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Evaluation of Digital Literacy and Knowledge Competencies of Iranian Academic Librarians

Maryam Moghadami Research Scholar
Tehran University, Iran, maryammoghadami68@gmail.com

Mila Malekolkalami Research Scholar
Tehran University, Iran, Milamalekolkalami@gmail.com

Marisennayya Senapathy Dr.
Wolaita Sodo University, Ethiopia, drsenapathy@gmail.com

Hassan Mantegh
Tarbiat Modares University, hassan.mantegh@gmail.com

Evaluation of Digital Literacy and Knowledge Competencies of Iranian Academic Librarians

Maryam Moghadami[1], Mila Malekolkalami[2] and Senapathy.M[3], Ph.D.*

Abstract:

Purpose: This study aims to assess the Digital Literacy and Knowledge Competencies of Iranian Academic Librarians. Also, librarians' challenges in acquiring digital literacy skills are assessed.

Method: The present study is a survey method. The data collection tool was a researcher-made questionnaire in 4 main components and 31 items among 166 experts in librarianship and information. Cronbach's alpha test was used to determine the reliability of the measuring instrument, and structural validity was used to evaluate the validity of the measuring instrument. In this study, KMO and Bartlett tests were used to perform factor analysis.

Findings: In the Digital literacy skills component, the digital library development skill is medium-level. All items in the Level of Qualifications and knowledge competencies of librarians, except the indexing of electronic resources, are medium-level. The items in the Digital competencies of librarians in implementing security measures to protect digital content are at the medium level.

Conclusion: Library management should make available the technical resources available in the university libraries to encourage librarians to use the resources. Digital skills competency should be considered when hiring librarians.

Keywords: Digital Literacy, Digital Technology, Knowledge Competencies, Digital Librarians, Digital Challenges, Knowledgte Security Challenges, Digital Literacy Skills, Digital resources, Reliability and Validity, Iranian

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1. **Ph. D. Research Scholar,** Maryam Moghadami, Tarbiat Modares University of Iran, Tehran, Iran.
   Email: maryammoghadami68@gmail.com

2. **Ph. D. Research Scholar,** Mila Malekolkalami, Tarbiat Modares University of Iran, Tehran, Iran.
   Email: Malekolkalami@modares.ac.ir

3. ***Corresponding Author:** Associate Professor, Department of Rural Development and Agricultural Extension, College of Agriculture, Wolaita Sodo University, Ethiopia, East Africa.
   Email:drsenapathy@gmail.com

Introduction

Libraries around the world are advancing in various fields of information technology and digitization. Today, libraries have various services, from digitizing resources to virtual reality

services, holding online conferences, 3D websites, podcasts and distance learning courses, etc. Digital space has become an integral part of librarians' lives in today's world. To be successful in the digital world and to use its capacities and facilities in work, study, and daily life, a set of new skills is needed. These skills are expressed in different terms such as computer literacy, digital literacy, information literacy, media literacy, etc. Types of literacy overlap, but in general, digital literacy is the skills needed to live in the digital world and use technological tools.

Digital literacy is a set of skills that enable people to use digital space to succeed in their personal, academic, and professional lives. Digital literacy is simply the ability to find, evaluate, use, and share information and produce content using information technology and the Internet (Sarrafzadeh, 2020).

The growth of technology has had a significant impact on the performance of libraries, on the training of librarians, on the skills and competencies of library employers' expectations, and on the curriculum in library courses. Technologies are changing, and librarians must welcome them with interest. Librarians in this digital age need more than ever to embrace digital literacy skills. Digital literacy helps professionals develop skills in all activities in life, and it can enhance their financial status and improve their overall job performance and standard of living.

University library users are primarily students. According to their research, students should have sufficient digital literacy skills to make progress in their careers. In the field of academic libraries, user-centric approaches are a new concept that has embraced traditional services. The growth of technology has led to creating "informal networks" that included email, mailing lists, newsgroups, chats, instant messaging, classroom discussion boards, and other Internet-based tools that develop information in academic libraries more than ever. These tools are just some of the tools that have drastically changed information technology in academic libraries (Wang, 2013).

Using digital literacy skills, librarians will be equipped with a variety of resource sharing processes, social networking, instant messaging and blogging, and other digital skills activities related to university library services. These skills help them to provide users with the information and training they need. Digital skills are skills that all information professionals should be able to acquire. Given the importance of digital literacy in all professions, including in academic libraries, this article aims to assess digital literacy skills and librarians' knowledge and security competencies in the digital age. The findings of this study will be helpful for library management decision-making for the processes of hiring, training, and developing librarians and equipping libraries with digital resources for learning. It is also essential to know the importance of digital literacy skills for librarians to allocate adequate funding to university libraries.

Research background

This section consists of two parts. The first part is the concept of digital literacy, and the second part is a review of digital literacy research among librarians.

Concept of Digital Literacy

Bawden (2008) defined digital literacy as a set of attitudes, perceptions, and skills for managing and communicating effectively with information and knowledge in various media and formats. Digital literacy can navigate effectively and critically, evaluate, and create information using a wide range of digital technologies. This requires an "accurate knowledge and use of the power of digital media conversion, pervasive distribution and their easy adaptation to new forms" (Jenkins, 2009).

People with digital literacy have a wide range of digital skills, including knowledge of digital tools, computer networking skills, the ability to participate in online communities and social networks by following behavioural protocols, and finding, recording, and evaluating Information, and having critical thinking (Gui & Argentin, 2011).

Finn (2004) takes a narrower and more precise view of the concept of digital literacy, stating that digital literacy is a means of determining a person's computer skills in the workplace.

Khan and Waheed (2015) have defined digital literacy as performing tasks effectively in the current digital information environment. They also show that when a person can interpret digital media such as audio, images, text and generate new information, they are digitally literate. Thus, digital literacy combines various literacy types such as visual photo literacy (the possibility of rearranging digital content to create new meaning), media literacy, information literacy (effective information retrieval method), and socio-emotional literacy.

In another study, Lankshear & Knobel (2006) called digital literacy skills of mastering and utilizing a wide range of technological, cognitive, and social competencies. Digital literacy skills, in their view, include the ability to work effectively with computers and search the web, manage large volumes of information, assess their reliability, and evaluate technological tools critically, but are not limited to these.

In fact, digital literacy is the ability to collaborate effectively in virtual learning environments to solve problems and communicate appropriately in participatory social environments through technology. Thus, digital literacy is not limited to familiarity with computers and the Internet and its functions and orientations and includes various knowledge theories and ethical issues in digital technologies. For example, Brown (2014) pointed out that the main concepts that underlie digital literacy are: ICT literacy, computer literacy, Internet literacy, and media literacy.

Brown (2014) and Zwimpfer (2016) believe that people with digital literacy should have the following skills:
Mastery of digital technologies such as computers, other mobile devices, and the Internet

- An effective search of information on the Internet also verifying the accuracy of information sources
- Efficient and effective use of digital technologies for office work
- Protect personal data against malicious programs and websites
- Use technology communication channels such as email and social media to communicate with others
- Understand and use online marketing platforms, online banking, and other transactions
- Buy and install software on digital devices and use online tutorials and help them learn simple tasks
- Complete online forms, photos, and videos and share them
- Understand copyright law.

Digital Literacy for Libraries

Emiri (2017) studied digital literacy skills among university library librarians in the 21st century in Edo and Delta, Nigeria. The findings show that the ability to work with email, social media, PDAs, cell phones, and Internet browsing is the most important digital literacy skill among librarians. They also found that librarians acquire these skills through peers, trial and error, I.T. programs, and formal training. However, the level of digital literacy of librarians in these three universities is low.

Watts and Ibegbulem (2006) examined the barriers to using electronic resources in the University of Nigeria Medical Library. Their study found that barriers to use, such as insufficient ICT infrastructure and cost-effective online access, lack of in-depth digital and information retrieval skills among library staff and users, are barriers to use electronic resources.

Following his study Oduwole & Sowole (2006) identified problems using assistive resources in Nigeria, including lack of digital skills among staff and users, low level of information literacy in people, and the cost of internet access (Salaam & Adegbore 2010).

Research has shown that differences in the level of digital literacy depend mainly on age and level of education, while the impact of gender on digital literacy skills is declining (van Dijk and van Deursen, 2010).

A review of the research literature shows that no study in Iran has examined the digital literacy of academic librarians. Therefore, this study aims to assess digital literacy skills and knowledge competencies - security measures of Iranian university librarians.

Research Questions:

1. How do Iranian university librarians acquire digital literacy skills and knowledge competencies - security measures?

2. To what extent do Iranian university librarians have digital literacy skills and knowledge competencies - security measures?
3. According to Iranian University librarians, what are the challenges of acquiring digital literacy skills and knowledge competencies - security measures?
4. Is there a significant relationship between the variables of age, gender, the field of study, and work experience of Iranian university librarians and the level of digital literacy skills and knowledge competencies - their security measures?
5. What effect do the existing challenges have on digital literacy skills and knowledge competencies - security measures of academic librarians?

Research Methods

The present study is a survey method that was conducted using a questionnaire. In this study, a questionnaire was distributed to the entire statistical population using the census method. The total statistical population of the study was 166 specialists in the field of librarianship and information. The Table below shows the demographic information of the respondents.

Table1. Demographic characteristics of the respondents

Degrees	Field of Study	Woman	Man	Total
Bachelor	Library and Information Science	8	5	13
	Knowledge and Information Science	8	14	22
	Total	16	19	35
Master	Library and Information Science	16	29	45
	Knowledge and Information Science	25	11	36
	Total	41	40	81
Ph.D.	Library and Information Science	19	16	35
	Knowledge and Information Science	10	5	15
	Total	29	21	50
Grand Total	Library and Information Science	43	50	93
	Knowledge and Information Science	43	30	73
	Grand Total	86	80	166

Table (1) of the demographic characteristics of the respondents show that out of 166 respondents, 86 were women, and the other 80 were men. Also, 35 respondents had a bachelor's degree, 81 had a master's degree, and another 50 had a doctorate. In the entire field of study, 93 respondents were librarians, and informants and 73 others were information science and epistemology.

Data Collection Tools

The data collection tool was a researcher-made questionnaire. This questionnaire was used to measure the data literacy components of the respondents from 31 items in a range of four options for measuring the components of "digital literacy skills" (13 items), "Qualifications and Knowledge Competencies" (8 items), " Digital competencies of librarians in implementing security measures to protect digital content (4 items), and "Librarians' Challenges in Acquiring Digital Literacy Skills" (6 items).

One of the most important methods of determining the validity of a structure is factor analysis. In this study, Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were used to perform factor analysis. Cronbach's alpha test was used to determine the reliability of the measuring instrument, and structural validity was used to evaluate the validity of the measuring instrument. The following tables present the values obtained from Cronbach's alpha and factor analysis (KMO, Bartlett).

Table 2. Reliability and Validity test results of the assessment tool

Categories of Item	Cronbach's Alpha	KMO	Bartlett's test and Sig.
Digital literacy skills	0.80	0.758	Approx. Chi-Square = 299/769 Sig =0/000
Qualifications and Knowledge competencies	0.78	0.751	Approx. Chi-Square = 89/034 Sig =0/000
Digital competencies of librarians in implementing security measures to protect digital content	0.85	0.744	Approx. Chi-Square = 75/255 Sig =0/000
Challenges for librarians while acquiring digital literacy skills	0.79	0.761	Approx. Chi-Square = 66/345 Sig =0/000
Total of Questionnaire	0.78	0.714	Approx. Chi-Square = 759/908 Sig =0/000

The results of the reliability and validity test of our measuring instrument are shown in Table 2; Cronbach's alpha for all components of the study is above 0.7. Therefore, it can be said that the reliability of the research tool is appropriate and approved. Also, according to the results of Table 2, the KMO level for all components of the study is higher than 0.7, and the Bartlett test shows 99% significance levels (sig = 0.000). This result indicates that the validity of the research tool's validity (validity) is appropriate and acceptable.

Data Analyzing Method

In the present study, the mean and standard deviation test was used to assess the level of digital literacy skills and knowledge competencies - security measures. The mean of the items was

measured based on three scoring ranges low (2.33-1), medium (2.34-3.3) and high (3.4.4). Also, t-test and multivariate linear regression test were used to test the research hypotheses.

Results:

1. **How do Iranian university librarians acquire digital literacy skills and knowledge competencies - security measures?**

Table 3. Frequent distribution of different ways of acquiring digital literacy skills

S. No.	Field of Study	Frequency	Per cent
1	Through workshops/seminars organized by the Professional Association	75	45.2
2	Online programs and tutorials	50	30.1
3	In-service training courses	39	23.5
4	Unanswered	2	1.2
	Total	**166**	**100**

Table (3) shows the frequency distribution of different ways of acquiring the digital literacy skills of the respondents. As the table results show, 45.2% of the respondents through "workshops/seminars organized by the professional association", 30.1% through "online programs and training", 23.5% through "in-service training courses" have acquired and upgraded their digital literacy skills.

2. **To what extent do Iranian University librarians have Digital literacy skills and Knowledge competencies - security measures?**

Table 4. The mean and standard deviation of Digital literacy skills level, Knowledge competencies and security measures of the respondents

Categories of Component	Items	N	Decision	Std. Deviation	Mean
Digital literacy skills	Database search skills	165	High	0.510	3.38
	Metadata development skills	166	High	0.537	3.39
	Digitization skills	166	High	0.501	3.51
	Send and receive emails	166	High	0.478	3.35
	Upload documents on online platforms	166	High	0.487	3.66
	Skills in using different social media	166	High	0.433	3.75
	Digital library development skills	166	Medium	0.468	3.29
	Use of new technologies in library services	166	High	0.490	3.61

	Library website development skills	166	High	0.506	3.58
	Ability to use different memory devices to store digital content, for example, more: DVD, CD-Rom, etc. at home	166	High	0.501	3.47
	the ability to create different file formats (Pdf, gif, bitmap, jpg).	166	High	0.491	3.0
	Ability to access open-source software	166	High	0.558	3.53
	Skills in information retrieval techniques	166	High	0.578	3.45
Mean of Digital literacy skills		166	High	0.136	3.51
Level of Qualifications and Knowledge Competencies of Librarians	Electronic resource indexing	166	High	0.636	3.37
	Knowledge and competence in making digital collections	166	Medium	0.685	3.25
	Knowledge of using personal archiving options like Research Gate, kudos and more	166	Medium	0.722	3.16
	Knowledge of marketing library services using social media.	166	Medium	0.757	3.10
	Knowledge of copyright laws in the digital environment	166	Medium	0.746	2.98
	Knowledge of how to evaluate the suitability of the software for digital projects	166	Medium	0.750	2.89
	Knowledge of software acquisition process (through vendors or open-source operating systems)	166	Medium	0.713	2.92
	Digital protection knowledge	166	Medium	0.699	2.70
	Mean of Level of competencies and knowledge competencies of librarians	166	Medium	0.328	3.04
Digital competencies of librarians in implementing security measures to protect digital content	Network and system security knowledge	166	Medium	0.745	2.79
	Ability to apply firewall security software, filter routers (encryption and decryption measures on data)	166	Medium	0.721	2.72
	Knowledge of data security through the backup of digital content in the event of any disaster	166	Medium	0.746	2.86
	Ability to protect access to digital content by providing a password or primary I.P. access	166	Medium	0.790	2.75
	Mean of Digital competencies of librarians in implementing security measures to protect digital content	166	Medium	0.429	2.78
Total average: Digital literacy skills and Knowledge Competencies - Security measures Respondents: Mean = 3.24 and SD = 0.155					

As can be seen in the results of Table 4; Except for the average item "Digital Library Development Skills", which is in the average score range (2.33-3.3); other components of the digital literacy skills component are in the excellent score range (3.4-3.4). Also, except for the average item "electronic resource indexing", which is in the excellent score range (3.4-3.4), other

items measured by the component of the level of competencies and knowledge competencies of librarians are in the average score range (2.34-3.33). All items measured by the component of digital competencies of librarians in applying security measures to protect digital content are also in the average score range (2.33-3.33). In addition, the other findings of Table 4 show that the digital literacy skills of the respondents were at a high level (Mean = 3.51, SD = 0.136), but the level of competencies and knowledge competencies of librarians (= 3.04). Mean, SD = 0.328) and digital competencies of librarians in implementing security measures to protect digital content are at a medium level (Mean = 2.78, SD = 0.429). The average of total digital literacy skills and knowledge competencies - security measures is equal to (Mean = 3.24, SD = 0.155).

3. **According to Iranian university librarians, what are the challenges for librarians while acquiring digital literacy skills and knowledge competencies - security measures?**

Table 5 shows the mean and standard deviation of challenges for librarians while acquiring digital literacy skills. As shown in the Table; Comparing the six challenges, the challenge of "lack of budget allocated to support the librarianship test" (Mean = 2.86, SD = 0.808) and the challenge of "no stable internet connection" (Mean = 2.84, 809 / 0 S.D. =) are the most critical challenges from the respondents' point of view. On the other hand, the challenge of "low quality of related units in librarianship courses" with the lowest average (Mean = 2.68, SD = 0.747) is less important than other challenges.

Table 5. Mean and Standard Deviation of Challenges for librarians while acquiring Digital Literacy Skills

Category	Type of Challenges	N	Mean	Std. Deviation	Priority by importance
Challenges for librarians while acquiring digital literacy skills	Lack of funds allocated to support the training of librarians	166	2.87	0.808	1
	Not participating in training workshops.	166	2.72	0.727	4
	Lack of physical facilities	166	2.76	0.680	3
	lack of time	166	2.70	0.690	5
	Low quality of related units in librarianship courses	166	2.68	0.747	6
	No stable internet connection	166	2.84	0.809	2

4. **Is there a significant relationship between the variables of age, gender, the field of study, and work experience of Iranian university librarians and the level of digital literacy skills and knowledge competencies - security measures?**

Table 6 shows a slight difference between the mean scores of respondents' digital literacy skills between men and women (Mean Difference = 0.001). In order to investigate the Significance of this Difference, the test results are examined by t-test.

Table 6. Test results of t-test on digital literacy skills and knowledge-security competencies by Gender

t-test for Equality or means		Levene's Test for Equality of Variances		Mean Difference	Women			Men		
Sig. (2-tailed)	T	Sig. (2-tailed)	F		Std. Deviation	Mean	N	Std. Deviation	Mean	N
0.963	0.046	0.309	1.043	0.001	0.164	3.243	86	0.146	3.242	80

The results of the t-test in Table 6 show that the obtained t (t = 1.043) is at an undesirable significant level (sig> 0.05) and is not significant (Sig = 0.963). Therefore, it can be concluded that in the present study, there is no significant relationship between digital literacy skills and knowledge-security competencies of respondents and their gender.

Regression analysis is used to explain the relationship between digital literacy skills and respondents' knowledge-security competencies and independent variables including: "Librarians' challenges in acquiring digital literacy skills" and the variables "age", "work experience", and "field of study".

Table 7. Results of digital literacy skills regression analysis and knowledge-security competencies

Statistical Index Variable	Multiple Correlation Coefficient (R)	Determination coefficient (r^2)	Actual determination coefficient Adjusted R Square	F	The level of Significance (Sig)
Digital literacy skills and knowledge-security competencies	0.257	0.244	0.216	4.086	0.03

As shown in the Table above (6), the multiple correlation coefficient of the independent variables entered in the digital literacy skill regression model is 0.257. The determination coefficient is 0.244, and the actual determination coefficient is 0.216. The value of the accurate determination coefficient indicates that approximately 0.22% of the respondents' digital literacy skills variable changes can be explained by the two variables entered in the model.

5. What effect do the existing challenges have on digital literacy skills and knowledge competencies - security measures of academic librarians?

As the results of Table above (7) show, the beta values of the variables "challenges" and "age" entered in the model were at the desired level of Significance ($p \geq 0.05$). However, the level of Significance obtained for the variables "work experience" and "field of study" is at an unfavourable level ($P > 0.05$). Therefore, according to the beta value obtained and the level of Significance obtained, the following results can be enumerated:

1) Considering the beta value (-0.341) of the challenge variable, it can be said that changing a standard deviation unit in the challenge variable causes a change (-0.34) of the standard deviation unit in the digital literacy skill variable.

2) Considering the beta value (0.113) of the respondents' age variable, it can be said that changing one standard deviation unit in the age variable causes a change (0.11) standard deviation unit in the digital literacy skill variable.

3) Also, according to the undesirable significant levels obtained for the variables of work experience (sig = 0.687) and field of study (sig = 0.452), it can be concluded that in the present study, between the variable of digital literacy skills, work experience and there is no significant relationship between the respondents' field of study.

Table 8. Coefficients of regression analysis test of Digital literacy skills and Knowledge-security competencies

seirogetaC	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	124.558	94.870		1.945	0.000
Challenges for librarians while acquiring digital literacy skills	4.720	1.412	- 0.341	3.343	0.000
Work Experience	1.022	12.63	0.001	0.899	0.687
Field of Study	0.702	56.23	0.041	1.02	0.452
Age	2.034	0.659	0.113	2.79	0.001

Discussion

Findings show that 45.2% of librarians acquire the most skills in digital literacy through workshops/seminars organized by professional associations, 30.1% through online programs and training, and 23.5% in-service training.

Conclusion

This conclusion contradicts the findings of several studies conducted in developing countries on how librarians acquire ITC skills. For example, Baro et al. (2013b) questioned ways to acquire the skills needed to use Web 2 tools. More than three quarters (79.5%) showed the acquisition of skills through self-study. More than half of these librarians (69.9%) indicated that they acquired the skills through friends/colleagues. Moreover, slightly more than half (57.4%) acquired skills through workshops. Only 22.7% of respondents indicated that they had acquired skills through librarianship schools. Similarly, Safahieh and Asemi (2010) study showed that most librarians at the University of Isfahan (Iran) had acquired their computer skills through informal channels.

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