

The effect of interactive e-book on students' achievement at Najran University in computer in education course

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Abstract:

The current study aims to examine the effect of interactive e-book on students' achievement at Najran University in computer in education course. Quasi-experimental study designs is used in the study and to collect data the researchers built achievement test to measure the dependent variable represented in the achievement affected by experimental treatment. The study sample is (60) students from the fifth level at Najran University in Saudi Arabia who registered in computers in education course, which has been divided into two groups, each with a strength (30) student, experimental group students study the computer in education course via e-book, and the control group students study the computer in education course via printed-book. The finding of the study illustrate there is a significant differences between the study groups in academic achievement favor to experimental group students whose study with e-book.

Keywords: e-book, e-textbook, higher education, technology diffusion, computer in education, Najran University

1. Introduction:

There is no doubt that e-learning no longer needs to prove its efficiency in learning process, many countries and nations have preceded us in using e-learning and computer in education, this is included in its strategic plans and objectives. Several studies have been performed to examine the effectiveness of different types of e-learning and usage computer in education in acquisition and enhance student's skills and increase the effectiveness of their achievement capabilities. The current research only in conscious response to the necessities of use of new types of educational technologies, in order to increase the effectiveness of the learning process, which is considered as a requirement to achieve distinctive growth in learning based modern technologies and tools. Hence, emerges the importance of the current research which aims to measure the effect of interactive e-book on students' achievement at Najran University in computer in education course.

With the emergence of educational technologies, with believing in the importance of the diversity of methods of providing information and its effect on increasing student achievement, the e-book emerges as one of the modern technology emergencies in introducing e-content in a more attractive and interactive manner which has never been seen before through the traditional printed book. E-book industry made it easy to exchange information and data via the internet and mobile phones, and emerges a new type of learning which is referred to mobile learning,

it gives the chance to teacher to acquire a large number of electronic educational materials in the form of e-book, and use it for learning anytime and anywhere he wishes.

Books are considered the most important tool used to transfer knowledge and assess information and academic educational program since the invention of the printing machine. With the development of the means of electronic publishing, globalized information, and easy access via internet, e-book became the more advanced tool used to transfer knowledge (Chen, 2002).

Zucker and others (2009) reported at the level of applied practice, e-books proved that they are attractive tools for many learners, because it can be easily integrated within educational programs for literacy, which required teachers to have a bit of procedural knowledge and practical skill to use computer. However, educational decisions relevant to using e-book are based on more than just the ease of application of e-book in the educational process, but based more on the research results that demonstrated the effectiveness of e-book in learn reading.

Several studies results which used empirical designs to examine the effect of use e-books addressing the effectiveness of using e-books in teaching and in acquisition skills and increase achievement (Slavin, 2008, p. 13).

Definitions of e-book are varied due to the different levels of expectations desired from electronic book, what it provides, and its style of presenting information and educational content. Shiratuddin and Landoni (2003) defined e-book as "a type of portable digital information having shapes varied from compacted disc to interactive database on the internet or a group of web pages", or "interactive pages containing electronic information displaying many of the characteristics of the electronic book", or "a learning environment with an application program containing a database with assistant media for educational resources capable of saving multimedia presentations related to subjects before importing them". According to Auradha and Usha (2006) e-book defined as "the container that has been transformed to digital form, and readable via personal computer or via a compacted disc or portable device designed to achieve this purpose, and usually it can be exchanged and set available on the internet and through its services; e-book is featured than printed media by adding multiple new specific features such as hypertext links, cross-references function and multimedia elements. (Auradha and Usha, 2006)

2. E-book components:

Electronic books are made of two main components: 1) devices; sometimes called reader device or readers (whether they are desktop devices, laptops, or PDA devices); the second component 2) software- which is responsible for displaying e-book on screen. CD-ROMs and the internet are used as the most important and famous media for displaying electronic books. The most known and popular reader devices are Sony Reader, iPad, HTC Flyer, Galaxy Tab, and Motorola Xoom (Siracusa, 2009). Reader devices have evolved and become multi-functional (Moody, 2010). The Kindle 2 and Kindle DX readers is represent that which enable users to transfer electronic books wirelessly from Amazon Kindle store and RSS for bloggers, with a pilot web browser,

the capability to support multiple formats, and enable certain possibilities such as listening to audio books in the Kindle reader (Amazon.com 2008; 2009).

3. Formats of e-book design:

Şensoy and Baki (2010) determined the formats and types used to design e-book files into three main types:

1) E-book in a (PDF) Portable Document File format

PDF is the more popular format for electronic book, easier to use and most widely used, it depends on its creation and reading on Adobe Acrobat software produced by the Adobe international company; this type of files is featured by how easy to upload and download it from/to the internet with all internet web browsers, which makes it no needs for special device to read, in addition to the possibility of displaying it on all operating systems, either on Windows, Mackintosh or Android. Adobe Company works consistently on developing Adobe Acrobat applications in order to facilitate its usage which make it easier to modify PDF files through these applications with no need to reproduce it again.

2) E-book in a (RTF) Rich Text Format

This type of e-book file formats is distinguished by being easy to modify and possibility to read it with word processing applications; it can be used as well for newspapers and magazines and books that can be printed in an arranged form such as the arrangement used for printed books.

3) E-book in HTML or CHM formats

This type of e-book file formats is used when e-book size is huge, this type of electronic books is used to produce help files for software and computer application, this type of formats needs skill and experience in webpages developing using HTML programming language, and it needs a special reader and also can read it through internet web browsers.

4. Comparison between electronic and printed books:

Table (1) Comparison between electronic and printed books

	Printed-book	E-book
Media form	The only media required for the book will be paper; paper type can be varied according to its type and texture according to usage purpose, either used for a magazine or a book.	There are multiple medias according to the display device; there are CDs, flash memory, and the internet.
Easy access	Can be accessed through publisher, printing presses and libraries; sometimes it can be hard to access.	Easily accessed through the internet, so it can be distributed to millions of users worldwide once published electronically.
Information updatability	Hard to update it, because updating a printed book requires reprinting, redistributing and retransforming it again.	Easily updated and redistributed with no extra cost, no reproduction; update is performed only on a certain part of the e-book.
Cost	cost is high as it needs printing papers, intellectual production cost, publishing, distribution, and profitability...etc.	Very low cost compared to printed book, because of the decreased cost of e-book media.
Educational effectiveness	low educational effectiveness	Very high educational effectiveness as it depends on multimedia which has a higher educational effectiveness proved by researches results and practical experiences.
Reader health	Causes no harm to reader, and non-stressful	May cause eye pressure because of the reading focus towards the screen of e-book reader
Reading devices	No needs special reading devices	Requires a reader, either by PC tablets or mobile devices.
The ability to search for information	Information search is performed by exploring all the book papers manually.	There is a capability to search for a text, word, or part of a text very quickly; besides pages access can be performed more easily and quickly.
Interactivity	No interactivity in printed book, some call it the silent teacher	Distinguished by the high interactivity through links, buttons and programming tools in hypertext.
Special Needs	Incompatible with disabled or with special needs	There are multiple forms of e-books in order to be compatible with disabled with special needs; possibilities to change colors, backgrounds, advanced audio text, video, and so on of multiple multimedia

	Printed-book	E-book
		which are suitable for different categories.
Environment preservation	Residues are huge, can cause environmental pollution when being disposed	E-books are environment friendly; its usage never results in any environmental residues.

5. Educational value of e-book:

E-books were used for electronic publishing purposes in foreign countries in order to facilitate readers' access to these types of books, as a result of the spreading of e-commerce elements through e-book websites and Amazon websites which are famous of selling e-books. Regarding the importance and disadvantages of printed textbook in the educational process at the same time, the attention of educators and those interested in the educational process went towards the e-book as an educational value as:

1. In the educational process based on e-book, teacher role is turned from a source of information and knowledge to a guider and facilitator; student's role will be affected by turning from a receiver of information, knowledge and skills to a more positive role in participating in acquire information and learning in accordance to self-paced and continuous learning principles.
2. Increasing academic achievement and motivation to participate in the educational process.
3. Increasing learning pleasure by making a good use of the advantages of e-book design based on multimedia learning.
4. E-books provide freedom and flexibility to learners in learning according to their own abilities, time and learning pace.
5. Control in learning method and approach is transferred from teacher to student.
6. Developing independency in learning through oriented self learning.
7. Reducing the burden of carrying printed textbooks, besides the ease of updating and developing knowledge and information available in e-books.

Many studies improve the effectiveness of using e-books in learning process; Amari and Shabl (2012) confirmed the effectiveness of using e-books in increasing the achievement of first-grade students of secondary school in reading course. Abdul Karim (2011) also confirmed the effectiveness of Individual self- learning simulated by computer and e-books in the development of creative thinking for second-grade science students at the Faculty of Education in Oman. Whereas Alzaq study (2008) reported the effectiveness of diversity of interface e-book interaction on academic achievement and skill performance for educational technology master students and their

attitudes towards it. In addition to Mubarez (2008) study that showed the effectiveness of e-books in developing the skills of producing multimedia presentations for KG teachers. These results confirmed by Chau study (2008) that reported positive effect of e-books designed for children education, it found that e-books and its advantages in the education field is like a rich land for teaching different ages specially children, and that it needs for more study and analysis.

6. Methodology

The current study is depended on quasi-experimental approach by using the experimental design with both experimental and control groups for the pre and post measurement; the study sample is composed of (60) students in fifth grade from students registered in computer in education course in the first semester of the academic year (2013-2014). Students are divided into two groups, the first is experimental group which comprises (30) students (who are learned using e-book), the second is the control group which comprises (30) students (who are learned using printed-book).

In the light of the syllabus of computer in education course, educational objectives and the course academic content, the researchers prepared an achievement test with multiple choices and true and false questions; the test was made up of (50) clauses, divided into (25) multiple choices, and (25) true and false. The researchers presented the test to a group of experts in the field of educational technology in order to determine the validity of the tool; the percentage of agreement among experts on the validity of the test clauses was (87%), which refers to the verification of the manifested validity of the test. The researchers performed a pilot study on a group of (15) students from those who are not participated in the study in order to measure the reliability of the test and determine the test time and the coefficients of difficulty and discrimination. The Cronbach's Alpha coefficient for the test was (0.793) which indicates the reliability of the test and that it is ready for application. The researchers used in the analysis of study data raw the t-test for measures the differences between the study groups in achievement and calculation of effect size using ETA square.

The researchers were eager to start the research experiment in order to ensure groups equality (experimental and control groups) in academic achievement in (computer in education) course, as the results of pre-test showed that there are no statistically significant differences between research groups which is illustrated in the following table:

Table (2): results of pre- achievement test for equality of experimental and control groups

Group	N	mean	Std deviation	df	t	Sig.
Experimental	30	18.27	3.04	58	Calculated	0.423
Control	30	17.85	3.09		Tabular	
					0.531	2.021

The previous table shows the value of calculated t is (0.531) which is less than the value of tabular t (2.021) at the significant level of (0.05), which means that there are no statistically significant differences between research

groups in the pre-test of academic achievement; this can explain the equality of experimental and control groups for the dependent variable (academic achievement).

7. Results and Discussion:

7.1 Results:

The results are displayed according to the sequence of the research hypothesis as follow:

- **First hypothesis:** implies that "there are no statistically significant differences at the level of (0.05) between the students' scores mean of achievement test of the experimental group (learned using interactive e-book) in the pre and post measurement of the achievement test for the computer in education course.

To validate of this hypothesis, the researchers used the (t-test) for two independent samples in order to examine the significance difference between the mean of student scores in the experimental group on the achievement test in both pre and post measurement, table (3) explains this:

Table (3) t-test results of pre and post achievement test of experimental group

Measurement	N	mean	Std deviation	df	t	Sig.
Pre-test	30	18.27	3.04	58	Calculated	0.000
Post-test	30	43.56	4.05		Tabular	
					27.405	2.021

The above table (3) shows that the means of scores of the experimental group in the posttest is (43.56) which is greater than the means of scores of the experimental group in the pretest measurement which is (18.27), by difference equal to (25.30), the detection of the significance of this difference found that the value of t-calculated equals to (27.405) which is greater than value of t-tabular which equals (2.021) at significance level (0.05), that means there are statistically significant differences at the significance level of (0.05) between the means of students' scores of experimental group in both pre and post achievement tests in favor to posttest, and this is means reject the hypothesis.

- **Second hypothesis:** implies that "there are no statistically significant differences at the level of (0.05) between the students' scores mean of achievement test of the experimental group (learned using interactive e-book) and the students' scores mean of achievement test of control group (learned using printed-book) in the post measurement of the achievement test of the computer in education course.

To validate of this hypothesis, the researchers used the (t-test) for two independent samples in order to examine the significance difference between the mean of student scores in the experimental group and control group students on the achievement test in the post measurement, table (4) explains this:

Table (4) t-test results between the means of experimental group and control group students in the post achievement test

Group	N	mean	Std deviation	df	t	Sig.
Experimental	30	43.56	4.04	58	Calculated	0.000
Control	30	38.33	1.62		Tabular	
					6.582	2.021

The above table (4) shows that the means of scores of the experimental group in the posttest is (43.56) which is greater than the means of scores of the control group in the posttest measurement which is (38.33), by difference equal to (5.23), the detection of the significance of this difference found that the value of t-calculated equals to (6.582) which is greater than value of t-tabular which equals (2.021) at significance level (0.05), that means there are statistically significant differences at the significance level of (0.05) between the means of students' scores of experimental group and control group in the posttest measurement of achievement tests in favor to experimental group, and this is means reject the hypothesis.

Effect size:

The concept of statistical significance of the results reflects the confidence that we grant for the results of differences or relationships regardless the size of the difference or the correlation; while the definition of (effect size) focuses on the difference or correlation size regardless of the degree of confidence we grant for results (Fam, 1997:59). Therefore, the researcher calculated the effect size by calculating the ETA square ² for the independent variable (using e-book) on the dependent variable (achievement), table (5) display this:

Table (5) effect size (ETA square) of using e-book in academic achievement

Independent variable	Dependent variable	ETA ²	Effect size
Using e-book	Achievement	0.43	medium

7.2 Discussion

The study results that were presented earlier shows the superiority of (experimental group) that was learning using e-book in the achievement of computer in education course than (the control group) that was learning using printed-book, this may be due to one or more of the following reasons:

1. E-book contains all the advantages of p-book; in addition to comprises interactive formats that contain audio, image, and video; the interactive multimedia links that are readable/ watched on PC and using manual tools designed specifically for reading e-books.
2. E-books provide discovery opportunities to find new ways of handling information. E-books include many activities and instructional strategies useful to improve the academic achievement results.

3. E-book provides opportunities to view content anywhere, at any time without restrictions so that some students may download the e-book on their mobile phones to be able to review the information and study at any time they have it.
4. E-book enables to store addresses and organize it so easily to make it accessible for read and thus increase student information acquiring associated with these titles.
5. E-book gives the chance to use different styles of surfing and navigating inside e-book like maps or tables of contents with its links, as well as providing the ability to search for a word or phrase, it needs to depend on strong navigation systems capable of connecting between parts of the book and also give the capability to navigate through menus, graphics or hyperlinks.
6. Teacher role is turned from a source of information and knowledge to a guider and facilitator in the educational process; student's role will be affected by turning from a receiver of information, knowledge and skills to a more positive role in participating in getting information and learn in accordance to self and continuous learning principles.
7. E-books provide freedom and flexibility to learners in learning according to their own abilities, time and learning pace.

The results of the current research is conforming with the results of previous Arabic and foreign studies; the results of previous studies implied the superiority of experimental groups that were learning using e-book over the control groups that were learning using printed-book, these studies are the study of Azmi and Moradny (2010) that revealed the existence of a statistically significant difference at the level of (0.05) among the means of grades of the students of the two experimental groups based on the basic effect of the difference in image style within the e-book (Static image versus Animated image) for the postgraduate students at the faculty of education in the course of computer maintenance. The researchers attributed this to the fact that image type inside e-book pages was a sort of cognitive pillar to the learner, regardless of it is being static or animated image. Amari and Shabl study (2012) that showed in its results the effectiveness of e-book and its educational effect on students performance via increasing their achievement, based on what it contains of texts, audios and images, and the easy access to required information; besides it is considered a new trend for students because it increases their self-confidence as the e-book gives student the chance to repeat the full lessons or parts of it without feeling shame from his other colleagues, e-book as well gives the chance to student to use their different senses which increased his understanding of the scientific material. The Mubarez study (2008) that revealed by its results the increase in student teachers' achievement in the cognitive side in terms of skills incorporated in the e-book after their study from it, while developing the skills of producing multimedia presentations at the course during using the e-book. The current study is also in accordance with the study of Jamali et al (2009) which implies that the e-book capabilities which make it featured than the p-book in terms of using all types of multimedia such as audio, images, animation and videos in addition to texts, call for the importance of using e-book instead of p-book, in addition to what the e-book provide of provoking the learner's thought and increase his motivation which in turns increases the academic achievement of learners. The current study is differed with Annand (2008) study which

results showed that students prefer to use printed educational materials; In terms of educational effectiveness the study did not find any statistically significant differences between groups. However, the study recommended the necessity of reconsider the production, use and distribution of e-book because of its lower cost and its cost effectiveness.

8. Conclusion:

The orientation of educational institutions towards using e-learning systems and e-management and the easiest access of e-books will increase the chances of using e-books either within different public academic levels or in higher education institutions. Then the current study is to examine the effect of using e-book on academic achievement of students registered in the computer in education course at the University of Najran in Saudi Arabia; results were in accordance with regional and international studies which ensured the superiority of experimental groups that were learning using e-books over those who were learning using printed books; this supports the multiple advantages supplied by e-books in increasing student motivation to learn and developing academic achievement, such as using multimedia within the e-book, easy to access, organization, easy to return to titles and texts in the e-book, in addition to the capability to load the book on tablets and mobile phones which makes it much easier to use at anytime and anywhere.

9. Recommendations:

Based on the results reached by this study, the researchers recommend the following:

1. The necessity to train faculty members at universities, teachers at schools and pre-service teacher on designing, producing and employing e-book in the educational process due to its great benefits and achievable results in terms of academic achievement and skills acquisition.
2. Supporting the centers and deanships of e-learning in the ministry of education and universities to supply the academic courses in the form of e-books in order to make it accessible by students, teachers and faculty members.
3. Launching initiatives that encourage specialists to design e-book as a substitute for printed book and provide material and moral support necessary for them.
4. Providing tablets for the university and school students at special prices so they can take advantage of the achievements of modern educational technologies, including e-book; where there should be a support for these devices by reducing the costs of printed book and transform it into e-book.
5. Following further research on the effectiveness of the e-book in the acquisition and development of practical skills associated with educational courses.

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