Using a New Information Literacy Instruction Model: A Case Study

Marzieh Siamak
Department of Knowledge and Information Science
Islamic Azad University of Hamedan
Iran

AlirezaIsfandyari-Moghaddam
Associate Professor of Knowledge and Information Science
Islamic Azad University of Hamedan
Iran

Tibor Koltay
Professor of Information and Library Studies
SzentIstván University
Hungary

ABSTRACT: *This paper presents a case of assessing the effectiveness of a new information literacy instruction model on research staffs of Regional Information Center for Science and Technology, Shiraz, Iran. First, the level of the participants' information literacy skills was measured and then (according to the model approach) their emotional intelligence, critical thinking, prior knowledge and creative thinking were determined because of the significant relationship between these three skills and information literacy. In the next phase of the study, it was tried to teach information literacy skills to the participants by new information literacy instruction model. Finally, after the period, level of information literacy skills was measured.The post-tests showed a significant difference between information literacy skills of participants before and after their attendance in the instruction. The significant relationship between pre-test and post-test scores supports the effectiveness of the model in improving their information literacy skills.*

Keywords: Information Literacy, Information Literacy Model, Critical Thinking, Creative Thinking, Emotional Intelligence, Information and Knowledge Management, Research Staffs of Library and Information Center, Effectiveness Assessment

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1. Introduction

New information literacy instruction models may bring in new approaches to information literacy education.

The authors share the opinion of those who believe that information literacy is not a one-dimensional issue; it must be studied and assessed from various angles. The internal and external elements that have an effect on information literacy skills must be identified in order to remove barriers and strengthen strong points. In addition, various issues such as communicational skills (motivation, self-confidence) (Asemi, Riahinia & Zandian, 2011), mental skills such as methodology skill, critical thinking (Wu, 2008; Chuang , 2009; Parirok, 2010; Haji Hiedari & Yazdian, 2011;Asemi, Riahinia & Zandian, 2011; and Moradi, Ali Abadim, Khazayi & Rasouli, 2014), creative thinking (Moradi, Jafari&Abedi, 2005; Asemi, Riahinia & Zandian, 2011; and Raeis, Bahrami & Yousefi, 2013), management skills (Ferguson, 2009; and Asemi, Riahinia & Zandian, 2011) in the education of information literacy are involved in improving information literacy of learners. Taking the above deliberations into account, Siamak (2012) developed a new information literacy instruction model. This paper presents a case study of assessing the effectiveness of this new model.

2. Literature Review

In the field of assessing the effectiveness a number of different approaches to information literacy instructions exists; in this section some of them are presented.

However, in order to give grounding to this argument, some of the conceptions of information literacy have to be presented. The perhaps best known and widely accepted definition of information literacy, further developedby other definitionssays that information literate people are able to recognize when information is needed. They are also able to identify, locate, evaluate, and use information to solve a particular problem (ALA, 1989). In their definition, Johnston and Webber (2003) emphasize information literacy's independence from the channel or medium, through information is obtained. They also underline wise and ethical use, and stress that it is information behaviour.

I-LEARN (Neuman, 2011) is an instructional design model connecting information science and instructional design. Greenwell (2013)with experimental study examined whether information literacy skills instruction designed using the I-LEARN model increased student understanding and application of information literacy concepts as compared to how librarians currently provide information literacy skills instruction.

Different *models* approach information literacy from different viewpoints. For instance, Markless and Streatfield (2007) offer a model that consists of three elements:

• Connecting with information (orientation, exploring, focusing, locating)

• Interacting with information (thinking critically, evaluating)

• Making use of information (transforming, communicating, applying).

The Big Six model (Eisenberg & Berkowitz, 1990) contains the following six stages of problem-solving with two sub-stages under each:

1. Task Definition

1.1 Defining the information problem

1.2 Identifying information needed

2. Information Seeking Strategies

2.1 Determining all possible sources

2.2 Selecting the best sources

3. Location and Access

3.1 Locating sources (intellectually and physically)

3.2 Finding information within sources

[1]http://big6.com/pages/about/big6-skills-overview.php

4. Use of Information

4.1 Engaging (e.g., read, hear, view, touch)

4.2 Extracting relevant information

5. Synthesis

5.1 Organizing from multiple sources

5.2 Presenting the information

6. Evaluation

6.1 Judging the product (effectiveness)

6.2 Judging the process (efficiency)[1]

Kuhlthau et al (2008) examined the ISP model twenty years after its development. The authors interviewed a sample of 574 students in grades six through twelve about their feelings throughout using the ISP model in a collaborative inquiry assignment. The authors identified and tracked nine feelings: disappointment, frustration, confusion, uncertainty, anxiety, confidence, relief, optimism, and satisfaction. While the authors found that students had individual patterns of feelings, those feelings did follow a consistent progression when using the ISP model. Others have conducted research related to ISP, notably Isbell & Kammerlocher, (1998) and Hyldegaard (2006). Isbell & Kammerlocher (1998) worked directly with Kuhlthau to conduct a pilot study to test the utility of using the ISP model at the library reference desk. Librarians recorded details about the search process on a form as they helped students through each step of the ISP process. At publication, the forms had not yet been analysed, so ten reference librarians were interviewed regarding their 19 perceptions of using ISP at the reference desk. The librarians found the model useful in assisting students. However, they reported concerns with time constraints in using the model for each transaction, particularly if the reference desk was busy. The librarians were also concerned about how the model would work with students who were at the initial stage of the research process and were reluctant to make the effort to follow each step of the model. Hyldegaard's (2006) case study examined the difference in using the ISP model as an individual versus using it in a group setting. Conducted over seven weeks, the study included two groups of information science students. Students were asked to keep a diary related to their research and were surveyed and interviewed. Hyldegaard (2006) found that both the individuals and the group had similar cognitive experiences in searching, though the group members reported more frustration with searching and did not feel the sense of relief that individuals reported (in Greenwell, 2013).

Two research studies evaluate some aspect of the use of the Big Six model. Chang (2007) developed a questionnaire for students to evaluate their understanding of each step of the Big Six model using Chang's Big Six Information Problem Solving scale. The survey was administered to 1539 fifth and sixth graders in Taiwan. Based on student perceptions, Chang (2007) concluded that the scale was a reliable measure to assess student perceptions about the Big Six approach. In another study using the Big Six model, Wolfe et al (2003) acknowledges that the library science literature has produced a strong body of anecdotal work, but there is little empirical research in general, particularly related to use of instructional design models such as the Big Six. Wolfe et al (2003) conducted a qualitative study of 18 eighth grade students using the Big Six model as a scaffold. Students were given instruction in using the Big Six model, provided worksheets and related information, and then were asked to research and write a news article related to the Civil Rights movement. In interviews and a post-survey, the authors found that students reported the Big Six to be a beneficial to conducting research (in Greenwell, 2013).

Szu-chia S. Lo (2015) surveyed effectiveness of Constructing Information Literacy via Credited Information Literacy Program. The aim of this study is to assess the effectiveness of credited information literacy program of constructing information literacy knowledge. The author took qualitative research approach with case study strategy. Document analysis, observing and interviewing students were applied for data collection. Content analysis strategy was taken to reveal the meaning of information literacy knowledge acquiring process. The results showed that credited information literacy program did bring positive influence on constructing knowledge in information retrieval and use. Both learning outcome and anonymous post-class survey provide evidence that supports the effectiveness of credited program, including the instructor had better understanding about students' performance and the students also found it would be easier to interact with the instructor.

Lalor, Clarke and Sheaf (2012) evaluated the effectiveness of information literacy training for undergraduate midwives to

poor, fair or good. The primary analyses compared the pre and post-instruction categories in each year, within each student, with a comparison of each student's post-instruction category one year and the pre-instruction category the following year. The data indicated that the sessions in the first and second years of the programs resulted in improvements in the ability to search, with less improvement in third year.

Ku, Sheu, and Kuo (2007) surveyed Efficacy of Integrating Information Literacy Education Into a Women's Health Course on Information Literacy for RN-BSN Students. This study explored the effectiveness of information literacy education by comparing information literacy skills among a group of RN-BSN (Registered Nurse to Bachelors of Science in Nursing) students who received information literacy education with a group that did not. This quasi-experimental study was conducted during a women's health issues course taught between March and June 2004. Content was presented to the 32 RN-BSN students enrolled in this course, which also taught skills on searching and screening, integrating, analyzing, applying, and presenting information. At the beginning and end of the program, 75 RN-BSN students self-evaluated on a 10 point Likert scale their attained skills in searching and screening, integrating, analyzing, applying, and presenting information. Results identified no significant differences between the experimental (n= 32) and control groups (n= 43) in terms of age, marital status, job title, work unit, years of work experience, and information literacy skills as measured at the beginning of the semester. At the end of the semester during which content was taught, the information literacy of the experimental group in all categories, with the exception of information presentation, was significantly improved as compared to that of the control group. Results were especially significant in terms of integrating, analyzing, and applying skill categories. It is hoped that in the future nursing students will apply enhanced information literacy to address and resolve patients' health problems in clinical settings.

The Information Literacy Competency Standards for Higher Education (ACRL, 2000) was elaborated and published by the Association of College and Research Libraries. By defining standards, performance indicators and outcomes, this document provided a structure for forming information literacy instruction in higher education. As a result of a cyclical review, the Framework for Information Literacy for Higher Education (ACRL, 2015) was officially adopted by ACRL in 2015. The Framework move away from prescriptive enumeration of skills by focusing on interconnected core concepts with flexible options for implementation is achieved by introducing threshold concepts into information literacy. It is asserted that information literacy skills depend on the understanding of the following:

The new Framework guidelines asserted that students in higher education who are developing their information literacy skills and knowledge should understand that:

• Authority is constructed and contextual;

• Information creation [is] a process;

• Information has value;

• Research as [a process of] inquiry;

• Scholarship [is a] conversation; and

• Searching as [a process of] strategic exploration (ACRL, 2015)

The Framework and Standards documents are not mutually exclusive; the successful use of the latter may require professional learning and training opportunities for librarians (Hess, 2015).

While the authors understand importance of this paradigm change, this study was based on the Standards.

3. The New Information Literacy Instruction Model

As said above, this model is based on the widely accepted assumption that information literacy is not a one-dimensional issue, thus it must be studied and assessed from various angles.

Interveningvariableseffectonlearningandinstruction of information literacy. These variables must be considered in literacy instruction to improve information literacy lead. The internal and external elements that have an effect on information literacy

skills have to be identified in order to remove barriers and strengthen strong points. In addition to this, various related skills, such as communicational skills, critical and creative thinking, methodology and management skills being motivated emotionally intelligent and self-confidents have to be taken into consideration, because they improve the information literacy of learners (Asemi, Riahinia & Zandian, 2011).

The researcher, with these pre suppositions, believes that all information literacy skills should be taught with regard to the information literacy standards for higher education and also critical thinking, creative thinking and. Indeed, this model is more than mere information search. It is introduced based on issues of emotion and recognition. Arguments for considering critical thinking in IL education are: 1. a person, having critical thinking skill, is able to make logical arguments; 2. to verify information; 3. to be sensitive to pre judgments, segregations and injustice; 4. to understand that people are not always right; 5. To verify the difference between valid sources and invalid ones.

IL education emphasizes critical thinking and the necessity of being able to recognize the quality of a given message. Critical thinking means distinguishing between content and its presentation, between fact and opinion. It consists of looking for explanations, causes and solutions, as well as being aware of fallacious arguments, ambiguity and manipulative reasoning. Critical reading is in many cases not easily distinguishable from critical thinking. It consists of determining the purpose of the text and assessing how the central claims are developed. Critical readers make judgments about the intended audience of the text and distinguish between the different kinds of reasoning in it. Examining the evidence and sources of the writing, assessing accuracy and bias also pertain to critical reading (Jones, 1996; Gilster, 1997; Lynch, 1998).

Arguments in favour of creative learning is that this skill: 1. Helps the learner to have a better performance in the absence of the teacher; 2. provides better possibilities for the learner to solve the forthcoming problems; 3. it brings very important circumstances in the learner's life; 4. it can bring satisfaction and pleasure to the life of learner.

Creative learning emphasizes the importance of knowledge through analysis.

Problem-solving has a close relation with creative thinking. Even mere description of these two skills shows a logical relationship between them. Creative thinking brings out new results and problem-solving is a new reaction to a new situation which itself is a new result. So, it can be claimed that problem-solving has creative aspects.

About the emotional intelligence it should be said that, at first, it may seem only to be related to psychology, but it is a naive approach. With regard to the researches in this area, it can be understood that emotional intelligence is an issue in the center of almost all areas of the research, engineering, medicine, education and commerce, a few to mention. The author thinks that emotional intelligence should be considered in teaching information literacy.

Because of the influence of emotional intelligence skills, they should be considered in the education of IL, like **self-awareness in** determining the nature and extent of the information needed; self-awareness (accurate self-assessment) is needed, in **clarifying**, revising, or refining the question; self-awareness (self-confidence), in identifying key concepts and terms and controlled vocabulary; self- management (adaptability), in identifying and selecting of the best investigative methods for information retrieval systems, refining the search strategy if necessary; self- management (initiative), in acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context, applying new and prior information to the planning and creation of a particular product or performance; social awareness in participants in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need, communicating the product or performance effectively to others, information use and accessing and using information ethically and legally, citing; social awareness (empathy), in validating understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners; optimism in reflecting on past successes, failures, and alternative strategies.

These skills should be taught to IL learners in order to improve the education.

With regard to the above discussions, in this model, the researcher suggests that, at first, the level of critical thinking, creative thinking, and emotional intelligence and IL skills of learners must be measured, and they should receive education in their weak skills and in the next phase, they should receive education in IL. Another choice is to teach these skills and IL skills at simultaneously.

The importance of this phase is in this fact that in entire educational program process is on the basis of the results of this measurement. Thorough assessment by the teacher provides the grounds for determined needs in the pretests for basic IL education (Mokhtarpoor, 2010).

Measuring IL skills will improve learning and provides criteria for measuring results and teaching efficiency and shows learning difference levels of learners; also provides chances for the assessment of teaching (Ghasemi, 2006). Measuring these skills will provide IL teachers and researchers with a real picture of learners' needs and knowledge. It is doubtless that the more the knowledge about learners' skills, the better teachers can help learners to have a deep understanding of their skills and abilities to take right decisions and to find better solutions for their problems.

After measuring their skills in the above areas, learners are measured according to their academic degree level, sex, graduation time; work experience to determine learners' skills level and then normalization is done to hold more successful educational courses. In this educational model, presence of a Specialistof Educational Sciences is necessary to reach IL education goals. This model approach is research-based.

This model presents 9 steps for education of information literacy. Transposition and application of each of the 9 steps, varies according to individual needs of learners. However, dominating the 9 steps is necessary for learners. The 9 steps are:

Step 1: How to being? (Determines the nature and extent of the Information needed)

- Difference between subject and topic
- Background Information and its importance
- Controlled Vocabularies and Keywords

Step 2: Selection of investigative methods

- Appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork)
- Benefits and applicability of various investigative methods

Step 3: Information resources, information production, and information organization and distribution information

- Variety of types and formats of potential sources for information
- Advantages and disadvantages of types of information resources (e. g., references materials, books, journals, webpages)
- Identify of the best resources for the query
- Knowing information production, information organization and dissemination information formally and informally
- Recognizing information organization into disciplines and access to it
- Value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)
- Identifies the purpose and audience of potential resources (e.g. popular vs. scholarly, current vs. historical)
- Identifying the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical)

Step 4: Search in library, databases and web

- Library Catalogue and its applications
- Concept of Online and computer Catalogues
- Concept of call number (retrieval number)
- classification systems of libraries (e.g., Dewey and library of Congress classifications)
- search entry

• Applications of Boolean operators (AND, OR, NOT) in advanced search
• Applications of at the search
• Concept of databases
• Key points in search in databases
• most common databases and search methods at the them
• difference between Internet and web
• Uniform Resource Locator (URL) and its Components
• Meaning of web domains
• Difference between web directory and search engine
• features of Meta-search engines
• Hidden (or deep) web
• The mainwaysof information search on the web
• Selection of keywords for search

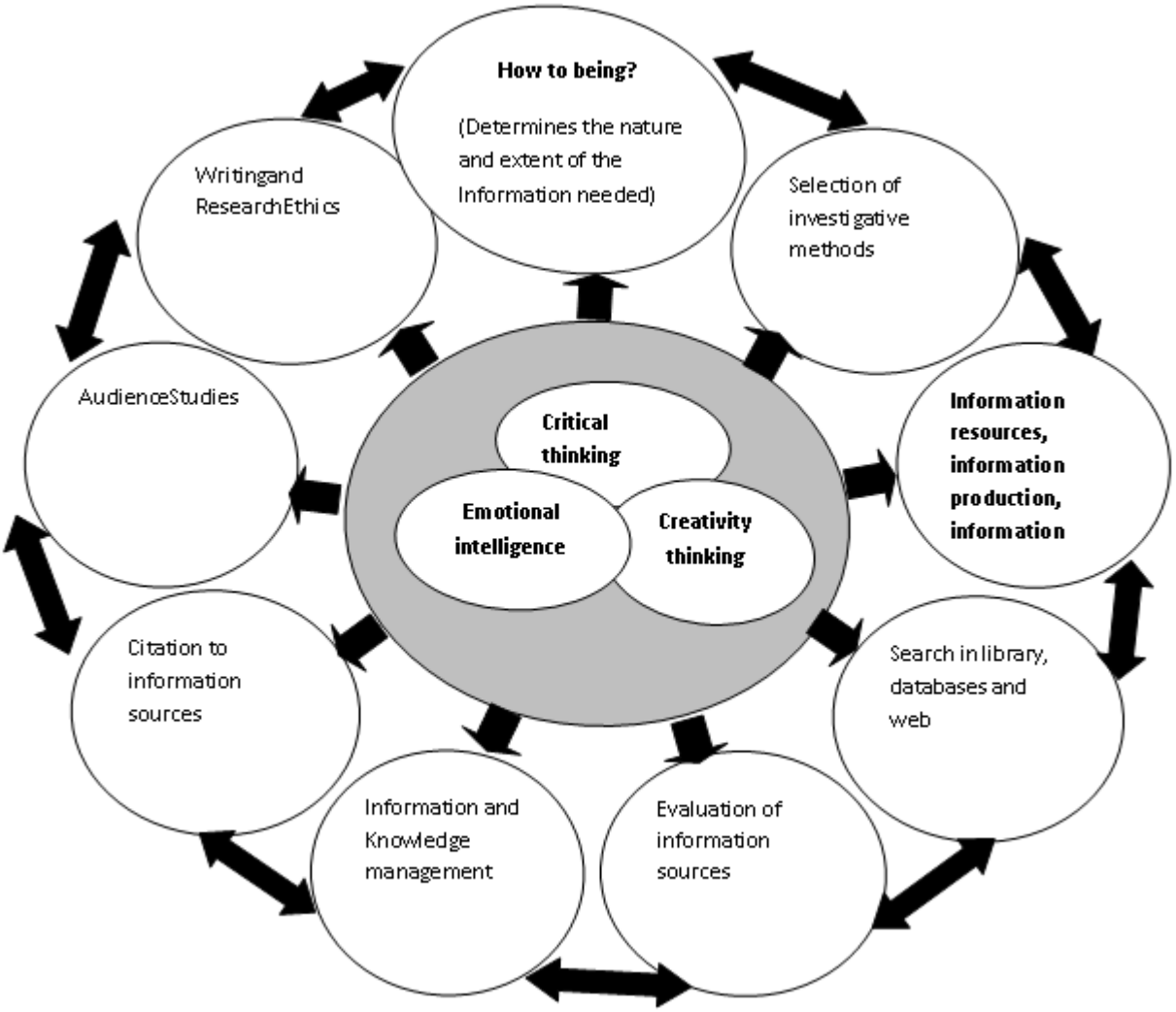

Figure 1. The information literacy model

Step 5: Evaluation of information sources

- Evaluation Criteria for print information sources
- Evaluation Criteria for electronic information sources

Step 6: Information and knowledge management

- personal information and knowledge management

Step 7: Citation to information sources

- Importance of citation
- Concepts of In-text citations and references
- Citation styles e.g., APA and MLA
- Citation software e.g., Endnote

Step 8: AudienceStudies

- Choosing a communication medium and format that best supports the purposes of the product or performance and the intended audience
- Using a range of information technology applications in creating the product or performance
- Communicating clearly and with a style that supports the purposes of the intended audience

Step 9: Writingand ResearchEthics

- Concept of copyright
- Concept of fair use and its applications
- Concept of plagiarism and ways of preventing it.

4. Methodology, Statistical Population

In this research, first, the level of the participants' information literacy skills was measured and then (according to the model approach) their emotional intelligence, critical thinking, prior knowledge and creative thinking were determined because of the significant relationship between these three skills and information literacy. In the next phase of the study, it was tried to teach information literacy skills to the participants by new information literacy instruction model. Finally, after the period, level of information literacy skills was measured. Figure 2 showed A Diagram Depicting Procedure for Conducting this Research.

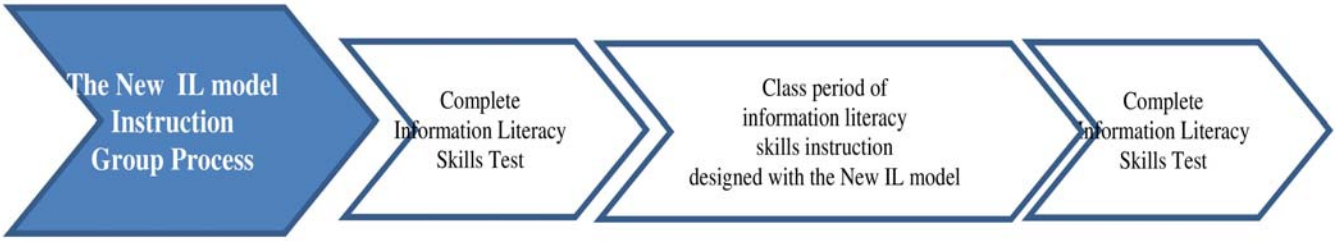

Figure 2. A Diagram Depicting Procedure for Conducting this Research

A survey was administered to research staffs of Regional Information Center for Science and Technology, Shiraz, Iran. Population of the study was 35 people. After evaluations (the following is mentioned) of population, the statistical population of the study

was 35 people. After evaluations (the following is mentioned) of population, the statistical population of the study was decreased to 30 participants out of 35 after normalization[1].

Property	Grouping	Frequency
Gender	Female	20
	Male	10
Grade	MS/MA	13
	BS	s15
	Associate Degree	2
Job Experience	1-5	13
	6-10	8
	11-15	-
	16-20	3
Time after graduation	1-5	15
	6-10	12
	11-15	-
	16-20	3
Field of study	Humanities	24
	Agriculture	1
	Science	-
	Engineering	5

Table 1. Frequencies of the Statistical population

5. Data Collection

Required data related to level of information literacy skills gathered on the base of the designed questionnaire based on Information Literacy Competency Standards for Higher Education, ACRL (2000), by Davarpanah and Siamak (DAS) (Davarpanah and Siamak, 2009) Testing the reliability of the questionnaire, Cronbach's Alpha result showed: 0/77 for pilot study. Cronbach's Alpha coefficient for two combined groups of students' questionnaires was 0/83. These results confirm that the reliability and validity of prepared instrument is quite high.

Required data related to emotional intelligence gathered with the help of the questionnairedesigned by Daniel Goleman (1998). Critical thinking was also measured, using the Persian version of the California Critical Thinking Skills Test; Form B (Khalili&HosseinZadeh, 2003). Creative thinking was determined by the Torrance Test of Creative Thinking (TTCT) (2009), while prior knowledge was measured by Khosrojerdi and Iranshahi (2009).

	Total score	Minimum	Maximum	Average	Standard deviation
Emotional intelligence	235	124.00	40.00	107.14	18.85
Critical thinking	210	146.00	87.00	126.46	14.85
Creative thinking	34	33.00	6.00	13.80	7.69
Prior knowledge	43	50.00	28.00	32.88	4.00

Table 2. Measuring the emotional intelligence, critical thinking, creative thinking and Prior knowledge scores

[1] The scores of some participants were extremely low or exceptionally high. For normalization and homogeneity of participants in the study, these scores were eliminated.

Table 2 presents scores of emotional intelligence, critical thinking, creative thinking and prior knowledge of 35 participants.Asyou can see,theminimum and maximum level in some areas studied is very far. Accordingly,it was decided thatthenormalizationofthescorebe addressed. As a result,people whoscoreveryhighorverylow, they were eliminatedfromthe sample.

6. Research Purpose

The first purpose of this study was to assess the effectiveness of Siamak's information literacy instruction model for the research staffs of Regional Information Center for Science and Technology, Shiraz, Iran.

Other purposes were:

• Describe / assessment the information literacy model learning

• Diagnose learning gaps

• Provide a structure for learning

• Provide opportunities for research staffs, students and teachers to talk about learning

Research Question

• Does instruction designed with the new information literacy instruction model increase learner understanding of the steps and procedure necessary to locate and evaluate information?

Need for Research

The literature includes few experimental research studies focused on the use of an instructional design model to facilitate learner learning of information literacy skills.

Numerous models for information literacy instruction exist and continue to be developed, but aside from the ISP model, the Big Six model and the I-LEARN model, none have been evaluated for their effectiveness through original research to determine their impact on learner learning. Also, a lack of documentation describing the modeg,s use or the model may have a weak or non-existent theory base. Based on a new design model is needed for information literacy instruction and the model needs to be studied to examine its role in learner learning; testing the new model is the necessary.

7. Analysis of Results

Research Question

• Does instruction designed with the new information literacy instruction model increase learner understanding of the steps and procedure necessary to locate and evaluate information?

In order to reply to this question, first, the level of participants' information literacy skills was measured and then their emotional intelligence, critical thinking and creative thinking were determined because of the significant relationship between these three skills and information literacy. Second, participants were surveyed on the basis of their gender, degree level, field of study, graduation time and working experience. In addition, their prior knowledge, expertise and experience were measured. Finally, the statistical population of the study was decreased to 30 participants out of 35 after normalization. In the next phase of the study, a series of the model was offered by the project conductor after surveying pre-tests. It was tried to minimize the impact of external and internal factors on this experiential research. In order to assess the effectiveness of the suggested the model, participants were given evaluation forms after instruction. Finally, it is advised to give a post-test for measuring IL skills of learners to find a significant difference of IL level before and after IL education.

This model was applied when teaching IL skills to the RICeSTresearch staffss. Table 1 presents the result of T-test studying. The difference between real IL and basic IL of the research population before and after IL courses was achieved.

According to the findings, there is a significant difference in the level of IL of learners after IL courses. According to the above finding, the mean score of the pre-test is 52/88, while the post-test shows 62/14. This significant difference is a clear indication that the level of information literacy skills of learners has increased after the courses.

Group	Mean	Std. Error Difference	T	Df	.Sig
Pre-test	52/88	9/51	- 4/330	34	0/000
Post-test	62/14	8/80			

Table 3. the result of T-test studying. The difference between real IL and basic IL of the research population before and after IL courses

8. Conclusion

This study provided an initial opportunity to establish information literacy goals and objectives in support of Information Literacy Competency Standards and to assess information literacy outcomes. The finding showed that the model is effective and advantageous. The significant relationship between pre-test and post-test scores supports the effectiveness of the suggested the model in improving their information literacy skills.

Thus as information literacy is not a one-dimensional issue, it must be studied and assessed from various angles. The internal and external elements interfering information literacy must be identified in order to remove barriers and strengthen strong points. All information literacy skills should be taught with regard to the information literacy standards for higher education and also critical thinking, creative thinking and emotional intelligence. In the end, it is recommended increasing the quality and effectiveness of education and training with teaching information literacy skills to higher education students in courses programs according to the model.

References

[1] ACRL (2000). *Information literacy competency standards for higher education.* Chicago: Illinois. Retrieved June 10, 2012, from http://www.ala.org/ala/acrl/acrlstandards/standards.pdf

[2] ———— (2001).*Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians. Retrieved October 12, 2015, from http://www.ala.org/acrl/standards/objectivesinformation*

[3] Asemi, A., Riahinia, N., Zandian, F. (2011). Information Literacy. Tehran, Ketabdar.

[4] Chang, C.S. (2007). An investigation of Taiwanese early adolescents' self-evaluationsconcerning the Big 6 information problem-solving approach, *Adolescence* 42, 405-415.

[5] Chuang, J. (2009). The relationship between junior higher school teachers critical thinking skills with information literacy and their integration of information technology into curriculum in Taiwan. NursEduc, 42 (11) 498-508.

[6] Davarpanah, M.R., Siamak, M. (2009). Construction and Validation of a Scale for the Assessment of Undergraduate Student's Information Literacy. *Library and Information Science* (a Scientific and Research Quarterly), 45 (12) 119-147. (in Persian language).

[7] Donaldson, C.A. (2004). Information literacy and McKinsey Model: The McKinsey strategic problem-solving model adapted to teach information literacy to graduate business students, *Library Philosophy and Practice*. 6 (2).

[8] Eisenberg, M. B., Berkowitz, R. E. (2001). The big 6 information problem-solving approach. Richmond Beach: Big6. Retrieved October 4, 2011, from http://www.big6.com

[9] Ferguson, S. 2009. Information literacy and its relationship to knowledge management. Journal of Information Literacy, 3 (2) pp. 6-24. Retrieved from http://ojs.lboro.ac.uk/ojs/index.php/JIL/article/view/PRA-V3-I2-2009-1

[10] Ghasemi, Ali H. (2006). *I*nvestigating the Status of InfoLit among Graduate Students and its Compliance with ACRL Infolit Standards and Four National Development Documents. Thesis for PhD, 2006.

[11] Goleman, D. (1998). Emotional Intelligence (translate by NasrinParsa). Tehran: Roshd.

[12] Greenwell, S. (2013). Using the I-Learn model for information literacy instruction: an experimental study. *Theses and*

Dissertations—Curriculum and Instruction. Paper 6. Retrieved June 10, 2015, from http://uknowledge.uky.edu/edc_etds/6

[13] Hadavandi, M., Hadavandi, F. (2010). The assessment of effectiveness of workshops on Crisis Management of Kerman province in the year 2009. *Quarterly Scientific Journal of Rescue & Relief*, 2 (1) 17-32 (translate).

[14] Haji Hiedari, H., Yazdian, A. (2011). Assessment and application of the five-level model of critical media literacy: A case study of college students of the Islamic Republic of Iran Broadcasting. *Glob Media J*, 6 (2) 30-57(in Persian language).

[15] Hess, A. N. (2015). Equipping Academic Librarians to Integrate the Framework into Instructional Practices: A Theoretical Application. *The Journal of Academic Librarianship*, *41*(6), 771-776.

[16] Hyldegaard, J. (2006). Collaborative information behavior: exploring Kuhlthau's Information Search Process model in a group-based educational setting, *Information Processing & Management*, 42 (1) 276-298.

[17] *Isbell, D., Kammerlocher, L. (1998). I*mplementing Kuhlthau: a new model for library and reference instruction. RSR: *Reference Services Review*, 26 (3-4) 33-44.

[18] *Journal of Nursing Research,* 15, 67-77.

[19] Khalili, H., Hossein Zadeh, M. (2003). Investigation of reliability, validity and normality Persian version of the California Critical Thinking Skills Test; Form B (CCTST). *Journal of Medical Education*, 3 (1) 29-32 (in Persian).

[20] Khosrowjerdi, Mahmood., Iranshahi, Mohammad. (2011). Prior knowledge and information-seeking behavior of PhD and MA students. *Library & Information Science Research*, 33, 331–335 (in Persian).

[21] Ku, Y.L., Sheu, S., Kuo, S.M. (2007). Efficacy of integrating information literacy educationinto a women's health course on informationliteracy for RN-BSN students, *Journal of Nursing Research*, 15, 67-77.

[22] Kuhlthau, C.C., Todd, R. (2005). Guided Inquiry: A framework for learning through school libraries in 21st century schools. Retrieved June 10, 2014, from http://www.cissl.scils.rutgers.edu/guidedInquiry/guidedInquiry.htm

[23] Lalor, JG., Clarke, M., Sheaf, G. (2012). An evaluation of the effectiveness of information literacy training for undergraduate midwives to improve their ability to access evidence for practice. *Nurse Educ Pract*, 12 (5) 269-72.

[24] Lo, S.-c. S. (2015).Effectiveness of Constructing Information Literacy via Credited Information Literacy Program. Frontiers in Artificial Intelligence and Applications, Vol. 274: Intelligent Systems and Applications, p. 680 - 688

[25] *McKenzie, J. (1999). The Research Cycle 2000. The Educational Technology Journal,* 9 (4). *Retrieved from http://www.fno.org/dec99/rcycle.html*

[26] Mokhtarpoor, R. (2010). Holdings IL education workshops in educational libraries: necessities, principles and methods. *Journal of Information and Science Technology*, 25 (4) 745-755.

[27] Moradi, R., AliAabadi, Kh., Khazayi, A., Rasouli, B. (2014). Relationship between Critical Thinking and Information Literacy of Medical Sciences Students. Bimonthly of Education Strategies in Medical Sciences, 7 (3) 141-147 (in Persian language).

[28] Neuman, D. (2011). Learning in information-rich environments: I-LEARN and the construction of knowledge in the 21st century. New York: Springer.

[29] Parirokh, M. (2010). The application of critical and systematic thinking in writing research reports, *In*: Proceedings of national conference on knowledge and security.

[30] Raeis, A. R., Bahrami, S., Yousefi, M. (2013). Relationship Between Information Literacy and Creativity: A Study of Students at the Isfahan University of Medical Sciences. *Mater Sociomed*, 25 (1) 28-31.

[31] Rezae, Said., Manoochehri, Mahshid. (2009). Reliability, validity and standardization of the Torrance of Creativity among high school teachers in Tehran. *Psychology and Educational Sciences*, 38 (3) 47-68 (in Persian language).

[32] Runco, M. A., Millar, G., Acar, S., Cramond, B. (2010). Torrance Tests of Creative Thinking as Predictors of Personal and Public Achievement: A Fifty-Year Follow-Up. *Creativity Research Journal*, 22 (4) 361-368.

[33] Sarmad, Z., Bazargan, A., Hejazi, E. (2011). *Research Methods in Behavioural Sciences*. Tehran: Agah. (in Persian).

[34] Scriven, M., Paul, R. (2007). Defining critical thinking for the national council for excellence in critical thinking instruction.

[35] Siamak, M. (2007). Developing a standard tool for basic and factual information literacy competency assessment of undergraduate level and testing it on the students of Ferdowsi University. Unpublished MA dissertation, Ferdowsi University

of Mashhad.

[36] WWolf, S., Brush, T., Saye, J. (2003). The Big Six information skills as a metacognitive scaffold: a case study. *School Library Media Research, 6.*

[37] Wu. CP. (2008). Exploring the relationship between self-regulating intentional internet search.