Computer-Based Examination System for the Licensure Examination of Agriculturist

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ABSTRACT

Computer-based examination plays an important role in the assessment process in the 21st century. The study aimed to develop a computer-based examination system intended for the Agriculture graduates who would like to review in preparation for the Licensure Examination for Agriculturist. The researchers utilized various web scripting languages and Content Management System (CMS) in developing different pages. A descriptive survey was used to evaluate the capability of the system. There were one hundred seventy-eight (178) students taking agriculture related courses requested as respondents of the study. The statistical treatment used in the study was weighted mean to determine the perception of the respondents utilizing the Likert five-point scale criteria. Based on the findings of the study, it showed that the developed computer-based examination system for the licensure examination for agriculturist is meaningfully accepted by the users, because of the high accessibility, functionality, and usability level of the system features. Based on the result of the data gathered when respondents are grouped according to sex, it is described that the system is highly accessible, very much functional, highly reliable and highly usable. Therefore, this study should be adopted by the college, the review center of the school and other institutions across the country to help students review for their upcoming exams using this computer-based examination system.

Keywords — Information Technology, Computer-based examination, Descriptive survey, accessibility, functionality, usability, Philippines

INTRODUCTION

Today, Information and Communication Technology (ICT) is considered vital in the development, delivery, and assessment of curriculum. In England,

positive effect was found in all subjects more specifically in the use of word processing in English, modeling in mathematics, or using simulations in science (Cox, Abbott, Webb, Blakeley, Beauchamp & Rhodes, 2004).

Internet became quite popular in the field of education because of the vast range of information it offers. The Internet became an online library that caters to worldwide users, mostly students in various fields. It made learning and information gathering easier for the students as well as other people from the academe (Ramos & Velasquez, 2013).

According to Whittington, Bull and Danson (as cited by Jamil, Tariq & Shami, 2012), Computer – based examinations are form of assessment in which majority of the procedures such as question papers delivery, response storage, marking of response or reporting of results from a test or exercise are done by the computer. It reduces human effort in validating and checking the answers, accommodating maximum students at a time with less percentage of errors. This application is also useful because it can make the transaction and process paperless (Ramos & Velasquez, 2013). Computers have infiltrated all the aspects in our society. The computer is most likely one of the great technological mechanisms for increased human productivity and advantages. It can now simply make our work easier and lighter. With this great thing, it would not be more useful without the computer's software.

Through these ideas, the researchers consider that this mode will lead them to develop a certain system that can help and provide the students with the top-of-the-in reviewing and testing. Further, the students can take their review and examination conveniently. The developed system is very useful and easy to access. With this proposed system, the students will feel excited every time they experience testing and reviewing.

Henceforth, the main objective of the study is to develop and design a new computer –based testing system for the students of the JRMSU-Tampilisan Campus, Philippines for them to practice more and at the same time reviewing. The proposed study will help the students' perception succeed in whatever examination they will take and will increase their motivation because of the great experience they will encounter. Further, the examinees will also feel challenged, thus, they will try harder compared to the conventional test.

OBJECTIVES OF THE STUDY

The study aimed to develop and design a new computer–based examination

system and at the same time a computerized reviewer for agriculture students of the Jose Rizal Memorial State University-Tampilisan Campus, Philippines.

MATERIALS AND METHODS

Materials

Hardware

The researchers used a laptop for the documentation and system development, testing and checking, reviews and implementation.

Software

The researchers utilized various web scripting languages such as PHP and Content Management System (CMS) capable of developing the Computer – Based Assisted Examination System for Agriculturist.

Methods

To make the study into actuality, the Waterfall Model under System Development Life Cycle (SDLC) was adopted to develop a well-designed and unique form of computerized assisted examination system (Rouse, 2007).

The model views the process of software development in five stages. The activities in one stage shall be completed before moving to the other. Phases involved in the Waterfall Model are;

1. Requirement Gathering and analysis. All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification doc. During this process, the researcher analyzed the system process and flow, laid out concrete plans, gather all the necessary information and prepare it for the designing of software and hardware.
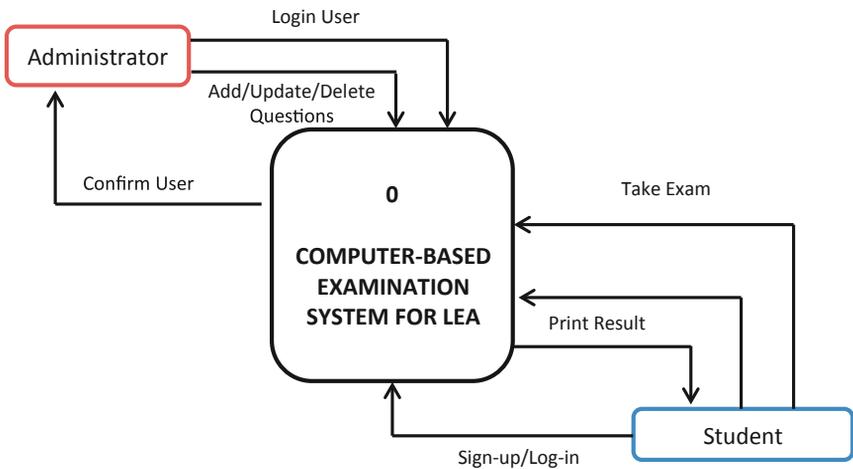
Figure 1. Context Diagram of the Study

2. System Design. In this stage, the researchers create plans and designs that will suite to the hardware specification of the system. Data gathered in the first phase will be studied and will serve as the basis for the possible system flow. The plans and designs will then be realized by putting them into codes.
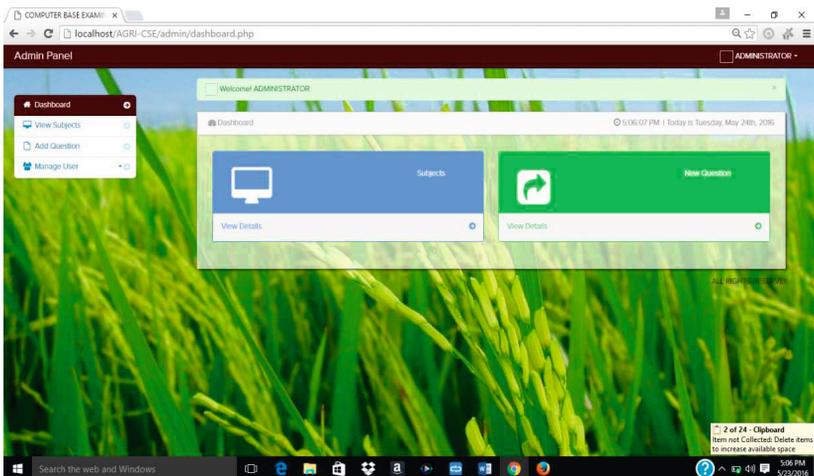

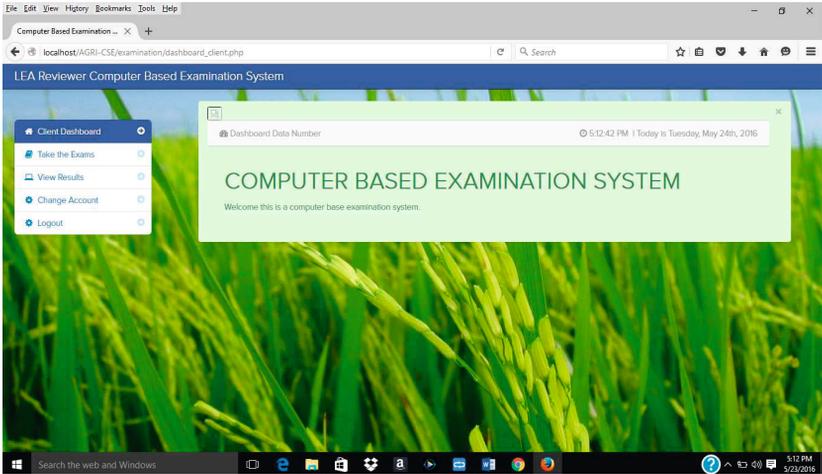Figure 2. The Home Page for Administrator User

Figure 3. The Main Screen for Client User

3. Implementation. With inputs from system design, the system is first developed in small programs called units, each unit is developed and tested for its functionality which is referred to as Unit Testing. When all the units are completed, the system is now ready for integration.

4. Integration and Testing. During this stage, units are complete and integrated to constitute a system. The system is tested for any faults and failures.

Figure 4. Researchers conducted the testing of the system

5. Deployment of the system. Once the functional and non-functional testing (Alpha and Beta) is done, the product is deployed in the environment ready for further evaluation.

Figure 5. Researchers distributed the questionnaire
to the respondents for system evaluation

6. Maintenance. There are some issues which come up in the actual environment. To enhance the software, some better versions will be released. Maintenance is done to deliver these changes in the environment. Further test will also be conducted to assure the functionality of the system as deploy in the real environment.

All these phases are cascaded to each other wherein no phase shall start unless the succeeding phase is finished or when its goals are completed (Gordiyenko, 2017).

The Survey

In this study, the researchers used the stratified sampling involving the use of "stratum", or a subset of the target population wherein the members possess one or more common attribute.

The survey procedure consists of a set of questions intended to satisfy the ISO 9126 standard. ISO 9126 is an international standard for the evaluation of software. The set of quality characteristics as specified in the standard can be modified to suit to the characteristics of the software (Behkamal, Kahani & Akbari, 2009).

The modified ISO 9126 based questionnaire-checklist was distributed as the survey instrument with a set of questions by system characteristic based on the statement of the problem to determine the responses or reactions of the respondents on the developed computer-based examination system.

Respondents

There were one hundred seventy-eight (178) selected students as respondents from the College of Agriculture and Technology involved in the study as SY 2015-2016.

The population of the respondents is composed of one-hundred seventy-eight students from first year to fourth year under the College of Agriculture and Technology; specifically, the students who took agricultural courses.

Statistical Treatment of Data

Frequency count and simple percentage were used. Moreover, Likert's method of determining the weighted mean was used to analyzed and interpret the data.

To determine the responses of the respondents in the developed and designed computer-based assisted examination system, the following rating scale was used:

1) For the system accessibility, Below is the table representing different rating scale, value and description as a guide;

Rating Scale:	Range		Description:
5	4.21-5.00	**HA**	Highly Accessible
4	3.41-4.20	**MA**	Moderately Accessible
3	2.61-3.40	**N/F**	Neutral/Fair
2	1.81-2.60	**LA**	Less Accessible
1	1.00-1.80	**NA**	Not Accessible at all

2) For the system functionality, Below is the table representing different rating scale, value and description as a guide;

Rating Scale:	Range		Description:
5	4.21-5.00	**HF**	Highly functional
4	3.41-4.20	**MF**	Moderately Functional
3	2.61-3.40	**N/F**	Neutral/Fair
2	1.81-2.60	**LF**	Less Functional
1	1.00-1.80	**NF**	Not Functional at all

3) For the system usability, Below is the table representing different rating scale, value and description as a guide;

Rating Scale:	Range		Description:
5	4.21-5.00	**HU**	Highly Usable
4	3.41-4.20	**MU**	Moderately Usable
3	2.61-3.40	**N/F**	Neutral/Fair
2	1.81-2.60	**LU**	Less Usable
1	1.00-1.80	**NU**	Not Usable at all

RESULTS AND DISCUSSION

Based on the data gathered and analyzed, it was found out that male and female perception for the system accessibility is described as "highly accessible", for the system functionality, respondents described the system as "Highly functional" and for the system usability, respondents described as "highly usable". Further, this implies that the developed computer-based examination system for the licensure examination for agriculturist is meaningfully accepted by the users, because of the high accessibility, functionality, and usability level of the system features. The result was supported by the study of C. Kulik and J. Kulik (1991) which showed that computer-assisted instruction (CAI) usually produces positive effects to students. CAI provide students with frequent, immediate and adequate feedback (Diviva, 2017), and supports engagement and learning process (Confrey, 2006).

Table 1. Summary of the respondents' perception on the system features when grouped according to sex

Respondents	Accessibility	Description	Functionality	Description	Usability	Description
Male	4.38	Highly Accessible	4.30	Highly Functional	4.27	Highly Usable
Female	4.41	Highly Accessible	4.23	Highly Functional	4.26	Highly Usable
TOTAL	8.79		8.53		8.53	
Grand Weighted Mean	**4.40**	**Highly Accessible**	**4.27**	**Highly Functional**	**4.27**	**Highly Usable**

CONCLUSION

Worldwide, information-communication technologies are increasingly being used for educational purposes. It is clearly shown that the developed computer-based examination system for the licensure examination for agriculture is meaningfully accepted by the users, because of the accessibility level, functionality, and usability features of the system.

Based on the data gathered in the computer-based examination system for the licensure examination for agriculture, it is described that the system is highly accessible, very much functional, highly reliable and highly usable. Therefore, this study should be adopted by the college or the review center of the school because this is a big help for the students to review their upcoming exams.

TRANSLATIONAL RESEARCH

The developed computer-based examination system for the licensure examination for agriculture of JRMSU-Tampilisan Campus has been proposed for adaptation and utilization of the developed system to the concerned office, specifically, the college of agriculture and technology and JRMSU-TC review center.

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