

# Satisfaction Analysis for Agricultural Worker Digital Course Learning Platform

Jui-Hung Chang<sup>1,2(✉)</sup>, Ren-Hung Hwang<sup>3</sup>, and Hung-Hsi Chiang<sup>2</sup>

<sup>1</sup> Computer and Network Center, National Cheng Kung University,  
Tainan City 701, Taiwan

changrh@mail.ncku.edu.tw

<sup>2</sup> Department of Computer Science and Information Engineering,  
National Cheng Kung University, Tainan City 701, Taiwan

P76051331@mail.ncku.edu.tw

<sup>3</sup> Department of Computer Science and Information Engineering,  
National Chung Cheng University, Minxiong, Taiwan

rhhwang@cs.ccu.edu.tw

**Abstract.** In the era of knowledge economy, learning has become increasingly important, it is more and more convenient to acquire the information in a fast way and E-learning has become increasingly popular. Under this trend, the traditional teaching method in the classroom will not be the only choice any longer and the application of E-learning system will be the important trend in the future. In recent years, related governmental departments also vigorously promote the E-learning system. Some special courses enable learners to firstly possess the prior knowledge of agriculture and then the relevant agricultural knowledge is digitalized; lastly, the professional teachers will be equipped for teaching and a system platform for high-efficient learning will be provided through E-learning. The learning effectiveness desired by this research through the establishment of an agricultural E-learning platform is shown as below: (1) apply E-learning platform to increase learning variety, further enhance learners' knowledge-ability and learning willingness, break through the territory restriction in learning and facilitate the learning; (2) apply satisfaction survey and assessment mechanism to understand the learning effectiveness of E-learning platform. This research established the agricultural E-learning platform and used students' satisfaction with information contents and course contents for E-learning system obtained through the satisfaction survey to present the positive affirmation. Therefore, it can be known that E-learning is greatly helpful to improve agricultural workers' learning.

**Keywords:** Agricultural E-learning platform · Satisfaction survey · Learning process · E-learning

## 1 Introduction

Information and Communications Technology (ICT) has improved the learning and teaching procedure and its resources also exceed the traditional teaching resources. As a result, the generation of E-learning system has a deep effect on education and has

changed the teacher-student relationship in traditional teaching. ICT has improved the learning and teaching procedure and its resources also exceed the traditional teaching resources. Talebian et al. (2014) took the students in agricultural higher education in Iran as the research subjects to research and observe the advantages & disadvantages, convenience and restriction when ICT and E-learning are applied together.

As a kind of future education, E-learning can replace traditional learning and overcome the limitation in space and time. Due to its importance in public sectors, learning field has been increasing rapidly in recent years. Dreheeb et al. (2016) proposed the system quality of E-learning. The success of E-learning system depends on system quality and sustained use. According to user's opinion, it is found that the attributes and functions of usability, reliability and efficiency have the effect on the E-learning system used. Therefore, the research target of Dreheeb et al. is to develop the suitable model for E-learning to meet user's demand from the perspective of using E-learning system.

In recent years, ICT has been extended to agriculture and enterprises related to agriculture. The research of Manoj and Chimoy Kumar (2013) aims to conduct the 2-year E-learning plan in Kerala. Their research applied E-learning strategy, established virtual learning environment and adopted the tools used in communications technology to explain the diversity of tools applied in E-learning technology and their convenience, so as to greatly facilitate the establishment of E-learning system.

Governmental agencies attach increasing importance to enhancement of human qualities, the pursuit of excellence and talent cultivation to meet the demand of a modern country. The main purpose of talent cultivation is overall development and improvement of organizational capability, inheritance of experience and the maintenance of core competence. Conducting agricultural survey is a heavy work. How to complete the agriculture survey work successfully and smoothly is of great importance to the cultivation of agricultural workers, so as to increase work efficiency and enhance the data application value. In terms of the existing method, the training, learning and work conferences are usually held on a regular basis to develop agricultural workers' appropriate capabilities, offer on-the-job training and improve agricultural professional prior knowledge-ability, but agricultural work is heavy and if personnel reshuffle occurs frequently and they often need to make use of business trips to go to fixed places to learn, the huge cost for manpower training will be caused.

In conclusion, in addition to the design of an agricultural E-learning platform, this research also provided the adaptive online agricultural digital textbooks and designed questionnaires to understand the satisfaction with E-learning system and improve system functions. Only in this way can we enhance the investigated students' learning motivation and increase the learning effectiveness. Meanwhile, this research made an analysis to know whether the results have the positive effect on the use of system. If learners can increase learning efficiency through the use of E-learning system, their usage intention can also be enhanced, which is the goal this research intends to achieve.

The contributions of this research are as follows:

- Establish agricultural E-learning platform and offer agricultural investigators this platform to conduct course learning in place of face-to-face teaching, so as to facilitate personnel's learning and reduce expenditure.

- Make use of satisfaction survey to understand learners' acceptance of and satisfaction with E-learning system.

The remainder of this paper is organized as follows: Sect. 2 is the literature review; Sect. 3 describes the architecture of agricultural E-learning platform; Sect. 4 is the detailed description for the assessment and research methods of system satisfaction; Sect. 5 summarized conclusion and future works.

## 2 Related Work

E-learning has become a trend recently. For the adults, they can continue to learn by giving consideration to both work and family. Such culture of active learning has deeply affected learner's motivation because this learning mechanism is not bound by time and space.

The booming development of ICT has changed the learning and teaching process. People can apply the E-learning where the teaching resources far exceed the traditional learning resources. Sogol Talebian et al. investigated the agricultural students in Iran who had applied ICT to education to understand the advantages and disadvantages, convenience and restriction, etc. brought by E-learning.

With the adoption of actually participatory action method, Camilius Sanga et al. developed a discussion channel to spread the knowledge related to agriculture and agriculture science and technology information and such information comes from agents or Agricultural University and so on. 19 villages in Tanzania were selected in the experiment to develop this system by m-learning and e-learning. The experimental result proves that this system can provide the agricultural suggestions and information which can be gained through mobile phone and network for these 380 small tenant farmers.

Šárka Hošková-Mayerová and Zdena Rosická presented the E-learning experience and method from 3 universities and also mentioned how the E-learning will improve the learning efficiency.

Valentina Arkorful and Nelly Abaidoo researched many researchers' literature and academic researches on E-learning as well as the teaching status by combining E-learning in higher educational institution. These researches are mostly based on the investigation.

### 2.1 Satisfaction Scale

It is very important to assess the satisfaction with the development of E-learning technology (Bekele 2010; Ho and Dzung 2010). In order to understand the E-learning learners' usage satisfaction, it is of great significance for the research scholars to assess the satisfaction and lots of scholars also universally apply the satisfaction scale for assessment. (Bekele 2010; Ho and Dzung 2010; Ong et al. 2009) put forward that satisfaction assessment can help to understand that it is important to understand the major factors of system and those factors affecting user's intention for system. At the same time, more suggestions can be offered for the future analysis and design of

system, so that user’s usage of system can be more specific and user can better accept it. The assessment of satisfaction scale can be used to analyze whether the system meets the user’s demand to further understand the benefits achieved by the system (Ong et al. 2009). As for satisfaction scale, Ong et al. (2009) summarized much relevant information about research achievements previously, among which Information Systems Success Model (D&M IS Success Model) proposed by Delone and McLean (1992) and satisfaction assessment model proposed by Huang et al. (2012) can be used to assess learners’ satisfaction.

### 3 Architecture of Agricultural E-learning Platform

This research describes and plans the several module units of the agricultural E-learning platform. The proposed system architecture is shown in Fig. 1 and it will be described below.

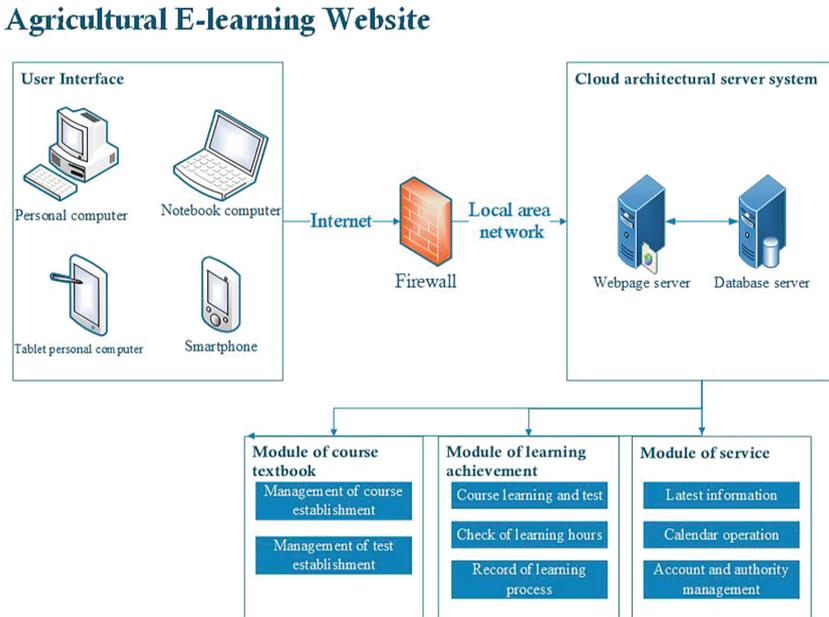


Fig. 1. Architecture diagram of agricultural E-learning system

The description for the architecture diagram of cloud mobile E-learning system is shown below:

It is mainly divided into the modules of service, learning achievement, course textbooks, etc. and personnel role is divided into general learner and course administrator.

The database for agricultural mobile E-learning system is mainly MySQL in charge of the data storage and acquisition, webpage server is mainly Apache and program

language is mainly PHP. The course activities and contents are complex, so Xml with highly expandability and structuralization as well as better data organization ability is applied to achieve flexible data processing and application.

In user interface, the device used by user can be assessed in the server management and maintenance system through the Internet to obtain the operation module related to system management and operation.

The server management and maintenance system is mainly constructed in the currently most popular cloud computing environment. The cloud virtual machine will be established on this system. The cost for the establishment of server and maintenance human power can be avoided in cloud computing environment, the storage space and system resource can be added whenever possible according to its needs (like CPU, Memory), and meanwhile information safety is protected, which is of great help to proceed with the research.

The main modules of service, learning achievement and course textbook are described as below:

#### [Module of Service]

- It mainly contains the following sub-operations: latest announcement, calendar operation, account and authority management

**Latest announcement:** learners can acquire the relevant information related to latest system and course activities. Any latest online course can be established through this operation.

**Calendar operation:** the course learning in the certain scheduling can be planned and the activity data can be set in advance.

**Account and authority management:** managers will do the setting about whether the account is used and what kind of roles (teacher or student) it includes.

#### [Module of Learning Achievement]

Figure 2 is the **main system interface of the module of learning achievement**

- **Course learning, check of learning hours and record of learning process**

**Course learning:** users learn through the related course textbooks established on the system and they can also combine the sharing and discussion function to share and discuss the contents related to course with each other.

e-University Online Learning Platform, Council of Agriculture

Latest Information **Course Learning** Course Test Record of Learning Process Website Resource S/E/A/R/C/H .Go

- Membership Cancellation
  - Cancellation
- Calendar
 

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

• Course | Category

Title	Category	Function	Download
Basic training manual for visitor (elementary level)	basic training		Download
Investigation into pig raising	investigation data		Download

第 1 / 1 页

Fig. 2. Interface of learning achievement

**Testlet test:** it refers to the test for the learners' learning achievement, so that learners can test their relevant learning effectiveness through the course learning after learning.

**Record of learning process:** if learners pass the test, the relevant learning process will be recorded.

#### [Module of Textbook Learning]

- **Management of course establishment and test establishment**

**Management of course establishment:** the relevant course textbooks will be up-loaded for management and maintenance.

**Management of test establishment:** relevant question bank for testing can be established according to the relevant course textbooks. After learners learn this course, they can use the relevant question bank for testing established by this operation for learning assessment.

## 4 Research into System Satisfaction Assessment

In addition to the establishment of an E-learning system and adaptive teaching materials, this research also surveyed learners' satisfaction with this E-learning system. The relevant description is shown below. This experiment conducted the questionnaire analysis against learners who had used agricultural E-learning system to understand the satisfaction assessment for the use of this set of system and course.

### 4.1 Design of Satisfaction Scale of E-learning System

The main contents of this scale adopted Likert 5-point scale for scoring and assessment, with a total of 11 items. The answering options include: 1. Extremely satisfactory, 2. Dissatisfactory, 3. General, 4. Satisfactory. 5. Extremely satisfactory. If you choose Option 1, "Extremely", you get 1 score; if you choose Option 5. "Extremely satisfactory", you get 5 scores. Testees' higher scores mean higher satisfaction. Conversely, the Testees' lower scores mean lower satisfaction.

The pre-test was done against the questionnaire items, so as to understand whether the designed items can conform to the results expected by us and analyze the questionnaire reliability.

### 4.2 Pre-test

Prior to formal test, a pre-test was done against a small sample size. The samples were collected through Google form questionnaire, with totally 16 questionnaires retrieved. All the testees have filled in the questionnaire completely and there are 16 valid questionnaires. SPSS statistics software was used to conduct fundamental statistics and reliability analysis. The pre-test is applied to understand whether the satisfaction scale conforms to consistency (Table 1).

**Table 1.** List of questionnaire items

Item	Item code
1. I feel satisfied with the stability of online learning system of agricultural statistics	Q1
2. The information contents provided by online learning system of agricultural statistics are correct	Q2
3. The information contents provided by online learning system of agricultural statistics can meet my demands	Q3
4. I feel satisfied with the contents of “survey course on face-to-face interview”	Q4
5. I feel satisfied with the contents of “survey course on live-stock and agriculture”	Q5
6. I feel satisfied with the contents of “survey course on major farmer”	Q6
7. I feel satisfied with “the introduction course of statistical information and system operation”	Q7
8. I feel satisfied with “the course for the collection of survey experience of agricultural statistics”	Q8
9. I am joyful to use online learning system of agricultural statistics	Q9
10. I feel satisfied with the information learned from online learning system of agricultural statistics	Q10
11. On the whole, my interaction with online learning system of agricultural statistics is satisfactory	Q11

### 1. Reliability Analysis:

Cronbach’s  $\alpha$  coefficient is used as the reliability of questionnaire pre-test and it means that a value lying between 0 and 1 is measured to represent the consistency of questionnaires. Larger Cronbach’s  $\alpha$  value means higher reliability and more stable scale. General speaking, Cronbach’s  $\alpha$  value above .70 is optimal.

Under the circumstance that no item is deleted in this scale, Cronbach’s  $\alpha$  is 0.945 (high reliability); it can be known from the Field “ $\alpha$  Coefficient after the deletion of single item” in Table 2 that Cronbach’s  $\alpha$  will not increase after the deletion of any item. Therefore, it is concluded that no item is deleted.

### 2. Conclusion:

It can be known from the reliability analysis that the consistency of this scale is higher, signifying it is stable. Therefore, the scale without deleting any item is used as the satisfaction scale for E-learning system in the formal test.

## 4.3 Formal Questionnaire Survey and Satisfaction Assessment

Google form questionnaire was used to collect samples with totally 50 questionnaires retrieved. All the testees have filled in the questionnaire completely and there are 50 valid questionnaires. SPSS statistics software was used to conduct statistical analysis to understand testees’ satisfaction with E-learning system.

**Table 2.** Reliability analysis result of “satisfaction scale for E-learning system”

Item code	$\alpha$ coefficient after the deletion of single item
Q1	0.945
Q2	0.937
Q3	0.939
Q4	0.941
Q5	0.938
Q6	0.938
Q7	0.936
Q8	0.939
Q9	0.945
Q10	0.945
Q11	0.940

### 1. Single sample t-test ( $\alpha = 0.05$ )

$H_0: \mu_i < 3$ ;  $H_1: \mu_i \geq 3$ ;  $i = 1, 2, 3, \dots, 11$ . When significance (p-value)  $\geq 0.05$ ,  $H_0$  is not rejected. So, there is not enough evidence to prove that the average satisfaction score  $\geq 3$ ; when significance (p-value)  $< 0.05$ ,  $H_0$  is rejected. So, there is enough evidence to prove that the average satisfaction score  $\geq 3$ , signifying the average satisfaction of this item is greater than “general” and testees have the good affirmation for this item.

It can be known from Table 3 that each item’s p-value  $< 0.001$ , so  $H_0$  is rejected. However, there is enough evidence to prove that each item’s average satisfaction is greater than “general”, signifying users using the system have the good affirmation for E-learning system through the questionnaire filled.

**Table 3.** Items of satisfaction scale for E-learning system (Average mean, Standard deviation, and p-value)

Item code	Mean	Standard deviation	p-value
Q1	3.76	0.309	<0.001
Q2	3.80	0.408	<0.001
Q3	3.80	0.490	<0.001
Q4	3.84	0.504	<0.001
Q5	3.90	0.418	<0.001
Q6	3.82	0.477	<0.001
Q7	3.88	0.393	<0.001
Q8	3.86	0.490	<0.001
Q9	3.84	0.464	<0.001
Q10	3.88	0.475	<0.001
Q11	3.84	0.382	<0.001

## 2. Summary:

According to the analysis results of satisfaction scale for E-learning system, learners show positive affirmation both for the information contents and course contents of E-learning system.

## 5 Conclusion and Future Works

The satisfaction scale is used to understand that agricultural E-learning system is helpful to learner's learning. It can rapidly improve the prior knowledge related to agriculture, the learning becomes flexible without the limitation in time and space, training cost can be reduced and the training process can be understood quickly to reduce the employment of teachers and increase learning time. Resources can be recycled to fully reduce cost. Learners can record the learning process and fully understand their own status through system learning for review and modification. In this way, learners can achieve the optimal condition, which is also the goal of establishing agricultural E-learning system.

This research only conducts the survey on satisfaction with system and course contents. More dimensions can be assessed and analyzed in the future, such as education background, age, information ability, effect on acceptance of E-learning system, etc. All the topics above are interesting and deserve to be further discussed.

## References

- Bekele, T.A.: Motivation and satisfaction in internet-supported learning environments: a review. *Educ. Technol. Soc.* **13**(2), 116–127 (2010)
- Sanga, C., Mlozi, M., Haug, R., Tumbo, S.: Mobile learning bridging the gap in agricultural extension service delivery: experiences from Sokoine university of agriculture, Tanzania. *Int. J. Educ. Dev. Inf. Commun. Technol. (IJEDICT)* **12**(3), 108–127 (2016)
- DeLone, W.H., McLean, E.R.: Information systems success: the quest for the dependent variable. *Inf. Syst. Res.* **3**(1), 60–95 (1992)
- Dreheeb, A.E., Basir, N., Fabil, N.: Impact of system quality on users' satisfaction in continuation of the use of e-learning system. *Int. J. e-Education e-Business, e-Management e-Learning* **6**(1), 13–20 (2016)
- Ho, C.L., Dzen, R.J.: Construction safety training via e-Learning: learning effectiveness and user satisfaction. *Comput. Educ.* **55**(2), 858–867 (2010)
- Huang, Y.M., Liu, C.H., Lee, C.Y., Huang, Y.M.: Designing a personalized guide recommendation system to mitigate information overload in museum learning. *Educ. Technol. Soc.* **15**(4), 150–166 (2012)
- Manoj, R., Chimoy Kumar, G.: The benefits of the e-learning agricultural project kissankerala to digital immigrants and digital natives. *Turkish Online J. Distance Educ.* **13**(2), 152–153 (2013)
- Ong, C.S., Day, M.Y., Hsu, W.L.: The measurement of user satisfaction with question answering systems. *Inf. Manag.* **46**(7), 397–403 (2009)
- Hošková-Mayerová, Š., Rosická, Z.: E-learning pros and cons: active learning culture? *Procedia – Soc. Behav. Sci.* **191**(2), 958–962 (2015)

- Talebian, S., Mohammadi, H.M., Rezvanfar, A.: Information and communication technology (ICT) in higher education: advantages, disadvantages, conveniences and limitations of applying e-learning to agricultural students in Iran. *Procedia – Soc. Behav. Sci.* **152**(7), 300–305 (2014)
- Arkorful, V., Abaidoo, N.: The role of e-learning, advantages and disadvantages of its adoption in higher education. *Int. J. Instruct. Technol. Distance Learn.* **12**(1), 29–42



<http://www.springer.com/978-3-319-71083-9>

Emerging Technologies for Education  
Second International Symposium, SETE 2017, Held in  
Conjunction with ICWL 2017, Cape Town, South Africa,  
September 20-22, 2017, Revised Selected Papers  
Tien-Chi Huang, V.; Lau, R.; Huang, Y.-M.; Spaniol, M.;  
Yuen, C.-H. (Eds.)  
2017, XV, 567 p. 127 illus., Softcover  
ISBN: 978-3-319-71083-9