USE OF WEB BASED RESOURCES BY RESEARCHERS OF UNIVERSITIES IN DELHI: A COMPARATIVE STUDY

ABSTRACT

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**PREFACE**

Web has become a preferred medium for discovery and delivery of information and web resources have emerged as a major source for a variety of scientific and scholarly information. The emergence of web resources has led to more efficient and productive ways of knowledge sharing and scholarly communication making them an important vehicle and a spontaneous choice for various research and academic activities.

The proliferation of web resources has brought revolutionary changes in the realm of academic research and learning. Web resources have been significant in revolutionizing the global research trend. Web resources have presented users with a stimulating environment for research and learning by modernizing the tools of learning as well as, the process of research moreover, the web resources are playing a crucial role in scholarly communication by expediting the process of scholarly communication thus overcoming the publication delays.

Web resources are very efficiently serving the purpose for which they are used by the research community however, with the technological advancements preferences and choices of researchers and scholars change regarding the use of web resources in order to keep up with the current research trend. Thus, it is indispensable to explore the current picture regarding the use of web resources among the researchers.

In this context, the present study was formulated to examine the use of web resources by researchers. The study is aimed at exploring and presenting a valuable insight on different aspects related to the use of web resources by the scholarly community.

The literature review manifests that no comprehensive study has been conducted on the scholarly use of web resources in University of Delhi (DU), Jamia Millia Islamia (JMI), and Jawaharlal Nehru University (JNU). In this context, the present study attempts to explore the dynamics of web resources use by the researchers of the select universities.

The originality and significance of the study lies in the fact that it portrays the current picture regarding the use of web resources. The study explored the scholarly use of web resources by researchers as they constitute the core group of the users of web resources. The study will be significant in developing an understanding about the various important issues related to the use of web resources by researchers such as the
awareness and use of web resources; purpose and frequency of using web resources; an analysis of the various features of the web resources; hindrances and problems faced by the users in the use of web resources; queries related to search and access of web resources; impact of web resources on researchers; evaluation of web resources and importance of training and guidance in utilization of web resources.

The present work intends to provide some valuable suggestions derived from the findings of the study. Study will be beneficial in enhancing the research and learning experience of researchers by presenting them with better designed web resources that can be developed as a result of the present study.

The entire research work runs into five chapters. The First Chapter provides the outline and nature of research study undertaken the statement of the problem, definitions, objectives, significance of the study, scope and limitation of the study. The research methodology adopted in conducting the study is also explained.

Second Chapter is enriched with an exhaustive and comprehensive literature review of all the related literature. It highlights the research work taking place worldwide. For this purpose a variety of documents such as electronic journals, print journals, books, seminar and conference proceedings were consulted.

Chapter Third presents an insight into the origin of the web resources explaining the concept of web resources along with the definitions. The chapter also highlights the significance of web resources in research and learning also, explaining the impact of web resources on researchers. Moreover, the advantages and various types of web resources are also explained.

Chapter Four highlights the need for the evaluation of web resources. It also reviews the various established criteria that have been formulated and presented by various scholars over a period of time for the evaluation of information and suggests the criteria that should be considered for the proper and productive utilization of the web resources.

Chapter Five deals with the analysis and interpretation of data. The chapter analyses the collected data and proposes findings based on the interpretation of the data collected from the respondents which comprised of the researchers of the select universities.

Chapter Six presents the major findings of the study on the basis of analysis and interpretation of data. On the basis of findings derived from the study some
suggestions along with the recommendations for future research have also been provided.

List of bibliography and appendices have been provided in the last part of the thesis. Appendix-A contains print version of the questionnaire administered to the researchers and copy of online questionnaire has been appended as Appendix-B. Data tables have been appended as Appendix-C (C1 to C9). The profiles of universities under the study have been attached as Appendix-D.

The researcher has published a paper entitled “Awareness and Use of Web Resources among the Post Graduate Engineering Students of ZHCET, Aligarh Muslim University (A.M.U), Aligarh” based on the study area.
ABSTRACT

The World Wide Web has proliferated into vast information repository by agglomeration of a number of information resource and services and this accumulation is constant and loads and tons of information is added every day. Web has formed an inseparable alliance with our life in this era; where learners have access to a universe of electronic information through the information superhighway. The web has brought an exceptional change in the scope of web resources that can be reached by making them accessible, like never before.

The scholarly community has very efficaciously utilized web and web resources as a significant channel to facilitate the flow of scholarly output between researchers and the outside world. The primary reason for web resources attaining such a significant position in current research scenario is the change from traditional research environment to currently prevailing e-research and virtual research environments (VRE) characterized by profound use of information and communication technology (ICT). Intense intellectual use of Information and Communication Technology (ICT) has given birth to a number of web based information sources.

With the application of ICT tools and services the number of web resources is ever increasing leading to the accumulation of a wide variety of web resources driven by the technological innovations. Although the web is flooded with information on any conceivable topic of importance on a variety of disciplines and subjects but not every bit of information presented on the web is credible or to be blindly trusted upon hence, evaluation of information on the web has become an essential part of any research and scholarly work.

Web resources have influenced researcher’s scholarly and academic work in a number of ways. Use of web resources has led to instant access to plethora to scholarly information catering to the information need of the researchers. Availability of greater range of scholarly literature has been significant in improving the quality of work also in keeping up-to-date with the current development and inspiring new ideas. Thus the role of web resources in the research and scholarly process cannot be denied.
SIGNIFICANCE OF THE STUDY

Researchers are in the possessions of circumstances and an environment to explore the unexplored and make significant contributions to human knowledge. It is only due to the dedicated efforts of the researchers all over the world that mankind has been able to make many groundbreaking discoveries, from life saving drugs to many technological innovations making our society a better place to live. In today’s modern age of global networking and information superhighway that supports e-research characterised by the use of newer research methodologies exploiting a gamut of advanced information and communication technology (ICT) capabilities and virtual research environments for collaboration among the e-research community that has made web resources the lifeline of researchers and scholars and its importance in current research environment is unequivocal.

Although the Web resources are very efficiently serving the purpose for which they are used by the research community but, as in today’s society science and technological advancements occur at a very rapid pace, and with these advances in the scientific knowledge the related technologies also become obsolete hence, the preferences of researchers and scholars also change in keeping up with the current research trends giving way for improvement in design and development of web resources to pertinently cater to the information needs of the researchers. Thus, it is indispensable to explore the current picture regarding the use of web resources among the researchers.

The constant shifting of trend from print resources to web resources with its numerous advantages has provided the investigator an impetus to explore and present a valuable insight on different aspects related to the use of web resources. The current study seeks to investigate the use of web resources by researchers of universities in Delhi. The utilization of web resources as a valuable tool has bestowed researchers with modern ways and innovative techniques for conducting research.

The need for the study is quite apparent as the researchers constitute the core group of the user of web resources in universities. The study will be examining the acceptance of web resources among the researchers along with the perceived advantages, users’ satisfaction, impact that the web resources have on the respondent’s research and academic work and obstacles that come during the use of web resources. The study will be significantly helpful in providing a detailed, up-to-
date picture and identifying major emerging trends about the scholarly use of web resources. The significance of the study can be summed up in the following points.

- Study will be helpful in designing of more pertinent web resources by critically analyzing the best used features and scrutinizing those that are less used.
- Study will be beneficial in enhancing the research and learning experience of researchers by presenting them with better designed web resources that can be developed as a result of the present study.
- Analyzing the use of web resources will help in analyzing the impact that the web resources have on the research community.
- Study will be valuable in identifying search and retrieval pattern of the researchers and in analyzing the relevance of various search techniques among the researchers so that accordingly appropriate tutorials and lectures can be designed on the basis of the research findings to make researchers familiar with various search techniques.
- Familiarizing the researchers about the searching techniques will save their valuable time and will also ensure maximum productivity, i.e. by getting access to precious information with less effort and wastage of time.

**STATEMENT OF THE PROBLEM**

A well defined statement of the problem is very important to clearly describe the nature and scope of the problem helping in the achievement of goals and objectives of the study. The problem selected for the present study is:

“Use of Web based Resources by Researchers of Universities in Delhi: A Comparative Study”

**OBJECTIVES OF THE STUDY**

Clearly developed objectives are essential to attain the goals that are set for the study. Objectives serve as a significant tool in familiarizing the users about what the study wants to attain. The objectives formulated for the present study are as follows:

a) To explore the awareness and use of the web resources among the researchers of University of Delhi (DU), Jamia Millia Islamia (JMI) and Jawaharlal Nehru University (JNU).

b) To identify different purposes for which the web resources are used by the researchers of DU, JMI, and JNU.
c) To assess the frequency of using the web resources, and also to establish preferred location for accessing web resources among researchers in the select universities.

d) To examine the importance of different types of web resources for researcher’s academic and research tasks in the University of Delhi, Jawaharlal Nehru University and Jamia Millia Islamia, and to determine the various beneficial features of the web resources.

e) To identify and analyse the specific factors that hinder the use of web resources among the researchers of University of Delhi, Jawaharlal Nehru University and Jamia Millia Islamia.

f) To explore the various search and retrieval techniques adopted to locate the web resources, as well as to know about the amount of time spent while searching the web resources by the researchers in the select universities.

g) To identify the researcher’s preferred criteria for the evaluation of web resources in the University of Delhi, Jawaharlal Nehru University and Jamia Millia Islamia.

h) To ascertain the need for user training and, to know about the type of user training that the researchers would like to go through for better search and access of web resources in the University of Delhi, Jawaharlal Nehru University and Jamia Millia Islamia.

**HYPOTHESES**

The hypotheses of the present study were formulated on the basis of review of related literature moreover, the findings of the previous studies, provided valuable clues and important insights for the development of the hypotheses. The hypotheses for the study are:

**1.4.1 Hypothesis 1**

**H0**: There is no significant difference in the purpose of using web resources among the researchers of DU, JMI, and JNU.

**Ha**: There is significant difference in the purpose of using web resources among the researchers of DU, JMI, and JNU.

**1.4.2 Hypothesis 2**

**H0**: There is no significant difference among the researchers of DU, JMI, and JNU in considering e- journals as the most important form of the web resources.
Ha: There is significant difference among the researchers of DU, JMI, and JNU in considering e-journals as the most important form of the web resources.

1.4.3 Hypothesis 3

H0: There is no significant difference in the level of satisfaction with the use of web resources among the researchers of DU, JMI, and JNU.

Ha: There is significant difference in the level of satisfaction with the use of web resources among the researchers of DU, JMI, and JNU.

1.4.4 Hypothesis 4

H0: Use of web resources has not positively impacted the research and scholarly work of the researchers in DU, JMI, and JNU.

Ha: Use of web resources has positively impacted the research and scholarly work of the researchers in DU, JMI, and JNU.

1.4.5 Hypothesis 5

H0: Majority of the researchers from DU, JMI, and JNU do not consider user training helpful for better search and access of the web resources.

Ha: Majority of the researchers from DU, JMI, and JNU consider user training helpful for better search and access of the web resources.

SCOPE OF THE STUDY

Use of web resources by universities is a global trend and the present study covers the use of web based resources among the researchers in universities of Delhi. The present study has included in its scope three central universities in Delhi Viz. University of Delhi (DU), Jamia Millia Islamia (JMI), and Jawaharlal Nehru University (JNU). The sample population for the present study comprise of the researchers (faculty members and research scholars) in the select universities in Delhi as they constitute the core users of the web resources in universities.

The study within its scope seeks to examine the use of web based resources among the sample population. It looks into the various aspects related to the use of web resources. The study analyses the various purposes for which the web resources are used by the scholarly community. Furthermore, the study presents a detailed analysis of the various feature possessed by the web resources to get an insight into the features that are rated higher and lower i.e. the features that the researchers consider more valuable and fruitful for their research work and also those features that are low on popularity. Analysis of the hindrances and problems in the use of web
resources, search and retrieval pattern of the researchers have also been included in the scope of the study. Since, in modern times the use of web has been the greatest influence in every field of human knowledge and so the research and educational field is no exception, hence it becomes a necessity to examine the influence of web resources on researcher’s research and academic tasks.

The study has also included in its scope the evaluation of web resources as the evaluation of information is an integral part of any scholarly work, and a vital component of information search and retrieval. This makes it absolutely necessary for the researchers to have the necessary skills to be able to evaluate the information on the web. Appropriate training and guidance is a prerequisite for productive use of web resources therefore the study explores the issues related to the training and guidance in the use of web resources. In the conclusion the of the study some valuable suggestions derived from the analysis of data have been provided that will be helpful in improving the users experience with the use of web resources which in turn will ensure the productive use of web resources for research and scholarly work.

LIMITATIONS OF THE STUDY

Every research investigation has its limitations and this study is no exception. The limitations of the present study are presented below:

1. It was impossible to carry out a research covering all the universities in Delhi so the study has been limited to the Central Universities in Delhi to ensure an exhaustive and comprehensive study regarding the impacts of web resources on the researchers, so that the extent of use and the influence of web resources on researcher’s academic work can be efficiently judged and compared.

2. The present study has excluded Indira Gandhi National Open University (IGNOU) because of its Open and Distance Learning (ODL) mode.

3. The present study has excluded South Asian University (SAU) because at the time of survey it offered PhD program in very few subjects and the number of researchers were negligible as compared to the University of Delhi (DU), Jamia Millia Islamia (JMI), and Jawaharlal Nehru University (JNU) which are old and established universities in Delhi.

RESEARCH METHODOLOGY

Survey method is a cost effective and time efficient way to acquiring primary data from the universe under the study. Survey research is the most commonly used
method in educational research. To accomplish the purpose and objectives of the present study, survey method was adopted since survey method was considered most suitable for this study as it best served the nature of the current study. The methodology adopted for collection and analysis of data regarding the use of web based resources by researchers of the select universities is divided into following sections:

**Literature Survey**
A thorough review of literature was conducted by the investigator to get a clear picture of various aspects related to the use of web based resources. Related literature from both print and web based sources of information was consulted for the purpose of reviewing the related literature. Investigator made use of primary, secondary, and tertiary sources of information for collecting the relevant data for the study.

**Data Collection Methods**
Data Collection is a vital facet of any type of research investigation. Thus selecting the correct data collection tool is crucial for getting the valid results as inaccurate data collection methods might lead to invalid results. The present study employed structured questionnaire for the collection of the required data.

**QUESTIONNAIRE**
Questionnaires for the present study were designed keeping in mind objectives and hypothesis for the study.

**Questionnaire Design**
The questionnaire for the present study was designed to elicit responses to a variety of questions on the use of web resources. A thorough search and review of the related literature was conducted by the investigator to attain a better understanding of the various facets relating to the present problem in order to prepare a questionnaire that corresponds to the objectives of the study and is able to convert the research objectives into significant questions.

The questionnaire designed for the present research included various parameters such as the awareness and use of web resources; purpose and frequency of using web resources; an analysis of the various features of the web resources; hindrances and problems faced by the users in the use of web resources; queries related to search and access of web resources; influence of web resources on
researchers; evaluation of web resources and importance of training and guidance for the utilization of web resources.

**Pilot study**

Pilot study is an important element of a good research design. It is a trial study which is carried out before the main study to check the feasibility and reliability of the research tool. Pilot study for the present study was conducted with the purpose of getting respondents opinion on the questionnaire and also to rule out the presence of ambiguities and doubts so as to get clear and accurate responses. Pilot study was conducted among the researchers of the select universities in November, 2014. Pilot study provided the investigator with valuable suggestions and ideas. On the basis of the suggestions and feedback received from the respondents the necessary adjustment and modifications to the questionnaire was made. Some of the questions were redrafted while, some others were added and the irrelevant questions were removed.

**Sample Selection**

The present study was conducted among the researchers i.e. the research scholars and the faculty members of the three central universities of Delhi. The universe of population was divided into two groups on the basis of their academic status, viz. research scholars and faculty members. Quota sampling was then used for data collection. Questionnaires were distributed among the sample population within each group of the respondents through convenience sampling until each quota was filled for the required number of respondents.

**Administration of questionnaire**

The investigator visited the universities under the study namely University of Delhi (DU), Jamia Millia Islamia (JMI), and Jawaharlal Nehru University (JNU) and questionnaires were administered personally among the research scholars and faculty members of the select universities. The investigator distributed the questionnaire to the respondents by personally meeting them at various places such as chambers of the faculty members, libraries, departments of various faculties, departmental labs and other places within the university campus during the period of the study (February-May, 2015). In addition to personally administering the questionnaires to the respondents a number of online questionnaires were mailed to the faculty members of DU, JMI and JNU for this purpose the investigator obtained the email address of the faculty members from the websites of the universities.
A total of 610, 360, 645 questionnaires (including print and online) were distributed among the researchers of DU, JMI, JNU respectively. Out of the total administered questionnaire, a total of 490, 274 and 557 questionnaire were received back from DU, JMI, and JNU respectively. Finally, after screening and rejecting the incomplete questionnaire a total of 457, 252, and 494 completely filled in questionnaires were selected and used for the data analysis.

**DATA ANALYSIS AND INTERPRETATION**

The data collected from the researchers of DU, JMI, and JNU was organized, tabulated, analyzed, interpreted, and compared in the light of objectives set for the study using tables, percentages and statistical test (One way ANOVA). The data was analyzed using MS Excel and statistical package for social sciences (SPSS). Based on the analysis and interpretation of data findings, suggestions and conclusions were derived.

**FINDINGS**

The major findings based on the analysis and interpretations of the previous chapter are as follows:

**Awareness and Use**

For evaluating the awareness and use of the web resources among the researchers the study examined all the concerned areas such as; finding out the sources which were helpful in acquainting the researchers to web resources, to know about the places from where the researchers generally accessed web resources, to examine the importance of various web resources in researcher’s academic work. Major findings on the awareness and use of web resources are summarized below:

a) Search engines were identified as the leading source to give information about the web resources to the researchers. 93.44 percent researchers in DU, 93.25 percent in JMI and 93.32 percent in JNU admitted that they become aware about the web resources through the search engines. While, some other sources that were crucial in imparting knowledge about the web resources included social networking websites, communication with colleagues, teachers, and library websites etc.

b) Departments of the institution along with the homes/hostels were identified as two of the popular location for accessing the web resource. The highest number of researchers who usually accessed web resources from their Departments were reported from DU (60.18 %) followed by JMI (57.54 %) and JNU (50.40 %).
c) A high percentage of researchers from DU (59.30%), JMI (62.30%), and (50.40%) admitted accessing web resources from the home however, a high percentage of respondents from JNU (65.99%) preferred to access web resources from the university library than DU (41.14%) and JMI (33.33%).

d) Weighted Mean scores obtained regarding the importance of various web resources in the select universities under the study revealed that there is a consensus on the importance of top four web resources. Results revealed that e-journals were found to be the most important web resource for research and academic work in DU (WM=4.85; R=1), JMI (WM=4.79; R=1), and JNU (WM=4.86; R=1) followed by e-books, online databases and e-reference sources such as online encyclopaedias, thesaurus and dictionaries.

**Purpose of Use**

Study explored the various purposes for which the web resources are used by the researchers of DU, JMI and JNU. Study found that the web resources are satisfactorily fulfilling the purposes for which they are used by the researchers. A summary of the result based on the purpose of using web resources is presented below:

a) The major purpose of using web resources was found to be using them for research work. Majority of researchers in DU (96.72%), JMI (96.03%) and JNU (96.15%) affirmed that they use web resources for research work. The study also found that a very high percentage of researchers in DU (82.06%) made use of web resources for writing research papers followed by JNU (77.94%) although, in JMI (68.65%) the percentage of researchers who accepted using web resources for writing research papers was low as compared to DU and JNU.

b) Analyzing the level of satisfaction with the use of web resources among researchers is very important. The study observed a high level of satisfaction among the researchers with the use of web resources for fulfilling the purpose of use as the majority of the respondents in DU (62.36%), JMI (49.60%) and, JNU (57.09%) were highly satisfied with the use of web resources. Moreover, a good percentage of them were satisfied i.e. 46.43 percent researchers from JMI, 35.83 percent from JNU and 33.48 percent from DU are satisfied with the use of web resources. The Weighted Mean range obtained for the level of satisfaction with
the use of web resources also depicts a consensus on the satisfaction level with the use of web resources in DU (WM=4.60), JMI (WM=4.44), and JNU (WM=4.48).

**Frequency of Use**

a) The study reveals that majority of the researchers in DU, JMI and JNU used web resources very frequently. 64.11 percent in DU, 60.71 percent in JMI and 54.86 percent in JNU said that they make use of web resources very frequently. On the other hand it was noticed that a very less percentage of respondents used web resources less frequently.

**Features**

The study presented a list of popular features of web resources to the researchers for the purpose of examining the features that are high on researcher’s priority as well as to know about the ones that are low on priority. The summarized results are presented below:

a) Availability of full text on the web resources was identified as the highest rated feature as depicted by their Weighted Means in DU (WM=4.75; R=1), JMI (WM=4.61; R=1) and JNU (WM=4.66; R=1) followed by ‘Open access’ or the free availability of web resources in DU (WM=4.59; R=2), JMI (WM=4.54; R=2) and JNU (WM=4.61; R=2). Downloading facility provided by the web resources was placed at rank third in DU (WM=4.54) and JNU (WM=4.56) followed by JMI (WM=4.45; R=4).

b) Whereas, alerting services, multimedia/ graphic capabilities and the interaction through the provision of commenting facility were not rated very high on importance by the researchers from DU JMI, and JNU as depicted by their Weighted Means.

**Hindrances and Problems**

The study made a detailed analysis of all the hindrances and problems that the users faced while using and accessing the web resources. It included a look up into the factors that deter the researchers from using the web resources as well as the problems that the researchers face while using web resources. Major findings on the hindrances and problems faced by the researchers are summarized below:

a) It was found that poor internet connectivity caused hindrance to majority of researchers irrespective of the universities they belonged to. Poor Internet
connectivity was revealed as a cause of hindrance to 69.44 percent researchers from JMI, 68.02 percent from JNU and 63.02 percent from DU.

b) Limited access to full text was identified as the major problem among researchers of DU, JMI and JNU while searching and accessing web resources. The study observed that a higher percentage of researchers in JMI (62.30%) stated that limited access to full text caused problems as compared to DU (53.61%) and JNU (56.48%). Moreover, the other prominent problems included lack of effective searching skills, downloading problems and information overload.

**Search and Access**

The study tried to cover all the areas relating to search and access of web resources i.e. to know about the preferred means and ways of searching and accessing web resources, the type of simple and advanced search strategy that the researchers generally use, the amount of time spent in searching and accessing web resources. Summarized results are presented below:

a) The study established that the highest percentage of researchers from DU, JMI and JNU searched and accessed web resources using the links provided through the search engines. It was found that 89.68 percent researchers in JMI, 88.62 percent in DU 87.65 percent in JNU get accessed web resources using links through search engines.

b) It is heartening to see that a good percentage of researchers in JNU made use of library websites for gaining access to web resources. Furthermore, Publisher’s websites and hyperlinked references in e-resources were also revealed as two of the popular means for getting access to web resources among the researchers of the select universities.

c) The study identified keyword searching as the most frequently used simple search technique as majority of researchers affirmed their preference for keyword searching. 76.72 percent researchers from JNU, 75.49 percent from DU and 73.02 percent from JMI made use of keyword searching.

d) Phrase searching was revealed as the most preferred form of advanced search technique used by the researchers of DU, JMI and JNU followed by the Boolean operators. 43.65 percent respondents from JMI, 42.91 percent from JNU and 39.82 percent from DU made use of phrase searching.
e) Study reveals that majority of researchers on an average spend 1-3 hours searching for web resources daily in DU, JMI and JNU. 59.31 percent respondents in JNU, 56.75 percent in JMI, and 56.02 percent in DU searched web resources for 1-3 hours daily. Moreover, a very small number of respondents searched the web resources for more than seven hours.

**Impact of Web Resources**

Use of web resources has changed the way in which the researches are done now a day. Study assessed the ways in which the use of web resources has impacted the researcher’s scholarly and academic work namely to determine the level of dependency on web resources, to assess the researcher’s level of agreement on the positive impact of web resources on their research work also, to know about the areas in which the web resources largely influenced the researcher’s research tasks. Major findings on the impact of web resources are summarized below:

a) The study analyzed the level of dependency on web resources based on the Likert Scale ranking and it was found that the researchers from DU, JMI and JNU were extremely dependent on web resources for their research and academic tasks. The weighted mean obtained for DU, JMI, and JNU was 4.13, 4.23, and 4.12 respectively on a five point Likert Scale ranging from 1 (Not very dependent) to 5 (Very dependent).

b) A significant percentage of researchers in DU (42.23%) JMI (40.08%) and JNU (39.88%) affirmed that they were extremely dependent on web resources. Furthermore, 45.63 percent respondents in JMI, 37.04 percent in JNU and 36.32 percent in DU opined that they are very dependent on web resources.

c) The study reveals that the researchers from DU, JMI and JNU strongly agreed to the positive impact of web resources on their research and academic work. The weighted mean scores obtained in DU, JMI and JNU are 4.58, 4.54 and 4.55 on a five point Likert Scale ranging from 5 (strongly agree) to 1 (strongly disagree) which signified a strong level of agreement among the researchers regarding the positive impacts of web resources on their research and academic work.

d) Majority of researchers in DU, JMI and JNU believed that the greatest impact that the web resources have on their research work and academic efficiency is that they have made it easier to find the needed material. 78.56 percent researchers from DU, 81.75 percent users from JMI and 81.98 percent researchers from JNU
stated that the easy availability of the needed material was the greatest influence of the web resources.

e) A good number of researchers agreed that uses of web resources are crucial in improving the quality of their work, also that the web resources played a significant role in increasing their research output.

Evaluation of Web Resources

The study made a thorough analysis of the areas included in the evaluation of web resources and for this purpose the study identified the criteria which the researchers preferred in the evaluation of web resources, the study also analysed the researcher’s satisfaction level with the quality of information retrieved through the web resources, it also checked the researcher’s level of evaluation skills as well as researcher’s perception about the credibility of information retrieved through the subscribed web resources versus the open access web resources.

a) Authority of the web resources was revealed to be the most important criteria in the evaluation of web resources among researchers of DU and JNU i.e. the researchers checked the Author’s and Publishers’ credentials for evaluating the authority of web resources however, in JMI evaluating the accuracy represented by peer reviewed/scholarly information was found to be the top criteria with rank one while the authority was ranked second.

b) Analysis of the satisfaction level of researchers with the quality of information retrieved through the web resources revealed that a significant percentage of researchers were satisfied with the quality of information retrieved through the web in the select universities under the study i.e. 43.72 percent researchers from JNU, 42.86 percent from JMI and 40.92 percent from DU were satisfied with the quality of information retrieved through the web.

c) The study revealed that a very low percentage of researchers in all the three universities under the study claimed that they possessed excellent evaluation skills i.e. they were able to judge the quality of information retrieved through the web. Data shows that 7.29 percent respondents from JNU stated that they possessed excellent skills for evaluating the web resources followed by DU (6.78%) and JMI (5.56%). However, a decent percentage of researchers considered themselves good at evaluating the quality of information retrieved through the web resources.
44.42 percent respondents from DU, 41.50 percent from JNU and 36.90 percent researchers in JMI claimed themselves good at evaluating web resources.

d) An ambiguity was observed among the researchers of DU, JMI and JNU regarding the credibility of the web resources. A significant percentage of researchers in DU (36.54%) and JNU (35.62%) admitted that subscribed web resources are more credible or authoritative than the open access web resources while, in JMI (30.15%) majority of respondents stated that that open access web resources are more credible.

e) The study also shows that a fair percentage of researchers from DU, JMI and JNU believed that both subscribed and open access resources are equally credible.

**Training and Guidance**

Training and guidance are absolutely necessary for the optimum utilization of web resources. Thus it is very necessary to ascertain the need for user training.

a) The study reveals that majority of researchers in DU, JMI and JNU accepted that user training can be very helpful i.e. 39.68 percent researchers in JMI, 38.51 percent in DU and 37.25 percent in JNU considered user training to be very helpful for the productive utilization of web resources. In addition to this it can also be observed that a considerable percentage of respondents considered user training to be extremely helpful for the better search and access of web resources. 33.20 percent researchers in JNU, 31.35 percent in JMI and 30.41 percent in DU stated that user training can be extremely helpful in the better search and retrieval of web resources.

b) The study reveals that that majority of researchers in DU, JMI and JNU exhibited a preference for hands on training/ workshop. 45.30 percent researchers in DU, 44.74 percent in JNU and 43.25 percent in JMI asserted on the need for hands on training/ workshops. Some of the other preferred form of training included orientation lectures, information-retrieval training and discipline-specific training.

**TENABILITY OF HYPOTHESES**

A thorough analysis of previous research investigations and related literature has been significant in formulating the hypothesis for the present study. In the light of findings the tenability of hypothesis is checked and is presented below:
Hypothesis 1

**H0:** There is no significant difference in the purpose of using web resources among the researchers of DU, JMI, and JNU.

**Ha:** There is significant difference in the purpose of using web resources among the researchers of DU, JMI, and JNU.

The response regarding the purpose of using web resources among the respondents in Table number 5.5 reveals that variation is observed in the purpose of using web resources for writing research papers. Results revealed that higher percentage of researchers in DU (82.06%) and JNU (77.94%) accepted that they made use of web resources for writing research papers than JMI where a contrast was observed i.e. the percentage of researchers who used web resources for writing research papers was a slightly lower in JMI (68.65%) as compared to DU and JNU.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>100684.111</td>
<td>2</td>
<td>50342.056</td>
<td>8.627</td>
<td>.003</td>
</tr>
<tr>
<td>Within Groups</td>
<td>87532.167</td>
<td>15</td>
<td>5835.478</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>188216.278</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis was tested by performing one way ANOVA to determine if there is any statistically significant difference in the purpose of using web resources among the researchers of DU, JMI, and JNU. Result of ANOVA test reveals that the obtained p value is .003 which is less than the significance level of 0.05 i.e. (p<0.05) that denotes that there is significant difference in the purpose of using web resources among the researchers of DU, JMI and JNU. **Hence, the null hypothesis is rejected and alternative hypothesis is accepted.**

Hypothesis 2

**H0:** There is no significant difference among the researchers of DU, JMI, and JNU in considering e-journals the most important form of the web resources used.

**Ha:** There is significant difference among the researchers of DU, JMI, and JNU in considering e-journals the most important form of the web resources used.

It is evident from the Table number 5.4 that e-journals were found to be the most important web resource for research and academic work. E-journals obtained the
highest Weighted Mean in all the select universities under the study i.e. in DU (WM=4.85), JMI (WM=4.79), and JNU (WM= 4.86). E-journals were thus placed at rank one on the level of importance by the researchers of all the select universities clearly making it the most important form of the web resources used by the researchers of DU, JMI, and JNU.

**Table 2: One-Way ANOVA Test Results for Importance of the E-journals**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>6797.200</td>
<td>2</td>
<td>3398.600</td>
<td>.141</td>
<td>.870</td>
</tr>
<tr>
<td>Within Groups</td>
<td>290005.200</td>
<td>12</td>
<td>24167.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>296802.400</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On applying ANOVA test for checking the presence of any significant difference among the researchers of DU, JMI and JNU in considering e-journals as the most important form of the web resources used, it was found that the calculated p value is .870 which is more than the significance level of 0.05 i.e. (p>0.05) and indicates that there is no significant difference among the researchers of DU, JMI, and JNU in considering e-journals the most important form of the web resources used. **Therefore, the null hypothesis is accepted and the alternative hypothesis is rejected.**

**Hypothesis 3**

**H0:** There is no significant difference in the level of satisfaction with the use of web resources among the researchers of DU, JMI, and JNU.

**Ha:** There is significant difference in the level of satisfaction with the use of web resources among the researchers of DU, JMI, and JNU.

Responses regarding level of satisfaction with the use of web resources in Table number 5.6 makes it clear that majority of respondents in DU (62.36%), JMI (49.60%) and, JNU (57.09%) are highly satisfied with the use of web resources. Moreover, a good percentage of them are satisfied i.e. 46.43 percent researchers from JMI, 35.83 percent from JNU and 33.48 percent from DU are satisfied with the use of web resources. The Weighted Mean range obtained for the level of satisfaction with the use of web resources also depicts a consensus on the satisfaction level with the use of web resources in DU (WM=4.60), JMI (WM=4.44), and JNU (WM=4.48).
Table 3: One-Way ANOVA Test Results for Level of Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>6797.200</td>
<td>2</td>
<td>3398.600</td>
<td>.286</td>
<td>.756</td>
</tr>
<tr>
<td>Within Groups</td>
<td>142453.200</td>
<td>12</td>
<td>11871.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>149250.400</td>
<td>14</td>
<td></td>
<td>.286</td>
<td>.756</td>
</tr>
</tbody>
</table>

Results of the ANOVA reveals that the calculated p value is .756 which is more than the significance level of 0.05 i.e. (p>0.05) which shows that there is no significant difference in the level of satisfaction with the use of web resources among the researchers of DU, JMI and JNU. Hence, the null hypothesis is accepted and the alternative hypothesis is rejected.

Hypothesis 4

**H0:** Use of web resources has not positively impacted the research and scholarly work of the researchers in DU, JMI, and JNU.

**Ha:** Use of web resources has positively impacted the research and scholarly work of the researchers in DU, JMI, and JNU.

The analysis and discussions in Table number 5.15. Table number 5.16 and Table number 5.17 clearly shows that use of web resources has positively impacted the research and scholarly work of the researchers in DU, JMI, and JNU. Table number 5.15 makes it apparent that researchers in all the select universities under the study exhibited a high level of dependency on the web resources. A significant percentage of researchers in DU (42.23%) JMI (40.08%) and JNU (39.88%) affirmed that they are extremely dependent on web resources. Furthermore, 45.63 percent respondents in JMI, 37.04 percent in JNU and 36.32 percent in DU opined that they are very dependent on web resources.

Responses on level of agreement on positive impact of web resources in Table number 5.16 make it evident that use of web resources is positively impacting the researcher’s research work as majority of researchers in all the select universities under the study strongly agreed that the use of web resources has had a positive impact on their research work. 62.58 percent in DU, 60.53 percent in JNU and 59.92 percent in JMI strongly agreed that web resources have positively impacted their research work. The Weighted Mean scores obtained by the findings of the select
universities exhibited a concurrence among the researchers of DU (WM=4.58), JMI (WM=4.54), and JNU (WM=4.55) regarding the positive impact of web resources on their research work.

Table 5.17 illustrates that the use of web resources have impacted researcher’s academic and research work in variety of ways such as it has made it easier to find the needed material, improved the quality of work, extended the range of the material that is available. Though, Table number 5.17 clearly shows that the ease of use prevailed over all the other factors. **Hence, the null hypothesis is rejected and alternative hypothesis is accepted.**

**Hypothesis 5**

**H0:** Majority of the researchers from DU, JMI, and JNU do not consider user training helpful for better search and access of the web resources.

**Ha:** Majority of the researchers from DU, JMI, and JNU consider user training helpful for better search and access of the web resources.

Table 5.22 depicts that majority of researchers in DU, JMI and JNU accepted that user training can be very helpful i.e. 39.68 percent researchers in JMI, 38.51 percent in DU and 37.25 percent in JNU considered user training to be very helpful for the productive utilization of web resources. In addition to this it can also be observed that a considerable percentage of respondents considered user training to be extremely helpful for the better search and access of web resources. 33.20 percent researchers in JNU, 31.35 percent in JMI and 30.42 percent in DU stated that user training can be extremely helpful for better search and retrieval of web resources. On the basis of the analysis, it can be conclude that majority of the researchers from DU, JMI, and JNU consider user training helpful for better search and access of the web resources. **Hence, the null hypothesis is rejected and alternative hypothesis is accepted.**

**SUGGESTIONS AND RECOMMENDATIONS**

On the basis of findings derived from the study following suggestions are made for improving and ensuring the productive use of web resources by the researchers:

i. The study found that subject gateways/portals, institutional repositories, online indexing and abstracting sources, in spite of being valuable information sources were rated low on popularity among the researchers of DU, JMI, and JNU as compared to the other web resources thus, the study suggests that awareness about these sources should be created highlighting their importance in research
and scholarly work.

ii. The efficacy of social networking websites in today's age is undeniable thus social networking websites can be significantly helpful in serving as an important platform for creating awareness about the web resources.

iii. The study found that library website was identified as a major source to provide information about the web resources in JNU; hence the necessary efforts can be made for highlighting the importance of library websites among the researchers of DU and JMI also serving as a pivotal channel for accessing high quality scholarly web resources.

iv. Faculty members were revealed as an important source of familiarizing students to web resources in DU, JMI and, JNU hence, the faculty members can play a vital role in acquainting and guiding their students to pertinent web resources.

v. The study revealed that accessing web resources from the university library was not on priority among the researchers from DU, and JMI as compared to JNU. Hence the necessary efforts can be made in DU and JMI to ensure that the library becomes a preferred place for accessing web resources.

vi. Study found that the researchers from the select university under the study preferred to make use of Boolean operators and phrase searching while the other advanced searching techniques were underutilized. Therefore, measures can be taken to ensure search and information retrieval training programs for the researchers where they can learn to search literature by utilizing different searching techniques. As the use of advanced searching techniques can very effectively retrieve the required information from the deep web.

vii. Study identified information overload as a common problem among the researchers of the select universities therefore designing and disseminating information literacy tutorials among the user group can be very helpful to them in identifying, locating, evaluating, and effectively using the pertinent information from the vast amount of information retrieved.

viii. The study established the popularity of open access web resources among the researchers of DU, JMI and JNU therefore, notifying researchers of various open access resources and websites may be a great way of familiarizing them to a number of open access quality resources available on web.

ix. Live demonstration and special lectures by the publishers of scholarly literature can be arranged exhibiting features, search and retrieval techniques of the various
web resources in the different disciplines.
x. Circulation of various training resources such as self help guides, manuals along with the supplementary material such as video tutorials may be very useful in enhancing the awareness about various web resources. Circulating the material can be particularly helpful to those who are unable to attend the workshops due to time constraints or some other reasons.
xi. Well trained and skilled staff, who are well aware of the functioning of both software and hardware, and can help the users in areas like accessing, downloading, and proper exploitation of web resources can be recruited by the universities.
xii. Study revealed that poor internet connectivity was a major factor that hindered the use of web resources among the researchers of DU, JMI, and JNU hence, higher bandwidths should be sought to alleviate the problem of internet connectivity so as to provide faster access to web resources that will save valuable time of the researchers.
xiii. An adequate number of the respondents showed preference for user training/ workshop hence, to ensure proficient and productive use of web resources by the researchers, hands on training, workshops, and orientation programs can be provided to them at regular intervals.
xiv. A significant percentage of researchers in DU, JMI and JNU exhibited preference for discipline-specific training therefore, training pertaining to searching and retrieving of web resources related to a specific disciplines can be arranged for catering to the information of these specific users.
xv. Proper feedback system should be introduced to analyze the pros and cons of the web resource usage so that the problem areas can be identified and necessary steps can be taken to solve them effectively.

AREAS FOR FURTHER RESEARCH

The present study depicts the current state of scholarly use of web resources and explores the factors related to the use of web resources. The study can be replicated in various other ways. Based on the findings, the following recommendations have been made for further research:

- The present study was conducted among the central universities of Delhi; the study can be extended to other central universities of India.
• The study can be replicated among the premier higher learning institutes in India in the field of Science and Technology, Management and Medical Sciences.

• A comparative study can be undertaken to assess the scholarly use of web resources in various disciplines in order to determine the gap in the use of web resources across different disciplines.

• A comparative analysis examining the use of web resources from gender perspective i.e. the study addressing the gender variation in the use of web resources by male and female users can be researched.