Adapting and Normalizing the 6th Grade Version of the Tool for Real-Time Assessment of Information Literacy Skills (TRAILS) Among the Iranian 6th Grade Students

Fatima Baji
Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
Email:fbaji@yahoo.com

Zahed Bigdeli
Shahid Chamran University of Ahvaz, Ahvaz, Iran.
Email: bigdelizahed20@gmail.com

Given the lack of a standardized and normalized assessment tool for measuring Iranian primary school students' levels of IL, this study adapted and modified the Tool for Real-time Assessment of Information Literacy Skills to evaluate the IL skills of a group of the 6th grade students. In this research, descriptive research design was used and the data were collected through a survey. A sample of 701 female and male students in the 6th grade from Ahwaz city was selected. Stratified random sampling technique was used to draw/choose representative sample. Descriptive statistics such as mean, standard deviation, median, interquartile deviation, scores of percentile ranks, and z, Zn, T scores were used to specify the IL skills test norms. According to the results, the mean score of female students in IL skills assessment was 11.56, while in males was 9.04. This demonstrates that the Iranian 6th grade students have weakness in IL skills; this issue is due to the lack of IL instruction in school curriculum and despite the adoption of various documents to improve the education system in Iran in recent years. Findings of this research provide insights towards the IL assessment tool development of k-12 students in Iran and establish a baseline for introducing TRAILS testing in k-12 setting in Iran.

Keywords Information Literacy Assessment, TRAILS, Primary Students, Iran, Information Literacy.

Introduction

The term *"information literacy"* (IL) was introduced by Zurkowski in 1974. According to him, people who are trained how to access and incorporate information resources in their field of work is information literate. These people are familiar with techniques of using information tools in terms of informational ways for solving the problems (Bawden, 2001). According to American Library Association (1989) to become information literate, a person must be able to recognize when information is needed and has the ability to locate, evaluate and use information effectively. Information literate people are those who "have learned how to learn". This Association also focused on the gap between the need for information literate society and the integration of IL into education. In this regards, Bruce (2004) believes that IL is the critical and the essential literacy of the twenty-first century. Limberg et al. (2012) also examined IL research approaches. He believes that: the view of information seeking as something that is learned is well in accordance with the view that the appropriation of information literacy may be a goal for learning. However, information literacy can be approached as an object of teaching as well as an object of learning. In librarianship, information literacy is often viewed as an object of teaching and IL is considered the outcome of learning process (p. 94)

https://doi.org/10.47657%2F201617901

Literature Review

The link between IL and learning and education had led educational institutions and system to integrate IL skills with their curriculums. Institution of IL which is established in 1997 by the Association of College and Research Libraries (ACRL), views IL as an important factor in developing collaboration among libraries in order to enhance the students learning outcomes (Salem, 2014). American Association of School Librarians (AASL) which published IL standards has focused on the learning outcomes of those who completed successful IL programs as part of their K-12 education. Globally, International Federation of Library Associations (IFLA) in cooperation with United Nations Educational, Scientific and Cultural Organization (UNESCO) issued the Statement of School Libraries in 2002. Accessing information and equipping students with lifelong learning skills are emphasized in these guidelines (IFLA/UNESCO, 2002).

In sum, Development of IL standards at different levels has drawn attention to the issue of information literacy assessment and developing tools for IL assessment in academic and school environments. Most academic IL assessments are carried out using tools developed according to ACRL standards; in these tools IL is assessed as a process by both qualitative and quantitative approaches. One of the most important projects of IL assessment is the national American project entitled Rubric Assessment of Information Literacy Skills (RAILS) in which participating institutions are trained and assisted in adapting the IL rubric developed by the Association of American Colleges and Universities into analytic rubrics for local use. The rubrics are then shared on the RAILS Web site, and the student performance data are gathered, analyzed, and shared as well (Oakleaf, 2009).

Blevens (2012) cited in Salem (2014) listed three large-scale options: the Standardized Assessment of Information Literacy Skills (SAILS), the Information Literacy Test (ILT) from James Madison University, and the iSkills assessment from the Educational Testing Service (ETS). Assessment of information literacy in k-12 settings is not considered important as in the academic level. One of the most important standardized tools for assessing IL skills in k-12 is Tool for Real-time Assessment of Information Literacy (TRAILS) which started as a project of the Kent State University Libraries (KSUL) as part of the Institute for Information Literacy Education (ILILE). ILILE is a joint partnership of KSUL and the School of Library and Information Science at Kent State University. The early objective of the TRAILS project was to develop a test of 9th grade IL, measuring the learning outcomes articulated in the first national standards published by the American Association of School Librarians and the then recently published Ohio Academic Content Standards for K-12 Libraries. The first TRAILS test focused on IL at the 9th grade level and was released in January 2006 (Schloman & Gedeon, 2007). In 2008, the project expanded to include a test for 6th graders and finally, in 2010, the 3rd and 12th grade tests were developed and released (Schloman, Gedeon, & Schwelik, 2010).

IL in Irani Context

In Iran the first articles on IL were published in 1990s; however, major works in this field were not published until 2000 (Yari, 2011). Parirokh and Abbasi (2004) and Kokabi (2004) are mentioned as important studies which focused on IL instruction in academic level. Eini (2009), Naderi and Zahedi (2009), and Haidari- Hemmat-abadi, Mousa-pour and Horri (2007) investigated IL instruction in k-12 setting. However; two decades have passed since the introduction of IL in Iran and although Khosravi wrote the first book in this field in 1996 on information literacy for schools, this concept has not yet found its way in the National documents of education and school curricula. A trivial body of research has been conducted on how to integrate and use IL skills at different levels of the school curriculum.

The review of literature on IL assessment tools development and validation shows that most research focused on IL assessment among

https://doi.org/10.47657%2F201617901

university students. Ghasemi and Dayani (2009) modified ACRL Information Literacy Competency Standards for the university community of Iran. Likewise, Nazari (2006) and Haidari et al. (2013) worked on modifying these standards in the academic fields or areas. The only research that has integrated IL instruction in the high school curriculum is that of Poursalehi, Zandian and Fahimnia (2011). This study used a modified version of TRAILS for assessing IL skills of students.

Problem Statement

Although the development of new technologies has only recently been reflected in the social and cultural levels in Iran, it made the Ministry of Education aware of a need for education system reformation. This body started developing national programs and documents in order to make fundamental changes in the educational system on its agenda. *National Document of Educational Development in the Twenty Years Perspective, the Document of Fundamental Revolution in Education* and *the Document of National Curriculum* are some of these documents.

However, despite the adoption of various documents for improving the education system, some research show that IL skills, school libraries and librarians have an important place in the curriculums, documents, and textbooks. In the information age, students need to be information literate more than ever. In order to keep pace with information and communication technologies, the education system which starts teaching critical thinking skills, information literacy and lifelong learning skills from elementary level can be more successful in reaching its goals. since there is a lack of IL skills instruction and IL skills assessment tools in the education system of Iran and because of the importance and necessity of developing and adapting IL skills assessment tools in schools, especially in primary schools, this research seeks to standardize and modify TRAILS for the sixth grade Iranian students as part of a bigger research.

Significance/implications

Given the lack of a standardized and normalized assessment tool for measuring Iranian primary school students' levels of IL, this study adapted and modified the Tool for Real-time Assessment of Information Literacy Skills to evaluate the IL skills of a group of the 6th grade students. The findings of this study provide a background of IL skills level of the 6th grade students that can be used for IL instruction integration in the school curriculum.

Purpose/Aim

This study is part of a wider project and aims at adapting and normalizing the 6thgrade version of the Tool for Real-time Assessment of Information Literacy Skills (TRAILS) among the Iranian 6th grade students. The main objectives of this study are as follows:

1. To adapt the 6th grade version of TRAILS for the Iranian 6th grade students and to measure the difficulty index and the discrimination index for each question of it.
2. To measure the IL skills level and norms of the 6th grade students of primary schools in Ahvaz, Iran using an Information Literacy Assessment (ILA) adapted from TRAILS.

Methodology

In this research, descriptive research design was used and the data were collected through a survey. A sample of 701 female and male students in the 6th grade from Ahwaz, were selected using a random stratified sampling technique.

Research Tool

This research aims to adapt and normalize the Tool for Real-Time Assessment of Information Literacy Skills (TRAILS) among the 6th grade Iranian students. TRAILS is a tool widely used to assess IL skills of students in different grades in USA (Eisenberg, 2008). As one of the projects of the Institute for Library and IL Education (ILILE), TRAILS was developed by Kent State University

https://doi.org/10.47657%2F201617901

faculty with the assistance of school librarians. This tool can be accessed through the website: *www.trails-9.org* and includes multiple-choice questions to assess the IL of students of the third, sixth, ninth and twelfth grade sin 5 categories: Developing topic; Identifying potential sources; Developing, using, and revising search strategies; Evaluating sources and information; Recognizing how to use information responsibly, ethically, and legally.

In this study, in addition to the 6th grade version of TRAILS, we used Iranian 6th grade science text-book. The initial draft of the tool was distributed among a sample of students and the difficulty index and discrimination index were calculated for each question. Then, the final tool was distributed among 701, 6th grade students selected randomly from 11 primary schools of Ahwaz in order to measure the IL level of them.

Validity

For the validity of TRAILS, content validity approach was used. After translating 20 multiple-choice questions of the 6th grade version of TRAILS, the initial draft of the test was prepared. Then the prepared questions were localized and adapted according to the content of selected lessons of the Iranian 6th grade science text-book. The result test was reviewed by some of the library and information science experts and the 6th grade teachers and librarians in order to determine the validity of it. After receiving and applying their comments and recommendations, validity of tool content was confirmed.

Difficulty and Discrimination Indexes

Since TRAILS is a multi-choice test in which each question has only one correct answer, difficulty index and discrimination index were used for measuring the reliability of each question. The item difficulty index is one of the most useful, and most frequently reported item analysis statistics. It is a measure of the *proportion* of examinees who answered the item correctly; for this reason, it is frequently called the *p-value*. As the proportion of examinees who got the item right, the p-value might more properly be called the item easiness index, rather than the item difficulty. It can range between 0.0 and 1.0, with a higher value indicating that a greater proportion of examinees responded to the item correctly, and it was thus an easier item (Delavar, 2010).

The item discrimination index is a measure of how well an item is able to distinguish between examinees who are knowledgeable and those who are not, or between masters and non-masters. The possible range of the discrimination index is -1.0 to 1.0; however, if an item has discrimination score below 0.0, it suggests a problem. When an item is discriminating negatively overall the most knowledgeable examinees are getting the item wrong and the least knowledgeable examinees are getting the item right (Delavar, 2010). At this stage of the investigation, a pilot study was first applied on a sample of 75 students and then on a sample of 57 students of the 6th grade for measuring the difficulty and discrimination indexes of the prepared draft of localized TRAILS. After each pilot, questions which did not have the adequate value of the measured indexes were edited. Difficulty and discrimination indexes are reported in Table 1.

According to Table 1, the data show significant improvement in the difficulty and discrimination indexes of the questions. So, the modified and localized the 6th grade TRAILS was ready for doing the normalization survey. Therefore, in the final stage of this research, the 6th grade modified TRAILS was distributed among a sample of 701 males and female 6th grade students who were selected by random stratified sampling method from 11 primary schools of Ahwaz

https://doi.org/10.47657%2F201617901

Table 1. Difficulty and discrimination indexes of first and second pilot studies

Question No	First Pilot		Second Pilot	
	Difficulty Index	Discrimination Index	Difficulty Index	Discrimination Index
1	0.24	0.19	0.78	0.18
2	0.21	0.24	0.75	0.75
3	0.74	0.43	0.84	0.18
4	0.31	0.52	0.31	0.12
5	0.66	0.38	0.96	0.25
6	0.19	0	0.56	0.56
7	0.19	-0.09	0.71	0.56
8	0.47	0.09	0.84	0.60
9	0.24	0.28	0.78	0.31
10	0.12	0.14	0.56	0.50
11	0.24	0.19	0.71	0.43
12	0.21	-0.23	0.53	0.18
13	0.14	0.19	0.62	0.50
14	0.45	-0.04	0.68	0.62
15	0.24	0	0.63	0.75
16	0.17	0.04	0.43	0.50
17	0.26	0.04	0.59	0.56
18	0.40	0.14	0.68	0.62
19	0.17	0.04	0.53	0.60
20	0.12	-0.14	0.44	0.50

For assessing the psychometric properties of the test and IL skills levels of the students, participant students took 20-minute group sessions in order to know the research purpose and answer the test questions. Descriptive statistics such as mean, standard deviation, median, interquartile deviation, scores of percentile ranks, and z, Zn, T scores were used to specify the IL skills test norms.

Findings

For measuring the percentile rank, and normalized scores in the total scores of male and female students IL skills, firstly the distribution of raw score in 7 categories with 3 intervals were provided and middle class score of the categories calculated. Then, norm of percentile rank and normalized z, Zn, T scores were calculated for the middle class scores. Findings of percentile ranks and the middle class scores are shown in Table 2.

https://doi.org/10.47657%2F201617901

Gender	9-part scores	T	Zn	Z	z	Percentile rank	Cumulative frequency	Frequency	Middle class scores	Score interval
Female	9	74	2.4	70.4	2.04	99.1	361	12	19	18-20
	6	57	0.7	62.1	1.21	75.5	275	77	16	15-17
	5	50	0	53.9	0.39	50	182	102	13	12-14
	4	44	-0.6	45.8	-0.42	26.6	97	96	10	9-11
	3	38.7	-1.23	37.5	-1.25	10.9	40	52	7	6-8
	2	35.9	-1.41	29.3	-2.07	0.8	3	24	4	3-5
	1	20	-3	21	-2.9	0	0	1	1	0-2
Male	9	80	3	78.5	2.85	100	337	0	19	18-20
	8	67.4	1.73	69.9	1.99	95.8	323	21	16	15-17
	7	59	0.9	61.3	1.13	82.4	278	69	13	12-14
	5	51	0.1	52.7	0.27	54	182	87	10	9-11
	4	44	-0.6	44.2	-0.58	26.4	89	101	7	6-8
	2	32.6	-1.74	35.6	-1.44	4.1	14	54	4	3-5
	1	20	-3	27	-2.3	0	0	5	1	0-2

Z-scores can be used to compare a measurement to a reference value. The z-score is the number of standard deviations away from the average value of the reference group. This reference group usually consists of people of the same age and gender; sometimes race and weight are also included.

A T score is similar to a z score; it represents **the number of standard deviations from the mean**. While the z-score returns values from between -5 and 5 (most scores fall between -3 and 3) standard deviations from the mean, the t-score has a greater value and returns results from between 0 to 100 (most scores will fall between 20 and 80). Many people prefer t scores because the lack of negative numbers means they are easier to work with and there is a larger range so that decimals are almost eliminated. Table 3 shows z-scores and their equivalent t-scores.

Mean norms, standard deviation, high and low cut points of normalized TRAILS among the 6th grade students of Ahwaz are reported in table 3.

Table 3. Mean norms of modified TRAILS among the 6th grade students of Ahwaz

Measure	Gender	Mean	Standard deviation	Reliability coefficient	Standard error of measurement	High cut point	Low cut point
Total	Female	11.56	3.64	0.67	0.191	15.2	7.92
	Male	9.04	3.49	0.62	0.190	12.53	5.55

According to Table 3, among female students 15.2 or higher is considered as a high score in normalized TRAILS; while among male students 12.53 or higher is considered as a high score.

Discussion

This study sought to adapt and normalize the 6thgrade version of TRAILS among the Iranian 6th grade students and determine whether the 6th grade version of TRAILS could be used to provide an efficient, reliable, and valid measurement of the Iranian students IL skills. Research results offer a scoring criterion for the 6th grade normalized TRAILS test by developing a proficiency score. once test questions got revised and difficulty and discrimination indexes of the adapted IL assessment evolved, this proficiency scores may need to be revisited; however, the results of this study establish at least a baseline for introducing TRAILS testing in k-12 setting in Iran in order to develop a valid and reliable versions of TRAILS for the 3rd, 6th, 9th, and 12th grades. Moreover, this study used a 20 question IL assessment tool adapted from the 6th grade version of TRAILS to investigate the current levels of a sample of 701 the 6th grade Iranian students. According to the results, the mean score of female students in IL skills assessment was 11.56, while in males was 9.04. This result demonstrates that the Iranian 6th grade students have weakness in IL skills, this issue is originated form the lack of IL instruction in school curriculum and despite the adoption of various documents for improving the education system in Iran in recent years.

This result confirms Poursalehi, Zandian and Fahimnia (2011) study results as in their study the IL skills level of high school students was low before IL instruction and improved significantly after the instruction. In other words, as there is not a national program for IL integration and instruction in k-12 curriculum, that is why this study shows that the participating students have not achieved high IL levels, suggesting the need for improvement. The study also showed that female students generally scored higher on the ILA than their male counterparts, implying their higher level of IL.

Findings of this research provide insights towards the IL assessment tool development of k-12 students in Iran. As IL instruction and assessment have been deemed essential in 21st-century society and have been found to reinforce students' development in other skills, the integration of IL instruction into formal curricula needs to be valued and carefully considered in all levels of national documents of education and school curriculum. Finally, it is noted that a systematic and well-informed IL curriculum together with a comprehensive assessment tool are needed to facilitate and monitor students' development in IL skills in Iran.

https://doi.org/10.47657%2F201617901

References

American Library Association. (1989). Presidential Committee on Information Literacy, Final Report, American Library Association, Chicago, IL.

Bawden, D. (2001). Information and digital literacies: A review of concepts. *Journal of Documentation*, 57 (2), 218–59.

Bruce, C. (2004). Information literacy as a catalyst for educational change. A background paper. In Danaher, Patrick Alan, Eds. Proceedings *"Lifelong Learning: Whose responsibility and what is your contribution?"*The 3rd International Lifelong Learning nference, (8-19). Yeppoon, Queensland.

Delavar, A. (2010). *Measurement in psychology, consultation, and education*. Tehran: Arasbaran. [In Persian]

Eini, A. (1999). *Information literacy instruction development plan in national document of educational development in the twenty years perspective and presenting a template for reaching information literacy goals*.(Unpublished doctoral dissertation). Islamic Azad University, Science & Research Unit.

Ghasemi, A. H., & Dayani, H. (2009). Normalization of ACRL information literacy competencies standard for academic community of Iran. *Library & Information Science Research*, 8(3), 148-160. [In Persian] Available from: http://infosci.um.ac.ir/index.php/riis/article/ view/5719

Haidari, M., Alipour, A., Farzad, V., Ebrahimzade, E., & Zandi, B. (2013). Intending and normalizing the measurement of information and technology literacy skills and critical thinking of independent learner test in e-learning system. *Education & Leaning*, 1(2), 72- 76. [In Persian]

Haidari-hemmat Abadi, Z., Mousa-pour, N., Horri, A. (2007). Educational planning system for development of infomration literacy. *Curriculum Studies*, 4(1), 29-48. [In Persian]

IFLA/UNESCO. (2002). School Library Guidelines. Retrieved from www. ifla.org/VIL

Khosravi, F. (1996). Information literacy in schools. *Book Quarterly*, 7(1), 19-26. [In Persian]

Kokabi, M. (2004). A suggested lesson plan for introduction on library and librarianshipcourse. in: Pariroukh, M. (ed.) *School Libraries: Activation of Education System and Contribution In Teaching-Learning Process* (pp. 335-353). Ketabdar, Mashahd. [In Persian]

Naderi, M.R. & Zahedi, M. (2009). *School library and information literacy skills instruction*. In: Pariroukh, M. (ed.) School Libraries: Activation of education system and contribution in teaching-learning process (pp. 615-638). Ketabdar, Mashahd. [In Persian]

Nazari, M. (2006). Plan, examination, implementation, and evaluation of information literacy for higher education. *Library and Information Science*, 2(34), 121-130. [In Persian]

Oakleaf, M. (2009). Using rubrics to assess information literacy: An examination of methodology and interrater reliability. *Journal of the American Society for Information Science & Technology,* 60(5), 969-983.

Parirokh, M. & Abbasi, Z. (2004). *Information literacy instruction, methods and strategies*. In: Pariroukh, M. (ed.) School libraries: activation of education system and contribution in teaching-learning process (pp. 197-214). Ketabdar, Mashahd. [In Persian]

Poursalehi, N., Zandian, F., & Fahimnia, F. (2011). Study of effect of information literacy instruction by teacher and librarian on improving information literacy skills of

secondary students of tehran. *Academic Library and Information Science Research*, 58, 13—32. [In Persian]

Salem, J A. (2014). *The development and validation of all four trails (tool for real-time assessment of information literacy skills) tests for k-12 students*. (Unpublished doctoral dissertation). Kent State University College of Education.

Schloman, B., & Gedeon, J. A. (2007). Creating TRAILS. *Knowledge Quest, 35*(5), 44- 47.

Schloman, B., Gedeon, J., & Schwelik, J. (2010). Extending the trail. *Ohio Media Spectrum, 62*(1), 28-31.

Yari, S. (2011). Review of information literacy literature in Iran. *Library & Information Science Quarterly*. 53, 183-190. [In Persian]