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# Assessing Digital Literacy Skills of Research Scholars of Punjab Agricultural University, Ludhiana: A Study

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***Abstract***

*The present study explores the status of digital literacy skills of research scholars of Punjab Agricultural University, Ludhiana, their purpose and frequency of using digital tools, their familiarity with digital devices and the usefulness of Information and Communication Technology tools to them. A well-structured questionnaire was designed to collect data for the present study. The major findings of the study are that majority of the students are familiar with using 'laptops', 'desktop PCs', 'cell phones' and 'USB.' Online databases and e-theses/dissertations were rated as very useful by majority of the researchers. A majority of respondents were using ICT tools to update their knowledge and for writing research papers' for conferences/seminars. On the basis of the findings, some recommendations have been put forwarded to improve the digital literacy skills of the researchers.*

***Keywords:*** *Digital literacy, information age, ICT tools, web-applications, digital resources*

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## INTRODUCTION

In a networked society, information available is diverse in nature and also in a variety of formats. The proliferation of information in varying forms and formats require individuals to be equipped with technological expertise for locating and accessing information. In the fast-changing age where "today's truth become tomorrow's outdated concepts, individuals who are unable to use pertinent information are almost as helpless as those who were unable to read and write" (Breivik and Gee, 2006) [1].

The availability of information in digital or virtual form requiring individuals to be equipped with both cognitive and technological skills to access, store, process and use digital information. "Information users may be bewildered by a variety of digitized information. The process of identifying and selecting information has become complex. It is critical to promote information literacy in the digital age. Computers have become a necessary part of this digital society, and skills for computer use is a common prerequisite on many job applications" (Maharana and Mishra, 2007) [2]. Digital literacy skills are as pertinent as information literacy in order to survive in this information age.

## DIGITAL LITERACY: THE CONCEPTUAL FRAMEWORK

Glister (Brar, 2015) defines digital literacy as, "set of skills to access the internet; find, manage and edit digital information; join in communications; and otherwise engage with an online information and communication network. In simple terms, digital literacy is the ability to properly use and evaluate digital resources, tools and services and apply it to their lifelong learning process."

California Emerging Technology Fund ICT digital literacy initiative (2008) [3] defines the term as "ability to use digital technology and communications tools, and/or networks to access, manage, integrate, evaluate, create and communicate information in order to function in a knowledge society."

The American Library Association's Digital Literacy Taskforce (2011) [4] defines digital

 

literacy as "the ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both cognitive and technical skills. A digital literate person is one who is able to:

- Possesses the variety of skills-technical and cognitive-required to find, understand, evaluate, create, and communicate digital information in a wide variety of formats;
- Is able to use diverse technologies appropriately and effectively to retrieve information, interpret results, and judge the quality of that information;
- Understands the relationship between technology, lifelong learning, personal privacy, and stewardship of information;
- Uses these skills and the appropriate technology to communicate and collaborate with peers, colleagues, family, and on occasion, the general public; and
- Uses these skills to actively participate in civic society and contribute to a vibrant, informed, and engaged community."

From above definitions, digital literacy seems the use of digital tools to select, access, evaluate, use and communicate information effectively. Digital literate person is one who has all the cognitive skills of information literacy in addition to knowledge of technological tools to make use of digital sources of information.

## REVIEW OF RELATED LITERATURE

Maharana and Mishra (2007) conducted a survey to measure the digital information literacy of faculty of Sambalpur University, Orissa. The results of the survey revealed that 82.86% faculty were computer literate while 98.57% respondents expressed their need for electronic information in addition to traditional print sources. 82.86% respondents preferred electronic journals. The researchers also found that e-books, subject gateways and e-archives were less popular among the teaching community. The results of the survey revealed that 92.8% respondents used e-resources to keep their knowledge up-to-date. Authenticity and reliability were the most important parameters for evaluation of online resources. The authors recommended that the central library of the university should start digital information literacy programme to teach the faculty.

Chandrashekara, Ramasesh and Raju (2012) [5] assessed digital information literacy skills of postgraduate students at University of Mysore, Mysuru, Karnataka. Findings of the study revealed that all of the respondents were highly computer and internet literate. 87.34% of the respondents got training in the use of computer and internet. 94.66% respondents preferred e-newspapers to access digital information. 74.67% of the total sample used digital resources to keep their knowledge up-to-date while 29.33% for prepare notes and write assignments. About half of the respondents (57.33%) were familiar with digital information sources. Google was the most preferred tool for accessing digital information for 72% respondents. The researchers also found that 30% of the sample considered authority as an evaluation parameter to check quality of the digital information available over the internet.

Khatun (2013) [6] conducted a study of library staff of Oslo Public Library, Norway to investigate their digital information literacy. The findings of the study showed that majority of the staff used information technology for 7-10 hours daily for their work and personal purposes, have the ability to search beyond Google and were able to find more appropriate or accurate information.

Shopova (2014) [7] surveyed digital literacy of students of South-West University, LA, USA. The results of the survey indicated that 96% students had access to internet and used the web daily. The findings of the study also showed that 83% of respondents preferred Google over other search engines for finding information. 91% respondents were able to create and send e-mails and work with attachments. 76% respondents had skills to create and format documents, to generate tables, pictures and images.

Bansal (2015) [8] assessed digital literacy of undergraduate students of Fateh Chand College for Women, Hisar. The findings showed that majority of undergraduate students of this region preferred to use computer on weekly basis. The study showed very striking results as 27% respondents stated that they had never

used computer. Only 34 % students of arts, 46% students of science and 58 % students of commerce were familiar with E-mail.24 % arts students were not able to identify components of computer. Only 14 % students were very confident in the use of search engine and 20 % students had skills to use net-banking.

Anjaiah (2016) [9] examined digital information literacy of students and researchers of Dravidian University, Andhra Pradesh. Results showed that 63.28% respondents have PCs, laptops, smartphones and tabs. 45.91% respondents visited digital library of the university daily for accessing digital information. 86.73% respondents preferred e-books over other electronic resources.

## THE RESEARCH PROBLEM

In this digital age, information is packaged in multifaceted form and formats. The question arises are researchers able to use various digital formats to access, organize and analyze the information. Do researchers have sufficient skills to keep pace with advancements in ICT tools and techniques? The research problem involves a study of digital literacy skills among research scholars with a view to assess the existing scenario and to put forward recommendations for enhancing the level of digital literacy among the researchers.

## PUNJAB AGRICULTURAL UNIVERSITY, LUDHIANA

Originally established in 1962, Punjab Agricultural University (PAU) has played a key role in increasing food grain production in the Punjab state. Modeled on the pattern of land grant colleges in USA, the Punjab Agricultural University performs the integrated functions of teaching, research and extension in agriculture, agricultural engineering, home science and allied disciplines. At present through 28 departments in four constituent colleges, PAU offers 31 Master's and 30 Ph.D. programmers. The university has well equipped laboratories, library and lecture rooms and five elaborate seed farms. The PAU has made notable contributions in increasing livestock and poultry production and bringing an era of green revolution in India. In recognition of education and extension, it was adjudged the best agricultural university in India in 1995.

### M.S. Randhawa Library

The Government Agriculture College Ludhiana became the university's constituent unit and the library of this college became the main library of PAU. Initially it was established with a meager collection of 200 books in 1959 in college of agriculture. With the reconstruction of this temple of learning in 1972, the library was renamed as Mohinder Singh Randhawa Library to honor its founder Dr. M.S. Randhawa, the then vice-chancellor of PAU. The aim of the library is to provide rich knowledge to its users and to extend it further in terms of information technology, automation and networking.

The present beautiful five-storey building of the library is centrally air-conditioned, centrally located and surrounded by lush green lawns with covered area of 93,320.ft. It is one of the best libraries of the agricultural universities and equipped with all the modern facilities and state of the art technologies to cater to the needs of the users. Presently, library has collection of 401580 documents which includes 254326 books, 38294 theses, 104586 bound periodicals and 4490 e-documents. The library subscribes to 40 Indian, 24 Foreign and 12 online journals.

## OBJECTIVES OF THE STUDY

The objectives of the study are:

- To find out the computer and internet literacy of the researchers;
- To know their purpose and frequency of use of digital tools;
- To know their familiarity with digital devices and web-based applications;
- To assess the IT skills of the researchers;
- To evaluate the usefulness of ICT tools to the researchers.

## HYPOTHESES

The hypotheses of the study are:

- That the researchers have sufficient skills to use computer and internet;
- That the researchers have familiarity with various digital devices and web-based applications;
- That the researchers have sufficient skills to use ICT tools and techniques;
- That the researchers regularly make use of digital devices;
- That ICT tools are very useful to researchers.

## RESEARCH METHODOLOGY

Keeping in view the above objectives, a well-structured questionnaire was designed to collect the data from the respondents. The questionnaire covers a variety of topics pertaining to their digital literacy skills. There were no formal interviews conducted for the study as most of the questions were asked in the questionnaire itself. However, informal interviews were conducted with the researchers whenever the need was felt. Population consists of Ph. D. scholars of Punjab Agricultural University. Total 100 questionnaires were distributed among researchers, out of which 86 filled in questionnaires were received back. This constitutes more than 80% of the total response, which is considered satisfactory representative of the total population, and the same was used for analysis purpose. For collecting relevant data about the library, library records and reports were consulted. In addition, the problem was thoroughly probed and explored through the available literature.

## DATA ANALYSIS AND INTERPRETATION

Table 1 gives analysis of familiarity of respondents with digital devices. The results show that all the students of PAU were familiar with using 'laptops', 'desktop PCs', 'cell phones' and 'USB.' The other digital devices in order of preference are 'notebook smart phone' (79.07%), 'kindle' (26.74%), 'digital camera' (17.44%), 'i-pod' (12.79%) and 'i-pad' (10.46%). The least familiarity is shown towards 'scanner' (4.65%).

Table 2 exhibits the possession of digital devices by respondents. The results of the table reveal that all respondents have 'cell phones'. Majority of the respondents possessed 'laptop' (90.69%), followed by 'USB' (93.02%). 37.21% respondents owned 'digital camera' whereas 29.07% of the respondents have 'desktop PCs' at their home. However 'i-pad' (12.79%), 'i-pod' (5.81%), 'Kindle' (5.81%), 'notebook smart phone' (4.65%) and 'scanner' (2.32%) were possessed by least number of researchers.

When asked about their familiarity with web-based applications, all of the respondents stated that they have sufficient skills of using 'e-mail', 'Facebook' and 'WhatsApp.' The table shows that among the other web-based applications, 'Youtube' comes to fore with 91.86% responses followed by 'Instagram' (83.72%), 'Twitter' (72.09%), 'Skype' (25.58%) and 'web blogs' (20.93%).

***Table 1:*** *Familiarity with Digital Devices.*

| ICT tools | No. of users | Percentage |
|---|---|---|
| Laptop | 86 | 100.00 |
| Desktop | 86 | 100.00 |
| Kindle | 23 | 26.74 |
| Notebook smart phone | 68 | 79.07 |
| Cell phone | 86 | 100.00 |
| Digital camera | 15 | 17.44 |
| Scanner | 4 | 4.65 |
| i-pod | 11 | 12.79 |
| i-pad | 9 | 10.46 |
| USB (pen drive) | 86 | 100.00 |

***Table 2:*** *Digital Devices Possessed by Students.*

| ICT tools possessed | No. of users | Percentage |
|---|---|---|
| Laptop | 78 | 90.69 |
| Desktop | 25 | 29.07 |
| Kindle | 5 | 5.81 |
| Notebook smart phone | 4 | 4.65 |
| Cell phone | 86 | 100.00 |
| Digital camera | 32 | 37.21 |
| Scanner | 2 | 2.32 |
| i-pod | 5 | 5.81 |
| i-pad | 11 | 12.79 |
| USB (Pen drive) | 80 | 93.02 |

***Table 3:*** *Familiarity with Web-based Applications.*

| Applications | No. of users | Percentage |
|---|---|---|
| E-mail | 86 | 100.00 |
| Facebook | 86 | 100.00 |
| Twitter | 62 | 72.09 |
| YouTube | 79 | 91.86 |
| Web blogs | 18 | 20.93 |
| Skype | 22 | 25.58 |
| WhatsApp | 86 | 100.00 |
| Instagram | 72 | 83.72 |

***Table 4:*** *Frequency of Use of Web-based Applications.*

| Applications | Daily | 3–5 times a week | 1–2 times a month | Rarely | Never |
|---|---|---|---|---|---|
| E-mail | 79 (91.87) | 5 (5.81) | 2 (2.32) | 0 | 0 |
| Facebook | 71 (82.56) | 12 (13.95) | 3 (3.49) | 0 | 0 |
| Twitter | 45 (52.33) | 10 (11.62) | 13 (15.11) | 10 (11.62) | 8 (9.30) |
| YouTube | 58 (67.44) | 8 (9.30) | 12 (13.95) | 5 (5.81) | 3 (3.49) |
| Web blogs | 10 (11.62) | 11 (12.79) | 20 (23.25) | 28 (32.55) | 17(19.76) |
| Skype | 17 (19.76) | 13 (15.11) | 17 (19.76) | 26 (30.23) | 13(15.11) |
| WhatsApp | 80 (93.02) | 6 (6.98) | 0 | 0 | 0 |
| Instagram | 33 (38.37) | 36 (41.86) | 10 (11.62) | 5 (5.81) | 2 (2.32) |

***Table 5:*** *Usefulness of Information Resources.*

| Information resources | Very useful | Useful | Sometimes useful | Not useful |
|---|---|---|---|---|
| Subject gateways | 22 (25.58) | 38 (44.18) | 26 (30.23) | 0 |
| Web portals | 42 (48.83) | 28 (32.55) | 13 (15.11) | 3 (3.48) |
| Web directories | 2 (2.32) | 32 (37.20) | 52 (60.46) | 0 |
| Digital libraries/archives | 31(36.04) | 40 (46.51) | 15 (17.44) | 0 |
| Institutional Repositories | 30 (34.88) | 42 (48.83) | 14 (16.27) | 0 |
| Online databases | 55 (63.96) | 25 (29.06) | 6 (6.97) | 0 |
| Facebook/Twitter | 0 | 5 (5.81) | 46 (53.49) | 35 (40.70) |
| Open access e-books/e-journals | 44 (51.16) | 34 (39.53) | 8 (9.30) | 0 |
| E-theses/dissertations | 55 (63.96) | 25 (29.06) | 6 (6.97) | 0 |
| E-newspapers | 7 (8.14) | 16 (18.60) | 58 (67.45) | 5 (5.81) |

Table 4 shows frequency of use of web-based applications by respondents. The analysis of the table reveals that majority of the respondents (93.02%) used 'WhatsApp' daily followed by 'e-mail' (91.87%), 'Facebook' (82.56%), 'Youtube' (67.44%) and 'Twitter' (52.33%). 41.86% respondents update their Instagram account '3–5 times a week.' The table shows very striking results as 'web blogs' and 'Skype' were rarely used by respondents with 32.55% and 30.23% responses respectively.

Table 5 represents analysis of usefulness of various information resources to respondents. Majority of the researchers (63.96%) rated 'online databases' and 'e-theses/dissertations' very useful to them followed by 'Open access e-books/e-journals' (51.16%) and 'web portals' (48.83%). 'Institutional repositories', 'digital libraries/archives' and 'subject gateways' were found to be useful by 48.83%,46.51% and 44.18% researchers, respectively. Among the other information resources, 'e-newspapers' (67.45%) and 'web directories' (60.46%) were rated sometimes useful by respondents. However, 40.70% researchers reported that 'facebook/twitter' is not useful to them.

Table 6 gives analysis of IT skills of respondents. Among the various IT skills, 'Internet' comes to top with 83.72% responses followed by 'MS Office/DTP tools' (50%). Only 4 (4.65%) researchers have skills to use 'programming languages'.

***Table 6:*** *IT Skills.*

| IT skills | No. of users | Percentage |
|---|---|---|
| Internet applications | 72 | 83.72 |
| MS Office/DTP tools | 43 | 50.00 |
| Multimedia | 12 | 13.95 |
| Programming languages | 4 | 4.65 |

***Table 7:*** *Source of Learning IT Skills.*

| Source | No. of users | Percentage |
|---|---|---|
| Information professionals | 68 | 79.07 |
| Library staff | 11 | 12.79 |
| Friends | 3 | 3.49 |
| Trial and error method | 4 | 4.65 |

Table 8 shows analysis of researchers' purpose of using ICT tools. A majority of respondents (86.05%) stated that they use ICT tools to enhance their knowledge.82.56% researchers were using ICT tools to write research papers' for conferences/seminars, 'making presentations' (80.23%) and 'edutainment' (72.09%). 67.44% of the respondents were using ICT for the purpose of 'online reading' followed by 46.51% for their 'career development.' The purpose 'online shopping' is the one that motivates the least (33.72%).

Table 9 provides information about the respondents under study regarding their preference for the merits of ICT tools. Most of the respondents strongly agreed that ICT tools are 'helpful in their research work', 'gives faster access to information', 'easy to use' and 'provides access to current information' with 82.56%, 81.39%, 67.44% and 56.98% responses, respectively. 61.63% of the respondents stated that they use ICT tools because it is 'easy to copy and share information from the internet.'

Table 10 provides data regarding opinion of the respondents about the demerits of ICT tools. The most disliked disadvantage is 'plagiarism'. About59.30% respondents cited 'plagiarism' as a major demerit of ICT tools. About 48.84% respondents were unsure about the quality of information available on the internet. Difficult to study for long hours on monitor was another demerit of ICT tools reported by 46.51% respondents. About 55.81% researchers have preference towards traditional system of learning.

## FINDINGS AND RECOMMENDATIONS

All the research scholars of PAU were familiar with using 'laptops', 'desktop PCs', 'cell phones' and 'USB' and majority of them possessed 'laptop' (90.69%), followed by 'USB' (93.02%).

Majority of the researchers (93.02%) were using 'WhatsApp' daily followed by 'e-mail' (91.87%), 'Facebook' (82.56%), 'Youtube' (67.44%) and 'Twitter' (52.33%) while 'web blogs' and 'Skype' were rarely used by respondents.

Online databases and e-theses/dissertations were rated as very useful by 63.96% of researchers followed by 'Open access e-books/e-journals' (51.16%) and 'web portals' (48.83%). About 40.70% researchers reported that 'Facebook/Twitter' is not useful to them.

***Table 8:*** *Purpose of using ICT Tools.*

| Purpose | No. of users | Percentage |
|---|---|---|
| Career development | 40 | 46.51 |
| Edutainment | 62 | 72.09 |
| Making presentations | 69 | 80.23 |
| Online reading | 58 | 67.44 |
| Online shopping | 29 | 33.72 |
| Updating knowledge | 74 | 86.05 |
| Writing paper(s) | 71 | 82.56 |

***Table 9:*** *Merits of ICT Tools.*

| Merits of ICT tools | Strongly agree | Agree | Neutral | Strongly disagree | Disagree |
|---|---|---|---|---|---|
| Provides access to current information | 49 (56.98) | 30 (34.89) | --- | 5 (5.81) | 2 (2.32) |
| Quick/faster access to information | 70 (81.39) | 10 (11.63) | --- | --- | 6 (6.98) |
| Helpful in my research work | 71 (82.56) | 13 (15.12) | --- | 1 (1.16) | 1 (1.16) |
| Easy to use | 58 (67.44) | 18 (20.93) | --- | 6 (6.98) | 4 (4.65) |
| Easy to copy and share information from the internet | 21 (24.42) | 53 (61.63) | 2 (2.32) | 3 (3.49) | 7 (8.14) |

***Table 10:*** *Demerits of ICT Tools.*

| Demerits of ICT tools | Strongly agree | Agree | Neutral | Strongly disagree | Disagree |
|---|---|---|---|---|---|
| Unsure about the quality of information available on the internet (authenticity) | 31 (36.05) | 42 (48.84) | 2 (2.32) | 5 (5.81) | 6 (6.98) |
| Difficult to study for long hours on monitor | 40 (46.51) | 30 (34.89) | --- | 5 (5.81) | 11 (12.79) |
| I prefer traditional system of learning | 20 (23.25) | 28 (32.56) | 15 (17.44) | 13 (15.12) | 10 (11.63) |
| Copyright infringement is more in case of digital information (plagiarism) | 17 (19.77) | 51 (59.30) | --- | 10 (11.63) | 8 (9.30) |

A majority of the researchers (79.07%) learnt to use ICT tools from 'information professionals.' while only 12.79% of them learnt to use these tools from 'library staff'.

A majority of respondents (86.05%) were using ICT tools to update their knowledge and 82.56% for writing research papers' for conferences/seminars.

Most of the respondents strongly agreed that ICT tools were 'helpful in their research work', 'gives faster access to information', 'easy to use' and 'provides access to current information'.

Some of the demerits of ICT tools that were reported by respondents include plagiarism, authenticity, difficulty to study for long hours on monitor and preference towards traditional system of learning.

**Recommendations**

- Training should be provided to the research scholars of PAU to search/browse digital resources effectively.
- The library should organize workshops, seminars on digital literacy regularly for researchers and postgraduate students.
- There is a need to assess digital literacy skills of researchers at regular intervals so that necessary training could be provided to them, if required.

## CONCLUSION

The study of digital literacy reveals that a lot of work remains to be done in this subject. Higher education institutions have incorporated a course on research methodology in curriculum of postgraduate courses in which research methods and techniques are taught. But the multidimensional nature of information available in digital formats poses problems for individuals to access and use it. "There is an important need to address ICT-related skills (e-skills) issues in order to respond to the growing demand for highly-skilled ICT practitioners and users, meet the fast-changing requirements of industry, and ensure that every citizen is digitally literate in a lifelong learning context" (Commission of the European Communities, 2007) [10]. Government of India has started National Digital Literacy Mission (NDLM) with an aim to empower at least one member in a family with digital literacy skills. Digital literacy competency is an essential trait for researchers and knowledge workers.

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