

Attitude towards On-the-job E-learning: The Case of Agricultural Extension Workers in Iran

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ABSTRACT

The successful adoption of e-learning systems is mainly dependent on the learners' attitude and willingness to use them. This survey was conducted to investigate agricultural extension workers' attitudes toward using e-learning for on-the-job training in Iran and factors which affect it. Using the stratified sampling technique a sample of 379 extension workers were selected from six provinces. A structured questionnaire was used to collect data through an interview method. Findings show that extension workers' attitude toward e-learning is generally positive. Extension workers' knowledge of e-learning, access to technical support, and their motivation influence their attitude toward the use of e-learning for on-the job training. Therefore, recommendations are provided to promote the experts' motivation, knowledge and to improve infrastructures.

Keywords: Agricultural extension workers, Attitude, E-learning, On-the-job training.

INTRODUCTION

The importance of on-the job training for extension workers rises from the fact that this group of actors in agricultural sector need to have particular skills and competencies (Rad *et al.*, 2011) including teamwork, communication, and leadership skills, ability to understand diverse views, cultures and development issues which are not being developed at universities properly (Movahedi and Nagel, 2012).

In search for a more effective way to deliver on-the-job training, organizations have expanded their use of e-learning (Smart and Cappel, 2006) especially in the last decade (Batalla-Busquets and Pacheco-Berna, 2013). E-learning refers to the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance (Liaw *et al.*, 2007). According to

Aixia and Wang (2011) e-learning is an effective alternative to traditional face-to-face education. Moreover, it lowers costs, its content is more timely and dependable and finally, and it provides an increasingly valuable learner service (Rosenberg, 2001).

In case of agricultural extension, studies found the positive impact of internet in knowledge sharing among extension workers and improved training (Pezeshki Rad *et al.*, 2011). Although several studies suggest that online education can be as effective as traditional classroom models, few studies have helped to understand whether learners have a positive attitude towards e-learning (Smart and Cappel, 2006) and which factors affect their attitude. An attitude is a summary evaluation of a psychological object captured in such attribute dimensions as good-bad, harmful-beneficial, pleasant-unpleasant, and likable-dislikable (Ajzen 2001). According to Burns

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(1997, p. 456) “attitudes are evaluated beliefs which predispose the individual to respond in a preferential way”.

Attitudes shape actions. Individuals with a general positive attitude towards e-learning are more likely to adopt e-learning (Rodriguez *et al.*, 2008). The attitude towards acceptance and use of an e-learning system can be influenced by different factors (Šumak *et al.*, 2011) and consequently, several adoption-related critical factors must be carefully evaluated before, during, and after any adoption. Therefore, the literature was reviewed to understand factors that were found to contribute to the formation of learners’ attitude towards e-learning. In this article, we categorized these factors into three groups of personal, environmental, and technical determinants. Explanation on each group of these factors is provided below.

Personal Characteristics

Personal characteristics such as age, gender, education, and experience might contribute to the formation of learners’ attitude towards using e-learning. For example, Shashaani (1997) found that female students were less interested in computers and less confident than male students. However, Katz *et al.* (1995) and Paris (2004) in their research reported no significant difference between the attitudes of men and women toward using computer and e-learning. Other learners’ characteristics such as age, education, motivation and so on are found to be effective on the e-learning success by Dillon and Guawardena (1995) and Leidner and Jarvenpaa (1993) in past studies and recent works from Zhang *et al.* (2010), Selim (2007), Yu *et al.* (2007), and Bhuasiri *et al.* (2012).

Technical Determinants

Previous experience of e-learning, knowledge of computer, and skills to benefit from e-learning (computer competency), are technical factors indicated by previous studies

such as Volery and Lord (2000), Soong *et al.* (2001), and Selim (2007). Many studies suggest that computer users’ prior experience with technology affects their attitudes towards technology in general (Gefen *et al.*, 2003; Martins and Kellermanns, 2004; Stoel and Lee, 2003; Smart and Cappel, 2006). As students become more experienced in online instruction, their attitudes toward e-learning approaches may change. The greater amount of experience users have with technology the higher the levels of users’ satisfaction in learning to use new technology (Simmers and Anandarajan, 2001; Volery and Lord, 2000). Shashaani (1994) found that computer experience is positively related to computer attitudes. Eastmond (1994) similarly found that prior experience with e-learning could enhance the comfort with technology involved in e-learning, thereby satisfaction with e-learning. Gunawardena and Duphorne (2000) found that prior experience acquired from training improves e-learners’ readiness, which further enhances e-learners’ satisfaction. However, in another study, Rodriguez *et al.* (2008) did not find any significant association between online experience and the level of comfort with technology. Therefore, Drennan *et al.* (2005)’s study suggests that teachers at the beginning of the teaching term should consider the higher level technical ability of students, such as their ability to recover from computer error, and develop students’ skills where necessary because these skills influence perceived ease of use and usefulness of flexible learning.

Besides, some studies show the importance of learners’ online skills. Gunawardena and Duphorne (2000) found that a learner well equipped with online skills is significantly associated with the satisfaction of online learning. Individuals’ ability to use e-learning systems includes computer skills and comfort with the online mode of learning content delivery (Eastmond, 1994). This factor has received a strong empirical support in the context of the academic computer conference system (Gunawardena and Duphorne, 2000), indicating the central role played by online

skills and computer skills in the perceived satisfaction of e-learning (Bray *et al.*, 2008).

Environmental Factors

Environment has a definitely important impact on the attitude of learners on e-learning. Soong *et al.* (2001) using a multiple case study, confirms that one of the e-learning critical success factors is information technology infrastructure. Selim (2007), also confirm that ease of access to technology and infrastructure, and support can impact the success of e-learning and attitudes towards it. Findings from the study by Aixia and Wang (2011) presented that the perception of e-learning is positively influenced by widening the access to information among other factors.

Barriers of E-learning

Some researchers reviewed the barriers of e-learning. According to McVeigh (2009), potential barriers relate to the functional capability of students, perceived levels of computer literacy, and perceptions of e-learning as time consuming, competing home life elements and the lack of work-

based support. Students need to have time management, discipline, and computer skills in order to be successful in the e-learning era (Beyth-Marom, 2003). One study found that students' computer anxiety is one of the critical factors that reduced their satisfaction (Sun *et al.*, 2008).

Generalization of influencing factors on attitude towards e-learning is not possible for all contexts. Therefore, this study was conducted to understand the attitude of agricultural extension workers in Iran towards using e-learning for on-the-job training. The main objectives of the research were:

- 1) To understand the attitude of extension workers towards the use of e-learning for on-the job training in Iran,
- 2) To understand the impact of personal, technical and environmental determinants on the attitude of extension workers toward the use of e-learning.

The conceptual framework of the study is presented in Figure 1.

MATERIALS AND METHODS

This research was a quantitative study which assessed the attitude of respondents through a

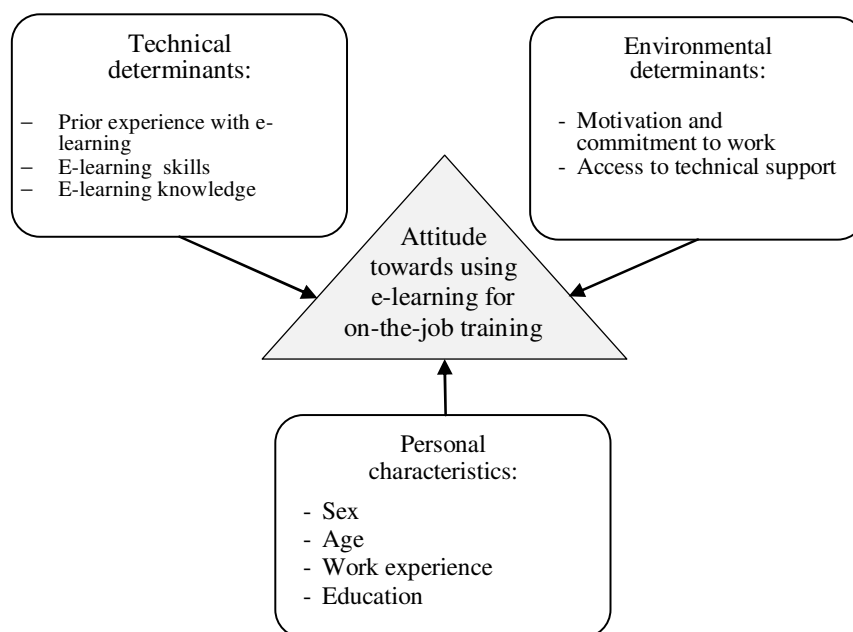


Figure 1. Conceptual framework.



questionnaire as the research instrument. The validity of the research instrument was verified by a panel of experts. A pilot test (n= 30) was carried out to estimate the reliability of the research instrument. For each part of the questionnaire, Cronbach's alpha was measured. Based on the results of this test, some questions were eliminated and some others were modified. The average reliability of the questionnaire was more than 0.89 which shows an appropriate internal consistency for test items.

Extension experts were studied (N= 2,745). Sample was selected from 6 provinces of Iran using a stratified proportionate random sampling technique. Sample size was estimated at 400 using Cochran formula. From 400 questionnaires, 379 questionnaires were filled and entered in the research analysis.

In order to construct the variables for measuring attitude, several previous studies were reviewed including Wilkinson *et al.* (2010), Berteau (2009), Yaghoubi *et al.* (2011), and Liaw *et al.* (2007). The dependent variable is attitude toward e-learning which was investigated through ten questions. Interviewees were asked to choose an option from the 5-point Likert scale (1: Strongly disagree to 5: Strongly agree). Independent variables included personal characteristics of extension workers, their knowledge and skills of e-learning, their prior experience with e-learning, their motivation, and finally their access to technical support.

Research variables and their measurement are presented in Table 1.

Data were analyzed using SPSS software (Version 16). In order to understand the cause and effect relationship between the dependent variable (attitude towards e-learning) and independent variables, correlation analysis and a regression model were used. The results are presented in the next section.

RESULTS

Personal Characteristics

Table 2 shows the general characteristics of extension workers. Ninety-three percent of the respondents were men and only 7 percent were

women. The average age of extension workers was about 40 years with the standard deviation of about 8 years. Although age could not limit the ability to benefit from e-learning, it could affect the occasion of acquaintance with electronic learning software. Later in this study, we observed a negative relationship between age and extension workers' attitude toward e-learning.

Most respondents studied agriculture at university (93.5%). This implies that respondents have a background of knowledge which can be improved through e-learning. About 60 percent of the respondents had ICDL (information and communication technology) certificate and about 78 percent had the experience of searching internet to access the needed information about their job. Therefore, the majority of respondents are expected to have appropriate potential for using e-learning methods. Virtually, half of the respondents (49.6 percent) had the experience of using e-learning in past.

Extension Workers' Attitude towards Using E-learning for On-the-job Training

According to the Coefficients of Variance (CV), 10 items of attitude toward e-learning were ranked. Most respondents had positive attitude about this item: "*E-learning provides new opportunities to access information*" (Mean: 4.12, CV: 1.86). However, the item which is ranked as the least agreed was "E-learning is more effective than traditional learning methods" (Mean: 3.35, CV: 0.319). Table 2 provides the details on the extension workers' attitude towards using e-learning. According to the table, respondents' attitude toward e-learning was generally positive (Total mean: 3.76). (Table3).

E-learning Knowledge

Respondents' knowledge about e-learning was measured through 4 questions. The mean of extension workers' knowledge was

Table 1. Main variables and their measurement.

	Variables	Measurement	
Personal characteristics	Sex	Male /Female	
	Age	Years	
	Work experience	Years	
	Field of study	(1) Agriculture (2) others	
	Education	(1) Technician (2) BSc (2)MSc	
Attitude towards using e-learning for on-the-job training	E-learning is a tool for raising participation.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning increases the learning quality.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning is an appropriate alternative for traditional methods.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	The advantages of e-learning are more than its disadvantages	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning provides equal opportunities for learning.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning is an appropriate method to cope with limitations condition.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning is more effective than traditional learning methods.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning provides new opportunities to access information.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning decreases costs of training.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
	E-learning is a better method in comparison to traditional learning.	5-point Likert scale, where 1:Strongly agree to 5: Strongly disagree	
Technical determinants	E-learning knowledge	Knowledge of the e-learning usage	5-point Likert scale, where 1: Very little to 5: Very much
		ICT knowledge	5-point Likert scale, where 1: Very little to 5: Very much
		Awareness of principles and concepts of e-learning	5-point Likert scale, where 1: Very little to 5: Very much
	E-learning skills	Awareness of advantages and disadvantages of e-learning	5-point Likert scale, where 1: Very little to 5: Very much
		Preparing documents in computer	5-point Likert scale, where 1: Very little to 5: Very much
		Connecting to internet	5-point Likert scale, where 1: Very little to 5: Very much
		Searching the web	5-point Likert scale, where 1: Very little to 5: Very much
		Knowledge of English language	5-point Likert scale, where 1: Very little to 5: Very much
		Using Internet effectively	5-point Likert scale, where 1: Very little to 5: Very much
		Communication through e-mail	5-point Likert scale, where 1: Very little to 5: Very much
Environmental determinants	Motivation	Experience with e-learning	Yes/No
		Flexibility of education (in place and time)	5-point Likert scale, where 1: Very little to 5: Very much
		Increasing professional and expert skills	5-point Likert scale, where 1: Very little to 5: Very much
		Interest in learning through internet	5-point Likert scale, where 1: Very little to 5: Very much
	Access to technical support	Believing in more effectiveness of e-learning system in comparison with traditional systems	5-point Likert scale, where 1: Very little to 5: Very much
		Job promotion	5-point Likert scale, where 1: Very little to 5: Very much
		Increase in bonuses	5-point Likert scale, where 1: Very little to 5: Very much
		Access to computer hardware	5-point Likert scale, from 1: Very little to 5: Very much
	Access to internet services	5-point Likert scale, from 1: Very little to 5: Very much	
	Access to ICT centers	5-point Likert scale, from 1: Very little to 5: Very much	
	Access to ICT courses or workshops	5-point Likert scale, from 1: Very little to 5: Very much	

**Table 2.** Descriptive statistics of general characteristics of extension experts.

Characteristics		
Sex	Female (7%)	Male (93%)
Age/Year	Mean= 39.66	SD= 7.65
Work experience/Year	Mean= 15.39	SD= 8.14
Academic background	Agriculture (93.5%)	Others (6.5%)
Education	BSc: 67.8%	
Prior experience with e-learning	Yes: 49.6%, No: 50.4%	

Table 3. Attitude towards using e-learning for on-the-job training.

Attitude to e-learning	M ^a	SD ^b	CV ^c	R ^d
E-learning provides new opportunities to access information.	4.12	0.767	0.186	1
E-learning decreases costs of training.	4.03	0.841	0.209	2
E-learning is a better method in comparison to traditional learning.	3.91	0.859	0.220	3
The advantage of e-learning is more than its disadvantages.	3.84	0.849	0.221	4
E-learning provides equal opportunities for learning.	3.78	0.894	0.236	5
E-learning is an appropriate method to cope with limitations.	3.60	0.868	0.241	6
E-learning is a tool for raising participation.	3.84	0.938	0.244	7
E-learning increases the learning quality.	3.66	0.901	0.245	8
E-learning is an appropriate alternative for traditional methods.	3.51	1.035	0.295	9
E-learning is more effective than traditional learning methods.	3.35	1.069	0.319	10
Total	3.76			

^a Mean; ^b Std Deviation; ^c Coefficient of Variation, ^d Rank.

3.24, which is above average. Among other items, respondents' knowledge on the cases of e-learning usage was the highest. The lowest level of knowledge is related to principles and concepts of e-learning (Rank= 4). (Table 4)

Following e-learning knowledge, the e-learning skills was investigated. Results are provided in next section.

E-learning Skills

Respondents' skills for e-learning were generally at average level (Total mean: 3.21). Respondents were more skillful in preparing documents in computer (Rank= 1, CV: 0.291). In case of communication through email, respondents were less skillful in comparison to other items (Rank=6, CV: 0.405). (Table 5).

Motivation

Several factors which could potentially motivate extension workers to use e-learning

system were investigated. As Table 6 shows, the most important item which motivates extension experts to use e-learning was the flexibility of e-learning in terms of place and time (Rank= 1, CV= 0.204). (Table 6).

Access to Technical Support

Extension workers' access to technical support was generally "good" (Total mean= 4.07). Respondents' access to computer hardware was more than other technical support (Rank= 1, CV= 0.139). Respondents had the least access to ICT courses or workshops (Rank= 4, CV= 0.254) (Table 7).

Correlation Analysis

Correlation analysis was used to determine the strength of the relationship between

Table 4. Extension workers' e-learning knowledge.^a

Items	M ^a	SD ^b	CV ^c	R ^d
E-learning usage cases	3.35	0.99	0.296	1
ICT Knowledge	3.17	0.97	0.307	2
Advantages and disadvantages of e-learning	3.27	1.00	0.308	3
Principles and concepts of e-learning	3.15	0.97	0.310	4
Total	3.24			

^a Mean; ^b Std Deviation; ^c Coefficient of Variation, ^d Rank.

Table 5. Extension workers' e-learning skills.^a

Items	M ^a	SD ^b	CV ^c	R ^d
Production of documents in computer	3.40	0.99	0.291	1
Connection to internet	3.35	1.13	0.337	2
Searching the web	3.27	1.14	0.348	3
Speaking and reading in English	2.85	1.00	0.351	4
Using Internet effectively	3.45	1.34	0.388	5
Communication through e-mail	2.96	1.20	0.405	6
Total	3.21			

^a Mean; ^b Std Deviation; ^c Coefficient of Variation, ^d Rank.

Table 6. Extension workers' motivation to use e-learning.^a

Items	M ^a	SD ^b	CV ^c	R ^d
Flexibility of e-learning (in terms of place and time)	4.09	0.835	0.204	1
Increasing professional and expertise skills	4.05	0.831	0.205	2
Interest in learning through internet	4.02	0.851	0.211	3
Believing in more effectiveness of e-learning system in comparison with traditional systems	3.78	0.874	0.231	4
Job promotion	3.91	0.965	0.247	5
Increase in bonuses (perks)	3.88	0.987	0.254	6

^a Mean; ^b Std Deviation; ^c Coefficient of Variation, ^d Rank.

Table 7. Extension workers' access to technical support.^a

Item	M ^a	SD ^b	CV ^c	R ^d
Access to computer hardware	4.21	0.587	0.139	1
Access to internet services	4.12	0.681	0.165	2
Access to ICT centers	4.15	0.758	0.183	3
Access to ICT courses or workshops	3.80	0.971	0.254	4
Total	4.07			

^a Mean; ^b Std Deviation; ^c Coefficient of Variation, ^d Rank.



the dependent and the independent variables. Results from correlation analysis (presented in Table 8) show that respondents' age was associated with their attitude toward e-learning ($r = -0.168^{**}$, Sig: 0.001). The association was negative. Therefore, younger experts have more positive attitude toward e-learning. There was a significant and positive association between respondents' e-learning knowledge and their attitude toward e-learning ($r = 0.167^{**}$, Sig: 0.001). The more knowledge respondents had about e-learning, the more positive attitude they have toward it. The same is for e-learning skill and respondents' attitude toward e-learning ($r = 0.133^*$, Sig: 0.01). Extension workers' motivation toward e-learning was associated with their attitude

toward e-learning positively ($r = 0.307^{**}$, Sig: 0.00). Finally, extension workers' access to technical support was positively associated with their attitude toward e-learning ($r = 0.256^{**}$, Sig: 0.00).

Regression Model

Regression model was used to investigate cause-and-effect relationship between the dependent variable, attitude toward using e-learning for on-the-job training and independent variables. Adjusted R^2 shows that independent variables explain about 36 percent of changes in dependent variable. According to Table 9, extension workers "e-learning knowledge" affects the attitude

Table 8. The association between extension workers' attitude toward e-learning and independent variables.

Factors	Correlation Test	Correlation Coefficient	Sig.
Age	Pearson	-0.168**	0.001
Work experience	Pearson	-0.071	0.168
E-learning knowledge	Pearson	0.167**	0.001
E-learning skills	Pearson	0.133*	0.01
Experience of e-learning	Pearson	0.062	0.22
Motivation	Pearson	0.307**	0.00
Access to technical support	Pearson	0.256**	0.00

* $P < 0.05$, ** $P < 0.01$.

Table 9. Regression model (Dependent variable: Attitude toward e-learning).

R	0.622		
R^2	0.386		
Adjusted R^2	0.362		
ANOVA	F: 8.97, Sig: 0.00		
Factors/variables	Beta coefficient	t^a	Sig ^b
Age	-0.068	-1.310	0.19
Work experience	-0.004	-0.077	0.93
Education	-.051	-0.928	0.35
E-learning knowledge	0.129	2.092	0.03
E-learning skills	-0.004	-0.059	0.95
Experience of e-learning	0.094	1.791	0.07
Motivation	0.268	5.121	0.00
Access to technical support	0.188	3.530	0.00

^a t-test, ^b Significance.

towards e-learning (Beta: 0.129, Sig: 0.03; $P > 0.05$). Extension workers' motivation affects their attitude toward e-learning (Beta: 0.268, Sig: 0.00). Moreover, extension workers' access to technical support affects their attitude toward e-learning positively (Beta: 0.188, Sig: 0.00).

DISCUSSION

The development of e-learning is principally dependent on the learners' attitude and willingness to adopt it. This research on agricultural extension workers, showed that respondents' attitude to e-learning was generally positive (Total mean: 3.76). Respondents mainly believe that e-learning provides new opportunities to access information. Results from correlation analysis show that respondents' age was negatively associated with their attitude toward e-learning. With increase in age, attitude toward e-learning becomes less positive. This is in line with the finding from Šumak *et al.* (2011). This could be attributed to the fact that older people are used to traditional learning methods and their abilities to operate computer is not developed fully.

Moreover, there was a significant and positive association between respondents' e-learning knowledge and their attitude toward e-learning. Logically, the relationship between knowledge and attitude could be a mutual relationship. The more knowledge had respondents about e-learning, the more positive was their attitude towards e-learning. This is in line with findings from Drennan *et al.* (2005). Also this is true that a positive attitude motivates a person to gain more knowledge.

There was a positive association between the extension workers' e-learning skill and their attitude toward e-learning. Respondents who had higher levels of skills in e-learning, had more positive attitude and those who had more positive attitude, were more skilled. This is in line with

findings of many studies including Drennan *et al.* (2005), Beyth-Marom (2003), Gunawardena and Duphorne (2000), Eastmond (1994), Bray *et al.* (2008) and Gunawardena *et al.* (2001). Extension workers' motivation to use e-learning was associated with their attitude toward e-learning positively. Extension workers' access to technical support was positively associated with their attitude toward e-learning. This finding is similar to findings from Selim (2007) and Paris (2004). Regression model showed that extension workers' access to technical support affect their attitude toward e-learning positively ($P < 0.01$). This is similar to findings from many studies including those of Šumak *et al.* (2011), Volery and Lord (2000), Soong *et al.* (2001), Leidner and Jarvenpaa (1993), and Selim (2007).

Knowledge and Skills

Given the importance of knowledge and skills in shaping the attitude towards the adoption of e-learning system, we suggest conducting training courses, workshops and conferences to raise knowledge and awareness on the application of ICT and modern methods of training in agricultural education and in on-the-job trainings for extension workers.

According to the results, lack of computer skills is an important challenge for extension workers to involve in e-learning initiatives. Moreover, there was a significant gap between attitude towards e-learning and e-learning skills. Extension workers had a generally positive attitude towards e-learning, while they lacked skills to use computer. Therefore, we suggest conducting practical courses to improve computer skills. Conducting these trainings should be a continuous process, since extension workers need to be updated on new softwares. Also, the quality of training on computer skills is very important. During the interviews, some extension workers asserted that they had attended low-quality training courses in past.



Infrastructures

Hardwares, softwares, internet bandwidth should be appropriate in order to focus on learning. Learners cannot stay connected to the educator continuously when internet speed is low. These equipments and facilities can be provided by extension organizations or ICT (Information and communication technology) centers. ICT centers are private organizations which can contract extension organizations to provide opportunities to hold e-learning courses.

Motivation

Providing some incentives for extension workers who had participated in other electronic training courses, can be effective in intensification of extension workers' motivation. Incentives include monetary and non-monetary awards. E-learning certificates can be included in annual evaluations, job promotions, and other job-related evaluations.

CONCLUSIONS

To sum up, we found significant influence from learners' e-learning knowledge, learners' access to technical support, and learners' motivation influence extension workers' attitude toward e-learning.

In conclusion, this study showed that knowledge and skills, infrastructures, and motivation will improve the attitude of extension workers toward e-learning. This positive attitude will result in the adoption of e-learning system for their on-the-job training.

Suggestions are provided to improve three main items of knowledge and skills, infrastructure, and motivation.

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نگرش نسبت به یادگیری الکترونیکی برای آموزش ضمن خدمت، مطالعه موردی کارکنان ترویج کشاورزی در ایران

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چکیده

پذیرش سیستمهای یادگیری الکترونیکی عمدتاً وابسته به نگرش فراگیران و تمایل آنها به استفاده از آنها می باشد. این مطالعه به منظور بررسی نگرش کارکنان ترویج کشاورزی نسبت به استفاده از یادگیری الکترونیک برای آموزش ضمن خدمت در ایران و عوامل موثر بر آن انجام شده است. با استفاده از روش نمونه گیری طبقه ای، نمونه ای از کارشناسان ترویج به تعداد ۳۷۹ نفر از شش استان کشور انتخاب شد. یک پرسشنامه ساختارمند برای جمع آوری داده ها به روش مصاحبه استفاده شد. یافته ها نشان داد که نگرش کارکنان نسبت به یادگیری الکترونیکی به طور کلی مثبت است. دانش کارکنان ترویج در رابطه با یادگیری الکترونیکی، دسترسی به حمایت فنی و انگیزه آنها بر نگرش ایشان نسبت به استفاده از یادگیری الکترونیکی برای آموزش ضمن خدمت تاثیر دارد. بنابراین پیشنهاداتی جهت ارتقای سطح انگیزه و دانش کارکنان و بهبود زیرساختارها ارائه شده است.