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The Use of Multimedia Technologies and Their Effects on English Language Learning

Kamel Mahamamad Qoitassi
Ph.D In English Language
Cihan University-Erbil-lraq

Rahim Jafar Mahammad Sharif
Deptt.Banking and Financial Sciences
Cihan University-Erbil-lraq

ABSTRACT:
One of the major reasons for the widespread attention focused on media and technology in education today is the enormous financial investment being made in media and technology in education around the world and there also has been little research conducted on e-reader devices and the effect they hold on learning. Also, the literature has demonstrated that there are more negative implications to using e-text in learning than there are positive. Regardless of the approach, media and technology have been introduced into schools because it is believed that they can have positive effects on teaching and learning. Understanding the role of e-reader devices in comprehension and transfer is a crucial component of expanding the literature. The goal of this study was to assess the effects of e-text, specifically on the iPad, on reading comprehension and transfer learning. Sixty students enrolled in an Introductory Psychology course read from textbooks and e-text and completed assessment measures in comprehension and transfer learning. Overall, the findings of this study provided support for the notion that there is a positive relationship between learning and reading on an e-text transfer scores when compared to traditional text. Additionally, scores for reading comprehension were similar between both groups.

KEYWORDS: English Language teaching, Multimedia Technology, Advantages, Disadvantages, Optimization, Strategies.

INTRODUCATION:

Learning is defined as ―a change in knowledge attributable to experience—(1) learning involves a change in the learner, (2) what is changed is the learner's knowledge, (3) the cause of the change is the learner's experience‖ (Mayer, 2011, p. 14). Learning is not measured through one operational definition. Rather, learning is a blend of comprehension, transfer of new material, and the retention of material. In fact, most transfer studies focus purely on the similarities and differences between the contexts of initial learning and subsequent transfer (Butler, 2010). Given the current study, learning has been evaluated usinga multimedia device Focusing on a multimedia learning device; therefore, it is important to understand the cognitive functioning of people learning from multimedia. According to the cognitive theory of multimedia learning (CTML), the visual information processing channel may become overloaded when students must process on-screen graphics and on-screen text at the same time (Mayer, 2001). However, when words are presented as narration, words can be processed in the verbal channel, thereby reducing the cognitive load in the visual channel. In several studies testing this theory, both non-interactive multimedia environments and interactive media environments were used.

It is important to note how transfer can elicit both positive as well as negative outcomes. Positive transfer is the primary goal of education. What is learned in one context helps enhance learning in a different context. In contrast, negative transfer is a type of error in learning where a previously learned context interferes with the acquisition of an adaptive response to a new context that is similar to the first (Cree & Macaulay, 2000). Negative interpretations prevent relevant skill knowledge from being applied to practiced and unpracticed goals which leads to negative transfer, whereas positive assessments will enable the transfer of relevant skilled knowledge to different goals (Osman, 2008). In the present study, if the experimental group

performed better on transfer tasks than the control group, there would be evidence of positive transfer, which is the primary goal in education.

Why is so much attention paid to media and technology in education? First, with respect to media, there are many issues of concern to students, parents, educators, governments, and society at large. For example, important questions are asked about the effects of different media on the cognitive and moral development of children. With respect to technology, people want to know whether various new technologies are more effective for teaching and learning than more traditional classroom approaches, whether some technologies are more motivating than others, or at the very least, whether technologies can be used to increase access or reduce costs within education. Questions about the impact of media and technology in terms of increasing access to education and reducing the costs of education are especially high on the agendas of politicians and government agencies around the world.

METHODS:

Participants were recruited from an Introductory Psychology course at Abilene Christian University. Students were invited to participate in the study via email after being informed of the study in class. Sixty nine participants (59.4% female and 40.6% male) responded and participated in the study. Participants ranged in age from 17 to 35 with mean age of 19.59 (SD = 2.30). When asked to report ethnicity, 90% of participants were Kurdish, 10% were Arabs.

MATERIALS:

For the reading material, King's (2010) Experience Psychology textbook was used either in hard copy or e-text copy. The section of the book used was taken from Chapter 11, pages 393-399. The content of the chapter consists of topics focused on social psychology, specifically conformity, obedience, and group influence.

PROCEDURES:

Upon arrival, participants were given a consent form and a general information questionnaire focusing on demographics. Participants were then randomly assigned to either a bound paper copy of the text or the electronic version. Participants who were assigned to the traditional text copy were given a bound photo colored copy of the text. Participants in the e-text group were handed iPads that already had the appropriate section in the book pulled up. Participants were instructed on how to use the iPad and where to stop. Participants for both sections were allotted 25 minutes to read a section in the text Experience Psychology (King, 2010). Once all of the participants had read the section or the time has elapsed, reading materials were gathered, and participants were instructed to complete the following two tests on comprehension and transfer learning. Participants were allowed 10 minutes to complete the comprehension section. Once all participants had finished or time had elapsed, the comprehension section was gathered and the first section of the transfer test was given. Participants were allowed 2.5 minutes for each of the transfer questions for a total of 10 minutes. Participants were instructed to keep working until they were told to stop, at which point participants were given the next transfer question. Once all four questions for the transfer assessment were completed, participants were debriefed and thanked for their participation.

MEASURES:

The same guidelines outlined by Craig et al. (2004) were implemented for the comprehension measurement. Each of the participants in the experimental and control group were given a 16 multiple choice question assessment. Multiple choice questions for comprehension were selected from the major themes and ideas within the chapter section. The transfer learning assessment was a 4-item scale adapted from Mayer (2001). The test included four specific questions based on redesign, troubleshooting, prediction, and conceptual prompts. Example items include ―What would increase the level of obedience a person has towards a given

task?‖ and ―What does social facilitation have to do with performance?‖ Prompts had two to five acceptable answers per page. Each acceptable answer was worth one point. Each prompt had a question listed at the top, at which point participants wrote their answers on the paper.

RESULTS:

Descriptive Statistics for Transfer and Comprehension In phase one of the analysis, descriptive statistics were used to calculate the mean and standard deviations for transfer and comprehension scores. These can be found in Table 1. As can be seen in Table 1, participant's scores for both comprehension and transfer learning displayed variability.

TABLE 1 : DESCRIPTIVE STATISTICS FOR TRANSFER AND COMPREHENSION (N = 69)

Measure	M	Mdn	Mode	SD	Range
Transfer	4.18	4.00	4.00	2.03	9.00
Comprehension	9.95	11.00	11.00	2.93	13.00

Traditional Text Vs. E-Text: Effects on Reading Comprehension It was predicted that participants in the experimental iPad group would obtain higher scores on comprehension in comparison to participants in the textbook group. In phase two of the analysis, a One-way ANOVA was used to examine mean differences on reading comprehension between the traditional text group and e-text group. The ANOVA statistics can be found in Table 2 with the group means presented in Figure 1. As can be seen in Table 2 and Figure 1, participants in the e-text reading group did not score significantly higher on reading comprehension compared to participants inthe traditional text reading group. While this finding was not predicted, it does indicate that the e-text device was comparable to the traditional text in a test of learning the traditional text reading group. While this finding was not predicted, it does indicate that the e-text device was comparable to the traditional text in a test of learning comprehension. As such, this trend in the data is favorable to those who advocate greater e-text usage in educational settings. Traditional Text Vs. E-Text: Effects on Transfer Learning In phase three of the analysis, a One-way ANOVA was used to examine mean differences on transfer learning between the traditional text group and e-text group. The ANOVA statistics can be found in Table 3 with the group means presented in Figure 2. As can be seen in Table 3 and Figure 2, the prediction was supported. It was predicted that participants in the e-text group would obtain higher scores in transfer learning in comparison to participants in the textbook group. As expected, the e-text group displayed significantly higher transfer learning tests scores when compared to the traditional text group. These findings can be seen in Table 3, Figure 2. In contrast to the reading comprehension findings, the increased transfer scores for the e-text group suggest that e-text is not merely equivalent to traditional text but may be superior. The effect size for transfer indicates a difference of .85 SD difference in performance on transfer scores.

Table 2
ANALYSIS OF VARIANCE FOR READING COMPREHENSION:

Source	SS	Df	MS	F	P	d
Between Group	3.15	1	3.15	.36	.55	.15
Within Group	538.71	67	8.71			
Total	586.78	68				

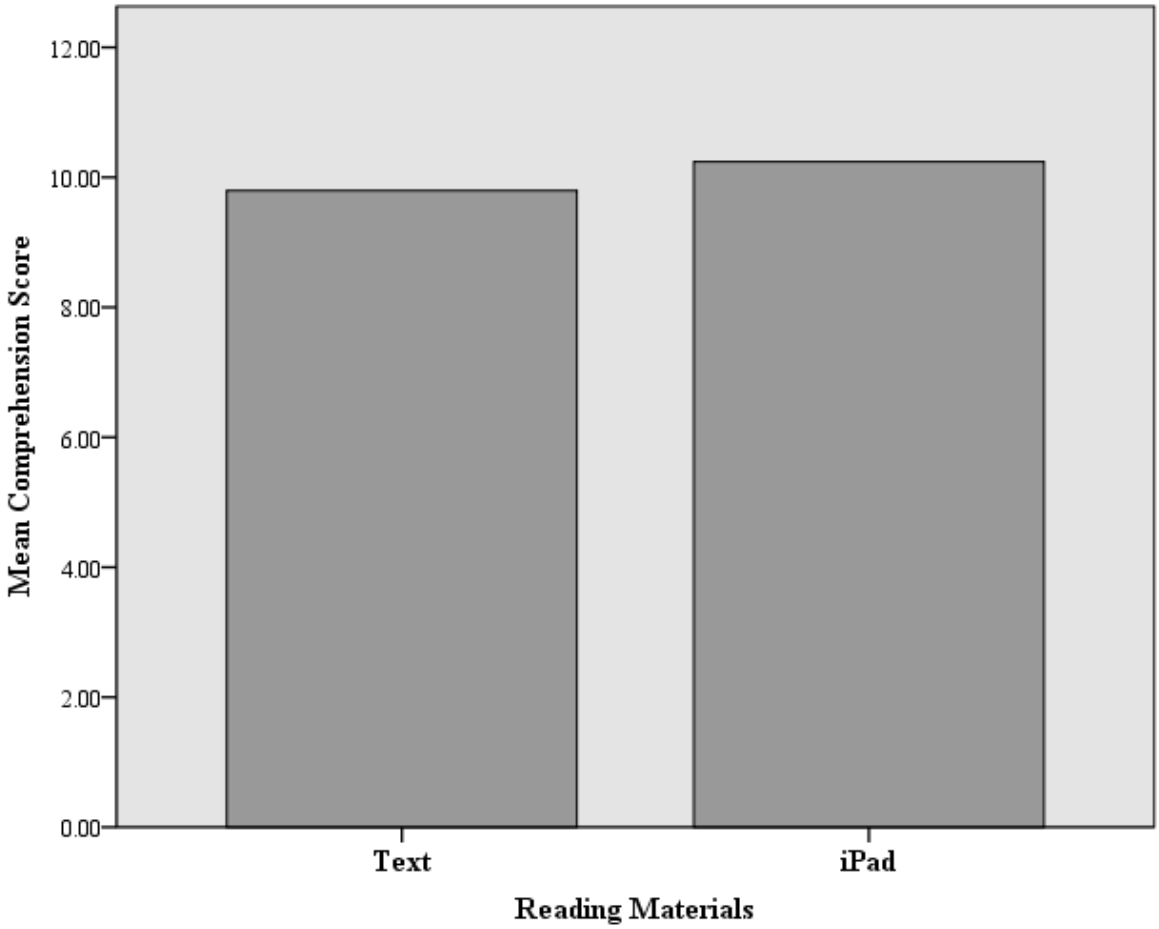

Figure 1.Comparison of Traditional Text and E-text Groups on Reading Comprehension.

Table 3
ANALYSIS OF VARIANCE FOR TRANSFER

Source	SS	Df	MS	F	P	d
Between Group	43.35	1	4 3.53	12 .24	.001	.85
Within Group	327.19	67	3.54			
Total	280.55	68				

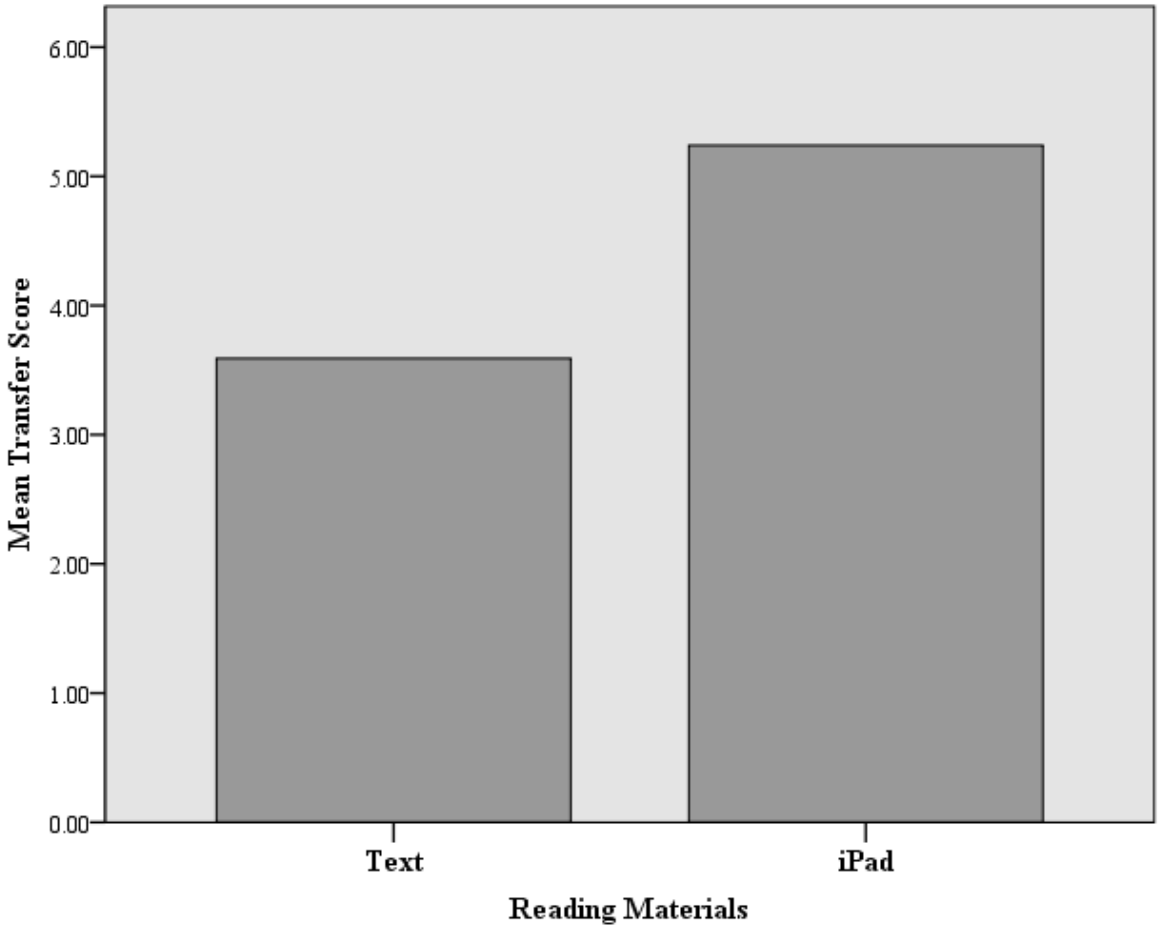

Figure 2.Comparison of Traditional Text and E-text Groups on Transfer Learning.

Summary of Results In summary, the findings did not support the predictions made for reading comprehension but did for transfer learning. However, reading comprehension scores were equivalent for both the traditional text group and the e-text group, despite the fact that the results were not significant. Traditional text readers scored within the same range as e-text readers. Finally, e-text readers exhibited significantly higher transfer learning scores compared to traditional textbook readers.

DISCUSSION:

Summary of Findings The impact of technology on society is indisputable. It has become increasingly clearer that newer more advanced methods of displaying information through electronic devices is prevalent in today's world. With such advances, the question raised about the effects of technology on learning is a topic in need of further research. No longer are books the sole sources of information to be learned. The sounds of spoken language were once the sole means of advocating newly formed ideas and were the only means of teaching and learning. The spoken word was later transcribed into visual books. A similar adaptation is occurring with textbooks in the present day. E-reader devices have the potential to become the new and improved means of storing information and learning from it. The newest and latest mode of reading and learning is now focused in the form of e-text. Sales are on the rise for e-reader devices; therefore, it has become an important undertaking to evaluate how these devices affect learning capabilities.

Comprehension was not significantly higher for the e-text group. However, transfer learning was significantly higher among readers in the e-text group compared to readers in the traditional text group. As mentioned previously, little research has been done that emphasizes the effects of e-reader devices on

learning. This study indicates that a person's learning when using an e-reader device is equal to or greater than a traditional textbook.

The reason as to why these results occurred is necessary to focus on. The results of this study suggest that how the e-text organizes and illustrates information may lead to higher transfer learning scores. This is interesting as it has been suggested that the presentation of learning materials on a multimedia device could hinder learning performance, but if the device was appropriately composed it might improve learning. In this study, the e-text presented information identical to traditional textbooks. However, the format permitted scrolling and, thus, displayed less information on the screen. Readers perhaps performed better on the transfer learning assessment due to the way the e-text presented the material as a more manageable reading. E-readers are able to read the text in a less daunting fashion because they are scrolling through bits of each page, instead of being presented with the page as a whole. The e-reader device also allowed access to featured ―key words that the author deemed important. E-readers are able to click on these key words which enabled a small pop out window. This helped minimize time wasted glancing back and forth to see vocabulary definitions which were located in the margins of the traditional textbook. Perhaps the ability not to lose one's place, gave readers on the e-text an inherent advantage by not wasting a user's working memory capacity on scanning the text for key information as presented by the text.

However, this still does not explain why comprehension scores were equivalent for both groups. This could be due to a variety of reasons. There are key differences between transfer learning and comprehension. Comprehension focuses on general information that an individual gathers on a subject matter whereas transfer learning is applied knowledge of the material presented. Based on this study, readers of the e-text group were more easily able to identify with the material as it applied to other situations. As stated before, this may have been due to how the e-text was organized in a more manageable form compared to the traditional text. In order to obtain transfer learning, readers must first be able to comprehend the text. Comprehension of a text includes every component of the text, meaning any facts, figures, vocabulary words, can be assessed. Thus, there is far more general knowledge that must be acquired whereas transfer learning involves a deeper level of reasoning with a more specific focus. Based on the results of this study, the e-text presented on the iPad was able to elicit a deeper level of reasoning for participants but did not strengthen learning for general knowledge. More research is needed, however, to replicate these findings and to illustrate the contrast found between transfer and comprehension.

Implications In light of the results of this study, e-text advocates' stance is strengthened. This may pave the path to improved e-reader devices that further enhance learning. E-reader devices can no longer be viewed as just devices for entertainment and light reading. Rather these e-reader devices can be developed to reach even greater heights to improve readers learning.The way in which learning and reading can occur is changing. The results of this study support the hypotheses that e-text is comparable to traditional text. Carbon copy books are not the only or even preferred way to learn. This study shows that there is not only the potential for e-reader devices to be equal with textbooks. In fact, they are possibly even better when used for learning.

Society as a whole may aspire to greater technological heights based on the knowledge that e-text may be beneficial to learning. As previously mentioned, society believes that investing in technology will help with long-term success. Our society is rapidly becoming a paperless world. The implication of this not only enables a greater breadth of applied knowledge at one's fingertips but also helps benefit the environment itself. Society has persisted in developing and advancing learning from oral stories to textbooks and is currently at a new crossroads: e-reader devices.

CONCLUSION:

There have been differing views concerning whether e-reader devices are even equivalent for learning compared to traditional textbooks. Consequently, with further innovation and more e-reader devices and e-textbooks being produced, it is important to appropriately assess their influence on learning. This study

looked at the effects of e-text on both comprehension and transfer learning in the hopes of increasing further knowledge in this newly developing field. While this study brought to light some of the possible positive effects of e-text on transfer learning, future research is still needed. Due to the increasing prevalence of e-reader devices, researchers, educators, and textbook companies should work with one another to explore their effects on learning.

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