Research Study on the Effect of E-Learning in Training Course

Ahmed Nuri Dkhel*
Fatah Mohamed Shakrum**

Abstract:

Despite the proliferation of E-learning in training and education world-wide, this methodology is not implemented on Libyan context .Therefore there is a need to investigate the effect of deploying E-learning methodology in training field.

The aim purpose of this study is to develop E-learning Excel training by using Moodle open source (learning management system). The secondary purpose is to compare the effects of two different modes of training delivery (E-learning training, and traditional classroom training) on trainee achievement used in an Excel training course at (Quality Assurance Ccertification Center).
A study was developed to examine trainees achievement in Excel training course by comparing results of pre-test and post-test for both modes of delivery. The sample was (14 trainees at classroom mode and 13 trainees at E-learning training).

The final results showed that the mean difference between the pre-test and the remote test using the *T.test* of the two groups was that the E-learning group obtained a higher achievement of statistical significance than the traditional education group at the significance level ($P < 0.05$).

These results indicate that excellence in using the E-learning course is well-designed and can be very effective for trainees' achievements.

* Advanced Center of Technology, Tripoli, Libya.
** High Institute of Medical Science and Technology, Tripoli, Libya.

Keywords:
E-learning; Moodle: Training; Excel:

Introduction:

Traditionally training has been performed by face to face style presentation and interaction. This requires the learner and the instructor to be in physical proximity. The cost of providing this type of training has become expensive, as it requires the learner to spend time away from the workplace combined with travel and accommodation costs. An alternative to face to face presentation is E-learning. Training can take place at a suitable time and location for the learner and the employer while the instructor can be an expert located anywhere in the world.

There is a shortage of more advanced skills that required in the job market.

A recent government restriction on foreign labour, which reduces availability of required skills in the short-run, increases this shortage. Steps to address the human capital challenge could include job-relevant training for Libyan workers, leveraging the skills and expertise of the Libyan people [1].

This study will discuss how E-learning based on training can be used to benefit QACC, to conduct training programmers by implementation of pilot project to develop Excel training course, by using Moodle and then analysis of result of study.

This study help to overcome potential limitations of training programmers in an alternative to face to face training.

The E-learning based training can be designed to support individual or organizational skills development. Examples include courses developed to provide information as well as those designed to build specific job-related skills. A myriad of online learning solutions have emerged over recent years, including self-paced E-learning, virtual classrooms, simulations, games and communities of practices.

Problem Statement:

Libyan public and private organizations face a big challenge in business due to lack of competency among their staff, therefore

there is a big demand for training to fill the gap between staff capability and job requirements.

QACC as training provider needs to address this challenge by providing wide range of training such as IT, management, and soft skills courses but there is a limitation in terms of training staff, resources, equipment's, and classrooms.

On other hand, Lack of examples for training is a disadvantage of traditional classroom as training has limited time, students have different capability in terms of understanding, and tutor can't manage demand of big trainees number in the class.

1.2 Related Work:

Pucel and Stertz have performed a research study comparing web-based instruction to traditional classroom instruction. Their study looked at student satisfaction and academic achievement for in-service teacher education courses for career and technical education teachers.

The purpose of the study was to identify a model for web-based instruction courses and to determine if the web instruction demonstrated similar results to traditional course instruction. The traditional and web-based courses had the same assignments, objectives, and grading criteria.

The satisfaction survey indicated that the students felt both courses were equal in rigor and challenge. The data indicated that there was no statistical significant difference in the student evaluations between the two methods of instruction. There was only a slight preference indicated for the traditional instructional method. When they looked at student academic achievement, the results indicated a statistically significant difference in two areas for the web-based students scoring less than the traditional method students in the History and Philosophy of Career and Technical Education course [2]. For the Instructional Methods of Business and Industry course the web-based students performed better in three of the four criteria evaluated than the students receiving traditional instruction.

The students also performed significantly better for the final exam. The study noted that on the presentation project portion of the course, the students receiving traditional instruction outperformed the web based instruction students.

The results of this studies indicated that students in the online learning group and the combined online and traditional learning group had a statistically significant higher achievement than students in the traditional learning group. Students in the online learning group had statistically significant greater satisfaction levels with their overall learning experience than students in the traditional learning group.

These findings suggest that a well-designed online course can be very effective in teaching wellness. Also, online learning may motivate students to become more active learners, making them responsible for more of the learning process because it accommodates different learning styles and is convenient for students [3]. Dougiamas, Taylor. The study aimed to analysis the effect of teaching any online course (by using Moodle) on student interaction. The researchers had chosen construction course for 8 postgraduate students by using Moodle at Curtin University of Australia. The result of questionnaire indicated that the course had achieved the aims of study successfully [4].

Reasearch Question and Hypothees:

Research Question:

What is the difference between the Excel scores of the trainees who received traditional classroom training (whiteboard and lecture instruction) and the trainees who received Moodle based training (E-learning).

Research Null Hypotheses:

H1: There will not be a statistically significant difference between the Excel Scores of the trainees who received whiteboard and lecture instruction and the trainees who received Moodle based training (E-learning).

Study Objectives:

This study has following objectives:

- To design and implement a proposed Excel training package for beginners based on the training needs of potential trainees using modern technology.
- To evaluate the influence of the proposed package on trainees achievement in comparison with traditional classroom delivery.

Literatue Review:

E-Learning:

The E-learning has different definitions, one of these definitions stating that E-learning is the set of ”whole activities of teaching and learning based on computer management environments constructed from network information techniques with interactive communications”[5]. Probably the best definition is stating that E-learning is any learning, training or education that is facilitated by the use of well-known and proven computer technologies, specifically networks based on Internet technology. This definition includes the key ingredients for the growing success of E-learning in the last couple of years, the advances in network and communication technologies.

There are four main phases in the E-learning process ranging from defining the targets and requirements (design), through generating and packaging learning materials (production) and distributing it (deployment), to the final assessment of learners and the process itself [6].

Technological Forms of E-Learning:

The development of electronic education can be divided into several periods according to techniques of communication and methods of sharing information contents.

Computer Based Training (CBT):

The definition of the term lies in its title. Electronic education is realized by using a computer, e. g. by CD-ROMs with an appropriate program. According to Kopecký, the main development of CBT in educational institutes can be dated between

years 1990 and 1999. However, CBT cannot be regarded only as a way of supporting school education; the principle is used for numerous games and simulations. For example Czech Airlines are using CBT for an individual pilot training [7].

Web Based Training (WBT):

Not only did the system settle the issue of updating but it has also brought new ways of communication between participants. WBT represents electronic education supported by a web, which means immediate updating whenever needed using the Internet or the Intranet.

It might seem that this system has no drawbacks, however, there is one major disadvantage of WBT. "WBT as well as CBT is not standardized. There are no obliged rules for structure of education courses, for distant text building and so on. Since WBT made access possible for many classes of population, requirements for administration of the courses started to grow".

Course Management System (CMS):

To create a course on the Internet requires rather extensive knowledge of HTML or other programming language, which is, however, not true for CMS.

This system facilitates building a course with basic knowledge of any of the computer language. "It provides an instructor with a set of tools and a framework that allows the relatively easy creation of online course content and the subsequently teaching and management of that course including various interactions with students taking the course"[8].

E-Learning Implemention Challenges:

Despite huge potentials that E-learning technologies have in enriching education delivery in developed countries, the application of such technologies in the context of developing countries is limited[9].

E-learning technologies are not yet used pedagogically by most instructors. According to instructors and students usually use

programs such as word processing, spread sheets and graphics for preparation of examinations and other related academic works.

There are different challenges that make instructors and students in most developing countries unable to fully exploit E-learning technologies. Some of the challenges are inadequate infrastructures such as computer and internet.

Another challenge is lack of readily access to E-learning technologies by both instructors and students in most developing countries. The situation regarding access to different technologies is different for different stakeholders.

However, utilization of e-learning as an alternative approach to teaching and learning still faces other numerous obstacles which range from technological, organizational and pedagogical challenges. Berhanu warn that introduction of e-learning without acknowledging the paradigm shift and setting up the required ICT infrastructure[10].

Successful implementation of E-learning technology requires a thorough. Understanding of the context. As mentioned earlier, this study is carried to understand the context of the Libyan training courses, and how to use open source software (Moodle) to develop Excel training course.

Types of LMSs:

The choice towards the best LMSs really depends on factors that are considered important to an organization. Organizations have the freedom to choose what system will fit best depending on their strategies, educational requirements and most importantly economy [11].

Open Source Learning Management Systems:

An open source software (OSS) is defined as an application source code that is free to the public. Just like any other open source application, an open source LMS is free to use and modify depending on the specific requirements of the user.

They are normally published under the GNU General Public License [12], which gives the copyright holder permission to share

and distribute the system to third parties. Its development process is normally collaborative, with communities of developers adding and improving functionalities as they use. The technology platform is normally built from free applications, from programming languages to databases and webservers.

Commercial Learning Management Systems:

Proprietary LMSs are business oriented and normally developed by commercial vendors. Cost has been one of the major challenges associated with these systems. It is costly to renew site licenses every year and processes becomes more complex when requirements in the institution are different and diverse. The main issue is the limited ability to modify the systems in order to address specific requirements of the institution, since the copyrights belong to the vendors [13].

Many of the systems in this category resulted from university development projects rather than business oriented software development vendors. Although the E-learning industry is currently dominated by open source applications such as Moodle, there still exists a place for commercial systems as well. Examples of proprietary LMSs are Blackboard and Desire2Learn.

Moodle:

Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments [14]. Moodle is an open source platform that is very popular globally.

The full form of Moodle is Modular Object-Oriented Dynamic Learning Environment and it is developed using the PHP programming language.

Moodle is also the focal point of this study, since it is one of the primary systems used by most educational institutions to support its teaching and learning activities. This leads to the need of performing an overview study on the system in order to

understand its key features and functionalities, which accumulatively define the context of this section.

History and Underlying Philosophy:

Moodle stands for Modular Object Oriented Dynamic Learning Environment It is open source software (OSS) which supports creation and facilitation of online learning sites. Moodle can be used to support online courses or supplement blended learning (traditional face to face teaching and online learning). It is offered under the GNU General Public License meaning that it is free to redistribute and amend as per the underlying license terms.

The system was originally developed by Martin Dougiamas in 1998. The first version of the system (Version 1.0) was released in August 2002. Moodle is currently managed by Moodle Pty Ltd and the current version is Moodle 2.8.

Moodle grew quickly: the first ever Moodle Moot was held in Oxford in 2004, With improved documentation and new certification , Moodle had established itself by 2007 as a leading and award-winning open source LMS.

The inauguration of the Moodle Research conference in 2012 served as a reminder that, however advanced the technology, Moodle design and development is guided by social constructionist pedagogy.

By 2017, statistics on Moodle.net indicated there were over 100 million registered users in over 224 countries for Moodle, these users include teachers, students, software developers, researchers, educational and system administrators. During 2017, a number of projects were developed, translating Moodle into different languages and creating themes, and Moodle.org became the community arm of Moodle, with Moodle.com representing the commercial aspect[15].

The concrete attributes of Moodle are flexibility, compatibility and ease of use, and can also be used as a stand-alone system.

Architecture/ Technical Platform:

Moodle is developed under the LAMP platform; Linux (operating system), Apache (webserver), MySQL (Database) and

PHP (Programming language) and its installation is easy with basic requirements of a PHP supporting webserver, databases from MySQL, Oracle or PostgreSQL and file storage (Table. 1). Requirements for installations are internet connection and a web browser that generally supports WYSIWYG (What You See Is What You Get) HTML editor.

Moodle Core, Add-Ans , Plugins		
Apache Web Server	Data Base (My SQL, PostgreSQL)	PHP Programming Language
Operating System (Linux Windows and others)		

Table 1: Moodle technical platform

General APIs:

An API (Application Programming Interface) can be defined as an interface or protocol that facilitates communication between two or more applications. In regard to Moodle and its architecture, APIs are considered very important in ensuring that the integration of standard plugins is efficient and also provide tools for Moodle scripts [16]. Among widely 25 used Moodle APIs are Access API, Data manipulation API, Navigation API and upgrade API.

General Plugins:

Due to its extensible nature, Moodle is surrounded by a variety of plugins, which supplement the system core (libraries and databases). A plugin is an application that adds functionality to the main application [17]. In Moodle, a plugin can be standard (it comes with the package) or an add-on (developed by a community of developers). Examples of common Moodle plugin categories are activities, blocks, themes, users, plagiarism, repositories and filters[18].

Features of Moodle:

Features of the Moodle system are developing practically every second but there are main features which this study is try to adopt in Excel training course.

Since the study is not a manual for creating an online course, the focus will not be put on how to create a course but rather to compare between two modes of delivery and how E-learning helps trainees with their learning process.

Design and Implementation of Project:

Lessons can be organized into several generic structures, such as a linear sequence, a branching hierarchy, or a two-dimensional grid. Although these generic structures have their place, most E-learning is structured in ways that reflect the needs of learners and the nature of the subject matter. We call these organizations "purpose-specific" and design them around the subject matter and the learners need for knowledge.

Here, we have used the topic architecture, which fit with purpose of design and develop of Excel training course, where learners start with an introduction to the lesson and then proceed through a series of topics teaching progressively more advanced skills or concepts. At the end of the sequence, learners encounter a summary or review of the concepts and a test or other activity to measure whether they accomplished the objectives of the lesson.

Course Log in:

The URL of course is: libyatraning.gnomio.com/course /view.php?id=2

To login to the course you have to enter username and password. As course admin you can add users to course (trainees, instructors) and give each of them permission for instance instructor can amend course material but this permission is disabled for trainees.

Result and Discussion:

Introduction:

The purpose of the research study was to discover if using E-learning (Moodle) to deliver Excel training online course improves trainee achievement. The study was of two groups of trainees (classroom based training and E-learning based training),

both groups had same course material and subjected to pre-test and post-test.

The study took place in QACC which is located in Tripoli. The participants were trainees of different back ground, for classroom group the sample was 14 candidates and E-learning group was 13.

The independent T. test was an appropriate statistical measurement to employ when comparing the means of traditional classroom and E-learning training groups. The independent T.test was utilized to test the hypotheses. Variables were the difference in the mean scores of both.

The classroom group received the whiteboard/lecture method of training, and the E-learning group received online training. An independent T-test was utilized to determine if a statistically significant difference existed between the mean trainees' score of both groups.

Instrumentation:

Two different training methods were the independent variables in this research study. One method was the classroom and lecture method of training, and the other method was the E-learning method of training including online videos, online testing, blogs, chatting rooms, forum, quizzes, video conferencing etc.

SPSS (Statistical Package for the Social Sciences) statistical software was the measurement tool. The SPSS software program is one of the most widely used statistical analysis programs used for educational research. The SPSS software program was an efficient and concise tool to measure the variables in the study.

Results:

This study has been determined that the independent T.test should be the method of data analysis for this study.

The independent *T.test* should be trainees when comparing two means and when the treatments have been randomly assigned.

If the sample size is less than 30 (Fig. 1) , For this study, the researchers utilized the SPSS software to analyses the student data employing the independent *T.test* to test the hypotheses. The SPSS program identified the M (arithmetic mean), the SD (standard deviation), the T (*T.test*) , the P (*P value*), the mean difference, and the CI (confidence interval) for the collected data. For the study, the dependent variable was Excel trainees scores. The independent variable was training methodologies.

The classroom group received the whiteboard/lecture method of Excel training, and the E-learning group received Moodle methods of Excel training.

An independent was employed to determine if a statistically significant difference exists between the classroom group's mean Excel score and the E-learning group's mean Excel score when technological instruction was employed and when whiteboard and lecture was the method of instruction, the M (arithmetic mean) for classroom group was 63.71 and 76 for E-learning group (Table 1).

The independent *T. test* identified T =-2.259 and P = 0.0341 at a 95% confidence interval, and the P = 0.0341 was lower than any standard significance level, and in particular the alpha level of 0.05 used with SPSS. Furthermore, P= 0.0341 means that one shouldn't expect to achieve a result with similar differences approximately 94% of the time. Based on the data in (Table 2), the researchers did not accept the null hypothesis H1 which stated: there will not be a statistically significant difference between the classroom group Excel scores and E-learning group Excel scores. In conclusion, there is not enough evidence to say there is a statistically significant difference between the mean scores for classroom and E-learning groups in Excel training in favor of E-learning group which means that using of E-learning helps trainees to achieve rather than classroom based training.

Fig. 1 The Score of trainees in both Method

Table (2) The T.test Result

Group	N	M	SD	T.test	P
The traditional method	14	63.71	17.022	2.259	0.0341
E-learning	13	76.00	10.747	2.259	

Conclusion:

The purpose of this study was to investigate the effects of using Moodle based training on trainees achievement in comparison with traditional classroom training used in Excel training course at QAAC (in Libya).

the mean scores between the pre- and post-course knowledge tests. *T.test* revealed that there were statistically significant differences in student achievement among the two learning groups. The results of this study indicated that students in the Moodle based learning group had a statistically significant higher achievement than students in the traditional classroom learning group.

However, to maximize the different benefits of Moodle to be implemented on different training courses, further research needs to be conducted taking another group of participants: larger in size, mixed in gender and at different study level and courses.

The findings of this study indicate that the implementation of online training by using Moodle will help training provider to overcome potential training issue such as lack of resources, training facility and instructors. In addition online training help employer to overcome skill shortage and provide on-job training instead of classroom based training and reduce cost of continuous professional development.

For decision maker this study will raise awareness of importance of implanting E-learning methodology in training and education sectors, and recommending the education organization to apply the system to take advantage of the positive impact of the use of the Moodle system in the development of self-learning skills.

دراسة بحثية عن تأثير التعلم الإلكتروني في دورة تدريبية

احمد نوري دخيل *
فاتح محمد شكروم **

المستخلص:

على الرغم من انتشار التعليم الإلكتروني في مجال التدريب والتعليم في جميع أنحاء العالم، إلا أنه لا يتم تطبيق هذه المنهجية في ليبيا، لذلك رأينا ضرورة لدراسة تأثير نشر منهجية التعليم الإلكتروني في مجال التدريب.

والهدف الرئيسي من هذه الدراسة هو تطوير تدريب التعلم الإلكتروني باستخدام برنامج نمط مفتوح المصدر (نظام إدارة التعلم)، والهدف الثانوي هو لمقارنة تأثير وضعين مختلفين من التدريب (تدريب التعلم الإلكتروني، وتدريب الفصول الدراسية التقليدية) على تحصيل المتدرب في دورة تدريبية متميزة بمركز شهادة ضمان الجودة، وقد تم إعداد هذه الدراسة لاختبار درجات المتدربين في دورة تدريبية من خلال مقارنة نتائج الاختبار القبلي والاختبار البعدي. وكانت العينة (14 متدربا في وضع الفصول الدراسية و13 متدربا في تدريب التعلم الإلكتروني).

أظهرت النتائج النهائية ان متوسط الفرق بين الاختبار القبلي والبعدي باستخدام اختبار الدالة الإحصائية للمجموعتين أن مجموعة التعليم الإلكتروني تحصلوا على انجاز أعلى ذات دلالة إحصائية من مجموعة التعليم التقليدي بمستوى الدلالة ($P < 0.05$)، كما أشارت هذه النتائج إلى أن التفوق باستخدام الدورة التدريبية للتعلم الإلكتروني مصممة تصميما جيدا يمكن أن تكون فعالة جدا على إنجازات المتدربين.

*المركز المتقدم للتقنية.
** المعهد العالي للعلوم الطبية.

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