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Usability evaluation of an academic library website: A case of the University of the Punjab

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Abstract

The focus of the study was the usability evaluation of the Punjab University Library (PUL) website. The main objectives of the study were to ascertain the feelings of website users along with the efficiency of the system with reference to its goals and tasks. Similarly, the adaptability of users to the web and its uses were also determined. The study also dealt with the assistance which may be provided to users to resolve system problems, difficulties and users' opinions about the consistency and standardization of the PUL website.

To achieve these objectives, the study was processed through multi-phases. In the first stage a comprehensive literature review was conducted to understand the theoretical and technical aspects of the study. In the second phase, data were collected through a questionnaire instrument that was developed by Oulanov and Pajarillo (2001). A survey of four faculties was conducted which included 13 departments. The population was defined through stratified random sampling method. Data was collected from 300 respondents and was analyzed by using SPSS.

Findings of the study reveal that PUL website proves favourable in two out of five criteria particularly in terms of 'affect' and 'efficiency'. The data show that affect and efficiency are more outcome oriented than the technical aspects of 'learnability', 'control' and 'helpfulness.' The PU library was rated according to a variety of degrees, specifically 'learnability' and control which was rated higher than 'helpfulness.' This is basically the performance measurement that focuses on the user and effect of this process on the users.

Keywords: Usability; Usability evaluation; Library websites; Punjab University Library

Introduction

Web is playing a significant role in diverse application domains such as business, education, industry and entertainment. As a result, there are increasing concerns about the ways in which websites are developed and the quality of information delivered. The growth of the web is profoundly changing the way people interact with information and with people. This has led to an expansion of opportunities for the web on different vectors, including the massive production of contents (Lopes & Carrico, 2008).

As libraries move forward into the digital age, our web presence becomes increasingly important for meeting the needs of our users. The World Wide Web (www) is changing the way academic libraries teach and learn. Academic libraries have embraced the potential of www by developing innovative ways to meet users' needs, in a digital academic culture, by essentially designing user friendly websites (Tobin & Kesselman, 2000).

An academic library primarily serves the students and faculty of the specific campus of a college and university. However, it can also simultaneously serve other academic institutions and may also be accessible to the general public.

In recent years, the web has constantly been gaining importance as a platform for applications. Earlier web applications were simple and used static page layout, whereas, now the websites offer sophisticated applications with user interfaces.

What is usability?

Web usability is a technique which refers to methods for improving ease-of-use during the design process (Nielsen, 2003). This technique is being widely used in communication, consumer electronic and knowledge transfer objects. To evaluate the website, there is no need of specialized training. The International Organization for Standardization (ISO) defines usability of a product as “the extent to which the product can be used by specific users to achieve specified goals with ‘effectiveness,’ ‘efficiency’ and ‘satisfaction’ in a specified context of use.” “The emphasis on usability evaluation has increased recently in the library field with the predominance of information technology tools, gadgets, hardware, software and programs applications” (Oulanov & Pajarillo, 2001). According to Nielsen (1999) “with the swift development and increasing use of the World Wide Web as both information-seeking and an electronic commerce tool, web user interface studies grow in significance. Poor interface functionality is one potential cause for web usability meltdown.”

Literature review

Information technology (IT) is radically changing the face of academic libraries, their organizational structure and the manner in which they deliver services to their users. Academic libraries are being asked to provide greater service with fewer resources to users. According to Battleson, Booth and Weintrop (2001), “library websites are evolving into information gateways, unlocking access to library resources and services as well as electronic indexes and databases, primary research materials, and the internet at large” (p. 188). “Usability engineering is the discipline that provides structured methods for achieving usability in user interface design during product development. Usability evaluation is part of this process (Scholtz, 2001).

Traditionally, the evaluation of academic libraries was performed primarily by assessing the extent of the physical library use and the user satisfaction with the academic library’s printed collection (Cotta-Schonberg & Line, 1994). With the increased use of web based services and features, the overall evaluation of the academic library must now include not only the use of the physical facility and printed collection but also online usage and electronic resources (Shi & Levy, 2005). Library websites have been present for about 17 years and started to appear in the mid-nineties. To facilitate their users, the libraries are using a lot of online tools. These tools include both traditional websites and other newly emerging social network profiles. According to Connell (2008), “a library web-site is an integral part of a library’s identity. Many patrons visit library’s virtual location, its website, more than they visit its physical location. Library websites function as portals for research and marketing tools” (p. 121).

A library website (academic or public) facilitates its users to connect with the library 24 hours a day. “Today it is possible for student to conduct research for papers without ever stepping in the academic library. They can ask reference questions virtually; conduct research in databases; and place interlibrary loan requests electronically. All of these functions utilize library websites, requiring those websites to be timely and easy to use” (Connell, 2008, p.121). With the help of library websites, library professionals are able to provide information to the library users in an efficient way. Important messages about computers, placement details, examination, seminars and conference information etc. can be provided to the users centrally through the library website. To make library use easier for the users, information literacy instruction can also be delivered through the library websites.

How many library users use their library website, is called the “value of the website”. It depends upon how conveniently the library professionals provide information and links through the site. There are many methods for usability evaluation as Rogers and Preston (2009) used the combination of ‘experimental’ and ‘respondent research strategies’ and included ‘survey questionnaire’, ‘focus groups’, ‘formal usability testing’ and ‘card sorting’ to redesign the Caribbean academic library website to access the strength and weakness. It is also suggested that in libraries, usability training should be conducted for the evaluation purpose. Tobin and Kessleman (2000) conducted the “evaluation of web-based library instruction programs.” According to them, there was the potential in the academic libraries to meet the library users’ needs by developing new ways through www. They contended that academic libraries have

the potential to fulfill the library users' needs via WWW.

Zaphirs and Ellis (2001) conducted a study on website usability and content accessibility of the top 50 USA universities. In their investigation these universities were ranked on the basis of two factors; one was accessibility and the second was usability. This evaluation was carried out by using two automatic tools; Bobby and Lift. For most of the university websites usability rating was very low, while in the case of website content accessibility guide, the complain rate was very low. Finally, it was suggested that the size of the website in KB was the driving variable for both the usability and accessibility. In the field of library, the emphasis on usability evaluation increased due to information technology tools like gadgets, hardware, software and program applications. Therefore, at the stage of product designing, its development and acceptance, usability evaluation was considered an essential prerequisite.

One of the key studies regarding academic library is the usability evaluation of the City University of New York CUNY + database, conducted by Oulanov and Pajarillo (2001). This study was about a specific database that was online and was already being used in a large educational system. The purpose of this research was to evaluate the information service and examine the effectiveness of the online database by utilizing the criteria adopted by the Software Usability Measurement Inventory (SUMI) and the questionnaire tool. The results provided guidelines for redesigning the website as well as providing insight as to how the database was useful for supplying reference services in an academic library. It also proved useful for graphic website designers as it provided insight into the revision of website designs.

According to Battleson, Booth and Weintrop (2001) usability evaluation was considered an invaluable tool to evaluate the effectiveness and ease of academic library websites. They described the principles regarding usability evaluation and the formal implementation of these principles to the specific university libraries in Buffalo. They further demonstrated that "user needs" are now part of the software and interface development. They divided their evaluation work in three categories; 'inquiry', 'inspection' and 'formal testing', while the real users were involved only in 'inquiry' and 'formal usability testing.'

Research questions

1. What is the respondent's feelings about using the PUL website?
2. What degree does the particular website achieve its goals and tasks?
3. What is the degree to which the user can easily learn and use the website?
4. What is the feeling of the user about website in resolving their problems and difficulties?
5. What is the users' feeling about the consistency and standardization of the website?

Research design

This is a quantitative study based on questionnaire survey. In keeping with the main objective of the study, Oulanov and Pajarillo's questionnaire (2001) was employed after a few modifications, according to the local context. In the opted questionnaire, there were twenty questions comprising five categories. In each category, the PUL website was measured effectively via the related questions. The important point is that these questions were randomly arranged. Only the researchers knew which question was related to which specific category. The respondents were asked to rate the site by using a 5-point Likert type scale ranging from 1 to 5, 1 being strongly disagree and 5 being strongly agree.

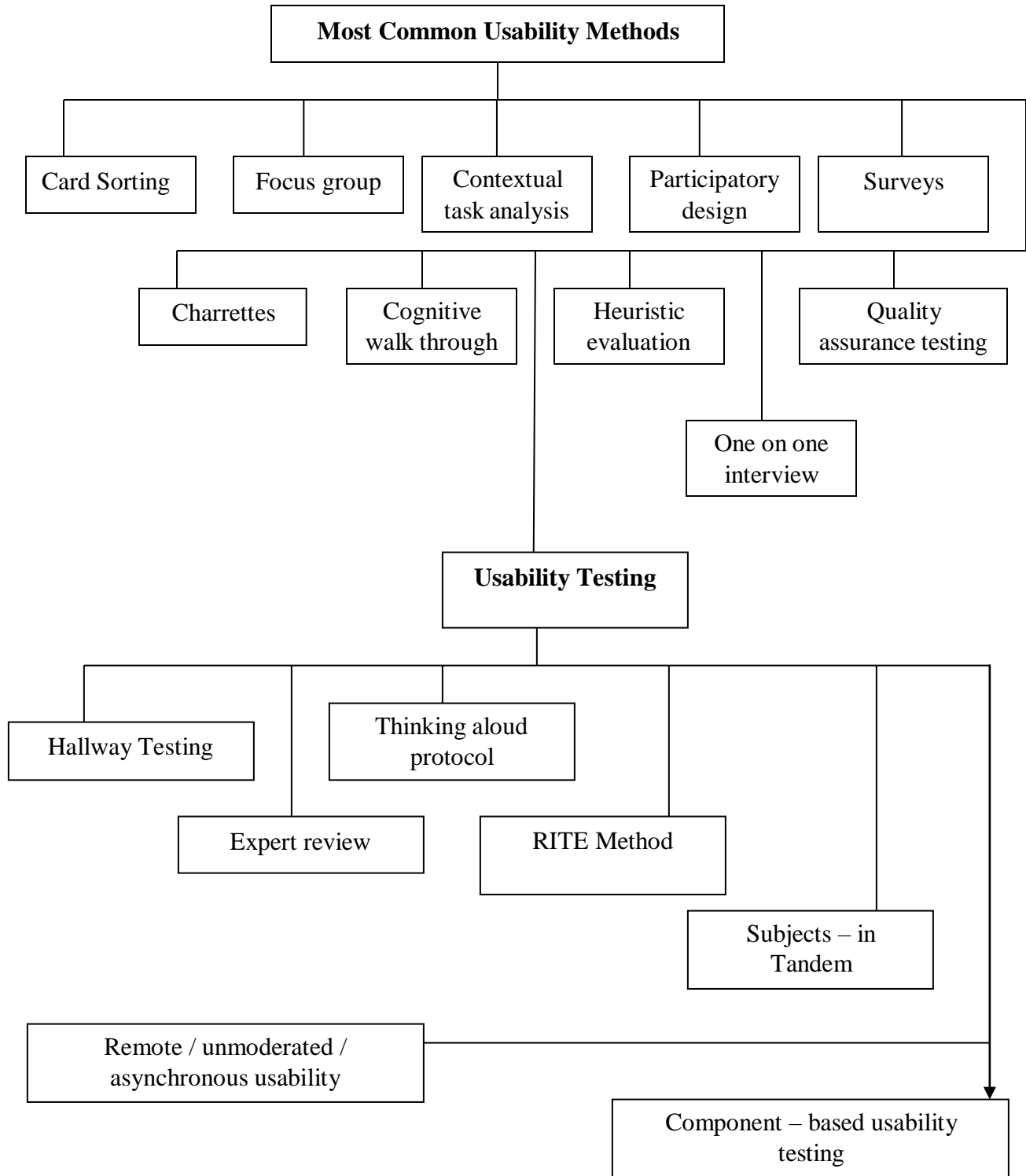


Figure 1. Most common usability methods

Population and sampling

The target population of the study was all the students of the Punjab University. However, out of 13 faculties of the Punjab University, four were selected as sample population. These are, "Economics and Management Sciences, Behavioral and Social Sciences, Science and Law." These four faculties are located in Quaid-e-Azam Campus, University of the Punjab, Lahore and consist of ten departments. The total number of morning master program students enrolled in sessions 2010-2011 of the selected faculties were 1260.

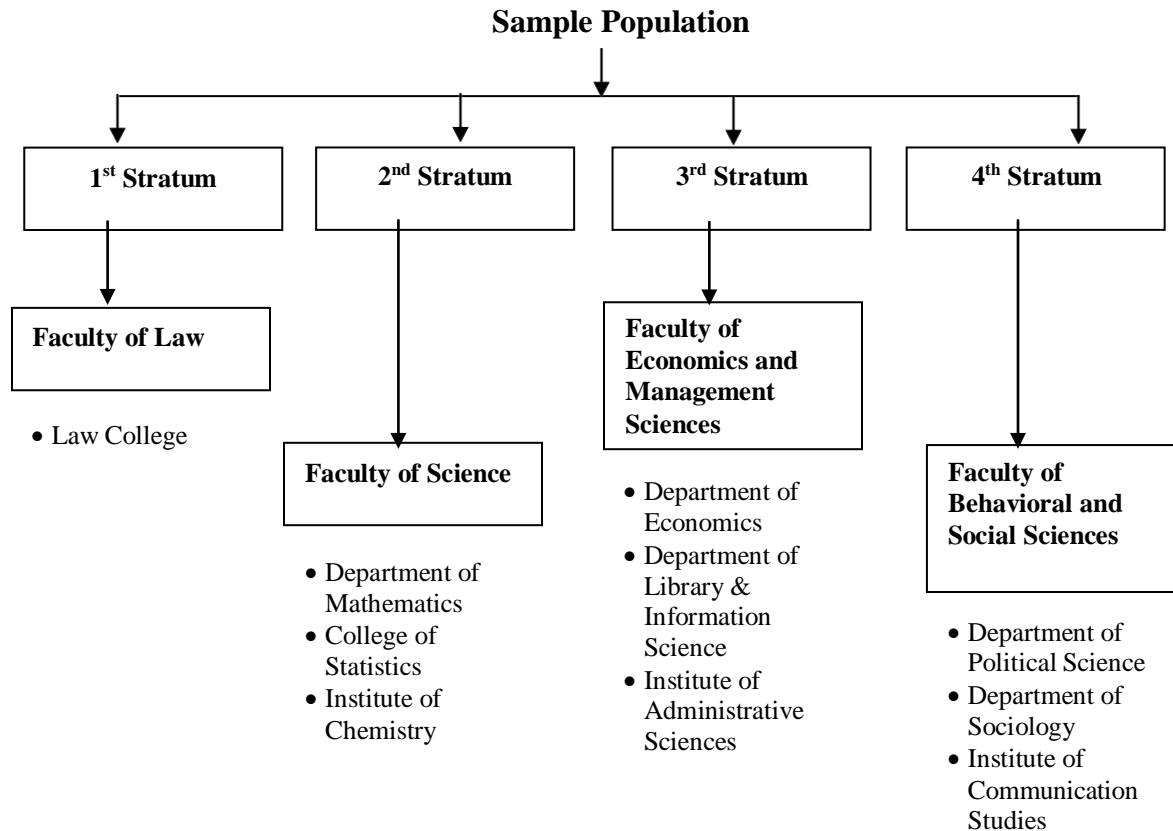


Figure 2. Sample population

Sample size

"Stratified random sampling" method was used, using the following formula provided by Yamane (1967, p. 99) to determine the sample size from the selected population:

$$n = \frac{N}{1 + N(d)^2}$$

Following three factors are responsible for the sample size.

- 1) Level of confidence.
- 2) Degree of precision
- 3) Degree of variability

It is assumed that:

- Confidence level is 95%.
- Precision rate is $\pm 5\%$
- Degree of variability $D = 0.05$

While $N =$ Population size,

n = Sample size,
d = Degree of variability,
N = 1260

By putting the above values in formula; the sample size was calculated as follows:

$$n = \frac{N}{1 + N(d)^2}$$

$$n = \frac{1260}{1 + 1260(0.05)^2}$$

Sample Size n = 304

Data Collection

The data were collected through personal visits during May-July 2011. Despite a few challenges, keen efforts were made regarding data collection; consequently the response rate was 98 percent. SPSS 16.0 version was used for quantitative analysis and content analysis of open ended questions.

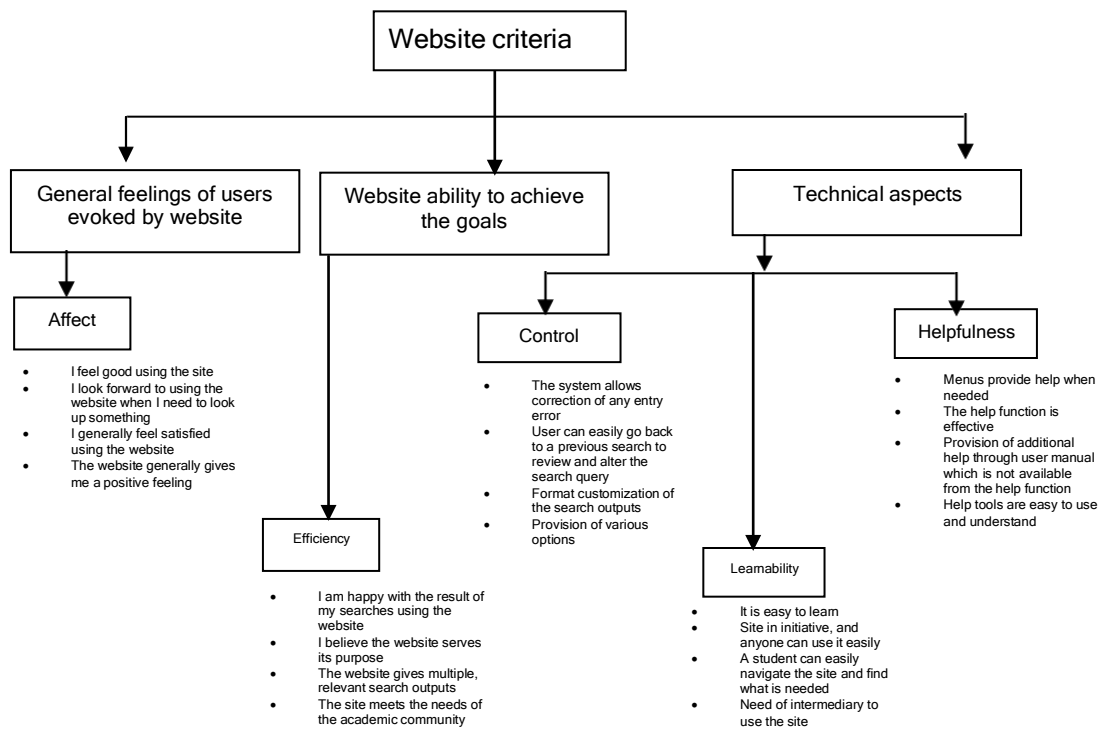


Figure 3. Website criteria

Data analysis

Data analysis is divided into two parts. The first part presents an analysis about the personal information of the respondents including 'gender' and 'age.' The second part mentioned the affect, efficiency, learnability, helpfulness, and control of PUL (Punjab University Library) website as perceived by the users.

Demographic information

Frequency distribution of the respondents' gender shows that there were 179 (59.7%) female and 121 (40.3%) male respondents (Table 1). It also shows that the age of eight (2.7%) respondents were below 20. Most of the respondents' age ranged from 21 to 25 year (262, 87.3%). There were only five (1.7%) respondents whose age was above 30.

Table 1. Frequency distribution of the respondents 'gender' and 'age' (N=300)

Age	Male	Female	Total	Percent
Below 20	4	4	8	2.7
21-25	95	167	262	87.3
26-30	18	7	25	8.3
Above 30	4	1	5	1.7
Total	121	179	300	100.0

Usability evaluation of library website

Affect: The respondents' satisfaction about using the website. There are four statements to explore the 'affect' of website. The analysis of these statements is given below (Table 2).

Nine respondents 'strongly disagree' that they feel satisfied while using the website. There are 51 (17.2%) respondents who 'strongly agree' and 18 (6.1%) respondents 'disagree'. Almost half of the respondents 140 (47.1%) agree and 79 (26.6%) respondents have 'neutral' opinion about the feeling of satisfaction. The mean of the statement 'that they feel satisfaction while using the website' is the highest (3.92) among the four statements of affect.

Sixty three (21.0%) 'strongly agree' and 15 (5.0%) respondents 'strongly disagree' that they feel good using the website with a mean of 3.76, while 59 (19.7%) have neutral feelings about the use of the site. Almost half of the respondents 147 (49.0%) agree and 13 (4.3%) respondents 'disagree' that they are comfortable in using the web.

Six (2.1%) respondents 'strongly disagree' about looking forward to using the website and 41(14%) respondents 'strongly agree' 28 (9.6%) and 123 (42.3%) 'disagree.' Overall, users are satisfied and their response is positive.

Table 2. Frequency distribution of responses to "Affect" the website

Statements	1	2	3	4	5	Mean	N
User's feeling of satisfaction while using the website	9 (3.0%)	18 (6.1%)	79 (26.6%)	140 (47.1%)	51 (17.2%)	3.92	297
Feeling good using the website	15 (5%)	13 (4.3%)	59 (19.7%)	147 (49%)	63 (21%)	3.76	298
Look forward to using the website when I need to look up something	6 (2.1%)	28 (9.6%)	93 (32%)	123 (42.3%)	41 (14%)	3.66	291
The website generally gives positive feeling	11 (3.7%)	22 (7.4%)	73 (24.6%)	152 (51.2%)	39 (13.3%)	3.62	297

Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

The data show that 11(3.7%) respondents 'strongly disagree' and 39 (13.1%) respondents 'strongly agree' that "The system generally gives a positive feeling" with the lowest mean of 3.66. Twenty-two respondents 'disagree' and 152 (51.2%) respondents 'agree.' Some responses 73 (24.6) are 'Neutral' in this regard.

It is clear from the frequency of responses to "affect" the website that users had a feeling of satisfaction while using the website with a mean of 3.92, general positive feelings regarding the website usage was given a little bit important with a mean of 3.62. The overall mean of 'affect' is 3.74.

Efficiency: The degree to which the system is able to achieve its goals and tasks. A significant number of respondents 154 (52%) agree that they are happy with the result of their searches using the site while 67 (22.6%) respondents are neutral (Table 3).

Forty nine (16.6%) respondents 'strongly' believe that the website serves its purpose, 20 (6.8%) respondents 'disagree' while 85 (28.8%) have 'Neutral' opinion. A large number of respondents 131 (44.4%) believe that Punjab University Library (PUL) website serves its purpose while few users 10 (3.4%) 'strongly disagree' with it.

More than half of the respondents 152 (51.0%) 'agree' that the PUL website meets the needs of the academic community while 56 (18.8%) respondents 'disagree' with it. Some users do not think that the site fulfills their needs and they are neither in favor of nor against it and thus are 'neutral' (59, 19.8%).

Table 3. Frequency distribution of response to "Efficiency" of the website

Statements	1	2	3	4	5	Mean	N
Feel happy with the results of searches using the website	8 (2.7%)	19 (6.4%)	67 (22.6%)	154 (52.0%)	48 (16.2%)	3.86	296
Users believe that website serves its purpose	10 (3.4%)	20 (6.8%)	85 (28.8%)	131 (44.4%)	49 (16.6%)	3.80	295
Capability of the website to meet the needs of the academic community	9 (3.0%)	22 (7.4%)	59 (19.8%)	152 (51.0%)	56 (18.8%)	3.75	298
Website to give the users multiple, relevant search outputs	11 (3.7%)	21 (7.1%)	78 (26.4%)	138 (46.6%)	48 (16.2%)	3.64	296

Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

One hundred and thirty-eight (46.6%) respondents 'agree' and only 21 (7.1%) users do not agree that "the site gives them multiple, relevant search outputs". Forty eight (16.2%) 'strongly agree', and 11 (3.7%) respondents 'strongly disagree' with the statement. Seventy-eight (26.4%) users are neither in favor of nor against the website's provision of multiple, relevant search outputs. Overall mean of the "Efficiency" of the Website is 3.76.

Learnability: The degree to which the user can easily learn/use the functions of website . Half of the respondents, 150 (50.5%), 'agree' about the acquirement of knowledge related to the website's working while only 19 (6.4%) respondents do not agree. There is also a great difference between the responses of 'strongly agree' (50, 16.8%), and 'strongly disagree' (6, 2%). Seventy-two (24.2%) respondents are 'neutral' in their opinion with the highest mean of 3.87 among the learn-ability statements (Table 4).

More than 40 percent users believe in the intuitiveness and easy usage of the website, as compared to only 37 (12.6%) respondents who do not agree with it. Fifty-three (18%) respondents 'strongly agree' as compared to only 6 (2%) respondents who 'strongly disagree' with this statement in the learnability criterion. Seventy-eight (26.6%) respondents are 'neutral' about the intuitiveness and easy usage of the site with a 3.80 mean.

Table 4. Frequency distribution of responses to "Learn ability" of the website

Statements	1	2	3	4	5	Mean	N
Easy learning of the website	6 (2.0%)	19 (6.4%)	72 (24.2%)	150 (50.5%)	50 (16.8%)	3.87	297
Intuitiveness and easy use of website	6 (2.0%)	37 (12.6%)	78 (26.6%)	119 (40.5%)	53 (18.1%)	3.80	293
Easy navigation ability and finding	7 (2.3%)	29 (9.7%)	101 (33.7%)	128 (42.7%)	35 (11.7%)	3.51	300
User's need of an intermediary to use the website	18 (6.0%)	45 (15.0%)	127 (42.3%)	91 (30.3%)	19 (6.3%)	3.16	300

Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Almost 42 percent respondents 'agree' about the website's easy navigation ability and finding, while only 29 (9.7%) respondents who 'disagree.' Thirty-five (11.7%) respondent 'strongly agree' that the websites' navigation is easy against only 7 (2.3%) respondents who 'strongly disagree.' Most of the students believe in the easily navigable nature of the website with a mean of 3.51 and one third of (33.7%) respondents have a neutral opinion.

Ninety-one (30.3%) respondents 'agree' that an intermediary is required while working through the site and 45 (15.0%) respondents do not agree about the need of an intermediary. Nineteen (6.3%) respondents 'strongly disagree' and an almost identical percentage (18, 6.0%) 'strongly agree' about the need of an intermediary. A striking difference with this item is that a large number of respondents 127 (42.3%) have a 'neutral' opinion and this statement has lowest mean (3.16) in learnability.

Summary of the frequency of responses to learnability shows that the most valuable statement according to users of the PUL website regarding is its easy learnability with the mean of 3.87 while need of an intermediary in using the website has the least value for the users.

Helpfulness: The feeling by the user that the program can assist in resolving system problems and difficulties. Seven (2.4%) respondents 'strongly disagree' that "the website menus provide help when needed" and 39 (13.4%) respondents 'strongly agree.' Thirty-two (11.0%) 'disagree' and 129 (44%) 'agree' with this statement while 84 (28.9%) are 'neutral' in their opinion regarding the website menus providing help when needed with the mean of 3.83 (Table 5).

One hundred and thirty-four (44.8%) respondents 'agree' and 19 (6.4%) 'disagree' with the statement that "website help tools (help function and user manuals) are easy to use and understand." Eleven (3.7%) respondents 'strongly disagree' and 49 (16.4%) respondents 'strongly agree,' while 86 (28.8%) respondents are 'neutral' about this opinion. One hundred and thirty-four (45.7%) respondents 'agree,' 40 (13.7%) 'strongly agree' while 90 (30.7%) respondents are 'neutral' in their opinion about the website's help function effectiveness. One hundred and twenty (40.3%) respondents 'agree' and 109 (36.6%) are 'neutral' about website user manual provision and additional help which is not available from the help function.

Table 5. Frequency distribution of response to "Helpfulness" of the website

Statements	1	2	3	4	5	Mean	N
Menus provide help when needed	7 (2.4%)	32 (11.0%)	84 (28.9%)	129 (44%)	39 (13.4%)	3.83	291
Help function is effective	11 (3.7%)	19 (6.4%)	86 (28.8%)	134 (44.8%)	49 (16.4%)	3.72	299
User manual provides additional help not available from the help function	6 (2.0%)	23 (7.8%)	90 (30.7%)	134 (45.7%)	40 (13.7%)	3.61	293
Help tools (help function and user manuals) are easy to use and understand	10 (3.4%)	42 (14.1%)	109 (36.6%)	120 (40.3%)	17 (5.7%)	3.30	298

Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

The frequency distribution of responses to 'helpfulness' shows that help provision through website menus has great importance for the users of Punjab University library website. The least valuable item regarding the helpfulness of the library website is the provision of additional help by user manuals of the site which are not available from the help function.

Control: The feeling by the user that the website is consistent, standard and can easily be internalized. One hundred and ten (37.7%) respondents 'agree' with the website to correct any entry error followed by 101 (34.6) respondents who have neutral opinions about this statement. Eleven (3.8%) respondents strongly disagree and 31 (10.6%) respondents 'strongly agree' with the opinion that "website allows correction of any errors" (Table 6).

Table 6. Frequency distribution of Response to "Control" of the website

Statements	1	2	3	4	5	Mean	N
Website to correct any entry errors	11 (3.8%)	39 (13.2%)	101 (34.6%)	110 (37.7%)	31 (10.6%)	3.99	292
Website provision for options	9 (3.0%)	29 (9.7%)	74 (24.7%)	150 (50%)	38 (12.6%)	3.77	300
Ease of website to go back to a previous search to review and alter the search query	7 (2.4%)	28 (9.5%)	79 (26.7%)	134 (45.3%)	48 (16.2%)	3.63	296
Website search output customization of format	8 (2.7%)	43 (14.4%)	104 (34.9%)	113 (37.9%)	30 (10.1%)	3.38	298

Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Half of the respondents 150 (50%), 'agree' with the website's provision for options from which a user can choose. Only 29 (9.7%) respondents 'disagree' with website option provision. Similarly, almost half respondents, 134 (45.3%), were in favor of the website's facility to allow one to go back to a previous search to review and alter the search query as compared to only 28 (9.5%) respondents who 'disagree,' 48 (16.2%) 'strongly agree' and only 7 (2.4%) 'strongly disagree' while 79 (26.7%) responses are neutral.

Eight (2.7%) respondents 'strongly disagree' with the website customization. Thirty (10.1%) respondents 'strongly agree,' while respondents who 'disagree' are 43 (14.4%). One hundred and thirteen (37.9%) respondents 'agree' and 104 (34.9%) are 'neutral' about the website's search output customization. Affirmative and neutral responses are almost the same.

The summary of frequency distribution of respondents 'control' regarding the website shows that 'website allows one to correct any error' is the most valuable while 'allow to customize the format of the search output to the way any one prefer it to be' is the least valuable in this criterion.

Conclusion

Punjab University library website proves favorable in two out of five criteria particularly in terms of 'affect' and 'efficiency' and these two criteria are more outcome oriented than the technical aspects of 'learnability,' 'control' and 'helpfulness.' The final result of the study deals with performance measurement with references to the users and the effect of this process on users.

'Affect' is the general feeling evoked by the system on the users. These are the users' feelings while using the PU website. Most of the users are 'satisfied and feel good' with the use of the website. On the otherhand, efficiency is also an effect that the website achieves. It includes the affordability of the website to perform the users' tasks. The outcomes or affect achievements while using the site are rated highly. The samples score of all four items show the efficiency of the website well.

The majority of the Punjab University website's users do not really give much importance to the technical components of the website. It is quite clear that the technical aspects of the system like 'learnability,' 'control' and 'helpfulness' are the core activities of the reference services of an academic library even when provided through the library website. These components strengthen the library website by heightening the positive effects on its users.

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