

COMPUTER AND INFORMATION LITERACY ASSESSMENT OF MATHEMATICS PROFESSORS AND LECTURES, CASE STUDY OF ISLAMIC AZAD UNIVERSITY BRANCHES IN TEHRAN

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Abstract. This study was conducted with the aim of evaluating the information literacy and computer literacy of faculty members at Islamic Azad University, in order to provide recommended strategies for improving this skill. In this regard, their level of familiarity and skill in using the data base and research computer was investigated. The research method was descriptive-survey. The population included the university professors at Islamic Azad University of Tehran. The sample included 200 lecturers, 97 of whom were sessional lecturers and 103 of whom were faculty member lecturers. Data collection instruments were two valid questionnaires. Data analysis was performed using Spss, and Amuse software. The research findings showed that there is a significant difference between computer literacy and information literacy among the faculty member lecturers and sessional lecturers. Moreover, it was found that there is a strong relationship between the two variables of computer literacy and information literacy among the lecturers; and that the relationship intensity between the faculty member lecturers and sessional lecturers is not significant in the two groups.

Keywords: computer literacy; information literacy; faculty member lecturers; sessional lecturers; information and communication technology; education

Introduction.

The term “information literacy” was first introduced by Zurkowski in 1974. In his point of view, those who are trained in the use of information resources about their work expertise are called information literate. They are aware of the techniques and skills to use and apply a wide range of information tools in the form of problem-solving information solutions, just the same way as they are aware of the basic resources. The basic components of this concept include the simplest skills needed by each individual in terms of their role in society, namely their abilities to read and write and to understand their mother tongue (Bawden, 2001). This concept has been constantly changing and evolving over different time periods. Feldmann defined information literacy as a set of individuals’ ability to identify information when it is needed, and the ability to

locate, evaluate, and effectively use the needed information (Feldmann, 2000). With the advent of new technologies and the rapid pace of social change, an evolved and new type of literacy is being constantly introduced to the society that can be called information literacy.

Adanson and Neredli (2003, as cited in Mansourian and Naeim Abadi, 1983) have emphasized on three main types of information literacy. They believed that only those individuals are considered to be information literate that have three types of abilities, including mental abilities (general or traditional literacy), technical abilities (computer literacy), and communication abilities which usually includes the two former groups. Andretta (2005) states that an information literate person is an individual who recognizes the need for information, understands the importance and value of information for solving problems, and making the right decisions; and understands the fact that the more updated is the information, the more efficient it is. The main and ultimate goal of information literacy is the lifelong and independent learning (Owusu-Ansah, 2004).

It is clear that by the advances in technology, the participation of computers in education of different subject areas and even mathematics education increases every day. Therefore, individuals were forced to achieve both computer literacy, and mathematical literacy. The previous studies showed that there was a continuous correlation between mathematical and computer literacy in such a way that computer literacy had influenced mathematical literacy.

In the past decade, information literacy has become a global issue, and many actions in this regard have been recorded around the world, that we can notably refer to what has been done in North America, Australia, South Africa and Northern Europe (Bruce & Candy, 2000).

Perhaps we can safely say that using an active methodology based on information and communication technology in teaching mathematics has not yet achieved the necessary publicity and behaviorism and the traditional way of teaching is still common among some teachers for various reasons, such as getting accustomed to the previously examined method, fear of taking risks in teaching, lack of time problems and the preference of teacher-oriented classes and speech method to the active method of teaching, lack of the necessary and useful tools and software, and lack of the required standards. On the other hand, the production of mathematical education software by inexpert software companies and unqualified groups in most cases promotes traditional teaching methods, while educational software manufacturers must, in addition to having the mathematical literacy, have the necessary skills and knowledge in integrating these two (Seraj, 2004).

In this field, some research has also been carried out both inside and outside the country, including:

Champeswar (2019) researched in using digital information in an Indian university in field of Digital Information Literacy (DIL) and their performance and com-

petencies in this study challenge and information requirements Faculty member lecturers from university by attaining innovative solution.

Liu & Lian (2016) researched on Information Literacy of teachers of Fujian province University, concluded that there was a significant correlation between 1. Information literacy and lifelong learning, 2. Lifelong learning and school affection 3. Information literacy and school affection

Fernández & Ramos (2019) investigated online information literacy level among Mexican university libraries and results shown that limited development of online education in exited the main obstacles were the lack of technology resources and qualified personnel, non-cooperation of faculty members, the motivation of students and the expertise of librarians.

Konan (2019) investigated about the level of computer literacy of teachers of Malatya in Turkey and concluded that there was a significant difference between the level of male and female teachers, Teachers with who are experienced enough teaching and who doesn't have experienced & also teachers with higher and lower education.

Hashemi & Hemati (2015) researched Information Literacy of Faculty Members of, district one, Islamic Azad University in Tehran, Iran. They resulted that the information literacy of the faculty members was at intermediate level and their familiarity and skills of the faculty members in using from the information base is poor.

Olutunu et al (2015) investigated the Level of information, technology and communication literacy among in-service teachers Central North of Nigeria universities and concluded that their literacy level is average. There wasn't significant difference between the ICT literacy levels of male and women of in-service teachers.

In 2016, Simona Vasilache conducted a study entitled "Student Perspectives of Computer Literacy Education in an International Environment". The aim of his study, based on the beliefs of the computer literacy course participants and according to his own experience of such course, was to identify the LMS functionalities that majority of the students prefer or accept to use during such classes and also to detect those teaching styles that attract positive responses of the students.

Since German schools require to develop students' digital skills information. In field of information and computer literacy. For this purpose Lorenz et al. (2019) investigated that teachers in this field of information and communication technologies (ICT), which could be effective as school information; as an important predictor in strengthening students' information and computer literacy.

Therefore, this study investigates the information and computer literacy of the faculty member lecturers and the sessional lecturers. To conduct this study, a questionnaire was used as the research instrument. After collecting and analyzing these questionnaires, the relationship between the two variables of computer literacy and information literacy were examined. The questionnaire was designed and prepared in a way that their statistical analysis would answer the following questions.

Question: 1: Is there a significant mean difference between the computer literacy and information literacy of the faculty member lecturers and the sessional lecturers?

Question 2: Is there any relationship between the two variables of computer literacy and information literacy between the university lecturers?

Question 3: How much is the relationship intensity between the above mentioned variables (i.e. computer literacy and information literacy)?

Research Methodology

The present study is an applied research in terms of purpose and it is a descriptive-survey study in terms of data collection method. The statistical population of this study were the mathematics professors of Islamic Azad University of Tehran and its suburbs, out of which 200 people (including 97 sessional lecturers and 103 faculty member lecturers) were selected as the sample of the study through the use of simple random sampling method. A questionnaire consisting of 24 items related to computer literacy and 86 items related to information literacy were distributed among them. It should be noted that the computer literacy questionnaire was derived from the Marchionini information seeking model and the information literacy questionnaire was derived from the ACRL's (2000) study. The obtained data were analyzed using SPSS and AMOSE software. Independent-Sample T-Test was used at the beginning and then factor analysis was used to analyze whether there is any relationship between the Reliability assessment of the questionnaire Cronbach's alpha was used in this study to measure reliability. The values of this index were calculated separately for each of the research variables, the results of which are indicated in table 1.

Table 1. Cronbach's alpha coefficient of each variable

Name of the variable	Cronbach's alpha coefficient
Computer literacy	0.848
Information literacy	0.895

Given that the appropriate value of Cronbach's alpha is 0.7 (Cronbach, 1951) and according to the above table the obtained values for all variables are greater than this value, it can be said that the questionnaire has appropriate reliability.

Findings

To answer the first question "Is there a significant mean difference between the computer literacy and information literacy of the faculty member lecturers and the sessional lecturers?" the independent-Sample T-Test was used. This test compares the mean of the two groups of respondents. In other words, the means obtained from the random samples are judged. To do so, we randomly select, whether equal or non-equal, samples from two different populations and compare the means of the two populations

Table 2. Group Statistics

Group	N	Mean	Std.Deviatio	Std.Error	Mean
Computer Literacy	0	97	3.84	3	.305
	1	103	5.16	2.89	.28
Information Literacy	0	97	58.13	16.90	1.71
	1	103	62.99	15.31	1.5

Table 2 represents the mean of the variables of computer literacy and information literacy in the two groups of faculty member lecturers and the sessional lecturers within the sample. Based on the mean values, the computer literacy mean of the two groups of the sessional lecturers and faculty member lecturers were 3.84 and 5.16, respectively; and the information literacy mean of the two groups of the sessional lecturers and faculty member.

Lecturers were 58.13 and 62.99, respectively. Therefore, it can be said that in the sample studied, the mean of computer literacy and information literacy is higher among the faculty member lecturers. To examine this difference in the population, we should first run a test called Levine's test to find how the two groups differ from each other in terms of dispersion.

In Table 3, the t-value of the two variables of computer literacy and information literacy is presented.

Table 3. T-test for Equality of Means

		T-test for Equality of Means						
							95% Confidence Interval of the Difference	
		t	df	Sig	Mean diff.	Std.Error	Lower	Upper
Computer Literacy	Equal variances assumed	-3.163	198	.002	-1.32	.41	-2.14	-.49
	Equal variances not assumed	-3.160	196.2	.002	-1.32	.41	-2.14	-.49
Information Literacy	Equal variances assumed	-2.13	198	.34	-4.85	2.27	-9.34	-.36
	Equal variances not assumed	-2.12	193.1	.35	-4.85	2.28	-9.36	-.34

The Sig value which is less than 0.05 at the confidence level of 99%, the mean values of computer literacy and information literacy of faculty member lecturers and the sessional lecturers are not the same, and it can be said that the computer literacy and information literacy of faculty member lecturers are more than the computer literacy and information literacy of the sessional lecturers. Based on these results, the faculty member lecturers' information and computer literacy were rated better than those of sessional lecturers. This is due to the fact that compared to sessional lecturers, the faculty member lecturers have made more efforts in the fields of computer literacy and information literacy because of their work sensitivity and responsiveness to the university and their workplace. The other reason is that, faculty member lecturers need to do more research and studies compared to sessional lecturers to get annual promotion, and this is not possible unless by increasing their computer and information literacy.

Is there any relationship between the two variables of computer literacy and information literacy between these two types of lecturers?" AMOS software was used to answer this question. In this regard, the research model's goodness of fit was examined first, and the significance of the relationship between computer literacy and information literacy were investigated. Testing the model's goodness of fit: the model's goodness of fit indices are presented in the following table. First, the models' goodness-of-fit were tested through the use of goodness-of-fit indices such as statistic value χ^2 , ratio of statistic χ^2 to the degree of freedom, RMSEA, CFI, NNFI, GFI and AGFI.

As can be seen in Table 4, the goodness of fit indices had been able to meet the permissible limit stated in the sources. Therefore, it can be said that the research model as an appropriate goodness of fit.

Table 4. Perfectionism Goodness of fit indices for the structural factor analysis model

Type of the goodness fit index	Index range for the acceptable fitting	Index range for the acceptable fitting	Observed goodness fit index	Result
Value of χ^2 statistics			407.14	Good fitting
P-value of the χ^2 test			> 0.05	Good fitting
Ratio of the χ^2 statistic to the degree of freedom	< 5	< 3	1.16	Good fitting
RMSEA	< .08	< .05	.02	Good fitting
P(RMSEA < 0.05)	> .05	> .1	1	Good fitting
CFI	> .90	> .95	.98	Good fitting
TLI	> .90	> .95	.98	Good fitting
GFI	> .85	> 90	.88	Good fitting
AGFI	> .85	> .90	.86	Good fitting

Investigating the Relationship between Computer Literacy and Information Literacy

In this section, we examine the relationship between two structures. Figure 1 shows the relationship between two structures.

In this figure given:

Savray by means that: Computer Literacy

SavEte by means that: Information Literacy

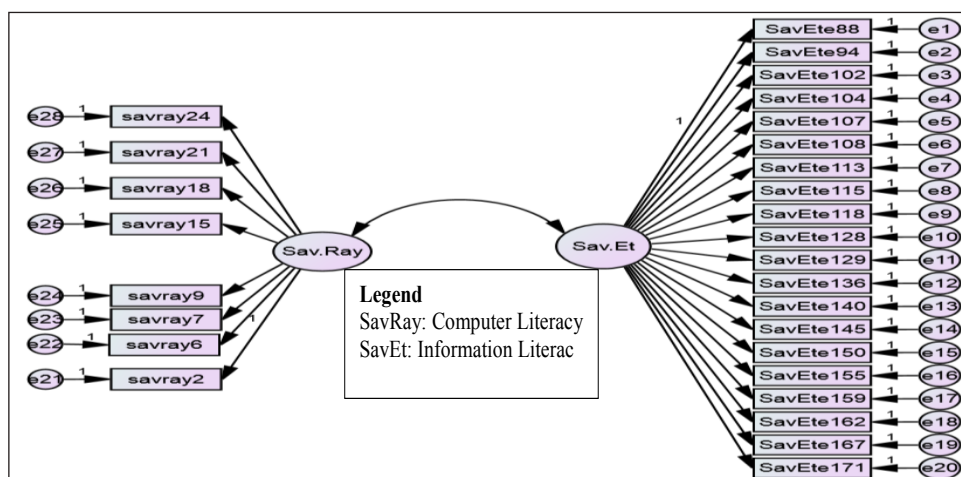


Figure 1. CFA 2 Factor

Tables 5 and 6, respectively show the correlation indices of the two variables of computer literacy and information literacy.

Table 5: Covariance's: (Group number 1 - Default model)

Covariance's: (Group number 1 – Default model)			
	Estimate	S.E	C.R
Information literacy ↔ Computer literacy	.16	.02	6.32

Table 6: Correlations: (Group number 1 – Default model)

	Estimate
Information literacy ↔ Computer literacy	.64

In Table 5 we can see that the obtained correlation coefficient is 0.169 and their p-value is 0.645 based on Table 6, which indicate the existence of a strong, direct and significant

relationship between the two variables. That is, the relationship between the two variables of information literacy and computer literacy of mathematics professors is strong, and this relationship is direct. In other words, the greater the computer literacy of professors, the greater their information literacy, and vice versa. It shows that there is a strong, direct and meaningful relationship between the two constructs. In other words, there is a strong relationship between the information literacy and computer literacy of faculty member lecturers and the sessional lecturers and this relationship is direct. Accordingly, the greater the computer literacy of the professors, the more impact it will have on the information gathering and information approach of the professors, and vice versa. That means that the higher the computer literacy of the professors and the more proficient they are in computer literacy, the better they can have the information they need in their research or teaching, and this has impact on increasing the professors' information. Successful professors in teaching and research are those who are rich in terms of information and computer literacy. A successful instructor is the one who is able to enhance his teaching in the field of education and research, and this requires updated information, and this information is provided when he has sufficient skill in information processing.

The third research question is as follows:

“Is the relationship intensity between the faculty member lecturers and the sessional lecturers significant in the two groups?” To answer this question, the z-score of the two variables of computer literacy and information literacy of the mathematics professors were examined. The results are presented in Table 7.

Table 7. Different between 2 groups

	Full-time lecture		Part-time lecturers		z-score
	Estimate	P	Estimate	P	
Com-lit ← Inf lit	1.53	0.00	1.32	0.00	-0.59
Com-lit ← Inf lit	1.11	0.00	1.08	0.00	-0.19
Com-lit ← Inf lit	1.15	0.00	1.25	0.00	0.61
Com-lit ← Inf lit	0.98	0.00	1.00	0.00	0.20
Com-lit ← Inf lit	0.95	0.00	1.10	0.00	1.17
Com-lit ← Inf lit	1.16	0.00	1.15	0.00	-0.11
Com-lit ← Inf lit	1.03	0.00	1.05	0.00	0.12
Com-lit ← Inf lit	0.96	0.00	1.09	0.00	0.98
Com-lit ← Inf lit	1.00	0.00	1.06	0.00	0.38
Com-lit ← Inf lit	0.94	0.00	1.03	0.00	0.66
Com-lit ← Inf lit	0.87	0.00	1.12	0.00	1.63
Com-lit ← Inf lit	1.16	0.00	1.28	0.00	0.79
Com-lit ← Inf lit	1.06	0.00	1.11	0.00	0.37
Com-lit ← Inf lit	0.88	0.00	0.89	0.00	0.12

Com-lit ← Inf lit	1.12	0.00	1.05	0.00	-0.45
Com-lit ← Inf lit	1.05	0.00	0.99	0.00	-0.43
Com-lit ← Inf lit	1.06	0.00	1.11	0.00	0.35
Com-lit ← Inf lit	1.12	0.00	1.16	0.00	0.26
Com-lit ← Inf lit	0.88	0.00	1.06	0.00	1.17
Com-lit ← Inf lit	1.10	0.00	0.976	0.00	-0.86
Com-lit ← Inf lit	1.01	0.00	1.071	0.00	0.27
Com-lit ← Inf lit	1.05	0.00	1.329	0.00	1.30
Com-lit ← Inf lit	0.99	0.00	1.075	0.00	0.38
Com-lit ← Inf lit	0.96	0.00	0.903	0.00	-0.27
Com-lit ← Inf lit	0.95	0.00	1.179	0.00	1.02
Com-lit ← Inf lit	0.83	0.00	1.088	0.00	1.21
Com-lit ← Inf lit	1.12	0.00	1.214	0.00	0.42

In table 7, arrows represents the relationship between two groups of information and computer literacy of the faculty member lecturers and the sessional lecturers.

p-value <0.01 illustrate the cohesion between information and computer literacy of the faculty member lecturers.

p-value < 0.05 illustrate the cohesion between information and computer literacy of the sessional lecturers.

P-value < 0.1 illustrate the correlation between information and computer literacy between two groups of faculty member lecturers and the sessional lecturers which shows that there is difference, but this difference is meaningless.

According to the results of table 7, since the absolute value of the z-score was 0.596 and was less than 2, there is no significant difference between the two groups. In other words, the relationship intensity between faculty member professors' and sessional professors' computer literacy and information literacy is not much. Based on these results, it can be said that the exchange of information does not take place much between the faculty member lecturers and the sessional lecturers. In other words, the faculty member lecturers had no relation with the sessional lecturers in the field of research and this fact hinders the development of scientific and research quality. This is the reason for saying that "faculty member lecturers have a greater sense of responsibility for teaching and research than sessional lecturers".

Guided by faculty member lecturers and the sessional lecturers in problem-based courses, the students argue about the content of their lesson while learning problem solving methods, at a deeper level than is possible through full oral and written learning.

To get the most out of problem-based learning, students often need to use thinking skills, which require them to become skilled in the work with information resources – wherever and in whatever form they are – and thus increase their own

responsibility for learning. This will not happen unless the faculty member lecturers and the sessional lecturers work together to become skilled users of information resources (information and computers).

Discussion and conclusion

The advent of information science and its growing advancements in the world's educational systems, especially in higher education institutions, have provided an opportunity for everyone to have access to the wide range of information and learning resources. The emergence of information and communication technology has led to major changes in the fields of education, research and services that are the main functions of the universities. Hence, higher education institutions are required to seriously review their missions and practices. The advances made by this technology have provided the ground for the emergence of a new concept of human society, called the Information Society. The most important feature of this community is the widespread use of information networks and the information and communication technology to generate knowledge and exchange information.

Iran's education system should widely take advantage of the information and communication technology in its educational, research and service environments, in order to meet the diverse and growing needs of its audiences, and also in order to actively participate in international competitions. Undoubtedly, the entry of the Higher education system into the new era of information and communication, and taking advantage of its potential and actual benefits, requires recognizing its coordinates and the ways of using the initial tools of information and communication technology in different applications. Achieving this issue requires paying serious attention to planning and policy making for the proper use of information and communication technology on one hand and the development of information and computer literacy of the different users of higher education, on the other hand. In the educational system of Iran, the role and place of information and computer literacy is totally overlooked and it is not understood in a way that it should have been understood.

Informational and computer literacy is internationally presented as a necessity for the realization of the Information Society (Knowledge Society). Governments have focused on national education at different levels, and on training a new and intellectual generation in the field of information and communication technology, in order to realize such a society. But the realization of such a goal is not possible with the fundamental changes in the educational status of learners (students, college students, experts, etc.).

It can be said that by equipping the professors and students of universities and institutes of higher education with information and computer literacy as an important and influential factor for the use of Information and Communications Technology (ICT)-based knowledge space, we can refer to the role of information and

computer literacy in institutionalization of the Information and Communications Technologies in higher education as an indispensable and inevitable issue.

The basic issue in this regard is to equip university professors, university students and the higher education institutions with the information and computer literacy as an important and effective factor in using the knowledge-based Information and Communication Technology (ICT). Therefore, paying attention to the role of information and computer literacy is essential and inevitable in the institutionalization of information and communication technology in higher education.

The main aim of this study was to investigate the information literacy and the computer literacy of the faculty member lecturers and the sessional lecturers of the Islamic Azad University of Tehran branch. The descriptive-survey method was used in this study and the population included the faculty member lecturers and the sessional lecturers of the Islamic Azad universities of Tehran branches. 200 mathematics professors of the Islamic Azad University of Tehran were considered as the sample of this study through convenience sampling, 97 of which were sessional lecturers and 103 of which were faculty member lecturers. Data collection instruments were two valid questionnaires, with reliability and validity of more than 70%. Data analysis was performed using SPSS, and AMOS software. According to the obtained results, investigating the extent of computer literacy and information literacy between the two groups of faculty member lecturers and sessional lecturers in the field of mathematics showed that the average rate of the information literacy and computer literacy of faculty member lectures was higher than the average rate of information and computer literacy of the sessional lecturers. The t-test of the two absolute samples showed the existence of the significant difference between the computer literacy and the information literacy of the faculty member lecturers and the computer and information literacy of the sessional lecturers, and that there was a relationship between the two variables of computer literacy and information literacy of the faculty member lecturers and the sessional lecturers; It can even be said that the intensity of these relationships between the two variables have no significant differences. It can also be said that the information literacy and the computer literacy of the professors are at the optimum level.

There was no exchange of information between the two groups (i.e. the faculty member lecturers and the sessional lecturers), meaning that no research has been conducted on these two important issues. In order to have a scientific environment with dynamic modern information, all professors, whether faculty member lecturers or the sessional lecturers.

In examining the research results on this component it can be concluded that, despite the fact that the computer and information literacy of the faculty member lecturers is evaluated to be better than the sessional lecturers, due to the accelerating developments of the current century in the area of using the modern information technologies, we still need to review the skills and needs of developing this skill;

because with the development of information and computer literacy in the community, we can provide a situation in which people can acquire high quality and appropriate information freely and without reliance and dependence on verbal and invalid information sources and we can provide comprehensive development.

Meanwhile, it can be said that the results of this study are inconsistent with the research results Champeswar (2019), Konan (2019) and Liu & Lian (2016). The reason for this discrepancy can be attributed to the use of technologies or having computer information and the use of information technology. The findings of this study are in some way consistent with the results of the studies by Fernandez (2019), Hashemi & Hemati (2015), Olutunu et al (2015) and Simona Vasilache (2016). And the reason for the harmonies can be attributed to the use of technology, including computers.

The information society needs to shift the classical framework of development from capital-oriented to the knowledge-oriented form, and this is possible with the use of technology, especially in educational centers, since technology generates fundamental changes in the teaching structures and methods, so that the ability to respond to changes will be increased along with the change in the qualifications and competencies required by globalization, and increase in the power of responding to the changes. This will be achieved by creating new competencies such as critical thinking, decision making, the ability of making effective relationships, and the development of the learners' skill domain. Based on the obtained results, the following suggestion is presented: In order to train the information ally literate forces, it is suggested that training and research empowerment and information literacy promotion workshops be regularly held for the university instructors.

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