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THE INTERNET AS AN INFORMATION SOURCE *VS.* LEVEL OF SATISFACTION: USERS' LEARNING STYLES, PERCEPTIONS, EMOTIONS AND REGRESSION MODEL AT NATIONAL INSTITUTES OF TECHNOLOGY IN INDIA

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Abstract. An attempt has been made to promote and optimize the use of the Internet as an information Source among engineering faculty and research scholars of National Institutes of Technology (NITs) in India. A total of 850 questionnaires and interview schedules were distributed to the faculty and research scholars of NITs in India, 665 questionnaires were duly obtained with a response rate of 78.24%. An attempt has been made to develop an instrument of acceptance of Internet technology known as Technology Acceptance Model (TAM) among faculty and Research scholars of National Institutes of Technology (NITs) in India using the original constructs i.e. Perceived Usefulness as 'the degree to which a person believes that using a particular system would enhance his or her job performance', and Perceived Ease of Use as 'the degree to which a person believes that using a particular system would be free of effort'. Thus, the Perceived Usefulness of Internet Technology, Perceived Ease of use, Experience of using Internet, attitude towards using Internet, Behavioral Intention to use Internet, Perceived Complexity and actual System use using the Internet has been determined and thereby reflecting the Learning Style, Perceptions and Emotions of the focus groups. Further the research study encompasses independent variables mainly Designation, Age, Qualification, Teaching and Research Experience and Formal Training of respondents. In this paper, efforts were made to examine the relationship between the variables Use of Internet (UOI) and Level of Satisfaction (LOS), as a two major dependent variables of the research study. The various dimensions included are quantification of these two variables. To evaluate multiple effects, a set of four variables i.e. age, teaching and research experience and level of satisfaction were put to Regression Analysis to see the multiple effects on variable Use of Internet. The variable LOS has emerged as the most affecting the dependent variable that means affecting the dependent variables i.e. Use of Internet. Thus, there is very high correlation between variables, Use of Internet and Level of satisfaction. The co-efficient of correlation is also statistically significant showing high positive correlation, which implies that higher the level of satisfaction, higher will be the use of Internet. This has resulted in coming out with a mathematical – regression model in which the results of regression analysis shows that, the four variables age, teaching and research experience and level of satisfaction put together explains 39 per cent of variance in variable Use of Internet (UOI).

Introduction

The Internet has been viewed as a valuable source of information that can assist students in the pursuance of knowledge, learning, research, and increasing their capacity for social interaction. Internet is seen to promote inquiry and creativity through interaction of various forms of knowledge such as text, multimedia, graphics, photos, music, video, sound, animation etc. (Karisiddappa, 2002). In this context, it is rightly said - The Sun can only shine on half of the globe at a time, while Internet delivered education can cover entire globe and around the clock with knowledge (Kostopoulos, 1998).

As Internet has become integral part and parcel of Library and Information service, it becomes obligatory on the part of Library and Information Science professionals to carryout extensive research on Internet user study for promoting better use of Internet and derives level of satisfaction towards the effort of user community to access their desired information needs. The timeliness and importance of studying use of the Internet were described by Silva and Cartwright (1993): 'As use of the Internet continues to grow, educational systems will be faced with increasing user demand for help and instruction … As students become linked to virtual libraries, on-line catalogues and databases, it is incumbent upon instructions to provide the means for students to optimally exploit these resources'. An attempt has been made to study the Use of Internet and Level of Satisfaction among users of National Institutes of Technology in India to arrive a statistical model of relevance.

Review of Literature

The Internet is an important information resource for science and engineering faculty, research scholars and librarians. Internet can be established as a topic to the class syllabus, and providing at least one Internet-related assignment can accomplish inclusion of information available through the Internet. This works as a strategy for introducing these resources to library school students enrolled in science and technology literature and reference classes (Youngen, 1998). The research study conducted by Kaur (2002) based on the responses from 160 users of Guru Nanak Dev University found that, e-mail is the most preferred service followed by WWW. Majority of the respondents accept that Internet is time saving, easy to use and more useful than traditional documents. The Internet offered by the Pune University Computing Network Centre, India which links all university departments and the Jayakar Library discusses the use of the Internet in university library services for research workers, students and faculty and further suggests that courses should be organized for library staff in the development of a Web site and the use of the Internet in university libraries (Mahajan and Patil,1999) while Selvi (1999) discusses the impact of Internet use on academic library services and presents an overview of important Web resources for academic library users and staff. Further states that the Internet has enabled academic libraries to widen their services far beyond a basic reference service and traditional print-based collections. The study made by Krishna (1999) reveals that, the application of computers and networking technologies has improved the efficiency of library services and enhanced information storage and retrieval and describes the features of Internet and intranet technology in which this technology can be applied in library activities and services to improve library services. Pathak (1999) discusses the provision of Internet in Indian universities, focusing on the India's North East Region and particularly access to the Internet for the region's eleven universities remains a challenge and urges other universities in the region to take advantage of information technology. Koganuramath and Jange (1999) study conducted to identify the purpose of using Internet and extent of its services used and to provide suggestions for maximizing use of Internet services by the Social Scientists. Majority of the users use Internet for communication, followed by access to information. The popular Internet services used were E-mail, WWW, Discussions forums, FTP and TELNET. The study conducted at Muslim Aligarh University revealed that the users were satisfied with the timings of service (52.28%), 69% of users opined that the number of nodes should be increased and 71% were not satisfied with the existing Internet service. It was suggested to enhance the bandwidth, provide Internet user-training programmes and the service should be made available around the clock (Ali,2000)

Objectives

The objectives of the study are -

- To determine the relationship of Use of Internet and specific learner characteristics of respondents viz. Status, Age, Qualification, Teaching and Research Experience, Formal Training with a view to examine the level of literacy among Engineering faculty and Research scholars of National Institutes of Technology in India.

- To examine the Level of Satisfaction towards Internet perceptions and emotions of respondents in relation to Status, Age, Qualification, Teaching and Research Experience and Formal Training.
- To explore the constructs of Technology Acceptance Model i.e. perceived usefulness and perceived ease of use indicating the respondent's perceptions and emotions of using Internet as an Information source.
- To evaluate the dimensions of variables of Use of Internet and Level of Satisfaction of Internet technology as an information source are correlated to each other or not.

Research Hypotheses

- The extent of Use of Internet are independent of designation, age, qualification, teaching, research experience and level of formal training of respondents;
- The extent of Level of Satisfaction is independent are independent of designation, age, qualification, teaching, research experience and level of formal training of respondents;
- Higher the level of satisfaction, higher will be the Use of Internet and vice versa

Methodology

Survey method has been employed to study the use of Internet as an Information Source by engineering faculty and research Scholars of National Institutes of Technology in India to answer the research questions and hypotheses of the study. A total of 850 questionnaires and Interview Schedule were distributed to the faculty and research scholars with a total feedback of 665 questionnaires (78.24%) covering 12 National Institutes of Technology representing south, north, east and west regions of India. The data so collected has been tagged using Statistical Package for Social Science SPSS.

The research study encompasses independent variables mainly Designation, Age, Qualification, Teaching and Research Experience and Formal Training of respondents. The major dependent Variables are Use of Internet (UOI) and Level of satisfaction (LOS).

The indicators derived for **Use of Internet** are

- ❖ How often do you use the Computers; From where you have access to Internet facilities; How long have you been using Internet; Purpose of using Internet; and How frequently the Internet services are being used.

Similarly the **Level of Satisfaction** (LOS) includes the indicators as under

- ❖ Problems encountered while surfing the net; Extent of problems for the various Internet services; Satisfaction level with the current state of Internet to support academic and research activity; and Rating of Internet features as a source of Information.

Analysis and Interpretations

Rensis Likert's method of summed ratings has been used for analyzing and reporting responses from the respondents of National Institutes of Technology, India for the variables Use of Internet (UOI) and Level of Satisfaction (LOS). The Use of Internet is grouped under three quartiles as Low (score 3 to 57), Medium (Score 58 to 74) and High (Score 75 to 93) and also Level of Satisfaction under three quartiles as Low (score 0 to 44), Medium (Score 45 to 51) and High (Score 52 to 69). This is depicted in following Table 1.

Table 1. Score Analysis for UOI and LOS

Quartile Deviations	Use of Internet (UOI) Scores	Level of Satisfaction (LOS) Scores	Remarks
Quartile I	3 to 57	0 to 44	Low
Quartile II	58 to 74	45 to 51	Medium
Quartile III	75 to 93	52 to 69	High

Use of Internet Vs. Learner Characteristics

It is presumed that the Use of Internet by the respondents varies according to their varied characteristics of the engineering scientists. Information needs and perception is supposed to vary and thereby the use of Internet as an information source also changes with respect to its use, strategy and optimization. An

attempt has been made to summarize and explore whether the changes in learner characteristics of respondents i.e. designation, age, qualification, teaching and research experience and formal training changes the use of Internet and is depicted in Table 2. Thus from the results of Chi-Square Test found that, there is a strong relationship between use of Internet and respondent characteristics and are dependent on each other and thus the hypotheses is accepted.

Table 2. UOI vs. Respondent Characteristics

Use of Internet vs.	Chi Square Tests			Null Hypothesis
	X^2 Calculated Value	Degree of freedom	Significance	
Designation	43.87	6	*	Rejected
Age	40.866	4	*	Rejected
Qualification	19.81	2	*	Rejected
Teaching Experience	76.84	6	*	Rejected
Research Experience	49.58	4	*	Rejected
Formal Training	24.352	4	*	Rejected

* Results are significant

Level of Satisfaction Vs. Learner Characteristics

Level of satisfaction refers to how far the respondents of the study are satisfied with the Internet services, tools and features in supporting their teaching and research activities. This level of satisfaction towards Internet is directly proportional to the use of Internet by the respondents. This is because, once the respondents perceive Internet as valuable information source and of research value and easy to use, then usage of Internet will certainly increase. As the demand and expectation from Internet technology to meet their information need is met, consequently the level of satisfaction also increases. The learner characteristics of respondents i.e. designation, age, qualification, teaching and research experience and formal training are the significant factors, that are likely to influence the level of satisfaction towards Internet, and therefore it was necessary to summarize and explore whether the change in these characteristics affects the level of satisfaction of the respondents towards Internet or not. In this context, the null hypotheses formulated for the various variables have been tested using Chi Square Test at 0.05 level of significance vide Table 3. Thus from the results, it is revealed that, except age and formal training, there is a strong relationship between Level of satisfaction and respondent characteristics and are dependent on each other and hypotheses is partially accepted.

Table 3. UOI vs. Respondent Characteristics

Level of Satisfaction vs.	Chi Square Tests			Null Hypothesis
	X^2 Calculated Value	Degree of freedom	Significance	
Designation	24.31	6	*	Rejected
Age	5.18	4	**	Accepted
Qualification	13.161	2	*	Rejected
Teaching Experience	13.52	6	*	Rejected
Research Experience	4.71	4	**	Rejected
Formal Training	13.85	4	*	Accepted

* Results are significant ** Results are not significant

Use of Internet vs. Level Of Satisfaction

The variables Use of Internet (UOI) and Level of Satisfaction (LOS) are the two major dependent variables of the research study. Since the dimensions of the variables are inter-dependent, it was hypothesized that 'higher the level of satisfaction, higher will be the use of Internet and vice versa'. To test the hypothesis, Pearson Correlation co-efficient was calculated and results are presented in Table 4.

Table 4. Bi-Variate Correlation Coefficients Between UOI AND LOS

Particulars	Test	LOS	UOI
Level of satisfaction	Pearson Correlation	1.000	0.583
	Sig. (2-tailed)		0.000
Use of Internet	Pearson Correlation	0.583**	1.000
	Sig. (2-tailed)	0.000	

** Correlation is significant at the 0.01 level

The results of the test show that, there is very high correlation between variables UOI and LOS. The co-efficient of correlation is also statistically significant showing high positive correlation, which implies that higher the level of satisfaction, higher will be the use of Internet. Hence the hypothesis 'higher the level of satisfaction, higher will be the use of Internet and vice versa' is accepted. The results are obvious and thus a mathematical formula can be derived based on the results as follows:

In this context, the Technology Acceptance Model (TAM), perhaps one of the most frequently tested models in MIS literature, can be cited. TAM defined the constructs of perceived usefulness as 'the degree to which a person believes that using a particular system would enhance his or her job performance', and perceived ease of use as 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989). Thus, optimum use of Internet and level of satisfaction depends upon the acceptance of TAM, wherein the perceived usefulness (Vide Table 5) and perceived ease of use (Vide Table 6) should be the inherent qualities expected from Internet technology.

To evaluate multiple effects a set of four variables age, teaching and research experience and level of satisfaction were put to Regression Analysis to see the multiple effects on variable Use of Internet. The results of regression analysis are presented in Table 7.

Table 5. Perceived Usefulness of Internet Technology

Internet usefulness	Perceived Usefulness of Internet (In Per cent)		
	Low	**Medium**	**High**
Research/Project	20.3	31.2	48.6
Lesson Plans	44.8	29.1	42.3
Accessing online databases	50.6	21.9	27.4
Means of Communication	25.8	20.6	73.5
Forum for discussion	64.2	22.6	13.1
Publishing	76.0	11.2	12.8
Downloading programs	34.8	20.9	43.4
Professional development	29.3	39.4	31.4
Placements	44.8	22.8	32.4
Chatting	45.9	14.1	40.0
Entertainment	38.3	23.9	37.8
Mean	43.1	23.3	36.5

Table 6. Perceived Ease of Internet

Characteristics	Perceived Ease of Internet (In Per cent)		
	Low	Medium	High
Ease of use	16.2	45.4	38.3
Accessibility	19.9	36.1	44.0
Speed and quickness	50.1	32.7	17.3
Uniqueness	24.0	31.6	44.4
Usefulness	6.5	34.6	58.9
Flexibility	9.1	34.4	56.6
Hypertext links	15.9	22.6	61.4
Organized information	7.7	31.5	60.8
Content of information	11.9	34.7	53.4
Comprehensiveness	17.8	25.9	56.3
Timeliness	16.1	17.8	60.0
Mean	17.7	31.6	50.1

Table 7. Regression Analysis of Use of Internet in relation to Independent Variables

Independent Variables	Un-Standardized Co-Efficient		Standardized Co-Efficient	T	Sig.	R Square
	β	Std. Error	β			
Constant	30.749	2.936	-	10.474	0.000	0.394
Age	9.921e-02	0.070	0.074	1.417	0.157	
Research experience	0.491	0.187	0.134	2.622	0.009	
Teaching experience	0.384	0.145	0.168	2.652	0.008	
Level of satisfaction (LOS)	0.772	0.042	0.571	18.398	0.000	

The result of Regression analysis shows that, the four variables age, teaching and research experience and level of satisfaction put together explains 39 per cent of variance in variable UOI. The variable LOS has emerged as the most affecting the dependent variable. That means affecting the dependent variables i.e. use of Internet. Therefore, utmost care has to be taken so that users derive maximum satisfaction.

By taking regression co-efficient, a mathematical model can be proposed as

UOI=30.749+0.772(LOS)+0.491(RE)+0.384(TE)+0.0992(Age)

R Square value (0.394) shows that, the four variables taken together explain 39.4% of variance in the Use of Internet. These four variables are significant with respect to use of Internet. The model suggests that, the most contributing factor is LOS (Level of satisfaction). Hence any step to improve the UOI, LOS should be given high priority, followed by other variables. One unit increased in level of satisfaction will increase seven units in use of Internet.

Conclusion

As information professionals, one has the opportunity not only to play a leading role in the organization and navigation using new tools and technologies such as metadata and web mining, but also in the development and maintenance of web based services of Internet for the user community. The future will require the librarians to reorient themselves, think creatively and adopt the new technology to generate services and resources where skills of structuring and organizing resources are put to its best use. With myriad of disorganized and unverified information, the web is in need of librarians who are trained in

the structuring and organizing information, have the ability to locate and evaluate information resources and have in-depth subject expertise. This will enhance the optimization of Internet resources and derive satisfaction towards Internet accessibility.

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