Internet Usage by Faculty in Saudi Higher Education

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Abstract *In this study, we examine the level of Internet utilization by faculty members from across disciplines in four Saudi higher education institutions: King Saud University, Imam Muhammad bin Saud University, Prince Sultan University, and Al-Yamamah College. Results indicate that Internet technologies were primarily used by faculty for teaching purposes, followed by communication, and then research. Moreover, the faculty's computer skills were found to be a strong predictor of their Internet use. Barriers that inhibit efficient utilization of the Internet were identified. Implications for technology integration planning and faculty development programs are discussed.*

Introduction

The widespread adoption of Internet applications in Saudi Arabia started in the late 1990s. Universities were among the first adopters of the technology, and years later, the Internet witnessed an unparalleled spread across campuses. Despite increased Internet connectivity in Saudi Arabian higher education institutions, there is little empirical research investigating the factors associated with the use of the Internet by faculty in teaching, research, and communication. Large portions of higher education budgets are allocated to provide new technology (CITC, 2007). These funds typically are spent on providing hardware, setting up computer labs, and improving infrastructure to guarantee high-speed Internet access. Considering the size of these investments and the demonstrated effectiveness of utilizing Internet technologies in studies conducted in other countries (Bates, 2000; Brown, 2000), the need arises to understand Internet usage patterns of faculty members in the local higher education context.

Internet Adoption in Higher Education in Saudi Arabia

There has been considerable interest in the influence of the Internet on the Saudi social, economic, and education systems (Sait, Al-Taweel, & Hussain, 2003). Although some universities in the Kingdom had limited Internet access before 1998, in December of that year, Internet diffusion began across local campuses (ISU, 2000). Following the advent of the Internet for the public in 1999, a number of studies have emerged investigating the adoption of Internet technologies in educational contexts.

Early investigations of Internet adoption and diffusion in academia, specifically higher education, have demonstrated that faculty members are in the early stages of adoption (Al-Abdelmenem, 2000; Allehaibi, 2001; Al-Fulih, 2002; Lal, 2000; Ghandour, 1999). More recent studies have reported similar patterns and consistently reported low adoption rates (Al-Asmari, 2005).

Al-Abdulmenem (2000) investigated the effect of using the Internet as an educational tool in the colleges of technology in Saudi Arabia. Participants included faculty members, students, and administrators at three main colleges in Riyadh, Jeddah, and Dammam. In a survey of more than four hundred faculty members in Saudi universities, Al-Fulih (2002) examined attributes of the Internet as perceived by faculty members and how the perception of attributes by faculty can be used to predict Internet adoption for instructional purposes. Similarly, Allehaibi (2001) conducted a study on patterns of Internet use among faculty members in Saudi universities in an attempt to identify attributes associated with Internet diffusion in the region. These studies were conducted in a period when the Internet was considered a new innovation in the education setting and not fully adopted at universities in the Kingdom.

More recently, Al-Asmari (2005) investigated the use of the Internet by EFL teachers at the colleges of technology in four cities in the Kingdom: Riyadh, Abha, Jeddah, and Dammam. Results of this study, conducted in 2004, indicated a low level of Internet adoption by faculty members for instructional purposes. Barriers to the adoption were identified - mainly limited access to the Internet and lack of computer skills. Sait et al. (2003) examined the use of the Internet by students and teachers, as well as the Internet's effect on them, in education levels ranging from primary schools to universities in Saudi Arabia. Results of the survey revealed trends in Internet effects, perceived usage patterns, and effects on students and faculty.

As Internet connectivity increased across institutions, studies examining Internet usage by faculty and students provided an insight into the usage patterns and difficulties early adopters faced in higher education. While some of these studies examined Internet adoption and use among students in higher education institutions (Al-Saleh 2004; Al-Muhaya, 2002), the issue of Internet usage among faculty members has been examined to a wider extent (Al-Asmari, 2005; Al-Kahtani, 2001; Al-Kahtani, 2004; Al-Oteawi, 2002; Allehaibi, 2003; Ghandour, 1999; Lal, 2000).

The literature shows variations in the approaches Internet usage issues were examined. Some studies have a more focused scope, either by examining Internet use in one specific discipline across several universities (Al-Kahtani, 2001), or examining all disciplines in one university (Al-Saif, 2005), or investigating Internet usage for a specific purpose such as research (Al-Shibl, 2006), or focusing on the use of Internet technologies by one gender such as those studies that examined issues relevant to Saudi female faculty (Al-Dubyan, 2005; Al-Kahtani, 2004).

The scarcity and limited scope of such studies do not permit the creation of any firm conclusions or generalizations about Internet utilization in Saudi Arabia, particularly in the higher education context. Research in the 2000-2005 period indicated that the diffusion of the Internet among faculty members in Saudi universities was in its early stages. However, considering increased Internet availability, the need arises for investigations into the extent to which these faculty members utilize Internet technologies currently available to them for instructional, research, and communication purposes.

The issues surrounding Internet usage by faculty members in Saudi Arabian higher education have been inadequately examined in light of the rapid developments in Internet connectivity. The goal of this study was to investigate faculty members' Internet use for educational activities and identify key factors that influence their utilization of Internet technologies. This research is designed to answer the following questions:

- How do faculty utilize the Internet in their teaching, research, and communication?
- Is there a correlation between faculty Internet usage and (1) available university resources (2) academic discipline (3) age (4) gender and (5) level of computer usage?
- What are the major problems facing faculty members with respect to their Internet use?

In this paper, we report and discuss the results of a survey of faculty members conducted in 2007. The study design is described in detail in Al-Wehaibi (2007). The following sections describe the methodology and results of the survey. We conclude with recommendations to consider in information technology planning and faculty development in higher education.

Method

The study was implemented using a survey research method that involves gathering information for scientific purposes from a sample of a population using standardized instruments or protocols (Rossi et al., 1983). The research design of this study is a cross-sectional investigation of faculty from selected higher education institutions in Saudi Arabia using a quantitative approach of self-reported practices of Internet usage. A number of hypotheses were developed to investigate factors affecting Internet adoption and usage.

H_1 Faculty members use the Internet more for communication than for research and teaching.
H_2 There is a positive relationship between faculty use of the Internet and available university resources.
H_3 Faculty in science and technology-based disciplines use the Internet more than those in professional and academic disciplines such as humanities, arts, and social sciences.
H_4 Younger faculty members have higher usage of the Internet than do older faculty.
H_5 There is a positive relationship between faculty use of the Internet and their general computer skills.
H_6 There is no relationship between faculty gender and level of Internet use.

The target population is full-time teaching faculty; part-time faculty, visiting faculty, and teaching assistants were excluded from the sample. The methodology itself employed a survey instrument developed and tested for a similar study conducted in the United Sates (Alshawi, 2003). The survey was adapted to the local context and validated in an exploratory study with a selected sample of faculty members in Saudi universities. Measures were employed to ensure the validity of the adapted version in terms of language, terminology, and suitability for the study sample. Reliability of the measurement scales that were used in testing the research hypotheses was ensured. The survey was distributed to faculty members of the participating institutions, totaling 3247 participants. Data were obtained from 504 valid surveys from faculty members across disciplines in the sample (253 from KSU, 127 from Imam University, 118 from PSU, and 6 from Al-Yamamah College).

Respondents' profiles

Complete data were obtained from 504 faculty members (54% male, 46% female). Table 1 presents the demographic characteristics of the faculty sample. Respondents had a median age between 31-40 years and held various academic ranks within their institution (11.1% professors, 13.7% associate professors, 35.1% assistant professors, 40.1% lecturers and instructors).

Table 1. Demographic profile of respondents.

Variable	Category	n	Percent
Gender	Male	271	53.8
	Female	233	46.2
Age group	<30 years	62	12.3
	31-40	204	40.5
	41-50	157	31.2
	51-60	69	13.7
	60+	12	2.4
Teaching experience	<10 years	228	45.2
	10-20	163	32.3
	21-30	97	19.2
	31-40	16	3.2
	40+	0	0.0
Academic rank	Professor	56	11.1
	Associate Professor	69	13.7
	Assistant Professor	177	35.1
	Instructor / Lecturer	202	40.1
Academic discipline	Science & Technology	175	34.7
	Humanities, Arts, & Social Sciences	329	65.3
Respondents' Institution	King Saud University	253	50.20
	Imam Muhammad bin Saud University	127	25.20
	Prince Sultan University	118	23.41
	Al-Yamamah College	6	1.19

Computer and Internet usage characteristics for respondents

Table 2 displays descriptive data pertaining to computer use by faculty. Approximately half of the respondents (50.6%) reported three or more hours of computer use per day. The most frequent computer application used was an Office Application such as Word, Excel, Powerpoint, and Access (92.1%), followed by the use of special software related to the academic discipline (40.2%), then the use of programming software (11.9%). Only 10.9% of responding faculty members were familiar with web development software.

Variable	Category	*n*	Percent
Daily hours spent using computers			
	Less than 1 hour	64	12.7
	1 – 2 hours	185	36.7
	3 – 5 hours	178	35.3
	More than 5 hours	77	15.3
Type of computer applications used (multiple responses)			
	Office	465	92.1
	Programming	60	11.9
	Web development	53	10.9
	Special software	203	40.2
Level of general computer proficiency			
	Low	13	2.6
	Low to moderate	65	12.9
	Moderate	208	41.3
	Moderate to high	140	27.8
	High	78	15.5

Table 2. Descriptive data pertaining to computer usage.

Demographic data related to Internet usage are presented in Table 3. The majority of faculty respondents (71%) believe that the Internet plays an increasingly important role in the way in which they do academic work. Regarding the number of years they had used the Internet, most respondents (81.9%) had been using the Internet for four or more years. More than 86% of faculty reported Internet proficiency levels in the range between moderate to high levels. In terms of daily usage, 62.1% spent at least one hour per day on the Internet.

Variable	Category	*n*	Percent
Number of years using the Internet			
	Do not use Internet	6	1.2
	Fewer than 4 years	85	16.9
	4 – 8 years	178	35.3
	More than 8 years	235	46.6
Amount of time spent on the Internet daily			
	Fewer than 30 minutes	50	9.9
	30 – 60 minutes	141	28
	1 – 3 hours	230	45.6
	3 hours or more	83	16.5
Extent Internet helps academic work			
	No help	10	2.0
	A little help	24	4.8
	Some help	111	22
	Major help	359	71.2
Level of general Internet proficiency			
	Low	17	3.4
	Low to moderate	53	10.6
	Moderate	138	27.5
	Moderate to high	179	35.7
	High	114	22.8

Table 3. Descriptive data pertaining to Internet usage.

Table 4 shows descriptive data related to email usage for academic purposes. The number of emails received during the day varied, with the majority of respondents (83.1%) reporting receiving 20 or fewer per day. Data show less activity in sending emails, with most (88.3%) reporting sending 10 or fewer emails per day.

Table 4. Descriptive data pertaining to Email usage.

Variable	Category	n	Percent
Amount of email received daily			
	Fewer than 10	239	47.4
	10 – 20	181	35.9
	21 – 30	49	9.7
	31 or more	35	6.9
Amount of email sent daily			
	Fewer than 5	283	56.2
	5 – 10	162	32.1
	11 – 15	45	8.9
	16 or more	14	2.8

Results

Internet usage for teaching, research, and communication

The first hypothesis was that faculty members use the Internet for communication more than for research and teaching. This was examined using Spearman correlation between Internet usage and the three scales for teaching, research, and communication. Results in Table 5 show a significant correlation between Internet usage and teaching, followed by communication, and then research. Thus, this hypothesis was not supported, as faculty in this sample demonstrated higher utilization of the Internet in teaching more than in communication or research.

Table 5. Spearman correlations for Internet usage in academic work.

Internet usage and other scales	Spearman Correlation	Std. Error	Sig
Research	0.35	0.04	0.00
Communication	0.36	0.04	0.00
Teaching	0.39	0.04	0.00

Factors affecting Internet usage

Available University Resources. The hypothesis of having a positive relationship between Internet usage and available resources was examined using Spearman correlations. The scale for Internet usage measures faculty members' experience with and duration of using the Internet, proficiency level, and email usage. The scale for available resources measures the perceived level of available technology, technical support, training, and recognition of efforts. Both scales range from 1 to 4, in which "1" indicates strong agreement and "4" indicates strong disagreement. Table 6 shows the Spearman correlations for these scales.

Table 6. Correlations for Internet usage and available resources.

	Available University Resources	Approx. Sig. Level
Internet Use	0.02	0.65
Daily Internet Use	-0.03	0.47

Although a positive correlation was observed in this sample for the Internet usage scale (coefficient = 0.02, approx. sig. level = 0.65), it was not found to be significant at the $p <.05$ level. Furthermore, we examined the correlation with self-reported daily usage of the Internet. Daily usage was measured on a scale of 1 to 4, where "1=< 30 min", "2=30min-1hr", "3= 1 to 3hrs", and "4=3 or more hours". A negative correlation was found (coefficient = -0.03) indicating that when faculty perceive more availability of resources and support, there is a corresponding increase in Internet usage. However, this correlation was weak and not statistically significant at the $p<.05$ level. As such, this hypothesis was not supported.

Academic Discipline. Spearman correlation was found to be significant between disciplines and Internet use (significance level at $p < 0.001$). Faculty in technology-based disciplines (i.e. engineering, computer science, physical and medical sciences) demonstrated higher Internet usage when compared to faculty in other disciplines. Statistically significant correlation was found between academic disciplines and Internet usage. Thus, hypothesis three was supported. Detailed analysis of differences in Internet usage and adoption among faculty in academic disciplines is reported in Al-Wabil et al. (2008).

Age. This hypothesis was examined using a Spearman correlation between age of respondents and Internet usage. The correlation coefficient between the two variables was 0.11, indicating a weak correlation. The significance value for this observed correlation is less than .05; therefore, it can be concluded that there is a significant relationship between age and level of Internet usage. The correlation itself is positive; therefore, it is concluded that younger faculty reported higher Internet usage levels as compared to older respondents' levels. As such, this hypothesis was supported at $p < .05$.

Computer usage level. The correlation was significant. Spearman's correlation $p < .05$ between (a) Internet usage and computer usage was -0.47 and (b) between Internet usage and the respondent's perception of their computer proficiency was -0.49. Thus, this hypothesis was supported. Findings indicate that there was a positive relationship between faculty members' use of the Internet and their general computing usage level and proficiency.

Gender. The male and female faculty members were compared for their computer use and Internet use, utilizing Somer's d test for ordinals. None of the usage variables was significant at the $p < .05$ level. Thus, research hypothesis six was supported. Our findings demonstrate that there was no relationship between faculty gender and their level of Internet use.

Problems related to Internet usage

Table 7 presents the problems reported in using the Internet by faculty respondents. Ratings use a four-point scale: "1" = "Strongly Agree" to "4" = "Strongly Disagree." Items are rank-ordered by lowest mean rating.

Table 7. Descriptive statistics for problems with Internet use.

	M	SD
Information inaccuracy – *assessing the credibility of online information*	2.43	0.762
Too much information – *lack of adequate information-seeking skills*	2.42	0.873
Out-of-use websites – *broken links and inaccessible websites*	2.14	0.761
Loss of privacy when disclosing information – *information security*	2.04	0.789
Losing intellectual property – *concerns related to copyright*	2.00	0.876
Lack of speed – *slow response*	1.57	0.726

Lowest rated Internet problems were for "Information inaccuracy" (M=2.43, SD=0.762), "Too much information" (M=2.42, SD=0.873), and "Out-of-use websites" (M=2.14, SD=0.761). Highest rated problems were "lack of speed/slow response" (M=1.57, SD=0.726) and "Losing intellectual property/copyright" (M=2.00, SD=0.876).

Discussion

Our findings indicate that the Internet is utilized by faculty for teaching purposes more than for communication and research. Previous studies examining faculty Internet usage in the local context have consistently reported email and communication as the major purposes for their online activities (e.g. Al-Hazmi, 2004) when compared to teaching or research purposes. Integrating Internet technologies in the teaching process generally indicates higher utilization. This may be an indication that in contrast to studies conducted in the past that showed that Internet adoption is in its early stages (Al-Abdelmenem, 2000; Allehaibi, 2001; Al-Fulih, 2002), the Internet is being utilized to a wider extent as the resources become more accessible to faculty in higher education institutions.

In our examination of the hypotheses, the study showed that there is no correlation between available university resources and Internet use. This finding is in line with findings of studies that reported that organizational factors have minimal effect on faculty use of the Internet (Al-Saif, 2005). Perhaps, this may be viewed in light of the fact that a large number of respondents reported moderate to high levels of Internet proficiency and other

characteristics of early adopters. As previous studies in the local context reported that early adopters of the Internet did not rely fully on their institution's resources and sought their own Internet access at home or in alternative settings, this may be true of this sample as well. In line with findings from earlier studies, this study confirmed that faculty in science and technology-based disciplines use the Internet more than do faculty in other disciplines (Ghandour, 1999; Al-Harbi, 2003; Allehaibi, 2001). Regarding age of faculty members, the study confirmed the findings of previous studies that stated that younger faculty members tend to use the Internet more in their academic activities. In terms of gender differences in Internet usage, findings of this study demonstrated that gender does not significantly predict the level of Internet adoption and use. In terms of computer skills of faculty, there was a strong correlation between faculty Internet use and level of computer usage. Adequate computer skills have been consistently reported as strong predictors of Internet usage in general and in our local context in particular (e.g. Al-Saif, 2005). This finding points to the need for considering training and support for faculty in technology integration planning.

With regards to problems in utilizing Internet technologies in academic activities, faculty's responses varied. Respondents indicated that the main obstacles preventing them from using the Internet more are connectivity issues such as slow and dropped connections, followed by concerns with intellectual property when publishing online, followed by privacy concerns when disclosing information. This finding is in line with studies conducted previously in the region that reported concerns with availability and connectivity (Al-Asmari, 2005; Al-Dubayan, 2005; Al-Fulih, 2002; Al-Kahtani, 2006; Al-Khabra, 2003). Concerns with the quality of the information and skills required to efficiently integrate Internet technologies in academic activities are still important, as the mean ratings that were observed in this sample were similar and did not vary significantly depending on age, gender, or academic discipline.

The overall results of the study and the insights obtained on patterns of faculty Internet use are important to consider by stakeholders and policymakers for Saudi higher education. Much of previous research in Internet diffusion in higher education, conducted across the world, provides explanation for low adoption rates by putting the blame on faculty; either they are stuck in traditional methods of teaching, labeled as resistors, or charged with negative attitudes towards technology. These unfair explanations are based on a poor understanding of different faculty with different needs. The challenge of increasing the benefits gained from Internet technologies should focus on understanding individual faculty needs. Stakeholders are advised to include faculty members in every step of the planning and implementation of up-to-date technologies. If they are involved from the early stages, then their requirements would be met, and this should allow for increased levels of efficient integration of Internet technologies that meet their particular needs.

This study offers an in-depth understanding of problems in utilizing the Internet and faculty perceptions towards the Internet. Technology solutions are not expected to be the quick fix to all educational problems and issues. It is generally known that technology solutions do not improve inadequate teaching methods. Therefore, the focus should be on adopting the right technology solution that fits the education context and the faculty involved. The human factor should always be considered as the starting point on making the decision on how technology, and more specifically the Internet, could be employed to improve teaching and research efforts. Faculty should be given the chance to participate in decision making with regard to the appropriate use of technology in their specific academic discipline.

Limitations

An inherent limitation of the study was the self-selection of the four local universities. There is no assumption that the selected sample is representative of all faculty members around the country. Moreover, findings of this study should be subject to cautions generally exercised with subjective reporting by respondents. Internet usage patterns were perceived by faculty respondents, not measured by objective tests. In addition, it is probably inevitable that most respondents were positive about the benefits of the Internet; otherwise, they would not have adopted it in their academic activities or even considered responding to the survey. Nevertheless, findings of this study remain significant in providing an understanding of faculty perceptions and needs for successful utilization of Internet technologies in the context of higher education.

Conclusion

This investigation was successful in obtaining insights on faculty members' perceptions and attitudes about integrating Internet technologies in institutions of higher education in Saudi Arabia. Factors influencing efficient usage of Internet technologies were found to be academic discipline, age, and computer skills and usage level. Increased understanding of the factors affecting usage can aid higher education policy-makers involved in the provision of educational technologies, especially those who need to overcome a divide between early adopters of

technology and mainstream faculty who are yet to utilize technology in their teaching and research. A clearer perception of the differences between these two groups is needed in order to achieve broader adoption of new technologies. Internet usage patterns of faculty and barriers that inhibit efficient utilization in academic activities can aid in identifying the most effective methods of integrating the Internet in teaching and research and motivating faculty to use it. Moreover, faculty should be made aware of the potential of various Internet technologies for enhancing the teaching and learning process. Clarification of the incentives and elimination of obstacles to fully integrate the new technology is needed. On a final note, this study demonstrated significant changes in higher education as Internet adoption increases; efforts of early adopters (both faculty and administrators) involved in promoting efforts to raise awareness have facilitated and encouraged widespread acceptance of the Internet across college campuses. This study will hopefully motivate educators to expand their own knowledge and proficiency in Internet technologies and lead to more efficient utilization.

Acknowledgement

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