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Developing the skills of using cloud computing among university students: a proposed program

Halima Aboobaker[1*], Abobaker Zargoun[2]
[1]Computer Engineering & IT, College of Electronic Technology Baniwalid, Libya
[2]Control Engineering, College of Electronic Technology Baniwalid, Libya
*Crosspnding author: halimabobaker@bit.org.ly

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Abstract: The study aimed to build a proposed e-training program to develop the skills of using cloud computing (Google Drive apps) among university students using the Moodle e-learning system and according to the instructional design system ADDIE, the program included five training modules.

To achieve the objective of the study, the extent to which students possess the skills of using cloud computing applications was measured through a questionnaire about the study, where the sample of the study was 98 students from Bani Walid University.

The results showed that many students do not have the skills to use cloud computing applications, which led to the proposal to design and build an e-training program that will have an impact and effectiveness on the development of these skills among students. At the conclusion of the study, the researcher recommended a set of recommendations that could contribute to the development of the skills of using cloud computing among students in the teaching and learning processes in various curricula, whether at the undergraduate or graduate level.

Keywords: (Cloud computing, E-learning system, E-training program, Google Drive applications, Skill،)

Introduction

Cloud Computing applications are an important thing because they offer a solution to some of the barriers to adoption of e-learning by providing you with a large public resource that can be used by all members of an educational institution without requiring an infrastructure, in addition cloud computing applications provides communication and collaboration tools between users such as e-mail, contact list, calendar and notepad, as well as office applications such as storing documents, creating documents and sharing with others, and a working platform Applications, for example: support for creating websites, using educational management systems.

This study aims to highlight on the most important technological applications that have a significant impact on the teaching and learning processes, it is cloud computing applications and how to benefit from it for the learner, through building a proposed e-training program to develop the skills of university students using these applications, which meet the required and constantly changing training needs, overcome the boundaries of time and space, and provide an interactive e-training environment.

Problem of study

Through my work, noticed that most students do not use cloud computing applications and do not know the importance of these applications in the teaching and learning processes, which they must have to keep up with the technological development in education.

Objectives of study

The study aims to achieve the following goals:

- Building an e-training system using Moodle that includes educational content and training courses focused on enhancing students ' cloud computing skills.
- Encourage students to use cloud computing applications in study and work, analyze their benefits, disadvantages and compare them with traditional computing.
- Provide the necessary technical support and guidance to students in case they encounter problems while using cloud computing applications.

Importance of study

The importance of the study is the following:

- The proposed e-training program using the Moodle helps students to use cloud computing applications in collaborative learning through collective participation among themselves.
- The proposed e-training program provides an opportunity to provide faculty members with a practical program that includes how to use cloud computing applications in teaching.
- The results of this study benefit curriculum developers in building e-courses using cloud computing applications.

Cloud computing

Rashid and Chaturvedi [1] define Cloud Computing "is the use of hardware and software to deliver a service over a network (typically the Internet) with cloud computing, users can access files and use applications from any device that can access the Internet".

According to the researcher, all the previous definitions agreed between them on the existence of a virtual place as a computer frame storage platform, accessed via the internet, which is an essential element to access the cloud, this place contains storage space in addition because it converts computer programs and technologies from productive technologies to services that provide fast processing through a series of devices and servers somewhere, thus saving the user storage space, software purchase, maintenance and development costs, and therefore the user's focus is on using this services only.

Cloud computing types

Cloud computing has several types for providing services and applications to educational and other institutions, this can be illustrated as follows:

- Software as a service (SaaS)

Namely, you use a specific application stored in the cloud, for example, a word program located in the data centre, and you connect to it via the internet and write in it, modify and add data, and then get the output from it, and all this while you are in the cloud and your device is only the communication tool, and the user here cannot control the operating system in the cloud and does not control the hardware nor the network connection, and YouTube can be considered within this classification.

- Platforms as a service (PaaS)

Using the cloud as a platform to put several applications on it and can work on all of them, you can also put a complete operating system as well, and there is integration between applications, for example, something can be designed with Photoshop and then inserted to another application, which

moves and adds effects, so you get a video clip with sound like Google Apps, a platform that allows you to add applications as desired.

- Infrastructure as a service (IaaS)

Here the cloud is treated as an infrastructure limited by a certain processing capacity, storage space and a certain number of users, and you are free to use it in the way that suits you, for example, you can install several operating systems, install several applications on each system and allow a certain number of users to enter each operating system to use its applications without allowing confusion between them.

The diversity of the former cloud components and the multiplicity of their services can serve the educational process very effectively, as these components provide the educational institution with the infrastructure for computing education, as well as the high cost of creating huge servers, purchasing programs and facilitating the preparation of electronic courses in accordance with the electronic capabilities of students. In computing, we have free applications that are easy to access collectively from several users via the internet and do many educational services, such as Google applications, which have created many educational applications in its cloud and allocated a special section for them, and we also have free electronic platforms through which we can develop applications and software for the institution affiliated with electronic courses and various auxiliary enrichment programs that excite students and give an atmosphere of fun with benefit, as well as we have an infrastructure that has a processing capacity that may not be available within the institution's network and exceeds its computing capacity, in addition to huge storage spaces such as that provided by Google, which starts from 15 GB for free and reaches to 16 TB for a certain amount is considered cheap in front of the size of the benefit to the organization due to the use of these spaces and applications.

Services provided by cloud computing for universities

- Accommodate the dependencies of the rapid increase in the use of the mobile device.
- Storage of expanded amounts of sensitive data and easily accessible information.
- Getting the latest software and Application Updates.
- Simplify the enrolment and admission processes at universities, which are expensive and time-consuming processes.
- It allows more flexibility and multiple options that enhance Effectiveness, raise efficiency in organizations by increasing productivity and reducing cost.
- Taking advantage of the huge infrastructure provided by cloud services to carry out practical tests and experiments, so it copes with the great developments that have occurred in recent years in the computer industry.
- Some complex calculations take years to perform on high-end computers, while companies such as Google and Amazon and their clouds of thousands of servers connected to each other make it possible to perform such calculations in minutes or hours from anywhere in the world where internet service is available.

Construction and design of the proposed e-training program

The process of building training programs is a key stage in the methodology of the training process, during which the objectives of the program are formulated, its content is determined in terms of topics, activities, events, diagnostics of training methods for its implementation, identification of other requirements required by the implementation process, and all this is done in the light of scientific assessment of the actual training needs of participants in these programs.

There are many educational design models related to the production of electronic training programs, and among these models are: ADDIE Instructional design model, Kemp model, Waterfall model and others.

During this study, the researcher chose the ADDIE Instructional design model for the following reasons:

- Clarity of the form steps and their sequence.
- A general model based on its steps is considered to be the dominant of other models. The model establishes a specific, structured and flexible framework for the design of training programs.
- All these steps are suitable for building a training program based on the Moodle course management system, and it is considered one of the models with high flexibility to build research tools and materials.

The model consists of five steps that represent its name, namely:

Analysis, design, development, implementation, evaluation. The following are the steps to build the e-training program that was designed and built in this study.

1. The analysis phase

It represents the basic and important stage for all other stages. The most important training needs were identified in order to design an electronic training program to develop the skills of using cloud computing applications for university students. The results of the study showed through a questionnaire to measure students ' possession of the skills of using cloud computing applications conducted on 98 students from Baniwalid University, that 69 students, 70.4%, do not have the skills of using cloud computing applications. Therefore, the study highlighted the need for students to learn cloud computing skills, through electronic training programs that bring them those knowledge and skills. Through the above, the training needs of the e-training program have been identified as follows:

- The cognitive aspect of students:
    - Knowledge about cloud computing and how to use it in education.
    - Knowledge of the Google Drive application and how to use it in education.
    - Knowledge of Google Docs and how to use them in education.
    - Knowledge of Google presentations and how to use them in education.
    - Knowledge of Google models and how to use them in education.
- The skill side of students:
    - Special skills of the Google Drive application.
    - Special skills using Google Docs.
    - Special skills using Google presentations.
    - Special skills using Google Forms.

2. Defining the general objectives of the E-Training Program

The general objectives of any training program are one of the most important procedural steps in the design of the program, as they play an important role in determining the elements of the content of the program, as well as choosing the appropriate means and methods to achieve the desired goals of this program. The general goal of the program was set, which is to develop the skills of using cloud computing applications among university students, and then set the goals for the training program as follows:

- Students acquire theoretical knowledge of cloud computing, its applications and its importance in education.

- Students acquire knowledge and skills related to the Google Drive application and employ it in education.
- Students acquire the skills to deal with Google presentations and employ them in education.
- Students acquire the skills to deal with Google documents and employ them in education.
- Students acquire the skills to deal with Google Forms and employ them in education.

3. Development of the training content of the program

After defining the general outlines of the training program and formulating the goals, the scientific content of the training program was determined, formulated and organized based on the method of task analysis. The training content included five modules arranged according to the skills to be learned in a sequential and graduated manner from easy to difficult, from simple to complex, from knowledge to performance, and related to the previous experiences of students.

The content sequence has been organized in the form of training modules as shown in the following table:

Table1: Training modules for the proposed e-training program.

Training Modules	Sub-elements
Introductory module	The concept of cloud computing. The basic components of cloud computing. Characteristics of cloud computing. Types of cloud computing. Cloud computing services in education.
Google Drive app	The concept of the Google Drive app. Types of documents that can be edited through the Google Drive app. Advantages of using the Google Drive app. Create a Gmail email. Login to Google Drive. The main components of the Google Drive screen.
Google Docs	Create the document. Change & Copy the document language. Convert the document type. Publish the document on the web. Document settings change. Print the document. Insert photos into the document. Insert an equation into the document. Insert a drawing into the document. Insert a table into the document. Control the properties of the table. Add written comments. Add audio comments. Insert the table of contents. Format the text. Proofreading the document by spelling. Search for the topic in Google. Send the file by e-mail as an attachment. Share files with others electronically.

Google Slides	The capabilities of the Google presentations editor. Create a presentation. Import slides. Display format. Publish the offer on the web. Add movements to the presentation. Insert photos to the display. Insert a video to the presentation. Add a comment to the offer. Add & Delete a new slide. Change the background. Change the appearance. Change the order of the slides. Turn on the display.
Google Forms	Definition of Google Forms. The possibilities of the Google Forms editor. Create the form. Rename the form. Change the appearance of the model. Write form questions. Determine the type of question. Add a new question. Add photos of the model. Add a video to the form. Send the form by e-mail. Share the form via Facebook, Twitter, Google+. Accept responses. View responses in spreadsheets.

4. Design and implementation of the e-training program

The proposed e-training program is designed and built according to the following steps:

- The choice of the e-learning management system (Moodle), where the latest version (4.2) was chosen to be the e-training environment for the current study, where the Moodle system is one of the e-learning management systems (LMS) available for free and open source, and its tools can be customized according to the requirements of the study, and this system aims to create an interactive environment through which trainers and trainees communicate with each other through many means such as delivering the training material to trainees or adding activities, assignments, tests or communication and dialogue through discussion forums.
- Preparing a preliminary scheme for designing the e-training program in the form of stages and steps to help organize the e-training environment, and also facilitates the implementation of this scheme at the development stage.

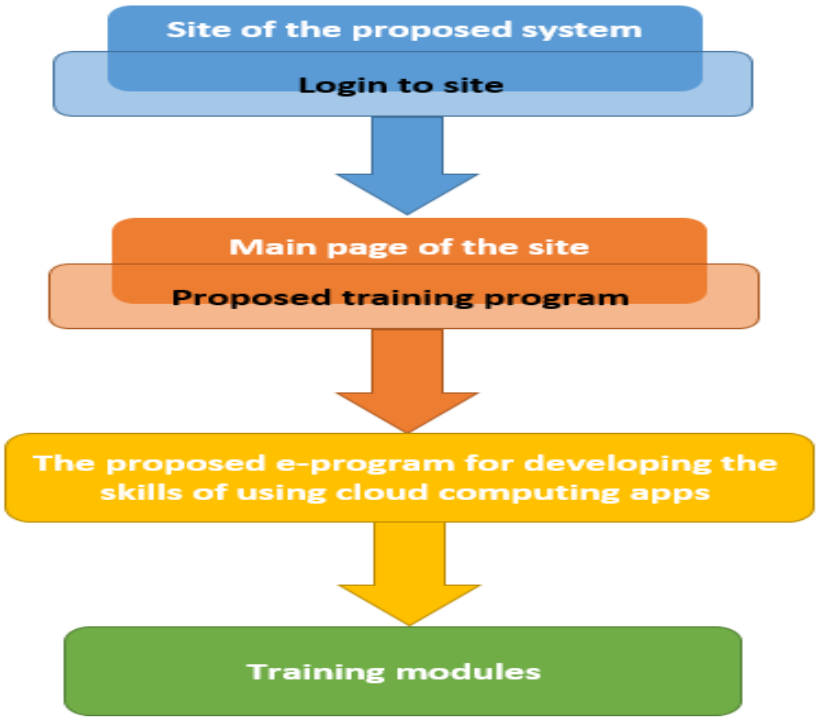

Fig. 1: The first scheme for the design of the e-training program

- After the preparation of the design scheme is completed, the scheme is reviewed to ensure that all the necessary topics, elements and tools are available to achieve the goals of the E-Training Program.
- Assembling some multimedia elements necessary to build the electronic training program from various electronic sources such as Google search engine as well as Pinterest website that provides photo sharing service.
- Download the Moodle version and install it to start building the E-Training Program, and then implement the design scheme and produce the proposed e-training program for this study.

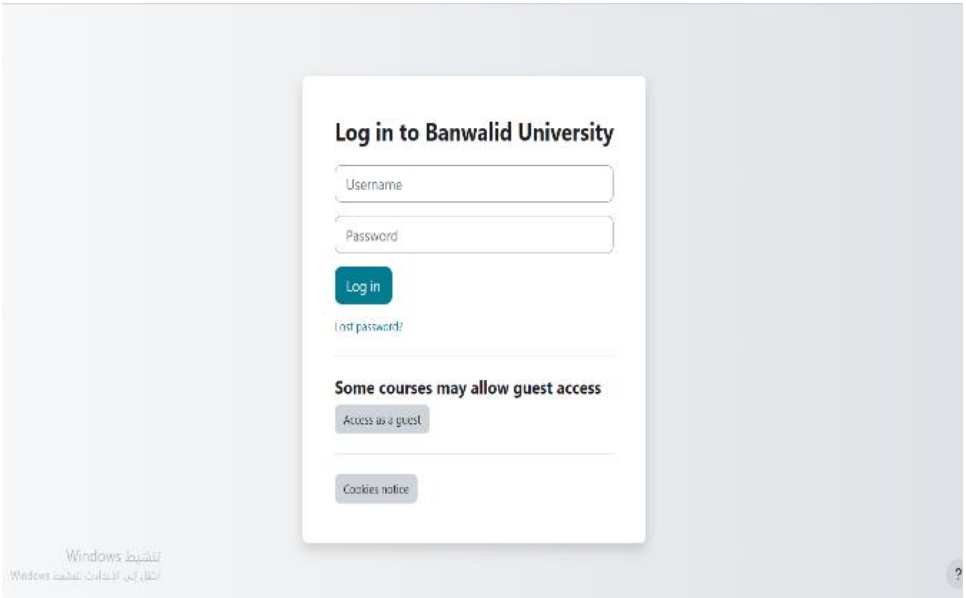

Fig. 2: Login screen

- After completing the registration process, the main screen of the program is accessed as shown in Figure (3).

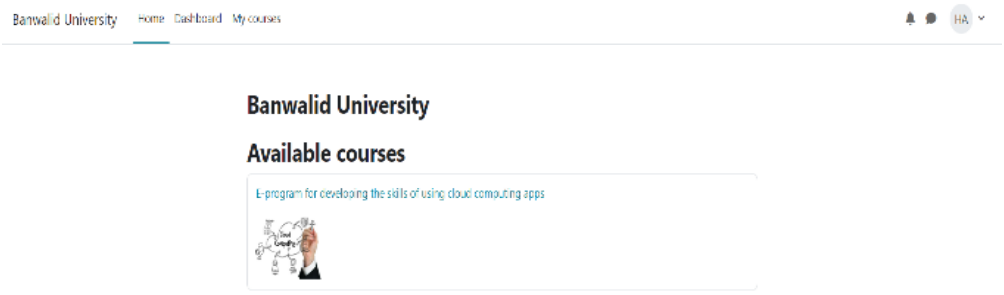

Fig. 3: Main screen for entering the e-training program

- Then, entering the main screen, click on the icon of the e-training program and then enter the main page of the program as shown in Figure (4).

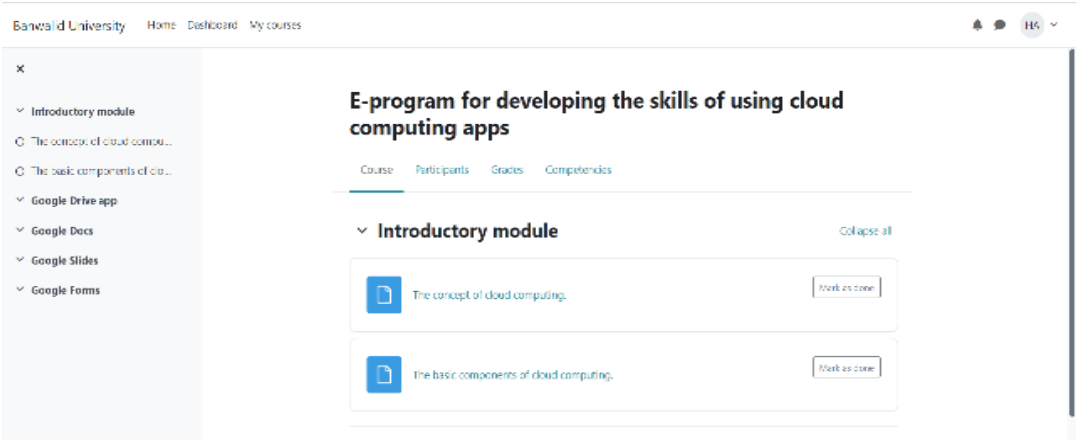

Fig. 4: Main page of the e-training program

5. Evaluation of the e-training program

After the completion of the process of building and designing the proposed e-training program, the evaluation process of the contents and elements of the program comes to ensure the accuracy, clarity and effectiveness of all the contents and elements of this e-training program.

6. Modification of the e-training program

This step comes in order to review the most important strengths and weaknesses of the program and its aim is to increase the effectiveness of the proposed electronic training program.

Conclusion

We conclude from this study that:

- The subject of the e-training program is one of the modern technological innovations in the field of e-learning, which prompts students to learn the knowledge and skills related to this program in addition to their aspiration to deal with cloud computing applications.
- The method of using cloud computing applications (Google Drive app) is a fun and easy way that makes it easy for students to understand, which leads to an increase in students ' achievement.
- The possibility of providing training according to the appropriate time and place for the student and also getting rid of the restriction of time and place that may restrict the student to receive training in the traditional way .

- Giving the student the opportunity to repeat the application several times without getting bored by entering the e-training program via tablets or smartphones more than once at any time he wants and from anywhere, and this may not be available to students in other training programs, as most other programs are done by viewing only .

Recommendations

According to the conclusions of the study, some of the following recommendations were made:

- The possibility of applying the E-Training Program proposed in this study to faculty members and students at universities in order to develop their skills in using cloud computing applications and help employ them in education.
- Expanding the use of cloud computing applications in education in general and the university stage in particular, due to its potential in developing a collaborative learning environment among students, in addition to increasing the effectiveness of learner-centered learning, it also reduces students ' dependence on learning methods based on teacher activities.
- Guiding and motivating students to use cloud computing applications, including (Google Drive application) to complete projects and study assignments, which makes them able to learn from each other as well as see the work of other groups participating in (Google Drive) projects.

E-learning centers at universities implement multiple strategies to employ cloud computing applications.

- Working on spreading awareness of cloud computing applications, employing them and relying on them in providing some courses that can be offered through these environments through holding conferences and workshops at various educational institutions.

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