The Impact of E-Learning on Egyptian Higher Education and its Effect on Learner’s Motivation: A Case Study

Samir El-Seoud¹, Islam Taj-Eddin¹*, Naglaa Seddiek², Pauline Ghenghesh², Mahmoud El-Khouly³

¹Faculty of Informatics and Computer Science, British University in Egypt-BUE, Cairo, Egypt
²English Department, British University in Egypt-BUE, Cairo, Egypt
³Faculty of Computers & Information, Helwan University, Cairo, Egypt
*Corresponding Author: islam_t@hotmail.com

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Abstract Web-based learning tools provide integrated environments of various technologies to support diverse educators’ and learners’ needs via the Internet. An open source Moodle e-learning platform has been implemented at universities in Egypt as an aid to deliver e-content and to provide the institution with various possibilities for implementing asynchronous e-learning web-based modules. This paper shows that the use of interactive features of e-learning increases the motivation of undergraduate students for the learning process.

Keywords E-Learning, Higher Education, Motivation, Web-Based Education

1. Introduction

The population of Egypt is 90 million, which supposed to have around 90 universities, however, only twenty two governmental universities and other ten private universities are exist. Students with average grades in high-school find a lot of difficulties to join the governmental universities, and they have only two choices, either to join private universities with a very high tuition fees or to study abroad. One of the alternative solutions is to allow the governmental universities to accept extra students through e-learning programs. However, we should answer the following questions first:

- Do we have the required infrastructure?
- Do we have the required hardware and software?
- Do we have on-going staff development? And “just-in-time” technical assistance?

Unfortunately, most faculties and colleges facing the following problems:

- insufficient power to change degrees and curriculum’s structure
- limited financial resources

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Studies in the field of e-learning and its effect on learners’ motivation is lacking in developing countries such as Egypt. Therefore, the main aim of this study was to measure whether the interactive features of e-learning has increased the motivation of undergraduate students for the learning process. The significance of this study should raise awareness of academic staff at the British University in Egypt and Helwan University to the importance of using the interactive features of e-learning (e.g. online quizzes), for motivating young adult learners. This study was also part of a longitudinal effort to understand the use of technology in teaching within higher education in Egypt.

This paper is divided into seven main sections: Abstract, Introduction, Literature review, Research methodology, Research findings, Conclusions and References.

2. Literature Review

The increase use of e-learning among educational institutions leads to a natural change in higher education. According to the findings of [10], there has been an increase of around 12-14 percent per year on average in enrolment for fully online learning over the five years 2004-2009 in the post-secondary system, compared with an average of approximately 2 percent per year in enrolments overall.

According to [28], the use of e-learning can make a significant difference about how learners learn to master a skill quickly through the easiness of studies while enjoying their learning. When the students use e-learning they creating an environment in which they can manipulate, explore and experiment. Thus, for the educational innovator, who seriously wishes to improve the quality of the education and the learning experience, it is imperative that we create an education system that is capable of rapid adaption to its technological, as well as its social, cultural and politically environment [24].

Over the last few years the structure of higher educational institutions has changed, partly due to the introduction of technological initiatives. The author in [31] supports this opinion and asserts that as e-learning is now facilitating a more flexible learning approach; the current structures of most academic institutions become less robust than in previous years. In addition, [11] reports that technology in general has not only improved knowledge storing methods and learning techniques but has also acted as a catalyst to combat the barrier of inflexible organizational structures. This view suggests that to fully experience the benefits of technological advancements in higher education, such as e-learning, universities must have flexible organizational structures. According to [31], the structure of today's universities must be changeable in order to integrate distance learning courses, and those institutions that will not or cannot change their structure to incorporate this technology may be bypassed by other educational providers, such as virtual universities and independent educational services.

The author in [17] argues that such a wide acceptance of e-learning methods in higher educational institutions will create broader repercussions regarding organizational structure. The author in [16] expresses the view that if universities are to compete in a global higher education market, then they must embrace the technological advancements and use them as a strategic tool, capable of transforming educational and business practices. The author in [16] considers that e-learning initiatives will not only give universities a new channel of educational deployment, they will also support strategic objectives by assisting asynchronous discussion consortiums and networked communities. It may be that e-learning strategies within universities could be orientated around technological capabilities.

The author in [6] details that any university incorporating e-learning initiatives into organizational strategy must take into consideration the following; the financial constraints of the strategy, suitability of the technology, implementation of the technology and the range of e-learning requirements within the institution. If sufficient attention is given to all these considerations, the university is in control of its distance learning future [6].

The author in [17] asserts that a number of established universities are embracing the use of technology in higher education, especially in distance learning disciplines, without understanding or addressing the business or educational requirements.

Recent studies indicate that the success of e-learning methods in higher education can only be measured according to the effectiveness of delivery. The adoption of e-learning initiatives falls considerably on the training staff which is really a major challenge. However, it has been acknowledged that many faculty members are reluctant in accepting aspects of technology in their teaching and learning process. Lecturers in higher educational institutions must accept, implement and adopt technological advancements offered by e-learning. The author in [7] explains that lecturers have to adopt new educational approaches in order to maintain the quality of courses.

The evidence suggests that staff training is a main concern for higher educational institutions implementing e-learning methods. It is essential that the opportunity to redesign and improve university teaching practices through e-learning is not usurped by a focus on training lecturers how to use the hardware and software [19]. Inadequately trained teachers using e-learning in educational environments can become an obstacle in a finely balanced learning process and can lead to problems in application use and in the perception of students [32]. In contrast to traditional teaching skills, e-learning requires lecturers themselves to be committed to a constant and changing learning curve, which may involve a mixture of formal training courses in conjunction with conferences and other less formal techniques, if they are to acquire and develop the skills needed to be an effective e-learning tutor [25].

Recent studies indicate that university students who have been enrolled on e-learning courses outperform better than
those enrolled on traditional courses. The author in [31] uses the example of Carnegie Mellon University (CMU) in America, where e-learning techniques have not only improved student exam results but have acted as educational bridges between subjects, breaking the ancient boundaries between disciplines.

One of the most valuable attributes of e-learning techniques and delivery are that they potentially give students greater access to education, in comparison to more traditional less flexible educational methods. The author in [5] express the view that full time and part time students can now partake in their chosen degree courses from any location, giving people who travel or who are relocated, a transferable and easily accessible learning resource and experience.

The Internet has allowed universities to expand beyond their local campuses and create global learning institutions for today's information age [15]. This globalised network of education services has resulted in enhanced domains of knowledge being available to students [13]. Recent studies indicate that e-learning has a fundamental impact on the structure of higher education. The importance of using e-learning would make a significant difference in university teaching.

Although the impacts of e-learning on higher education have numerous effects, their implication to the quality of education needs more attention that it has been in the past. The introduction of e-learning as one of the learning tools in the educational sector has had a lot of impacts on education. Researches that have been carried out in the past indicate that there are both positive and negative impacts of e-learning on education. One of the impacts that have brought about many questions is the lack of face-to-face contact of the teacher and the student. Recent studies indicate that most of it is e-training rather than educating. In the same line of thought, studies have cited that e-learning may not be acceptable by many teachers because of its time consume as well as by many students with limited technical background. Recent studies indicate that e-learning being more suitable to IT. Also the high costs associated with the implementations and maintenances have been cited among others.

In particular, e-learning means learning anywhere and at anytime. Therefore, it is important to point out that the impact of e-learning has been felt in education, economic sector, social sphere, health sector and generally it has impacted the whole world. Another impact of e-learning to education is that it has changed the design, implementation and delivery on the higher education.

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One of the factors that have contributed to the modification of e-learning to become a quality approach in the educational sector is its ability to share information and data in an easy way [9]. It is important to note that the internet remains as one of the most important technological inventions that has made e-learning a success. E-learning has contributed to a substantial reduction of costs that are involved in building classrooms and other resources that are needed for learning.

E-learning has been found to eliminate some of the classic roles in the conventional learning setup that are played by teachers in academic institutions. In the e-learning process, teacher doesn’t need to be there throughout the teaching process. Therefore, teacher should change the classical of delivering their materials. Teachers need to develop their technical skills. Teacher should change the classic way in which courses and programs are designed and delivered. They should also act as a social worker, guidance counselors and helping their students throughout the learning process. Hence, the success of a particular student will depend on an effort not only from the students but also from the teachers.

Apart from teachers, academic institutions have also acquired new roles. Whereas conventional learning has made academic institutions as centers of excellence where students come to acquire important knowledge and skills to develop their careers, the role of these institutions under e-learning setup has been found to shift from being academic centers to social centers. According to many research papers in this field, e-learning will transform academic institutions to become more of a social and activity centers. In summation, e-learning will change both the roles of teachers and academic institutions.

It is evident that the future of education will lie completely in the integration of technological development into the educational sector. As a result, e-learning is an appropriate approach towards enhancing the educational sector from a technological perspective.

The literature reviews concluded that the research has been uneven, there is evidence that educators in higher education believe that e-learning technologies (1) have a positive impact on course delivery and student learning, (2) are effective at achieving greater student participation and student interest, and (3) allow opportunities to improve critical thinking [14]. Consistent with these perceptions, a good deal of the literature also suggests that e-learning can transform learning experiences in positive ways, resulting in an increase in the quality of learning experiences [9], [26].

At BUE and Helwan university, most instructors prepare the course material via a number of educational strategies to suit the different learning styles of students. Assessments can be formative, i.e. taken throughout the duration of the course or summative at the end of the course [4]. The most appropriate method of obtaining the student's awareness is through summative assessment, which is carried out towards the end of the course. The student's performance, or achievement, may be apparent throughout the course in the form of homework, tests, and class discussions. However, in many classroom activities learning is fugitive, recordable and at great cost and inconvenience [27].

Incorporating technology in the learning process does not necessarily guarantee motivated students. In fact, online instruction has resulted in the student teacher relationship
becoming less personal. Teachers are required to turn the classroom into an online environment. Therefore, what exactly is required of teachers to motivate students in an online environment? [8] Wlodkowski [20] claims that learners learn more using computer-based instruction in comparison to traditional classroom methods. One possible reason for this seems to be the increased level of the learners’ participation through interactivity. This results in higher levels of cognitive engagement and perseverance to complete the task.

The higher education sector in Egypt is comprised of universities and institutions of technical and professional training. This system is made up of:

- 21 public universities, including Alazhar University, and four branches which will become independent universities soon.
- 19 private universities.
- 13 public non-university institutions made up of 8 technical.
- 96 private institutions: Only 8 of them are two-year Middle Technical Institutes (MTI). 4 institutions offer both two and four-year degrees, while 88 institutions are four-year higher institutes.
- 11 non-university institutions were established by other governmental entities (i.e. not the Ministry of Higher Education), or under special agreements.
- 8 private foreign institutions.

On a national level, there are several programs operating to address the issue of e-learning centers at the higher educational level. The effort of the Ministry of Higher Education has been summed up as follows [21]:

- 18 e-learning labs (6 Personal Computers (PCs) & Server + Local Area Network (LAN)) have been installed in all universities (17 public universities & Alazhar University).
- 20 e-learning labs for students (20 PCs & LAN) accessibility have been installed in universities. At 2008, 81.4% of Egyptian higher education institutions had computer labs and Internet access, while 98.7% of the students had personal computers PCs.
- The Faculty of Engineering at Ain-Shams University has been equipped with a wireless network.
- The Faculties of Engineering at Assuit University and Ain-Shams University have been equipped with the latest technologies of e-learning offered by HP company (2 faculties of Engineering won the labs in the HP e-learning competition).
- Developed and inaugurated phase I (1.2 million scanned research pages) of Science and Technology Portal.
- Multinationals’ e-content:
  - The NetAcad curricula of Cisco were mapped to the technical colleges’ curricula (3 colleges).
  - Creating a network in all Faculties of Engineering and Computer Science (36 faculties).
  - Currently studying e-courses from Microsoft and Oracle to be accredited as part of the higher education curricula in all faculties of Engineering and Computer Science (36 faculties).
  - Studying Microsoft e-content for disabled (visually impaired/hearing impaired) for Training of Trainers (TOT) training.
  - Obtaining new 30 Cisco CCNA certificate bundles to be used in all universities.
  - Multi-core was implemented at Cairo University.
- Interdisciplinary Council on Development and Learning (ICDL) Certificate was accredited and implemented at Helwan University.

3. Research Methodology

3.1. Design and Approach

Since the aim of this research was to try to determine how far e-learning has helped to increase the motivation of students towards learning a subject, a twofold task was conducted, i.e. using both qualitative and quantitative research methods of data collection. The research was quantitative as it measured the percentage of students’ participation in online versus offline assignments. It was also qualitative as it depended on the results of feedback from a questionnaire given to students to evaluate their willingness to use e-learning.

The qualitative results were obtained from questionnaire surveys administered to students at two universities in Egypt: The British University (BUE) is a private validated university [33] and Helwan a governmental university [12]. Both universities introduced e-learning as a learning tool to support traditional face-to-face lectures/classes.

The LMS (learning management system) Moodle is open source software. It can be configured to run on most operating systems. Therefore, it can be used to solve our problem. Moodle version 2.0 and higher is used. Therefore, both universities have relevant experience with e-learning and can offer insights into the factors affecting the present and future state of a blended learning approach.

3.2. Research Hypothesis

H1: Students will show preference towards web-based activities as opposed to the traditional method of learning.
H2: The teacher has an impact on the students’ willingness to use Web-based exercises.
H3: There will be a difference in attitudes towards e-learning based on the students’ faculty.

3.3. Evaluation Process

The evaluation process is direct and is conducted in two ways:

1. paper-based evaluation,
2. web-based evaluation

The paper-based evaluation is time consuming with slow
feedback response. In addition, questionnaires are often outdated with rapidly changing student population and instructional technologies. Furthermore, the results are often too late for faculty members to make appropriate changes in the classroom. However, the web-based module evaluation is more adaptable to the rapid and continuous change in student population and technologies, along with the additional advantage of instant feedback.

4. Research Findings

The participants of the research were natural groups. This means that the students were enrolled and studying at the two universities before the research had begun. They were students at the British University [33] and Helwan University [12]. The online survey was administered to students in the Faculty of Informatics and Computer Science as well as the English Department at the BUE and the Faculty of Computer Science and Information at Helwan University.

The participants were given two different kinds of exercises to be answered at home for the duration of two successive weeks. They were: 1) Web Based Interactive Exercises and 2) Paper Based Exercises. Students were informed that they would not be graded. The exercises were balanced in terms of difficulty, number of questions, question types and the time given to answer each exercise. Following this, students were taken to the university computer lab to take a quiz. They had the choice of taking the quiz online (Web-based interactive quiz) or to complete a hard copy of the quiz (Paper-based).

An online and paper based questionnaire was developed as an instrument for the qualitative part of this study. The questionnaire was designed to measure student attitudes towards e-learning for the modules to be included in the study. The questionnaire was adapted slightly to reflect the different modules the research was focusing on. The questionnaire consisted of 12 questions. Each question contained five Likert scales: Strongly agree=5, Agree=4, Neither agree nor disagree=3, Disagree=2, Strongly disagree=1.

In this paper the p-value has been used. P-value is a probability statement which answers the question: If the Null Hypothesis is true, then what is the probability of observing test statistics at least as extreme as the one observed. A p-value of 0.05 or less rejects the null hypothesis (i.e. at the 5% level) that is; the statistical assumptions used imply that only 5% of the time would the supposed statistical process produce a finding this extreme if the null hypothesis were true. 5% and 10% are common significance levels to which p-values are compared.

The questionnaire (See Table I) was administered to two different groups of students in the Data Structure Module at Helwan University [12]. The first group consisted of 17 students who participated in the completion of the paper-based survey, while the second group consisted of 25 students for the on-line survey. The results of the two surveys are shown in Figures 1 and 2. The Y axis in Figures 1 and 2 show the value of the mean for the responses of the students to the twelve questions as well as the value of the standard deviation. The maximum value of the mean is five (i.e. Strongly agree=5, Agree=4, Neither agree nor disagree=3, Disagree=2, Strongly disagree=1). Figure 4 shows the results of the Computer Graphics module. Figure 5 presents the results of the Digital Design module at the BUE, and Figure 7 illustrates the results for English modules at the BUE. It is important to note that English modules are compulsory for all students in the different Faculties at the BUE. English is taken alongside the degree area modules and students must pass it for progression and graduation requirements. The students, who are studying English, are registered in the different faculties at BUE.

The results of the questionnaire surveys showed that:

- Figures 1, 2 and 3 revealed close opinions for all questions (p > 0.05) except for question 3 (see Figure 3 p = 0.047456 < 0.05). This indicates a significant difference in the teachers’ application of e-learning in teaching the data structure module at Helwan University. This will raise concern about the institutions’ preassumptions about using technology as a motivator for workplace e-learning and performance.

- Figures 4, 5 and 6 illustrated close opinions for questions 3, 9, 10 and 12 (p > 0.05).

<table>
<thead>
<tr>
<th>Questions</th>
<th>3</th>
<th>9</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value</td>
<td>0.16632</td>
<td>0.14144</td>
<td>0.18809</td>
<td>0.07229</td>
</tr>
</tbody>
</table>

Questions 1,2,4,5,6,7,8 and 11 demonstrated significant differences (p < 0.05), see Figure 6.

- Based on the results in Table I, questions 3, 9, 10 and 12 were chosen to be analyzed for the students who took English module (paper-based vs. Online) survey. Figures 7 and 8 revealed students also have close opinions for questions 3, 10 and 12.

<table>
<thead>
<tr>
<th>Questions</th>
<th>3</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value</td>
<td>0.41837</td>
<td>0.17541</td>
<td>0.10650</td>
</tr>
</tbody>
</table>

However, question 9 indicated a significant difference (p = 0.026269 < 0.05), see Figure 8.

- The above analysis showed a significant difference between higher grade and lower grade students in using e-learning. Students in higher degree years have more positive attitudes towards e-learning. Furthermore, there was positive evidence with regard to the attitudes of students towards e-learning regardless of the degree year, faculty or university. More investigation will be conducted in a further study [23].
From all of the above, see Figures 10, 11, 12 and 13, H2 is accepted.

From all of the above, see Figures 14, 15 and 16, H3 is accepted.

Investigating H1 was required to understand the attitude of students who chose online vs. offline activities. This also prompted further investigation to determine which variables affect the student's willingness to use e-learning. For H1, the percentage of students that preferred to use web-based and paper-based activities was almost the same (see Figure 9). However, the results of the questionnaire revealed that there is a significant difference between the students who had chosen web and paper-based exercises for answering questions 1, 6, 7, 8 and 9 (P<0.05), but no significant difference for questions 2, 3, 4, 5, 10, 11 and 12 (P>0.05) (see Table II). Therefore, according to the questionnaire, the findings for H1 might be accepted.

The above results are encouraging for further research to be conducted in this area.
Figure 7. Survey (159 Students-English-BUE-paper-based + on-line)
Blue bars represent the mean. Red bars represent the standard deviation

Figure 8. P-value for the two groups (paper-based vs. online) of figure 7 for questions 3, 9, 10 and 12

Figure 9. Students preference

Figure 10. Teacher 1 Impact

Figure 11. Teacher 2 Impact

Figure 12. Teacher 3 Impact

Figure 13. Teacher 4 Impact

Figure 14. Faculty Impact for Teacher 4

Figure 15. Faculty Impact for Teacher 4
5. Conclusions

The education system in Egypt can no longer ignore e-learning as an important motivational tool. This study has confirmed some commonly held beliefs about online education, refuted others, and provided a range of predictions about the future of technology-enabled education.

The preliminary results have encouraged the researchers to conduct more research on paper-based and web-based activities as a motivator for workplace learning and performance. This present study is part of a longitudinal effort to understand the use of technology in teaching within higher education in Egypt.

The Faculty of Informatics and Computer Science, the English Department at the BUE [33] and the Faculty of Computers and Information at Helwan University [12] are currently collaborating to work on an extensive research project to investigate the effect of e-learning on learner’s motivation. Moreover, in a forthcoming research, a number of research hypotheses have been proposed and will be examined. The researchers will examine which hypothesis should be accepted and which should be rejected [23]. It can be predicted that advances in Internet technology (e.g. greatly extended bandwidth and wireless Internet connections) are likely to increase the use of multimedia and interactive simulations in online learning. Moreover, it is expected that technology will have the greatest impact on the delivery of online learning.

The question is how will online instructors be ready to meet the challenges brought by projected increases in learner demands for online education?

### Table 2. The Questionnaire used for the survey for the English Module

<table>
<thead>
<tr>
<th></th>
<th>I like using e-learning for English modules</th>
<th>*** (P&lt;=0.001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>I think the teacher’s application of e-learning in teaching English modules helps me improve my skills in English</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>3</td>
<td>I think the teacher’s application of e-learning in teaching English modules is not useful</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>4</td>
<td>I think my grades will improve by using e-learning for English modules</td>
<td>* (P&lt;0.05)</td>
</tr>
<tr>
<td>5</td>
<td>I find English modules easier when the teacher uses e-learning in teaching</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>6</td>
<td>I hope teachers of English continue to use e-learning in their teaching</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>7</td>
<td>Using e-learning for English modules is more interesting than the traditional method</td>
<td>*(P&lt;0.05)</td>
</tr>
<tr>
<td>8</td>
<td>E-learning make me more interested in learning English</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>9</td>
<td>By using e-learning for English modules, the opportunity of interaction with the teacher is enhanced</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>10</td>
<td>By using e-learning for English modules, the opportunity of interaction with my classmates is enhanced</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>11</td>
<td>Using e-learning for English modules encourages me to continue learning on the Internet by myself</td>
<td>(P&gt;0.05)</td>
</tr>
<tr>
<td>12</td>
<td>I am unwilling to learn English modules through using e-learning</td>
<td>(P&gt;0.05)</td>
</tr>
</tbody>
</table>

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