 2005 the launch of a public Web portal with personalization in its latest move to attract more users after having introduced its free (by invitation only) Gmail service a year earlier (Sullivan, 2005). These new public Web portals could not be considered for this study.

Although the research reported here does not consider these changes over time, it needs to be emphasized, however, that the study could not be conducted in a laboratory setting providing full control regarding the availability of particular sites, their design and content. This alternative was not only impossible but also undesirable since the study aimed to investigate and to report on naturalistic, real-life behavior.

Other limitations relate to the nature of qualitative research techniques and analysis methods used in this study. In particular the selection of criteria used in the process of content analysis and the focus group technique have not only advantages but also limitations: "all techniques for gathering information have limitations, and focus group interviews are no exceptions" (Krueger, 1988, p. 46). Although the researcher as moderator tried to prevent domination by some students during the focus group meetings, it is possible that some members might not have been able to reveal their thoughts to the

[15] MyWay, iWon and Excite are now owned by Ask Jeeves, Inc. after acquiring Interactive Search Holdings, Inc. in May 2004.

extent necessary. However, since focus group interviews were complemented by the questionnaires and individual follow-up interviews, possible research error in the focus group interviews is likely to have been minimized.

While the overall framework for content analysis was provided by the literature on information behavior and usability testing, the specific analysis criteria relied primarily on the researcher's interpretation of the respondents' experiences and opinions. In other words, a different researcher may have identified different themes even when using the same data. However, since the research topic was new, the inductive approach is especially appropriate to gain insights into undergraduates' use of public Web portals.

Another potential limitation of the study is that respondents perceived some key terms in the study differently from the researchers intentions. As shown in Chapter 4, not all participants understood the terms *public Web portal*, *personalization* and *personal home page*. While these terms and corresponding answers could be clarified with participants in focus groups and interviews, the problem with comprehending the terms might have resulted in incorrect answers from other participants in the questionnaire.

FUTURE RESEARCH DIRECTIONS

The nature of the study contributed to the creation of several new ideas for future research about public Web portals and about undergraduates' information behavior more generally. The popularity of public Web portals was not only demonstrated by this study, but the ongoing and rather growing interest in public Web portal sites is also evident in Table 5.1 below.

While a very few students in the interviews were skeptical about the future of public Web portals, the majority of interviewees predicted both growing interest in public Web portals and market consolidation. An interesting development in this market

consolidation was the acquisition of three of the public Web portals (Excite, iWon, and MyWay) by Ask Jeeves, Inc. in May 2004. Despite the short-term synergy effects, it remains to be seen if the company will continue to maintain all three brands under one roof.

Table 5.1: Portal parent companies in U.S. top 50 Internet properties for April 2005 (comScore Media Metrix)

Rank	Property	Unique Visitors
1	Yahoo! Sites	116,321,000
2	Time Warner Network	115,829,000
3	MSN-Microsoft Sites	111,519,000
6	Ask Jeeves	42,341,000
14	Lycos, Inc.	27,326,000

Future research could address this consolidation of portals and investigate its influence on the information behavior of undergraduate students and other users of public Web portals. What happened to the users of Go2net after its closure? What happened to the users of MyAOL after the site was restricted to subscribers only? How will Google's "Personalized Home Page" influence the portal market? This future research should address brand name loyalty as well as privacy concerns.

Other potential research topics inspired by this study include investigation of the information behavior of other populations at public Web portals in general or at a particular portal site, and the information behavior of several populations at any one particular portal site. As the study has shown it was almost impossible to recruit non-

users of public Web portals among undergraduate students. Informal conversations with participants in the study reported here and with colleagues indicated that it would have been easier to find non-users of particular portal sites and non-users of public Web portals in general within other populations, including those based on characteristics such as personalization, non-personalization, age, profession, ethnicity, nationality, native language, income level and so on.

Other possibilities for future research directions include use of other specific research procedures and different variables. Despite the dynamic nature of the Internet, portal use could be addressed in a longitudinal study to see if and how users' information behavior on public Web portals changes over time. In the one-shot study presented here there were several respondents who mentioned that they did not use portals anymore. Other respondents had never used personalization at public Web portals before their participation in the research. Their information behavior at portal sites had obviously changed over time, but the extent of and the motivations for these changes could be only marginally explored. It would be of some value to determine how participants in the study reported have changed their information behavior at public Web portals since fall 2002. Different variables to consider include attributes of portal design such as color, navigation, organization, and labeling that were mentioned by some respondents but were not the focus of the research. Participants could be given several tasks to accomplish on portal sites, and the results of the tasks could be compared. Future studies could also make use of Kolb's Learning Style Inventory or the Myers-Briggs type indicator to measure personality types and their potential interaction with the use of public Web portals.

This study raised as many questions as it answered, if not more. Most of the above-mentioned research directions would require a high level of cooperation from participants. The interest in and excitement about the present study as expressed by most participants are indicators that such cooperation can be achieved and that further research in users' information behavior on public Web portals is warranted.

Appendix A: Invitation Letter to Participate in the Study

Hello,

I am a Doctoral Candidate in the Graduate School of Library and Information Science at The University of Texas at Austin. I received your name and contact information with the assistance of XYZ's Student Affairs Office. As part of the research for my degree, I am looking for about 50 participants. The study examines **why or why not** undergraduate students use public Web portals such as Yahoo! or Excite. This project is conducted by Heiko Haubitz, M.L.I.S, Dipl.-Bibl., (XXX) 477-XXXX and supervised by Philip Doty, Ph.D., (XXX) 471-XXXX. Your participation is entirely voluntary, and you may withdraw from this study at any time. Your participation or lack of participation will in no way affect the current or future relationships with your university.

The purpose of this study is to determine the extent of use AND non-use of public Web portals by undergraduate students including reasons for this information behavior. To encourage participation, I will hold a drawing for 20 gift certificates upon completion of data collection. These certificates are for BestBuy, Circuit City and other businesses in the XYZ area with face values between $10 and $50 each. You can double or triple your chances of winning one of these certificates by participating in all three stages of the data collection.

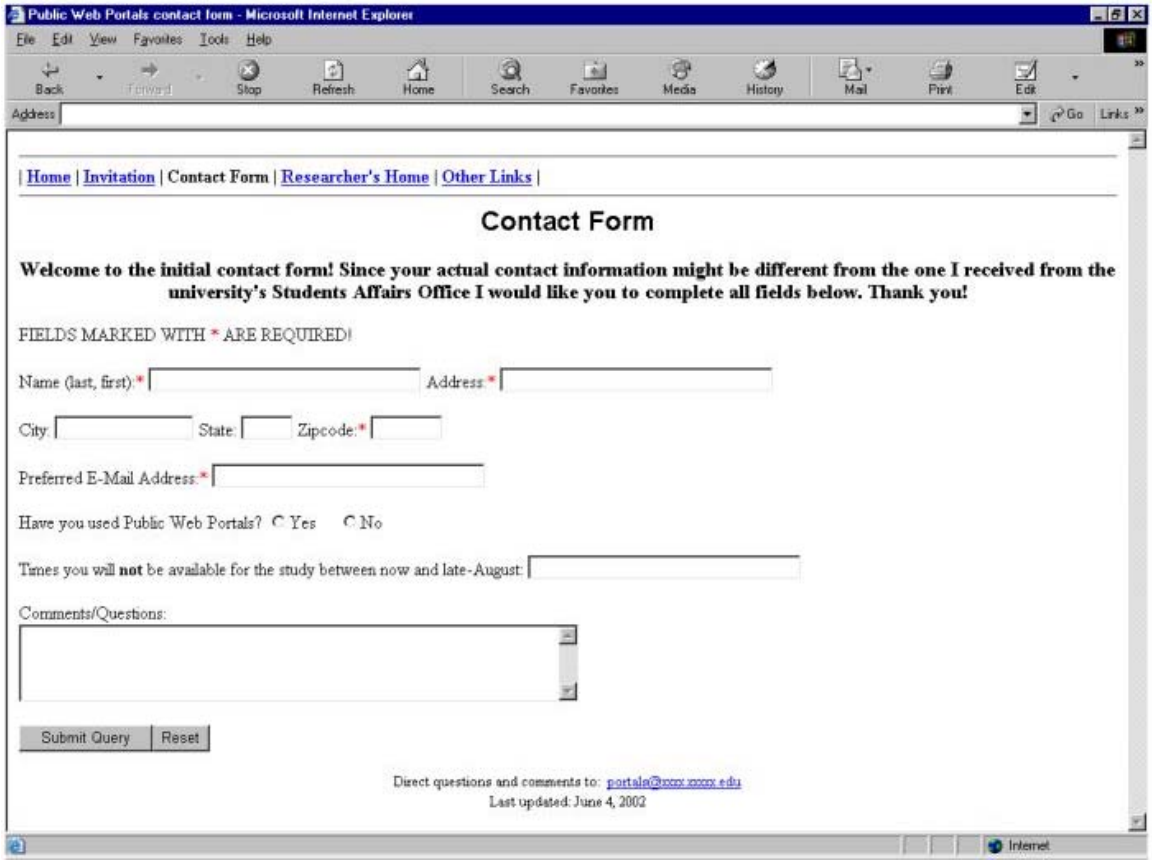
If you are interested, contact me directly by e-mail at portals@xxxx.xxxxxx.edu or complete a very brief form on the Web at http://www.xxxx.xxxxxx.edu/~portals. Following this notification, I will send you a questionnaire, including a return envelope, that should take you between 20 and 35 minutes to complete. The timely return of the completed questionnaire will be considered your final consent to participate in the study and it will be your first ticket in the drawing. Voluntary participation in a 1-hour focus group (audio-recorded with your permission) and individual interview will generate two more tickets for the drawing.

I can assure you that no one else will know who participates in the research or be able to match any particular response with any particular participant. If you would like to receive additional information about this study, feel free to contact me, or my academic adviser using the information provided above.

Data collection is supposed to be completed by the end of August, and I am looking forward to hearing from you soon. Thank you very much in advance for your participation.

Heiko

Appendix B: Initial Contact Form (Screenshot)



Appendix C: Follow-up Letter Mailed with Questionnaire

Dear student;

I would like to thank you very much for your interest in my study about the use and **non-use** of public Web portals by undergraduate students. So far, almost everyone interested seems to be a user. Please find enclosed the initial invitation letter, the questionnaire, and a pre-paid return envelope. Since I am still looking for more participants (in particular non-users) feel free to spread the word to any other undergraduate students who might also be interested in the study. Just point them to the form on the Web at http://www.xxxx.xxxxxx.edu/~portals, or, ask them to contact me directly by email at portals@xxxx.xxxxxx.edu.

Please read the enclosed materials very carefully and complete the questionnaire as detailed as possible. In particular, your detailed answers to the open-ended questions will provide the most valuable data for my research and save time during the individual follow-up interviews that will be scheduled at your convenience after the focus groups as soon as possible. I would like to ask you to return the completed questionnaire signed and dated by xxxx xx, 2002. Please leave Date of Participation on page 1 blank since the dates for the focus groups are not determined yet. The timely return of a signed and dated questionnaire will be your first ticket in the drawing for one of the prizes later this summer.

I will invite you to one of the focus groups according to the times you specified in the contact form very soon. This is, however, the most taxing part for me and I cannot ensure that all of the interested participants in the study will be offered a time slot that will be convenient at first sight. Since a focus group with only two or three persons is impossible I will try my best to arrange times as convenient as possible for as many participants as possible according to the times you provided. The focus groups should be fun and they will be very informal. As it looks right now, there is even a chance that some focus groups and individual follow-up interviews might have to take place once after the fall semester is in session. If times should become inconvenient for you feel free to contact me by e-mail as soon as possible stating your ongoing interest in focus group and/or individual follow-up interview once your schedule will allow this more freely. However, I cannot guarantee this opportunity since I will finish data collection as soon as I feel comfortable with what I have received. If you have further questions, please do not hesitate to contact me by e-mail (preferred), or, otherwise. I am looking forward to hearing from you very soon. Good luck with your studies this summer.

Sincerely,

Heiko

Appendix D: Questionnaire

R#_____

Heiko Haubitz: The Use of Public Web Portals by Undergraduate Students

Questionnaire **Date of Participation:_____**

Please answer the following questions and return the questionnaire to me prior to the focus group. Please be assured that your comments on this form will be kept confidential. No one will know your identities or see your responses. See also the audio-taping release at the end. Thanks for your participation in the focus group study!

Name:_____ Major:_____

1. Name of preferred browser **and** name of preferred operating system

2. Do you have Internet access at home? (Please circle one) yes no

3. Do you have Internet access away from your home? (Please circle one) yes no

If yes, please specify where:_____

_____

_____

4. How long have you used the **Internet**? (Please circle one)

less than 1 year
1 year – less than 2 years
2 years – less than 3 years
3 years – less than 4 years
4 years and more

5. Please rate your experience/skills in using Internet services and in doing business of any kind online. (Please mark one)

__Expert – I know my way around the Internet and back again.
__Very good – I can usually find and do what I want.
__Still learning – Sometimes I have to ask for help.
__Beginner – Have used email and surfed the Web!

6. Do you have a home page? (Please circle one) yes no

If yes, please specify what you use your home page for?

_____

_____

_____

_____

_____

_____

7. Have you used a public Web portal like Yahoo!, Netscape, iWon or MSN? (Please circle one)

yes no

If you answered **"no,"** please explain in detail why not and continue with **question 22**.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Questions 8 to 21 are only for respondents who have used public portal sites.

8. Please indicate your preferred portal site(s) by marking your highest preference with 1, your second highest preference with 2, and so on in the column Preference Rank. Please mark the places where you use these portal sites with an X in the remaining columns (Circle and mark all that apply).

	Preference Rank	Use at Home	Use away from Home
Yahoo!			
Netscape			
Excite			
AOL			
Lycos			
iWon			
MSN			
Go2Net			
Other (please specify)			

9. How long have you used public portal sites? (Please circle one)

less than 3 months
3 months – less than 6 months
6 months – less than 9 months
9 months – less than 12 months
12 months and more

10. How long do you typically spend on the portal site each time you use it? (Please circle one)

less than 5 minutes
5 minutes – less than 10 minutes
10 minutes – less than 20 minutes
20 minutes – less than 30 minutes
30 minutes and more

11. In a typical week, how long do you use portal sites? (Please circle one)

less than 1 hour
1 hour – less than 2 hours
2 hours – less than 3 hours
3 hours – less than 4 hours
4 hours and more

12. In a typical week, on how many days do you use portal sites? (Please circle one)

1 2 3 4 5 6 7

13. Why do you use portal sites? (Please be as detailed as possible)

_____

_____

_____

_____

_____

_____

14. Have you ever used the **personalization** option in your preferred public portal site? (Please circle one)

yes no

If you answered **"no,"** please describe why not and continue with **question 21**:

_____

_____

_____

_____

_____

_____

Questions 15 to 20 are only for respondents who have personalized their public portal sites. All of the following answers should refer to your preferred public portal site (see question 8).

15. On a scale of 1 to 5 (1 being very easy, 5 being very difficult), how would you rate the public portal in terms of ease of using personalization? (Please circle one)

very easy very difficult

1 2 3 4 5

16. On a scale of 1 to 5 (1 being very clear, 5 being very unclear), how would you rate the initial (default) page of the public portal in terms of indicating the availability to use personalization? (Please circle one)

very clear				very unclear
1	2	3	4	5

17. On a scale of 1 to 5 (1 being very satisfied, 5 being very unsatisfied), how would you rate your satisfaction with the results of the personalization? (Please circle one)

very satisfied				very unsatisfied
1	2	3	4	5

18. How often have you changed your personalized features during the last 3 months? (Please circle one)

never
once
twice
three times
four times and more

19. What are your preferred selections on a portal site and why? (Please describe briefly)

20. In your **preferred** public portal site, how appealing are the following features to you? Please circle one number in each row that applies to you. Please, feel free to add up to 3 other features at the end.

Features	**Very appealing**				**Not at all**
e-mail	1	2	3	4	5
chat	1	2	3	4	5
calendar	1	2	3	4	5
Internet searches	1	2	3	4	5
bookmarks	1	2	3	4	5
weather	1	2	3	4	5
horoscope	1	2	3	4	5
stocks	1	2	3	4	5
national news	1	2	3	4	5
local news	1	2	3	4	5
world news	1	2	3	4	5
business news	1	2	3	4	5
sports news	1	2	3	4	5
technology news	1	2	3	4	5
entertainment news	1	2	3	4	5
travel info	1	2	3	4	5
health info	1	2	3	4	5
TV listings	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

21. Describe briefly the sorts of tasks that you carry out with portal sites.

22. Suppose you had 1-2 minutes to talk to anyone about public portals, what would you say?

23. May I contact you by phone and/or e-mail for the focus group and brief follow-up? (Please circle one)

Yes No

If yes, how can I best reach you in the next couple of weeks (phone # & e-mail address)?

_____

24. Do you have any additional comments about public portal sites?

25. Age range (Please circle one)

under 18
18 - 23
24 - 30
31 - 39
over 39

26. Gender (Please circle one) male female

27. Classified as (Please circle one)

freshman
sophomore
junior
senior
other

28. Current GPA (Please circle one)

less than 2.00 2.00 – 2.49 2.50 – 2.99 3.00 – 3.49 3.50 – 4.00 none

Audio-taping Release

By signing below, I give permission for my participation in this discussion group/interview to be audio-taped. I understand that information from the tapes of these sessions will be used only for information and research purposes, and will not be made available to anyone but Heiko Haubitz and his dissertation advisors.

_____ _____
Students's Signature Date

Appendix E: Advertisement for Recruitment of Additional Non-Users

Undergraduate Students Wanted!

Participate in our study and earn $$$!
Never used Yahoo!, Lycos, Netscape, Excite, AOL, iWon or similar public Web portals? If you are one of those than

We want YOU!

What for: A research study (dissertation) about the non-use and use of public Web portals by undergraduate students

Who: Only the first 15 undergraduates who apply and who do **NOT use** public Web portals (qualification for study determined by the researchers)

When: Immediately (until the end of October)

Where: GSLIS (Library & Information Science) located in xxxxxxxxxxxxx

What to do first: Go to contact form at http://www.xxxx.xxxxxx.edu/~portals/

What's in for you: $2.50 for a completed questionnaire (about 10 mins.) and $7.50 for an audio-taped interview (about 30 mins.)

Interested? Send e-mail to portals@xxxx.xxxxxx.edu, or, call (XXX) 477-XXXX if you have any other questions! Hurry up!

Appendix F: Focus Group Moderator's Guide

1. Arrival of Participants

Install and test recording equipment while engaging participants in informal conversation.

Ask questions about possible daily concerns of participants (warm-up).

Provide all participants with name tags (first name only) and encourage them to enjoy refreshments during any time of the discussion.

2. Researcher Introduction

Hello. My name is Heiko Haubitz. Thank you for agreeing to participate in the study and in today's focus group. I will ask you several questions about your experience with public Web portals such as Yahoo!, Excite, Netscape, and others. Your answers are not graded or tested. You are highly encouraged to ask each other questions and to comment on other participants' remarks. Let me remind you that there are no right or wrong answers to these questions. I am interested in your opinion regardless of it being positive or negative. Everyone's opinion is important. If we all speak one at a time, I will be able to hear what everyone has to say. It will be my responsibility to make sure that everyone gets a chance to answer every question.

As explained earlier, I am going to be taping our conversation so I have a good record of our talk. The tape will remain confidential. Is this acceptable to all of you? Well, then let's start.

3. Participants Introduction

Why don't we begin by going around the room and introducing ourselves? This will also make it easier to identify your voices on the tape later. Please tell everyone your name, major, and which portal sites you have used.

4. Discussion

(Addressing RQ 2: Which portals do undergraduate students prefer and why?)

- How comfortable do you feel using public Web portals?
- Which site do you like best and why?
- Are there any features or services that you would like to see added?

(Addressing RQ 3: Why and how do undergraduate students use public Web portals?)

- What are your experiences with public Web portals in general and why have you used them?
- Why have you used/not used the personalization option?
- What do you think about the quality of content on public Web portals?

(Addressing RQ 4 (if possible): What differences, if any, are there between students with personal home pages and those without regarding the use of public Web portals?)

- Ask related questions only if there is a majority of participants with personal home pages present in focus group, and if time permits.

5. Closing

I'd like to thank you once again for your participation in this focus group. Your comments will be very helpful. I will invite you soon for a short individual follow-up interview. This interview will take place at your earliest convenience. Again, thank you very much for participating in the focus group today. Have we missed anything? Do you have any other comments or questions about public Web portals? Thank you!

Appendix G: Codebooks for Quantitative Data

Codebook for Questionnaire

Question	Variable Name	Possible Values
R#	USERNO	1 – 144
Major	MAJOR	1 = Natural Sciences 2 = Social Sciences 3 = Art and Humanities 4 = Other
1	PREFBROW	1 = IE 2 = Netscape 3 = Other
	PREFOS	1 = Windows 2 = Mac 3 = Other
2	INTHOME	1 = Yes 2 = No
3	INTAWAY	1 = Yes 2 = No
4	INTLONG	1 = less than 1 year 2 = 1 year – less than 2 years 3 = 2 years – less than 3 years 4 = 3 years – less than 4 years 5 = 4 years and more
5	INTSKILL	1 = Expert 2 = Very good 3 = Still learning 4 = Beginner
6	HOMEPA	1 = Yes 2 = No
7	PUSE	1 = Yes 2 = No

8	YAHOO	9 = highest preference (marked as 1 by participants) 1 = lowest preference (marked as 9 by participants)
	NETSCAPE	see above
	EXCITE	see above
	AOL	see above
	LYCOS	see above
	IWON	see above
	MSN	see above
	GO2NET	see above
	OTHER	see above
	PORTHOME	1 = Yes 2 = No
	PORTAWAY	1 = Yes 2 = No
9	PHIST	1 = less than 3 months 2 = 3 months – less than 6 months 3 = 6 months – less than 9 months 4 = 9 months – less than 12 months 5 = 12 months and more
10	PEACH	1 = less than 5 minutes 2 = 5 minutes – less than 10 minutes 3 = 10 minutes – less than 20 minutes 4 = 20 minutes – less than 30 minutes 5 = 30 minutes and more
11	PWEEK	1 = less than 1 hour 2 = 1 hour – less than 2 hours 3 = 2 hours – less than 3 hours 4 = 3 hours – less than 4 hours 5 = 4 hours and more
12	PDAYS	1 – 7
14	PERSO	1 = Yes 2 = No
15	PERSOEAS	1 – 5
16	PERSODEF	1 – 5
17	PERSOSAT	1 – 5

18	PERSOFEA	1 = never 2 = once 3 = twice 4 = three times 5 = four times and more
20	EMAIL	5 = Very appealing (marked as 1 by participants) 1 = Not at all (marked as 5 by participants)
	CHAT	see above
	CALENDAR	see above
	SEARCHES	see above
	BOOKMARK	see above
	WEATHER	see above
	HOROSCOP	see above
	STOCKS	see above
	NATIONAL	see above
	LOCAL	see above
	WORLD	see above
	BUSINESS	see above
	SPORTS	see above
	TECHNOLO	see above
	ENTERTAI	see above
	TRAVEL	see above
	HEALTH	see above
	TVLIST	see above
	GAMES	see above
	PERSONAL	see above
	GROUPS	see above
	MESSENGE	see above
	MOVIES	see above
	MAPS	see above
23	FG	1 = Yes 2 = No
25	AGE	1 = under 18 2 = 18 – 23 3 = 24 – 30 4 = 31 – 39 5 = over 39
26	GENDER	1 = male 2 = female

27	CLASS	1 = freshman 2 = sophomore 3 = junior 4 = senior 5 = other
28	GPA	1 = less than 2.00 2 = 2.00 – 2.49 3 = 2.50 – 2.99 4 = 3.00 – 3.49 5 = 3.50 – 4.00 6 = none

Codebook for Major

Natural Sciences = 1

Astronomy, Biochemistry, Biology, Biomedical Engineering, Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, Geology, Geophysics, Human Biology, Mathematics, Mechanical Engineering, Microbiology, Molecular Biology, Nursing, Pharmacy, Physics, Pre-Med

Social Sciences = 2

Accounting, Advertising, Applied Learning, Business, Business Administration, Child Development, Communication Studies, Convergent Media, Corporate Communication, Early Childhood Education, Education, Elementary Education, Finance, Government, Journalism, Kinesiology, Management Science and Information Systems, Marketing, Photojournalism, Psychology, Public Relations, Speech-Language Pathology, Sport Management, Sociology, Youth and Communication Studies

Arts and Humanities = 3

Architecture, Asian Cultures and Languages, Economics, English, French, Geography, History, Latin American Studies, Radio Television Film, Spanish, Theatre

Other = 4

Undeclared, Non-degree seeker

Appendix H: Chi-Square Calculations

Table H.1: Contingency Table for Gender and Preferred Portal; N = 142

Gender * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Gender	Male	Count	33	14	11	58
		Expected Count	32.3	13.1	12.7	58.0
		% of Total	23.2%	9.9%	7.7%	40.8%
	Female	Count	46	18	20	84
		Expected Count	46.7	18.9	18.3	84.0
		% of Total	32.4%	12.7%	14.1%	59.2%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.06

Table H.2: Contingency Table for Major and Preferred Portal (excluding no major); N = 137

Major * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Major	Natural Sciences	Count	26	8	7	41
		Expected Count	23.0	9.3	8.7	41.0
		% of Total	19.0%	5.8%	5.1%	29.9%
	Social Sciences	Count	34	16	16	66
		Expected Count	37.1	14.9	14.0	66.0
		% of Total	24.8%	11.7%	11.7%	48.2%
	Arts and Humanities	Count	17	7	6	30
		Expected Count	16.9	6.8	6.4	30.0
		% of Total	12.4%	5.1%	4.4%	21.9%
Total		Count	77	31	29	137
		Expected Count	77.0	31.0	29.0	137.0
		% of Total	56.2%	22.6%	21.2%	100.0%

Cramér's V = 0.075

Table H.3: Contingency Table for Classification and Preferred Portal; N = 142

Classification * Preferred Portal Crosstabulation

			Preferred Portal			Total
			Yahoo	MSN	Other	
Classification	All Other	Count	38	17	13	68
		Expected Count	37.8	15.3	14.8	68.0
		% of Total	26.8%	12.0%	9.2%	47.9%
	Senior	Count	41	15	18	74
		Expected Count	41.2	16.7	16.2	74.0
		% of Total	28.9%	10.6%	12.7%	52.1%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.075

Table H.4: Contingency Table for GPA and Preferred Portal (excluding no GPA); N = 136

GPA * Preferred Portal Crosstabulation

			Preferred Portal			Total
			Yahoo	MSN	Other	
GPA	less than 3.00	Count	30	12	7	49
		Expected Count	26.7	11.5	10.8	49.0
		% of Total	22.1%	8.8%	5.1%	36.0%
	3.00-3.49	Count	28	11	11	50
		Expected Count	27.2	11.8	11.0	50.0
		% of Total	20.6%	8.1%	8.1%	36.8%
	3.50-4.00	Count	16	9	12	37
		Expected Count	20.1	8.7	8.2	37.0
		% of Total	11.8%	6.6%	8.8%	27.2%
Total		Count	74	32	30	136
		Expected Count	74.0	32.0	30.0	136.0
		% of Total	54.4%	23.5%	22.1%	100.0%

Cramér's V = 0.129

Table H.5: Contingency Table for Length of Internet Use and Preferred Portal; N = 142

Length of Internet Use * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Length of Internet Use	less than 4 years	Count	23	5	4	32
		Expected Count	17.8	7.2	7.0	32.0
		% of Total	16.2%	3.5%	2.8%	22.5%
	4 years and more	Count	56	27	27	110
		Expected Count	61.2	24.8	24.0	110.0
		% of Total	39.4%	19.0%	19.0%	77.5%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.178

Table H.6: Contingency Table for Self-rated Internet Experience/Skill Level and Preferred Portal; N = 142

Self-rated Internet Experience/Skill Level * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Self-rated Internet Experience/Skill Level	Expert	Count	21	11	7	39
		Expected Count	21.7	8.8	8.5	39.0
		% of Total	14.8%	7.7%	4.9%	27.5%
	Very good	Count	49	17	19	85
		Expected Count	47.3	19.2	18.6	85.0
		% of Total	34.5%	12.0%	13.4%	59.9%
	Still learning & Beginner	Count	9	4	5	18
		Expected Count	10.0	4.1	3.9	18.0
		% of Total	6.3%	2.8%	3.5%	12.7%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramer's V = 0.074

Table H.7: Contingency Table for Preferred Portal and Use Preferred Portal at Home; N = 142

Preferred Portal * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Preferred Portal	Yahoo	Count	68	11	79
		Expected Count	66.2	12.8	79.0
		% of Total	47.9%	7.7%	55.6%
	MSN	Count	27	5	32
		Expected Count	26.8	5.2	32.0
		% of Total	19.0%	3.5%	22.5%
	Other	Count	24	7	31
		Expected Count	26.0	5.0	31.0
		% of Total	16.9%	4.9%	21.8%
Total		Count	119	23	142
		Expected Count	119.0	23.0	142.0
		% of Total	83.8%	16.2%	100.0%

Cramér's V = 0.093

Table H.8: Contingency Table for Gender and Use Preferred Portal at Home; N = 142

Gender * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Gender	Male	Count	48	10	58
		Expected Count	48.6	9.4	58.0
		% of Total	33.8%	7.0%	40.8%
	Female	Count	71	13	84
		Expected Count	70.4	13.6	84.0
		% of Total	50.0%	9.2%	59.2%
Total		Count	119	23	142
		Expected Count	119.0	23.0	142.0
		% of Total	83.8%	16.2%	100.0%

Phi = 0.024

Table H.9: Contingency Table for Major and Use Preferred Portal at Home; N = 137

Major * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Major	Natural Sciences	Count	35	6	41
		Expected Count	34.1	6.9	41.0
		% of Total	25.5%	4.4%	29.9%
	Social Sciences	Count	56	10	66
		Expected Count	54.9	11.1	66.0
		% of Total	40.9%	7.3%	48.2%
	Arts and Humanities	Count	23	7	30
		Expected Count	25.0	5.0	30.0
		% of Total	16.8%	5.1%	21.9%
Total		Count	114	23	137
		Expected Count	114.0	23.0	137.0
		% of Total	83.2%	16.8%	100.0%

Cramér's V = 0.093

Table H.10: Contingency Table for Classification and Use Preferred Portal at Home; N = 142

Classification * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Classification	All Other	Count	62	6	68
		Expected Count	57.0	11.0	68.0
		% of Total	43.7%	4.2%	47.9%
	Senior	Count	57	17	74
		Expected Count	62.0	12.0	74.0
		% of Total	40.1%	12.0%	52.1%
Total		Count	119	23	142
		Expected Count	119.0	23.0	142.0
		% of Total	83.8%	16.2%	100.0%

Phi = 0.192

Table H.11: Contingency Table for GPA and Use Preferred Portal at Home; N = 136

GPA * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
GPA	less than 3.00	Count	41	8	49
		Expected Count	40.7	8.3	49.0
		% of Total	30.1%	5.9%	36.0%
	3.00-3.49	Count	41	9	50
		Expected Count	41.5	8.5	50.0
		% of Total	30.1%	6.6%	36.8%
	3.50-4.00	Count	31	6	37
		Expected Count	30.7	6.3	37.0
		% of Total	22.8%	4.4%	27.2%
Total		Count	113	23	136
		Expected Count	113.0	23.0	136.0
		% of Total	83.1%	16.9%	100.0%

Cramér's V = 0.022

Table H.12: Contingency Table for Length of Internet Use and Use Preferred Portal at Home; N = 142

Length of Internet Use * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Length of Internet Use	less than 4 years	Count	26	6	32
		Expected Count	26.8	5.2	32.0
		% of Total	18.3%	4.2%	22.5%
	4 years and more	Count	93	17	110
		Expected Count	92.2	17.8	110.0
		% of Total	65.5%	12.0%	77.5%
Total		Count	119	23	142
		Expected Count	119.0	23.0	142.0
		% of Total	83.8%	16.2%	100.0%

Phi = 0.037

Table H.13: Contingency Table for Self-rated Internet Experience/Skill Level and Use Preferred Portal at Home; N = 142

Self-rated Internet Experience/Skill Level * Use Preferred Portal at Home Crosstabulation

			Use Preferred Portal at Home		
			Yes	No	Total
Self-rated Internet Experience/Skill Level	Expert	Count	33	6	39
		Expected Count	32.7	6.3	39.0
		% of Total	23.2%	4.2%	27.5%
	Very good	Count	71	14	85
		Expected Count	71.2	13.8	85.0
		% of Total	50.0%	9.9%	59.9%
	Still learning & Beginner	Count	15	3	18
		Expected Count	15.1	2.9	18.0
		% of Total	10.6%	2.1%	12.7%
Total		Count	119	23	142
		Expected Count	119.0	23.0	142.0
		% of Total	83.8%	16.2%	100.0%

Cramér's V = 0.014

Table H.14: Contingency Table for Preferred Portal and Use Preferred Portal away from Home, N = 142

Preferred Portal * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Preferred Portal	Yahoo	Count	68	11	79
		Expected Count	64.5	14.5	79.0
		% of Total	47.9%	7.7%	55.6%
	MSN	Count	24	8	32
		Expected Count	26.1	5.9	32.0
		% of Total	16.9%	5.6%	22.5%
	Other	Count	24	7	31
		Expected Count	25.3	5.7	31.0
		% of Total	16.9%	4.9%	21.8%
Total		Count	116	26	142
		Expected Count	116.0	26.0	142.0
		% of Total	81.7%	18.3%	100.0%

Cramér's V = 0.129

Table H.15: Contingency Table for Gender and Use Preferred Portal away from Home; N = 142

Gender * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Gender	Male	Count	48	10	58
		Expected Count	47.4	10.6	58.0
		% of Total	33.8%	7.0%	40.8%
	Female	Count	68	16	84
		Expected Count	68.6	15.4	84.0
		% of Total	47.9%	11.3%	59.2%
Total		Count	116	26	142
		Expected Count	116.0	26.0	142.0
		% of Total	81.7%	18.3%	100.0%

Phi=0.023

Table H.16: Contingency Table for Major and Use Preferred Portal away from Home; N = 137

Major * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Major	Natural Sciences	Count	34	7	41
		Expected Count	33.5	7.5	41.0
		% of Total	24.8%	5.1%	29.9%
	Social Sciences	Count	54	12	66
		Expected Count	54.0	12.0	66.0
		% of Total	39.4%	8.8%	48.2%
	Arts and Humanities	Count	24	6	30
		Expected Count	24.5	5.5	30.0
		% of Total	17.5%	4.4%	21.9%
Total		Count	112	25	137
		Expected Count	112.0	25.0	137.0
		% of Total	81.8%	18.2%	100.0%

Cramér's V = 0.027

Table H.17: Contingency Table for Classification and Use Preferred Portal away from Home; N = 142

Classification * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Classification	All Other	Count	55	13	68
		Expected Count	55.5	12.5	68.0
		% of Total	38.7%	9.2%	47.9%
	Senior	Count	61	13	74
		Expected Count	60.5	13.5	74.0
		% of Total	43.0%	9.2%	52.1%
Total		Count	116	26	142
		Expected Count	116.0	26.0	142.0
		% of Total	81.7%	18.3%	100.0%

Phi = 0.020

Table H.18: Contingency Table for GPA and Use Preferred Portal away from Home; N = 136

GPA * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
GPA	less than 3.00	Count	38	11	49
		Expected Count	39.6	9.4	49.0
		% of Total	27.9%	8.1%	36.0%
	3.00-3.49	Count	41	9	50
		Expected Count	40.4	9.6	50.0
		% of Total	30.1%	6.6%	36.8%
	3.50-4.00	Count	31	6	37
		Expected Count	29.9	7.1	37.0
		% of Total	22.8%	4.4%	27.2%
Total		Count	110	26	136
		Expected Count	110.0	26.0	136.0
		% of Total	80.9%	19.1%	100.0%

Cramér's V = 0.066

Table H.19: Contingency Table for Length of Internet Use and Use Preferred Portal away from Home; N = 142

Length of Internet Use * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Length of Internet Use	less than 4 years	Count	28	4	32
		Expected Count	26.1	5.9	32.0
		% of Total	19.7%	2.8%	22.5%
	4 years and more	Count	88	22	110
		Expected Count	89.9	20.1	110.0
		% of Total	62.0%	15.5%	77.5%
Total		Count	116	26	142
		Expected Count	116.0	26.0	142.0
		% of Total	81.7%	18.3%	100.0%

Phi = 0.081

Table H.20: Contingency Table for Self-rated Internet Experience/Skill Level and Use of Preferred Portal away from Home, N = 142

Self-rated Internet Experience/Skill Level * Use Preferred Portal away from Home Crosstabulation

			Use Preferred Portal away from Home		
			Yes	No	Total
Self-rated Internet Experience/Skill Level	Expert	Count	32	7	39
		Expected Count	31.9	7.1	39.0
		% of Total	22.5%	4.9%	27.5%
	Very good	Count	72	13	85
		Expected Count	69.4	15.6	85.0
		% of Total	50.7%	9.2%	59.9%
	Still learning & Beginner	Count	12	6	18
		Expected Count	14.7	3.3	18.0
		% of Total	8.5%	4.2%	12.7%
Total		Count	116	26	142
		Expected Count	116.0	26.0	142.0
		% of Total	81.7%	18.3%	100.0%

Cramér's V = 0.151

Table H.21: Contingency Table for Length of Portal Use and Preferred Portal; N = 142

Length of Portal Use * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Length of Portal Use	less than 12 months	Count	10	4	4	18
		Expected Count	10.0	4.1	3.9	18.0
		% of Total	7.0%	2.8%	2.8%	12.7%
	12 months and more	Count	69	28	27	124
		Expected Count	69.0	27.9	27.1	124.0
		% of Total	48.6%	19.7%	19.0%	87.3%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.004

Table H.22: Contingency Table for Duration of Portal Use and Preferred Portal; N = 142

Duration of Portal Use * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Duration of Portal Use	less than 10 minutes	Count	25	14	11	50
		Expected Count	27.8	11.3	10.9	50.0
		% of Total	17.6%	9.9%	7.7%	35.2%
	10 minutes - less than 20 minutes	Count	22	12	8	42
		Expected Count	23.4	9.5	9.2	42.0
		% of Total	15.5%	8.5%	5.6%	29.6%
	20 minutes and more	Count	32	6	12	50
		Expected Count	27.8	11.3	10.9	50.0
		% of Total	22.5%	4.2%	8.5%	35.2%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.133

Table H.23: Contingency Table for Weekly Hours of Portal Use and Preferred Portal; N = 142

Weekly Hours of Portal Use * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Weekly Hours of Portal Use	less than 3 hours	Count	52	25	20	97
		Expected Count	54.0	21.9	21.2	97.0
		% of Total	36.6%	17.6%	14.1%	68.3%
	3 hours and more	Count	27	7	11	45
		Expected Count	25.0	10.1	9.8	45.0
		% of Total	19.0%	4.9%	7.7%	31.7%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.114

Table H.24: Contingency Table for Days of Portal Use per Week and Preferred Portal; N = 142

Days of Portal Use per Week * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Days of Portal Use per Week	3 days or less	Count	16	8	8	32
		Expected Count	17.8	7.2	7.0	32.0
		% of Total	11.3%	5.6%	5.6%	22.5%
	4-5 days	Count	28	13	14	55
		Expected Count	30.6	12.4	12.0	55.0
		% of Total	19.7%	9.2%	9.9%	38.7%
	6-7 days	Count	35	11	9	55
		Expected Count	30.6	12.4	12.0	55.0
		% of Total	24.6%	7.7%	6.3%	38.7%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.095

Table H.25: Contingency Table for Personalization and Preferred Portal; N = 142

Personalization * Preferred Portal Crosstabulation

			Preferred Portal			
			Yahoo	MSN	Other	Total
Personalization	Yes	Count	43	12	11	66
		Expected Count	36.7	14.9	14.4	66.0
		% of Total	30.3%	8.5%	7.7%	46.5%
	No	Count	36	20	20	76
		Expected Count	42.3	17.1	16.6	76.0
		% of Total	25.4%	14.1%	14.1%	53.5%
Total		Count	79	32	31	142
		Expected Count	79.0	32.0	31.0	142.0
		% of Total	55.6%	22.5%	21.8%	100.0%

Cramér's V = 0.179

Table H.26: Contingency Table for Gender and Personalization; N = 142

Gender * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Gender	Male	Count	30	28	58
		Expected Count	27.0	31.0	58.0
		% of Total	21.1%	19.7%	40.8%
	Female	Count	36	48	84
		Expected Count	39.0	45.0	84.0
		% of Total	25.4%	33.8%	59.2%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.087

Table H.27: Contingency Table for Major and Personalization; N = 137

Major * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Major	Natural Sciences	Count	21	20	41
		Expected Count	19.2	21.8	41.0
		% of Total	15.3%	14.6%	29.9%
	Social Sciences	Count	29	37	66
		Expected Count	30.8	35.2	66.0
		% of Total	21.2%	27.0%	48.2%
	Arts and Humanities	Count	14	16	30
		Expected Count	14.0	16.0	30.0
		% of Total	10.2%	11.7%	21.9%
Total		Count	64	73	137
		Expected Count	64.0	73.0	137.0
		% of Total	46.7%	53.3%	100.0%

Cramér's V = 0.063

Table H.28: Contingency Table for Classification and Personalization; N = 142

Classification * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Classification	All Other	Count	30	38	68
		Expected Count	31.6	36.4	68.0
		% of Total	21.1%	26.8%	47.9%
	Senior	Count	36	38	74
		Expected Count	34.4	39.6	74.0
		% of Total	25.4%	26.8%	52.1%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.045

Table H.29: Contingency Table for GPA and Personalization; N = 136

GPA * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
GPA	less than 3.00	Count	21	28	49
		Expected Count	22.0	27.0	49.0
		% of Total	15.4%	20.6%	36.0%
	3.00-3.49	Count	26	24	50
		Expected Count	22.4	27.6	50.0
		% of Total	19.1%	17.6%	36.8%
	3.50-4.00	Count	14	23	37
		Expected Count	16.6	20.4	37.0
		% of Total	10.3%	16.9%	27.2%
Total		Count	61	75	136
		Expected Count	61.0	75.0	136.0
		% of Total	44.9%	55.1%	100.0%

Cramér's V = 0.117

Table H.30: Contingency Table for Length of Internet Use and Personalization; N = 142

Length of Internet Use * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Length of Internet Use	less than 4 years	Count	14	18	32
		Expected Count	14.9	17.1	32.0
		% of Total	9.9%	12.7%	22.5%
	4 years and more	Count	52	58	110
		Expected Count	51.1	58.9	110.0
		% of Total	36.6%	40.8%	77.5%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.030

Table H.31: Contingency Table for Self-rated Internet Experience/Skill Level and Personalization; N = 142

Self-rated Internet Experience/Skill Level * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Self-rated Internet Experience/Skill Level	Expert	Count	29	10	39
		Expected Count	18.1	20.9	39.0
		% of Total	20.4%	7.0%	27.5%
	Very good	Count	31	54	85
		Expected Count	39.5	45.5	85.0
		% of Total	21.8%	38.0%	59.9%
	Still learning & Beginner	Count	6	12	18
		Expected Count	8.4	9.6	18.0
		% of Total	4.2%	8.5%	12.7%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Cramér's V = 0.345

Table H.32: Contingency Table for Internet Access at Home and Personalization; N = 142

Internet Access (Home) * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Internet Access (Home)	Yes	Count	63	60	123
		Expected Count	57.2	65.8	123.0
		% of Total	44.4%	42.3%	86.6%
	No	Count	3	16	19
		Expected Count	8.8	10.2	19.0
		% of Total	2.1%	11.3%	13.4%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.242

Table H.33: Contingency Table for Length of Portal Use and Personalization; N = 142

Length of Portal Use * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Length of Portal Use	less than 12 months	Count	5	13	18
		Expected Count	8.4	9.6	18.0
		% of Total	3.5%	9.2%	12.7%
	12 months and more	Count	61	63	124
		Expected Count	57.6	66.4	124.0
		% of Total	43.0%	44.4%	87.3%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.143

Table H.34: Contingency Table for Duration of Portal Use and Personalization; N = 142

Duration of Portal Use * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Duration of Portal Use	less than 10 minutes	Count	19	31	50
		Expected Count	23.2	26.8	50.0
		% of Total	13.4%	21.8%	35.2%
	10 minutes - less than 20 minutes	Count	17	25	42
		Expected Count	19.5	22.5	42.0
		% of Total	12.0%	17.6%	29.6%
	20 minutes and more	Count	30	20	50
		Expected Count	23.2	26.8	50.0
		% of Total	21.1%	14.1%	35.2%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Cramér's V = 0.201

Table H.35: Contingency Table for Weekly Hours of Portal Use and Personalization; N = 142

Weekly Hours of Portal Use * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Weekly Hours of Portal Use	less than 3 hours	Count	30	67	97
		Expected Count	45.1	51.9	97.0
		% of Total	21.1%	47.2%	68.3%
	3 hours and more	Count	36	9	45
		Expected Count	20.9	24.1	45.0
		% of Total	25.4%	6.3%	31.7%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Cramér's V = 0.520

Table H.36: Contingency Table for Days of Portal Use per Week and Personalization; N = 142

Days of Portal Use per Week * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Days of Portal Use per Week	3 days or less	Count	4	28	32
		Expected Count	14.9	17.1	32.0
		% of Total	2.8%	19.7%	22.5%
	4-5 days	Count	23	32	55
		Expected Count	25.6	29.4	55.0
		% of Total	16.2%	22.5%	38.7%
	6-7 days	Count	39	16	55
		Expected Count	25.6	29.4	55.0
		% of Total	27.5%	11.3%	38.7%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Cramér's V= 0.448

Table H.37 Contingency Table for Use Preferred Portal at Home and Personalization; N = 142

Use Preferred Portal at Home * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Use Preferred Portal at Home	Yes	Count	61	58	119
		Expected Count	55.3	63.7	119.0
		% of Total	43.0%	40.8%	83.8%
	No	Count	5	18	23
		Expected Count	10.7	12.3	23.0
		% of Total	3.5%	12.7%	16.2%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.218

Table H.38: Contingency Table for Use Preferred Portal away from Home and Personalization; N = 142

Use Preferred Portal away from Home * Personalization Crosstabulation

			Personalization		
			Yes	No	Total
Use Preferred Portal away from Home	Yes	Count	53	63	116
		Expected Count	53.9	62.1	116.0
		% of Total	37.3%	44.4%	81.7%
	No	Count	13	13	26
		Expected Count	12.1	13.9	26.0
		% of Total	9.2%	9.2%	18.3%
Total		Count	66	76	142
		Expected Count	66.0	76.0	142.0
		% of Total	46.5%	53.5%	100.0%

Phi = 0.033

Table H.39: Contingency Table for Gender and Personal Home Page; N = 144

Gender * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Gender	Male	Count	13	46	59
		Expected Count	10.7	48.3	59.0
		% of Total	9.0%	31.9%	41.0%
	Female	Count	13	72	85
		Expected Count	15.3	69.7	85.0
		% of Total	9.0%	50.0%	59.0%
Total		Count	26	118	144
		Expected Count	26.0	118.0	144.0
		% of Total	18.1%	81.9%	100.0%

Phi = 0.086

Table H.40: Contingency Table for Major and Personal Home Page; N = 139

Major * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Major	Natural Sciences	Count	5	37	42
		Expected Count	7.9	34.1	42.0
		% of Total	3.6%	26.6%	30.2%
	Social Sciences	Count	16	50	66
		Expected Count	12.3	53.7	66.0
		% of Total	11.5%	36.0%	47.5%
	Arts and Humanities	Count	5	26	31
		Expected Count	5.8	25.2	31.0
		% of Total	3.6%	18.7%	22.3%
Total		Count	26	113	139
		Expected Count	26.0	113.0	139.0
		% of Total	18.7%	81.3%	100.0%

Cramér's V = 0.140

Table H.41: Contingency Table for Classification and Personal Home Page; N = 144

Classification * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Classification	All Other	Count	12	57	69
		Expected Count	12.5	56.5	69.0
		% of Total	8.3%	39.6%	47.9%
	Senior	Count	14	61	75
		Expected Count	13.5	61.5	75.0
		% of Total	9.7%	42.4%	52.1%
Total		Count	26	118	144
		Expected Count	26.0	118.0	144.0
		% of Total	18.1%	81.9%	100.0%

Phi = 0.017

Table H.42: Contingency Table for GPA and Personal Home Page; N = 138

GPA * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
GPA	less than 3.00	Count	10	39	49
		Expected Count	9.2	39.8	49.0
		% of Total	7.2%	28.3%	35.5%
	3.00-3.49	Count	8	43	51
		Expected Count	9.6	41.4	51.0
		% of Total	5.8%	31.2%	37.0%
	3.50-4.00	Count	8	30	38
		Expected Count	7.2	30.8	38.0
		% of Total	5.8%	21.7%	27.5%
Total		Count	26	112	138
		Expected Count	26.0	112.0	138.0
		% of Total	18.8%	81.2%	100.0%

Cramér's V = 0.062

Table H.43: Contingency Table for Length of Internet Use and Personal Home Page; N = 144

Length of Internet Use * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Length of Internet Use	less than 4 years	Count	4	29	33
		Expected Count	6.0	27.0	33.0
		% of Total	2.8%	20.1%	22.9%
	4 years and more	Count	22	89	111
		Expected Count	20.0	91.0	111.0
		% of Total	15.3%	61.8%	77.1%
Total		Count	26	118	144
		Expected Count	26.0	118.0	144.0
		% of Total	18.1%	81.9%	100.0%

Phi = 0.084

Table H.44: Contingency Table for Self-rated Internet Experience/Skill Level and Personal Home Page; N = 144

Self-rated Internet Experience/Skill Level * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Self-rated Internet Experience/Skill Level	Expert	Count	12	27	39
		Expected Count	7.0	32.0	39.0
		% of Total	8.3%	18.8%	27.1%
	Very good	Count	14	73	87
		Expected Count	15.7	71.3	87.0
		% of Total	9.7%	50.7%	60.4%
	Still learning & Beginner	Count	0	18	18
		Expected Count	3.3	14.8	18.0
		% of Total	.0%	12.5%	12.5%
Total		Count	26	118	144
		Expected Count	26.0	118.0	144.0
		% of Total	18.1%	81.9%	100.0%

Cramér's V = 0.242

Table H.45: Contingency Table for Internet Access at Home and Personal Home Page; N = 144

Internet Access (Home) * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Internet Access (Home)	Yes	Count	26	98	124
		Expected Count	22.4	101.6	124.0
		% of Total	18.1%	68.1%	86.1%
	No	Count	0	20	20
		Expected Count	3.6	16.4	20.0
		% of Total	.0%	13.9%	13.9%
Total		Count	26	118	144
		Expected Count	26.0	118.0	144.0
		% of Total	18.1%	81.9%	100.0%

Phi = 0.189

Table H.46: Contingency Table for Preferred Portal and Personal Home Page; N = 142

Preferred Portal * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Preferred Portal	Yahoo	Count	17	62	79
		Expected Count	14.5	64.5	79.0
		% of Total	12.0%	43.7%	55.6%
	MSN	Count	5	27	32
		Expected Count	5.9	26.1	32.0
		% of Total	3.5%	19.0%	22.5%
	Other	Count	4	27	31
		Expected Count	5.7	25.3	31.0
		% of Total	2.8%	19.0%	21.8%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Cramér's V = 0.096

Table H.47: Contingency Table for Length of Portal Use and Personal Home Page; N = 142

Length of Portal Use * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Length of Portal Use	less than 12 months	Count	2	16	18
		Expected Count	3.3	14.7	18.0
		% of Total	1.4%	11.3%	12.7%
	12 months and more	Count	24	100	124
		Expected Count	22.7	101.3	124.0
		% of Total	16.9%	70.4%	87.3%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Phi = 0.071

Table H.48: Contingency Table for Duration of Portal Use and Personal Home Page; N = 142

Duration of Portal Use * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Duration of Portal Use	less than 10 minutes	Count	11	39	50
		Expected Count	9.2	40.8	50.0
		% of Total	7.7%	27.5%	35.2%
	10 minutes - less than 20 minutes	Count	7	35	42
		Expected Count	7.7	34.3	42.0
		% of Total	4.9%	24.6%	29.6%
	20 minutes and more	Count	8	42	50
		Expected Count	9.2	40.8	50.0
		% of Total	5.6%	29.6%	35.2%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Cramér's V = 0.071

Table H.49: Contingency Table for Weekly Hours of Portal Use and Personal Home Page; N = 142

Weekly Hours of Portal Use * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Weekly Hours of Portal Use	less than 3 hours	Count	11	86	97
		Expected Count	17.8	79.2	97.0
		% of Total	7.7%	60.6%	68.3%
	3 hours and more	Count	15	30	45
		Expected Count	8.2	36.8	45.0
		% of Total	10.6%	21.1%	31.7%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Phi = 0.265

Table H.50: Contingency Table for Days of Portal Use per Week and Personal Home Page; N = 142

Days of Portal Use per Week * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Days of Portal Use per Week	3 days or less	Count	3	29	32
		Expected Count	5.9	26.1	32.0
		% of Total	2.1%	20.4%	22.5%
	4-5 days	Count	7	48	55
		Expected Count	10.1	44.9	55.0
		% of Total	4.9%	33.8%	38.7%
	6-7 days	Count	16	39	55
		Expected Count	10.1	44.9	55.0
		% of Total	11.3%	27.5%	38.7%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Cramér's V = 0.224

Table H.51: Contingency Table for Personalization and Personal Home Page, N = 142

Personalization * Personal Home Page Crosstabulation

			Personal Home Page		
			Yes	No	Total
Personalization	Yes	Count	17	49	66
		Expected Count	12.1	53.9	66.0
		% of Total	12.0%	34.5%	46.5%
	No	Count	9	67	76
		Expected Count	13.9	62.1	76.0
		% of Total	6.3%	47.2%	53.5%
Total		Count	26	116	142
		Expected Count	26.0	116.0	142.0
		% of Total	18.3%	81.7%	100.0%

Phi = 0.179

Appendix I: Other Calculations

Table I.1: Contingency Table for Classification and Internet Access (Home); N = 142

Classification * Internet Access (Home) Crosstabulation

			Internet Access (Home)		
			Yes	No	Total
Classification	Freshman	Count	20	0	20
		% of Total	14.1%	.0%	14.1%
	Sophomore	Count	16	1	17
		% of Total	11.3%	.7%	12.0%
	Junior	Count	24	3	27
		% of Total	16.9%	2.1%	19.0%
	Senior	Count	59	15	74
		% of Total	41.5%	10.6%	52.1%
	Other	Count	4	0	4
		% of Total	2.8%	.0%	2.8%
Total		Count	123	19	142
		% of Total	86.6%	13.4%	100.0%

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Vita

Heiko Haubitz was born in Berlin, Germany on March 16, 1964, the second son of Hilmar and Hannelore Haubitz (née Meinke). He attended Betriebsschule für Polygraphische Berufe (Technical Secondary School for Graphic Professions) in Berlin, Germany, where he earned his Abitur (High School Diploma) and an Offset Printer Certificate in 1983. After 18 months of military service, he worked in the print shop of the German State Library, and enrolled at Humboldt University Berlin, Germany in 1986.

In 1990, Haubitz graduated as Diplom-Bibliothekar (graduate degree in librarianship) from Humboldt University Berlin, Germany, and was a postgraduate student with special tasks in research and teaching a variety of informational areas until he was awarded a Fulbright Scholarship for graduate studies in the Library and Information Science program at Wayne State University in Detroit, Michigan in 1993. During that time he worked briefly as an intern at the Congressional Research Service of the Library of Congress in Washington, D.C.

After graduating from Wayne State University with a M.L.I.S. in 1994, Haubitz entered the Graduate School of Library and Information Science (now School of Information) at The University of Texas at Austin in 1995 where he worked as a Teaching Assistant before he became an Assistant Instructor. In this capacity he developed and taught courses for undergraduate students until 2002. In addition, he was invited by the German Foundation for International Development to teach courses in information management for information specialists from selected African countries in Berlin, Germany during the falls of 1998 to 2000. From 2003 to 2004, Haubitz was Instructor in the Information Architecture and Knowledge Management Program at Kent State University in Kent, Ohio.

His honors and awards include: Fulbright Scholarship, 1993-1994; University of Texas Presidential Tuition Fellowship, 1999-2002; University of Texas Bruton Fellowship, Layton B. Murphy Endowed Presidential Scholarship, and Kate Polk Dimmitt Memorial Scholarship, 2002-2003; Beta Phi Mu Eugene Garfield Doctoral Dissertation Fellowship, 2002; Member of Beta Phi Mu and Phi Kappa Phi.

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