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Research Paper

Designing Educators' Information Literacy Model at the Agricultural Technical Schools in Mazandaran Province, Iran

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Abstract

Information literacy embraces the ability to access useful information and to have the awareness of organizing knowledge and information which require different search methods and most effective diagnostic information for problem solving and decision-making. Those who lack these abilities are continuously confused in the vast ocean of information. This study investigated designing model of educators' information literacy at agricultural technical schools in Mazandaran Province, Iran. The date analyses methods used in this study involved a combination of descriptive and quantitative research. The statistical population consisted of 155 educators of agricultural technical schools in Mazandaran Province. The questionnaire validity was approved by the university professors and many of the educational system experts. The theta coefficients for each section were between 80 and 95 percent. The descriptive and inferential statistics and structural equation modeling were used to analyze the data using SPSS16 and Smart PLS2 software. The results showed that the educators had good information literacy. It was found that four variables of the field of study, work experience, age and social factor determined 66.3 percent of the variance in educators' information literacy at agricultural technical schools.

Keywords:
Agricultural technical school; information literacy; Mazandaran

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INTRODUCTION

In education, information literacy serves is a cultural, programming, and educational activity prescribing the content of modern education for effective presence in the third millennium. The process of acquiring knowledge and attitude about information and its skills is the main determinant in information society (Nazari, 2005). Having access to required information from the mass of available information requires specific skills that are constructed as informational literacy. Those who lack these abilities are continuously confused in the vast ocean of information (Bardestani, 2004). Having necessary information literacy requires having the skills and abilities to make the best of financial and human capitals used for the procurement, purchase, collection and organization of a variety of foreign and domestic materials and resources (Bakhtiyarzadeh, 2002).

Information literacy refers to a collection of search skills, retrieval and analysis, recognition of valid information, and ability to use information to solve a problem with critical thinking (Jill Boruff & Thomas, 2011). Information literacy includes recognizing information needs, identifying, locating, organizing, evaluating, and effectively using information skill that an individual uses to solve his or her problems. These skills are the prerequisites for effective participation in the information society and are basic rights of individuals for lifelong learning (His & Yeong, 2013). Information literacy is a tool for individuals' empowerment. This ability can be seen in the individuals' skill in analyzing and making judgments or his/her independence in search of truth (Wema & Hepworth, 2007). Information literacy contributes to individuals' discussion ability. Such a person enjoys searching for knowledge and is excited. This skill not only prepares individuals for lifelong learning, but also enhances their success in providing information needs (Chiang et al., 2007).

Considering the importance of information literacy for educators in conducting research, educational activities and improving academic status, it is clear that educators who lack necessary research and information literacy skills are not able to work effectively and efficiently in advanced environments using new technologies (Davarrpanah, 2007).

Investigations on the impact of different factors on information literacy suggested different outcomes. Durodolu (2018), in a study on information literacy, self-concept and metacognitive ability of teacher-librarians at the University of Zululand, concluded that the teacher-librarians lacked the ability to use computer applications unaided. The teacher-librarians also acknowledged that they had problems with their self-concept, especially pertaining to having the confidence to seek for help in using computers and the Internet.

Nwachulwu Arua et al. (2018), in a research on the information literacy for empowering the society, concluded that for the information literacy curriculum to be problem-based, inquiry-based, and resource-based, it should make an effective use of instructional pedagogies and technologies, and should be integrated and articulated with a discipline's learning outcome, based on which librarians should collaborate with stakeholders in their institution to ensure information literacy policy formulation and implementation.

Barimani and Rasooli (2017) investigated the relationship between information literacy and life skills of elementary school teachers. Findings indicated that the there was a significant positive correlation between information literacy and teachers' life skills. Also, there was a significant relationship between information literacy and empathy, communication, problem solving and creative thinking skills. Scherer et al. (2017) showed that the information literacy level among users was steadily increasing, and there was no significant difference in gender and nationality of students enrolled in Norwegian schools. Bebbington and Vellino (2015) investigated the point on "Can playing minecraft improve teenagers' information literacy?" and findings indicated that mental games promoted

teenagers' information literacy. Rahimi et al. (2014) in a study on the status of information literacy among normal and gifted school teachers in Kashan concluded that the mean of information literacy among teachers was higher than average. Thus, all teachers and education practitioners should pay special attention to the factors affecting the media and information literacy improvement as a main capability. Enayati and Erfani (2014) investigated Information literacy among students in technical schools of Sari based on information literacy standards. The result showed that the information literacy of the students was higher than the average level.

Comparing information literacy and social skills of students undergoing distance education and traditional education, Bakhtiari et al. (2014) concluded that there was no significant difference between information literacy and social skills among students undergoing distance education and traditional education. Naderi et al. (2013), in a research on the information literacy of the students at Rafsanjan University of Medical Sciences, concluded that the information literacy rate of students was lower than the average and it was expected that the necessary education in the field of information literacy should be provided to students to promote their information literacy. Malekipour and Malekipour (2013) in a study on the status of information literacy standards among the teachers of Dehloran education department concluded that the information literacy standards level among the teachers of Dehloran education department was low. Also, the information literacy standards level was different among the male and female teachers.

Information literacy enhances the capabilities needed to achieve a variety of literacy as an inclusive and effective phenomenon in the community (Cobus, 2008). In order for each of the members of the community to benefit from information in their professional and personal lives, information literacy is a basic requirement for all (Hashemi et al., 2012). The main goal of information literacy is a lifelong and independent learning experience (Zamani, 2012). It makes knowledge and recognition more relevant to the scientific developments of other related disciplines (Abdi, 2010).

The capabilities for information literacy include the five standards used in this research. These standards were extracted by the Association of College and Research Libraries (ACRL), approved by Texas Specialists in 2000. These standards include discriminating the nature and extent of information (the first standard), accessing the required information (the second standard), using required information (the third standard), evaluating the information and resources (the fourth standard) and considering the legal and economic matters (the fifth standard) (Zamani, 2007).

The main objective of this research was to design an educators' information literacy model at agricultural technical schools in Mazandaran Province, Iran. Information literacy for educators at agricultural technical schools in Mazandaran Province is important in research and educational activities and improvement of educational status and educators need to have information skills. Educators lacking the necessary research skills and information literacy will not be able to act effectively and desirably in advanced environments with new technologies.

METHODOLOGY

The methodology of this study will be discussed in terms of the study area, population, sampling and data collection, data analysis, and validation and reliability of the measurement tools. Regarding the literature in this field, the theoretical research model is presented as Figure 1.

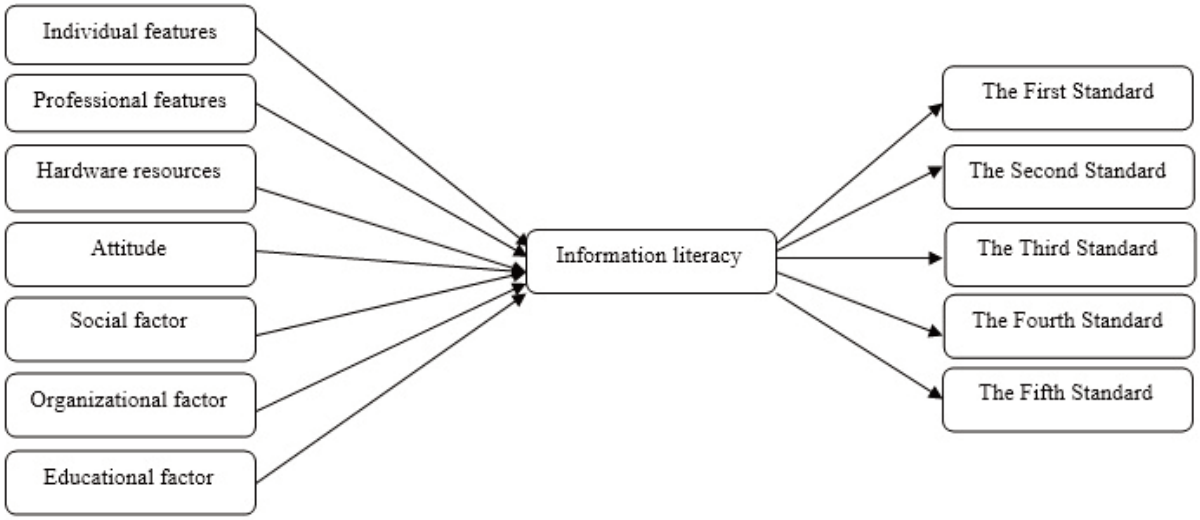

Figure 1. Theoretical Research Model

Study area

According to the statistics of the Mazandaran Provincial Education Directorate in 2017, this province has fifteen agricultural technical schools in Sari, Joybar, Amol, Behshahr, Neka, Miandurood, Ghaemshahr, Behnamir, Babol, Babolsar, Noor, Noshahr, Chalus, Tonekabon and Ramsar, with a total of 155 educators.

Population, sampling and data collection

The statistical population included 155 educators of agricultural technical schools in Mazandaran Province. The Total population (N), student t value with 95% confidence (t), the highest standard deviation of the initial test (s) and one third of the confidence interval (d) were 155, 1.96, 1.51, and 0.18, respectively, which were put in the Cochran formula, and the resulted sample size was 99, adding 19 samples (due to failing errors) to reach 118 in total, finally, 118 questionnaires were answered.

$$n=\frac{N(ts)^2}{Nd^2+(ts)^2}$$

After determining sample size through the Cochran formula, a stratified sampling (in terms of agricultural technical schools) with proportional allocation was used and the number of people from each school was calculated (Table 1). The main tool used in this study was a questionnaire. The information literacy was considered as the dependent variable. The individual features, professional features, hardware resources, attitude, social factor, organizational factor and educational factor were considered as the independent variables.

Data analysis

This was an applied study. The analyses methods used in this study included a combination of descriptive and quantitative research. The descriptive and inferential statistics and structural equation modeling were used to analyze the data using $SPSS_{16}$ and Smart PLS_2 software. The descriptive statistics was used to categorize subjects on different traits and describe the characteristics of the statistical population using frequency distribution, central tendencies (mean, mode) and dispersion tendencies (standard deviation). Considering the inferential statistics, Kruskal-Wallis test and Spearman's correlation coefficient test were used in $SPSS_{16}$; and PLS_2 software was used for designing the model.

Table 1

Number of Agricultural Educators and Number of Samples at Agricultural Technical Schools in Mazandaran Province

Agricultural technical school	County	Number of educators	Number of samples
Shahid Beheshti	Sari	29	22
West of Mazandaran	Amol	20	15
Imam Khomeini	Joybar	16	12
Machak Posht	Sari	5	4
Shahid Sazagar (Girls)	Behshahr	8	6
Shahid Motahhari	Neka	6	5
Shahid Sharifi	Miandurood	8	6
Sedigheh Kobra (Girls)	Ghaemshahr	8	6
Ghods	Babol	10	7
Taliee Enghelab	Babolsar	6	5
Jawad al-Aimeh	Behnamir	5	4
Late Naiij (girls)	Noshahr	9	7
Khayyam	Chalous	8	6
Narjes (Girls)	Tonekabon	10	8
Shahid Bahonar	Ramsar	7	5
Total	155	118	

The structural equation modeling was developed from a set of multivariate techniques such as multivariate regression and factor analysis. It investigated a set of simultaneous relationships (Kline, 2011). The PLS approach, or least partial squares, unlike Lisrel can provide an appropriate approach for researchers due to less dependency of sample size, variables level, and the normal distribution (Chin, 1998).

Validation and reliability of measurement

The Questionnaire validity was approved by the university professors and many of the educational system experts. A pilot study was conducted with 30 individuals for determining the reliability of the questionnaire. The theta coefficients for each section were between 80 and 95 percent.

RESULTS

The results showed that 37.3 percent of the educators were between 40-44 years old and 27.1 percent aged 35-39 with the average age of 38.80 years. 78 percent of the samples were male and 22 were female. The work experience of 28 percent of the educators was between 24 to 27 years and 27.1 percent had a work experience of 8 to 11 years, and the average work experience of educators was 16.93 years. Also, 80.4 percent of the educators had a second job.

Table 2 shows that the educational degree of 45.8 percent of agriculture educators was Bachelor and 39.8 percent had master degrees. The field of study of 38.1 percent of educators was agronomy. The organization of service place of 71.2 percent of educators was education directorate. Also, 48.3 percent of educators had a second job of agriculture.

According to Table 3, the information literacy average of educators was very high. According to the results, 16.9 percent of the educators' information literacy was high, 83.79 percent was very high.

Table 2

The *Status of Educational Degrees, Field of Study, Organization of Service Place and Type of Educators' Second Job at Agricultural Technical Schools*

Variable		Frequency	Percent	Mode
Educational degree	Technician	17	14.4	Bachelor
	Bachelor	54	45.8	
	Master	47	39.8	
	Total	118	100	
Field of study	Agronomy	45	38.1	Agronomy
	Horticulture	34	28.8	
	Animals' sciences	26	22	
	Other	13	11	
	Total	118	100	
Organization of service place	Education directorate	84	71.2	Education directorate
	Jihad-e-Keshavarzi	11	9.3	
	Private companies	20	16.9	
	Other	3	2.5	
	Total	118	100	
Type of second job	Agriculture	57	48.3	Agriculture
	Industry	14	11.9	
	Service giving	7	5.9	
	Other	4	3.4	
	No response	36	30.5	
	Total	118	100	

Table 3

Frequency Distribution of Educators' Information Literacy of Agricultural Technical Schools

Level	Frequency	Percent	Cumulative percent
High	20	16.9	16.9
Very high	98	83.1	100
Total	118	100	

Mean= 4.83 Standard deviation= 0.38

Likert-type scale: none (0), very low(1), low(2), moderate(3), high(4), very high(5)

Table 4

Correlation between Research Variables and Educators' Information Literacy at Agricultural Technical Schools

Variable	r_s	*p*-value
Educational factor	0.224**	0.015
Organizational factor	0.466**	0.000
Social factor	-0.196*	0.034
Hardware resources	0.545**	0.001
Attitude	-0.293**	0.001
Age	0.304**	0.001
Work experience	0.422*	0.014

** $p<0.01$, * $p<0.05$

As independent and dependent variables were ranked, Spearman's coefficient was used to determine the correlation and significance level. The results in Table 4 showed that there was a significant positive correlation between organization factor, hardware resources, age, educational factor and the work experience of educators with information literacy. Also, there was a significant negative relationship between social factor and attitude with educators' information literacy.

Kruskal-Wallis test was used due to multilevel status of the independent variables (field of study, the type of the second job and educational degree) and the dependent variable (educators' information literacy). The results of Kruskal-Wallis test (Table 5) indicated that there was a significant difference between field of study, educational degree, type of second job and the educators' information literacy. Therefore, the null hypotheses were rejected and the research hypotheses were confirmed. The means of educators' information literacy with a second job were higher for agriculture, service giving, industry and others, respectively. The results showed that the means of information literacy were higher in the field of horticulture, animals' sciences, other fields and agronomy, respectively. The means of educators' information literacy with an educational degree were higher for masters, technician and bachelors, respectively.

To design the model, the PLS_2 software was used. In order to investigate the construct validity, Fornell and Larcker (1981) proposed three criteria: 1) the validity of each item; 2) composite reliability (CR) of each construct; and 3) the average variance extracted (AVE). Regarding the validity of each item, the factor load of 0.7 and above for each item in the factor analysis was the indicator of a well-defined construct, and the factor load must be at least at a level of 0.01 (Gefen & Straub, 2005). Figure 2 shows the structural equation modeling of the study in standardized coefficient estimates. It should be noted that the educational factor, social factor, hardware resources, attitude, age, type of second job and educational degrees were eliminated from the model due to the little effects in spite of significance of correlation coefficient and Kruskal Wallis test. Also, Tables 5 shows the estimated standard coefficients and the factor load for each indicator of information literacy.

Table 5

Results of Kruskal Wallis Test to Investigate Individual Features with Educators' Information Literacy

Independent variable	Df	Chi-square	*p*-value	Mean comparison
Type of second job	3	27.21**	0.000	Agriculture> service giving >industry> others
Field of study	3	46.42**	0.000	Horticulture > Animals' sciences > Other> Agronomy
Educational degree	2	15.16**	0.001	Master > Technician > Bachelor

**$p<0.01$, * $p<0.05$

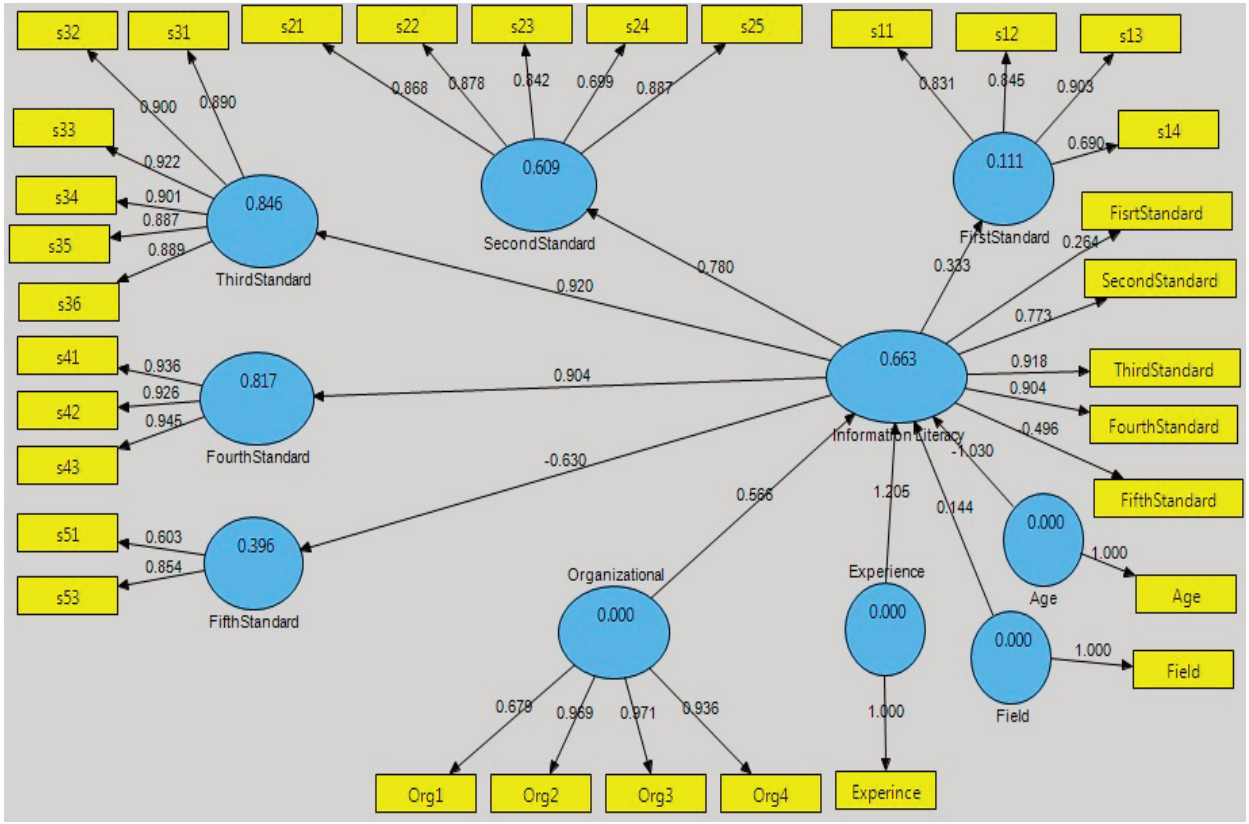

Figure 2. Structural Equation Model for Estimated Standard Coefficients

Table 6 indicates the ability to consider the costs and benefits of information in the latent variable of discriminating the nature and extent of information (first standard), also it shows the educators' ability to extract, record and manage information in the latent variable of accessing the required information (second standard); moreover, it indicates the educators' ability to combine information to reach the new concept in the latent variable of using required information (third standard); in addition, the table shows the ability to exchange performance with other professionals in the latent variable of evaluating the information and resources (fourth standard); and finally, it specifies the observance of the educators' trustworthiness in quoting others in the latent variable of considering the legal and economic matters (fifth standard) which had the highest impact on the five standards. Also, the standard of using required information had the highest impact among the standards of information literacy.

Table 7 shows the estimated standard coefficients of latent variables and factor load of indicators affecting information literacy. Table 6 shows that work experience, age and organizational factor (such as the existence of formal structure of information technology and attention to the creation of a database at the agricultural technical schools) had the highest impact on information literacy, respectively. The impact of age was negative on information literacy.

To investigate structures validity, Chin (1988) recommended the average variance extracted (AVE) of a construct should be greater than its correlation with other constructs; this indicates that the correlation of constructs with its indicators is more than its correlation with other constructs. Table 8 presents the results of the validity study which shows the suitability of the constructs.

The results of Table 8 shows that four variables of the field of study, work experience, age and social factor determined 66.3 percent of the variance in educators' information literacy at agricultural technical schools in Mazandaran Province. Acceptable values of the composite reliability for each construct should be 0.7 or greater. Fornell and Larcker (1981) recommended values of 0.5 and more for the average extracted variance (AVE), which means that the construct is about 50 percent or more of the variance of its indicators (Chin, 1988) . As shown in Table 9, the composite reliability value for each of the constructs was 0.7 or more and the average extracted variance is greater than 0.5.

Table 6
Estimated Standard Coefficients and the Factor Load for Each Indicator of Information Literacy

Latent variable	Symbol	Standardized coefficient	Indicator	Symbol	Factor load
Discriminating the nature and extent of information (First standard)	First standard	0.333	Educators' ability to recognize their information needs	S11	0.831
			Identifying various types of information sources in different formats	S12	0.845
			The ability to consider the costs and benefits of information	S13	0.903
			Educators' evaluation of the nature and extent of information	S14	0.690
Having access to the required information (Second standard)	Second standard	0.780	The ability to determine the most appropriate search methods and information retrieval systems	S21	0.868
			The ability to choose different strategies for information search	S22	0.878
			The ability to retrieve information from the Internet or other resources	S23	0.842
			The ability to correct information search strategies	S24	0.699
			The educators' ability to extract, record and manage information	S25	0.887
Using required information (Third standard)	Third standard	0.920	The educators' ability to summarize the collected information	S31	0.890
			The educators' ability to determine the information validity, stability, accuracy and expiration time	S32	0.900
			The educators' ability to combine information to reach the new concept	S33	0.922
			The educators' ability to adapt new and old information	S34	0.901
			Explaining the effect of new knowledge on educators' value system	S35	0.887
			The educators' ability to validate information with interpretation and discourse	S36	0.889
Evaluating The information and resources (Fourth standard)	Fourth standard	0.904	The educators' ability to use information to generate new performance	S41	0.936
			The ability to expand performance	S42	0.926
			The ability to exchange performance with other professionals	S43	0.945
Considering the legal and economic matters (Fifth standard)	Fifth standard	-0.630	The educators' ability to understand the ethical, legal and economic issues of information	S51	0.603
			The observance of the educators' trustworthiness in quoting others	S53	0.854

Table 7

The Estimated Standard Coefficients of Latent Variables and Factor Load of Indicators Affecting Information Literacy

Latent variable	Symbol	Standardized coefficient	Indicator	Symbol	Factor load
Organizational	Organizational	0.566	Holding the rate of workshop meetings at the agricultural technical schools	Org1	0.679
			Paying attention to and creation of a database at the agricultural technical schools	Org2	0.969
			Providing the formal structure of information technology at the agricultural technical schools	Org3	0.971
			Holding and attending specialized conferences at the agricultural technical schools	Org4	0.936
Work experience	Experience	1.205	Work experience	Experience	1
Field of study	Field	0.144	Field of Study	Field	1
Age	Age	-1.030	Age	Age	1

Table 8

The Matrix of Correlation and Validity of Constructs

Construct	Age	Work Experience	Field of study	Fifth standard	First standard	Fourth standard	Information literacy	Organizational factor	Second standard	Third standard
Age	1*									
Work experience	0.945	1*								
Field of study	-0.159	-0.068	1*							
Fifth standard	-0.209	-0.280	-0.153	0.740*						
First standard	-0.097	-0.088	0.227	0.002	0.821*					
Fourth standard	0.358	0.473	0.347	-0.426	0.325	0.936*				
Information literacy	0.343	0.488	0.284	0.630	0.333	0.904	0.718*			
Organizational factor	0.451	0.469	0.106	-0.368	0.279	0.7	0.683	0.897*		
Second standard	0.181	0.367	0.103	-0.405	0.264	0.566	0.780	0.465	0.837*	
Third standard	0.399	0.506	0.278	0.540	0.173	0.855	0.920	0.641	0.577	0.897*

* Root average extracted variance (AVE) of each construct

Table 9
The Average Extracted Variance, Composite Reliability and R^2 Value

Construct	Average extracted variance	Composite reliability	R^2
Information literacy	0.515	0.697	0.663
Discriminating the nature and extent of information (First standard)	0.674	0.891	0.111
Accessing the required information (Second standard)	0.701	0.921	0.609
Using required information (Third standard)	0.807	0.962	0.846
Evaluating the information and resources (Fourth standard)	0.876	0.955	0.817
Considering the legal and economic matters (Fifth standard)	0.547	0.701	0.396
Organizational factor	0.805	0.942	
Work experience	1	1	
Field of Study	1	1	
Age	1	1	

DISCUSSION AND CONCLUSIONS

The results showed that 78 percent of educators were male and 22 percent were female. This result means that women had less employment at the agricultural technical schools, and most agricultural educators are male. Also, 80.4 percent of the educators had a second job and 48.3 percent of educators had a second job of agriculture indicating that the educators had an agricultural experience that could provide practical training to their learners. 37.3 percent of the educators were between 40-44 years old and 27.1percent aged 35-39 indicating that 64.4 percent of educators were middle-aged with a good potential for work and effective information literacy programs. The work experience of 28 percent of the educators was between 24 to 27 years and 27.1 percent had 8 to 11 years of experience. The results indicated that the educators had a high educational experience, as well as showing the attention of the organization responsible for agricultural education in the last 11 years.

According to the results of this study, the educators' information literacy was very high. These results indicated that educators had good information literacy. Since human capital is considered to be the largest capital, the desired goals can be achieved if the conditions are fit. Findings of Rahimi et al. (2014), Enayati and Erfani (2014) confirmed these results. However, the finding of Malekipour and Malekipour (2013) contradicts the results obtained in this study.

The results of Spearman correlation test showed that there was a significant positive correlation between organization factor, hardware resources, age, educational factor and the work experience of educators with information literacy. Also, there was a significant negative relationship between social factor and attitude with educators' information literacy. Findings of Chiang et al. (2007) were in line with results of the present study. However, the findings of Bakhtiari et al. (2014) were not in harmony with these results.

The results of Kruskal-Wallis test showed that there was a significant difference between the field of study, educational degree, type of second job and the educators' information literacy. Findings of Bakhtiyarzadeh (2002) and Naderi (2013) confirmed these

results. However, the findings of Akbari Darian et al. (2012) were opposite to these results.

The results showed that four variables of the field of study, work experience, age and social factor determined 66.3 percent of the variance in educators' information literacy at agricultural technical schools in Mazandaran Province, Iran.

CONCLUSIONS

Information literacy of agricultural educators who had a second job in agriculture should be used in-service training classes or problem-solving workshops. It is recommended to attract and employ educators with attention to the field of study. It is recommended to pay more attention to the ability to take into account the costs and benefits of information, educators' ability to extract, record and manage information, educators' ability to combine information to reach the new concept, ability to exchange performance with other professionals and observance of the educators' trustworthiness in quoting others and more training is needed in these cases. Regarding the structural equations modeling, it is recommended to consider work experience, age and organizational factor (such as the existence of formal structure of information technology and attention to the creation of a database at the agricultural technical schools).

Based on the findings of this study, we concluded that the access to appropriate computer and Internet facilities, availability of adequate and up-to-date resources for teaching and learning, the ease of access to appropriate educational materials, the need assessment of educators, the appropriate educational content, the provision of appropriate managerial systems and, in general, attention to the individual, social, attitudinal, infrastructural, technical, educational, organizational, and support dimensions of educators were essential for educators' information literacy.

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