

## **The Effect of Using the iPad on Students' Performance in Writing and Reading Comprehension: Pilot Study Report**

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### **Abstract**

This pilot study aimed to examine the pedagogical potential of integrating mobile tablets, the iPad, into academic writing at Zayed University undergraduate courses. In spring semester 2014, 77 students were randomly assigned reading and writing activities in which the same groups used a traditional bound print text and pen on one occasion and iPads on another to access equivalent text through Blackboard content. Standardized teacher assessments and surveys were conducted as part of the class activity. While the majority of students strongly felt that the iPad could assist them in their reading and writing performance, their standardised test results revealed no significant positive impact on their performance. However, the study needs to be conducted on a larger sample to ascertain the validity of these preliminary results before a clear conclusion is drawn.

**Keywords:** iPad, mobile learning, reading, writing.

### **Introduction and Background**

Since its inception, Zayed University has demonstrated the importance of technology integration into its curricula through the development of its e-Learning infrastructure. However, the observation was made that these technologies have not always been utilized to their full potential to facilitate pedagogically sound activities (Patronis & Scheopp, 2006). Since spring semester 2011, mLearning technologies, in this case iPads, have been introduced to instructors and faculty in the Academic Bridge Program and the University College. Consequently, the use of iPad in the classroom has grown very rapidly, but there is a lack of comprehensive data that could begin to show the academic impact of this device on the classroom. Therefore, the introduction of these devices provides opportunities for research on emergent mLearning technology and pedagogy. The purpose of this pilot study is to address the following questions:

- To what extent does the iPad aid students in their writing skills?
- To what extent does the iPad aid students in their reading comprehension?
- Is there any evidence of improved writing accuracy whilst using the iPad (e.g., documented increase in grades)?
- Is there any evidence of improved reading comprehension whilst using the iPad (e.g., documented increase in grades)?

In addressing these questions, statistical data from students at Zayed University in the University College was gathered, as explained below. Standardized teacher assessment grades and survey data were gathered from students who had been using the iPad in the classroom for a minimum of 2 semesters. The data analysis was carried out and a report for the university was compiled. The report discusses the findings of the study along with recommendations for future directions of this research and possible future pedagogical uses of the iPad.

### **Literature Review**

When reviewing the literature, many indicated that the implementation of the iPad has the potential to offer access to effective and efficient pedagogy. For example, Bennett (2011) stated that iPads are able to deliver content in an interactive way and offer access to the web and instructional material. Webb (2012) added that students using the iPad demonstrated high motivation and a demand for its use. In his research, Harmon (2011) found that those students with iPad access had a 6% greater chance of passing the test's reading portion than those without, and an 8 percent greater chance of passing the writing portion. Others concluded that learning experiences were enhanced by the use of the iPad, which provided opportunities for collaboration and engagement (Henderson & Yeow, 2012) and the development of 21st-century skills (Murray & Olcese, 2011). More positive learning effects have been also found in reading and writing (Harmon, 2012; McClanahan, Williams, Kennedy, & Tate, 2012). Others suggested that iPads can "provide an added advantage over printed texts, as they provide further opportunities for students to physically interact with and manipulate texts and to transform texts to meet their needs and interests" (Eagleton & Dobler, 2007). Larson (2010) asserted that digital texts can make the reading experience more individualized, interactive, and engaging. An added advantage of digital texts, other scholars argued, is that they "can support individual readers' text comprehension and potentially engage struggling readers" (Reinking, 2001).

Further literature review revealed several definitions of mLearning. Brand et al. (2010) defined mLearning conceptually as "learner and device mobility and flexibility usually involving a

mobile device and flexible user access to content and communication". Murphy (2011), in his discussion of early adoption in tertiary education of iPad technology, referred to the use of mobile technologies as "post-PC devices," or PPDs, and added that such technologies have the potential to fundamentally impact teaching and learning. In their attempt to theorise mLearning, Sharples et al. (2005) suggested that it must be tested against the following criteria:

1. Does it account for the mobility of learners?
2. Does it cover both formal and informal learning?
3. Does it theorise learning as a constructive and social process?
4. Does it analyse learning as a personal and situated activity mediated by technology?

For the purpose of this research study, mLearning, as Sharples et al. (2005) suggested, is a personal and situated activity mediated by mobile technologies. This study, therefore, will test and analyse a classroom iPad-mediated activity.

## **Research Methodology**

### ***Sampling***

Purpose sampling was used for this study. Data was drawn from the written performance of 77 students (43 female and 34 male) enrolled in 4 sections of COL 240 (English Composition III) courses in spring semester 2014. All students in this cohort have successfully completed English Composition I and II and have used the iPad for a minimum of 2 semesters. Each of the course instructors administered the learning activity during their scheduled lessons. English Composition III was chosen for the purpose of this study under normal classroom conditions with no special allowances for the use of iPads. The students in this cohort had been introduced to the iPad for a minimum of three semesters. These students' positive perception of the ease of use and acceptance of the iPad has been documented in Patronis (2014).

### **Design of the Research Activities**

To determine whether a given student had achieved a better outcome in reading comprehension and writing with iPad integration, the following interventions were implemented.

Phase 1 (Day 1): To minimize the dependent and independent variables, the instructors of the 4 sections were provided with instructions on the nature of the standardised assessment.

Phase 2 (Day 2 with iPad): The instructors were given a short extract to disseminate to all participants electronically in their respective sections. In 30 minutes, individual students read and responded to the extract by paraphrasing the text and writing 10 sentences using Pages app on the iPad and posted it onto SafeAssign on Blackboard.

Phase 3 (Day 3 without iPad): Participants engaged in a repeat activity with a similar reading extract in length and difficulty. A print copy was handed over to students, and in 30 minutes, individual students read and responded to the extract by paraphrasing the text and writing 10 sentences using pen and paper.

### **Measuring Writing and Reading Comprehension Performance**

All written tests with and without the iPad were graded according to standard a rubric, and the two (quantitative) test scores were obtained and compared.

After grading the two standardized tests (with and without the iPad) of all students, an online survey was administered at the end of the intervention to better understand students' perception of the learning experience with the iPad. Using EXCEL, the percentage responses were calculated for each question of the 5 Likert scale (strongly agree to strongly disagree), and the results were plotted in the form of bar charts, as discussed later.

### **Ethical Considerations**

This study was conducted within an environment of local cultural awareness and ethical considerations. Issues related to cultural sensitivity, access to information, confidentiality of participants and the role of the researcher were carefully considered.

Before collecting any data, ethical clearance from the university was obtained and an informed consent was sought from the participants (Miles & Huberman, 1994). It was made clear to the participants that their participation was voluntary and their participation would not affect their grade in the course.

Ragsdale (1988) argued that researchers who study education technology may be biased toward technology. To this end, and to minimize the researcher's subjectivity, and to increase the validity and reliability of this study, instructors from other sections were randomly selected to carry out the experimentation in their own sections.

### **Results**

#### ***Standardised Teacher Assessment Results***

Table 1 below summarises the overall performance scores in both reading and writing with and without the use of iPads.

**Table 1. Overall students' performance, including both reading and writing**

| <b>Overall Performance</b>   | <b>Percentage of Participants</b> |
|--|-----------------------------------|
| No significant difference on overall grade with or without iPad              | 39%                               |
| Scored better with iPad  | 19%                               |
| Scored less with iPad due to "copy and paste" occurrences from original text | 42%                               |

As shown in Table 1, 39% of the participants scored similar grades with and without the iPad in their overall performance. Only 19% of the participants scored higher when using the iPad, with the remaining 42% of the participants copying parts of the original text whilst using the iPad.

Table 2 compares students' performance with and without the iPad on reading comprehension.

**Table 2. Students' performance scores in reading comprehension**

| <b>Reading Comprehension</b>                   | <b>Percentage of Students</b> |
|--|-------------------------------|
| No significant difference with or without iPad | 49%                           |
| Scored lower with iPad                         | 41%                           |
| Scored higher with iPad                        | 10%                           |

Table 2 shows that 49% of the students scored the same with or without the iPad. Only 10% scored higher when they read and paraphrased the text writing with the iPad, and the remaining 41% scored worse. In fact, when analyzing students' paper-based responses, their texts were written with more cohesion than they were with the iPad. The iPad responses were characterized by fragmentation and lacked logical sequencing of ideas.

Table 3 compares the students' performance with and without the iPad with respect to writing.

**Table 3. Students' performance scores in writing**

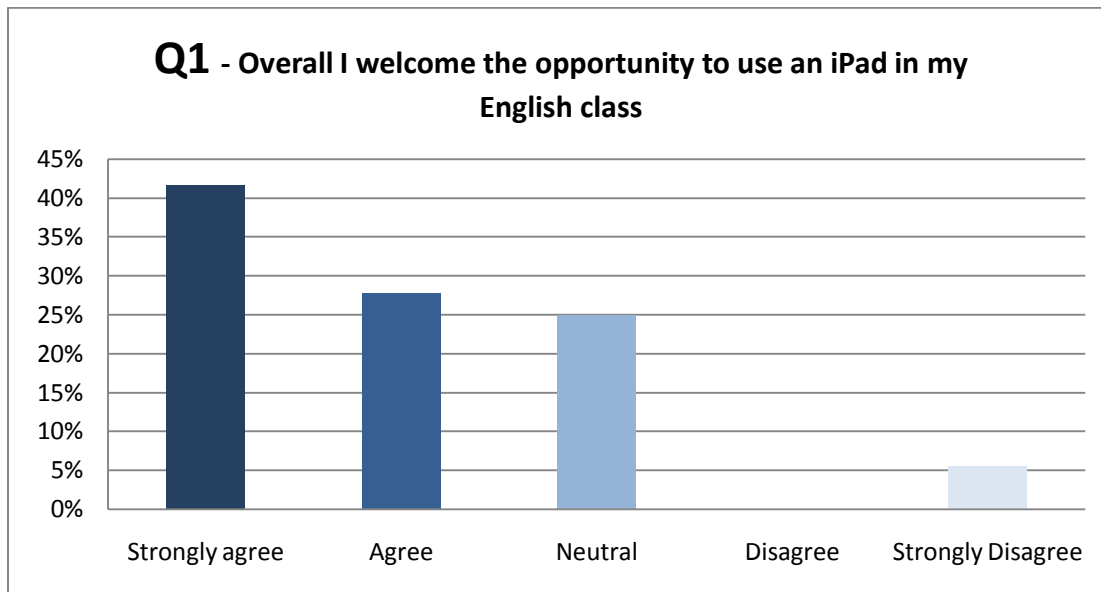
| <b>Writing</b>   | <b>Percentage of students</b> |
|--|-------------------------------|
| No significant difference with or without the iPad         | 53%                           |
| Scored less with iPad due to "copy and paste" occurrences. | 35%                           |
| Scored higher with iPad                                    | 12%                           |

On the basis of Table 3, 53% of the participants scored similar grades with and without the iPad. Only 12% scored better, with the remaining 35% scoring lower. One of the reasons for the lower marks in writing when using the iPad may be the fact that the iPad does not allow opening more than one application or page at a time. Due to this, some text of the original passage was simply copied and manipulated, which led to disjointed and fragmented text.

### Survey Results

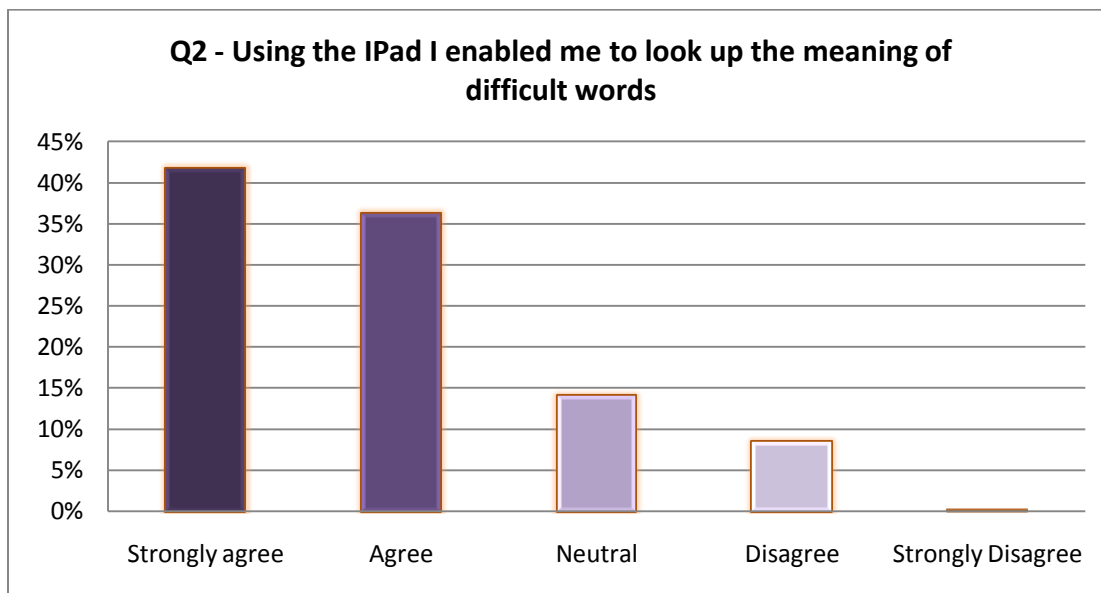
In addition to the overall performance data above, the figures below show students' responses to the survey's specific questions. The survey sought to determine students' agreement or disagreement on each of the 7 questions on students' perception of the use of the iPad while performing the test.

Students' perceptions ranged from a high 68% (indicating agreement) for the use of iPad to a low of 5% (indicating disagreement for the same item. As shown in Figure 1, an overwhelming majority of 68% of the participants welcomed the use of the iPad in the classroom. Only 5% of the participants disagreed about the use of the iPad in the classroom and 25% gave a neutral response.



**Figure 1.**Participants response to the question “Overall I welcome the opportunity to use iPad in my English Class”

As expected, the use of iPads facilitates the definition of difficult words. This is clearly demonstrated in Figure 2, where 77% of the participants agree with the question.



**Figure 2.** Participants response to the question “Using the iPad enabled me to look up the meaning of difficult words.”

Regarding the use of the iPad to improve the vocabulary, 79% of the participants reported a positive response, with only 10% disagreeing, as shown in Figure 3 below.

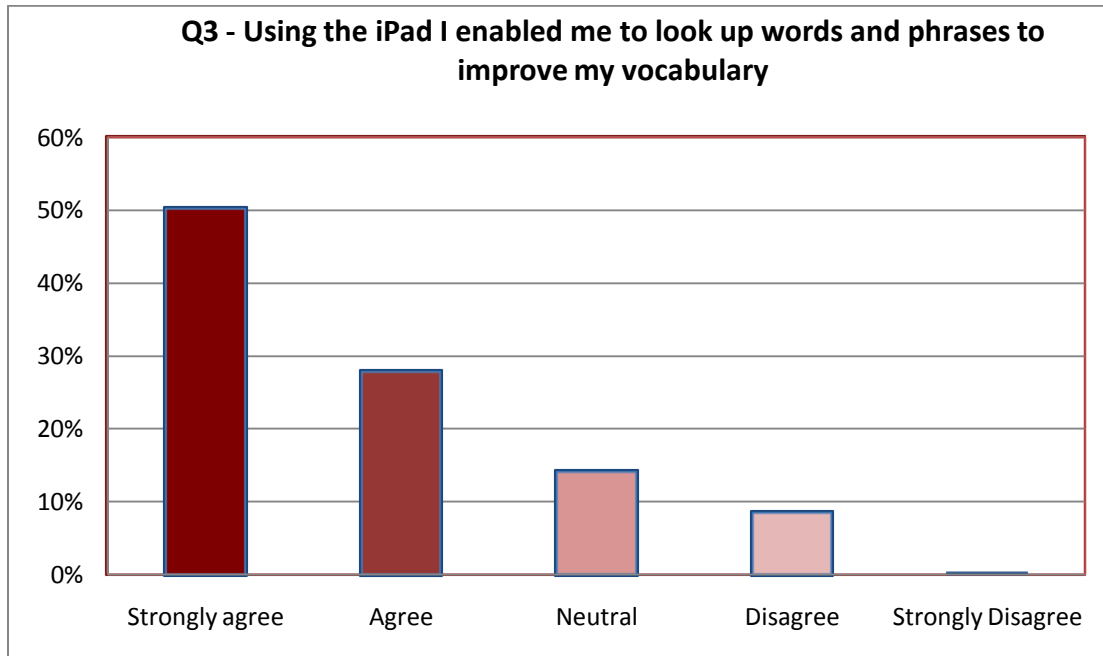


Figure 3. Participants response to the question “Using the iPad I enabled me to look up words and phrases to improve my vocabulary.”

As with earlier positive responses, the use of iPad, as shown in Figure 4 below, enabled about 82% of the respondents to check spelling, with only 10% disagreeing.

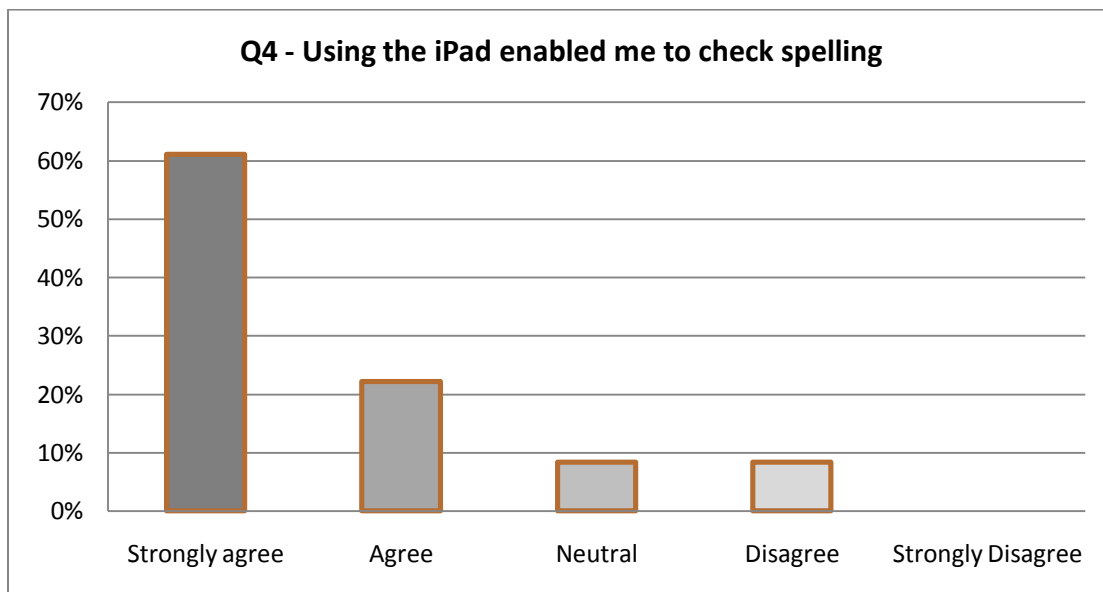
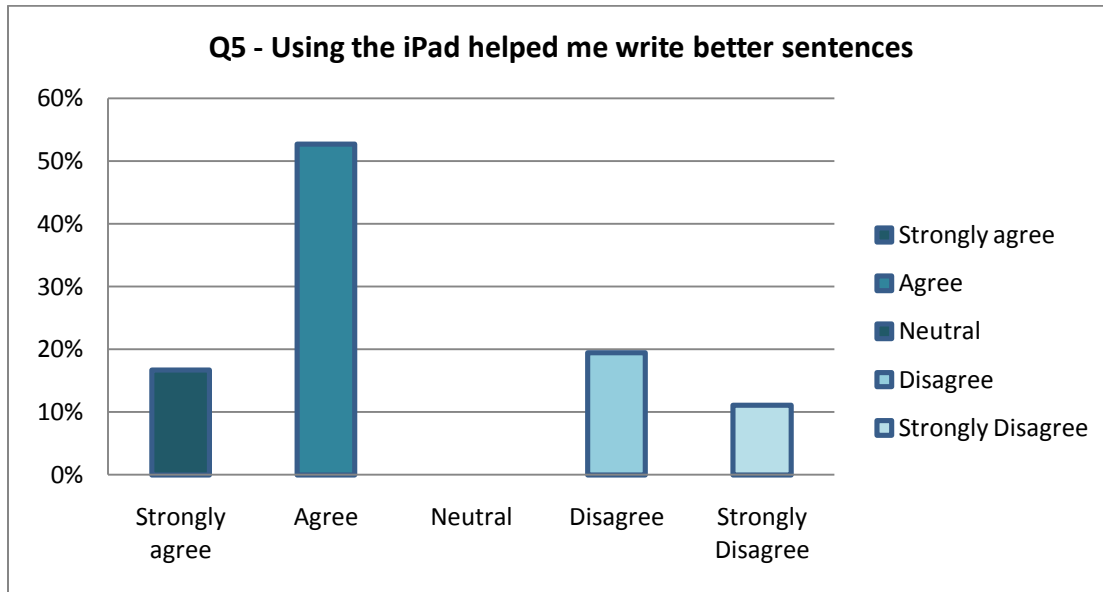


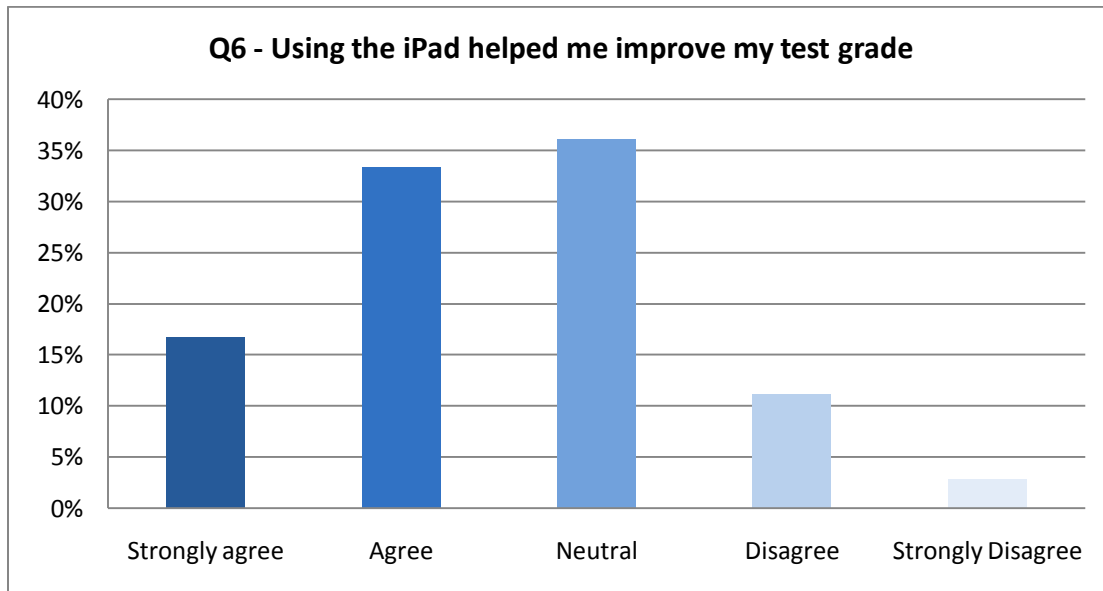
Figure 4. Participants' responses to the question “Using the iPad enabled me to check spelling.”

Regarding the use of iPad to aid in writing sentences, almost 70% of the participants gave a positive response, which is line with earlier findings (see Figure 5 below).



**Figure 5.** Participants response to the question “Using the iPad I was able to check spelling”

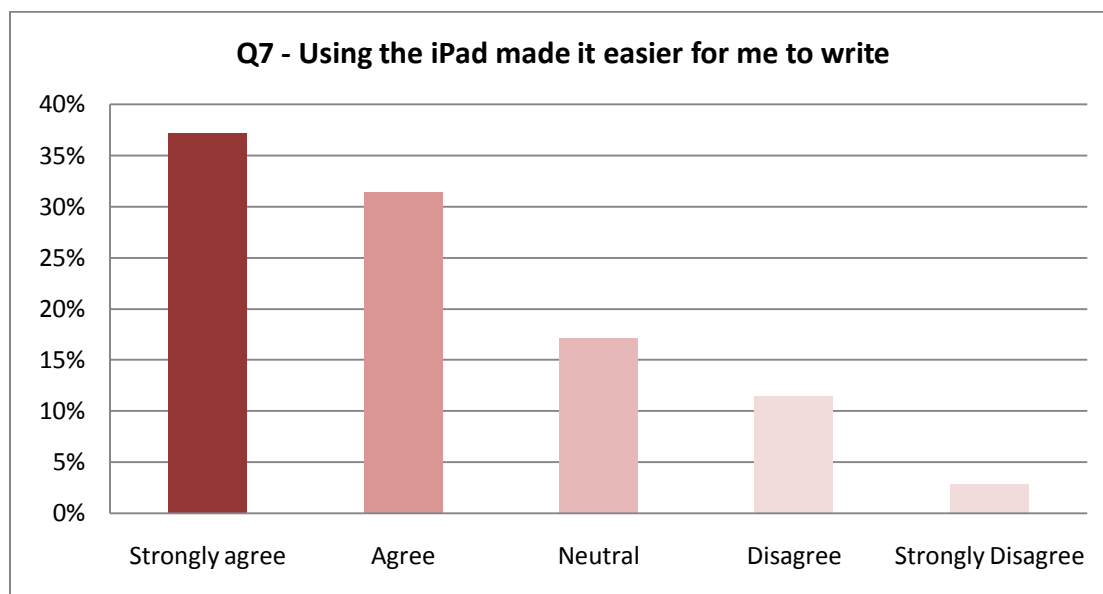
On the question whether the use of the iPad helped participants improve their test grades (Figure 6), about half of the participants agreed and about 35% were unsure. Only about 15% disagreed.



**Figure 6.** Participants’ response to the question “Using the iPad helped me improve my test grade.”

Finally, almost 70% of the participants agreed that the use of iPad made it easier to write, as shown in Figure 7 below, with less than 15% disagreeing.





**Figure 7. Participants' responses to the question "Using the iPad made it easier for me to write."**

### Discussion

Overall, students' perception of the benefits of the use of the iPad in this case study were very positive, with the majority agreeing that the iPad helped them perform better in their writing and reading comprehension.

Despite the above findings, the study did not indicate any statistically significant difference in the students' overall grade assessment with or without the iPad. In fact, the results were slightly in favour of pen-and-paper rather than the iPad.

This could be attributed to the following factors:

- 1) Time restrictions in performing the tasks in this case study, i.e., only 30 minutes. This did not allow the participants to take advantage of the full potential of the iPad features, such as using an online dictionary for defining concepts and terminologies. This agrees with several other studies that have reported no differences in student performance between web-based and pen-and-paper exercises (Alexander et al., 2001; Bonham et al., 2003).
- 2) Students need significant more time to exploit the features offered by the iPad.
- 3) The iPad does not allow opening more than one application or page at a time. Due to this, some text of the original passage was simply copied and manipulated, which led to disjointed and fragmented text. This affected the final results. In a recent study, Patronis (2014) reported that the majority of the students preferred using a print book to the ereader, as it was easier for taking quick notes in class about a variety of ideas. Others reported that writing in a sustained way was quite burdensome on the iPad, even with the external keyboard. The features of iPad applications for word processing are not as sophisticated as word processing on the laptop (Patronis, 2014).

### Future Research and Recommendation

On the basis of the review of the relevant literature and the data analysis of this study, the following recommendations for additional research are as below:

- 1) Use of the iPad in the true sense of a mobile tool with no time restrictions in or out of the class. The iPad is designed to facilitate collaborative creative inquiry and specifically individualized instruction for students with diverse learning styles.
- 2) Modify the methodology of testing to fully explore the potential of the use of the iPad.
- 3) Increase students' sample to confirm the validity of the pilot study results.
- 4) Conduct in-depth interviews with students who scored highest, lowest and the same to provide an insight into how students perceive the impact of the use of iPads on their performance.

### About the Author:

Dr. Marielle Patronis has over 30 years experience as a University Professor and a language teacher and over ten years experience in blended e-learning design, development and delivery of courses. Her research interest lies in the pedagogy of online learning. She presented in numerous national and international conferences.

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### Appendix A

**Q. Using the iPad read the following text on pollution and its effect on the environment. Then paraphrase it in 10 sentences using your own words. You have 30 minutes to complete the task.**

Pollution is the degradation of natural environment by external substances introduced directly or indirectly. Human health, ecosystem quality and aquatic and terrestrial biodiversity may be affected and altered permanently by pollution.

Pollution occurs when ecosystems cannot get rid of substances introduced into the environment. The critical threshold of its ability to naturally eliminate substances is compromised and the balance of the ecosystem is broken.

The sources of pollution are numerous. The identification of these different pollutants and their effects on ecosystems is complex. They can come from natural disasters or the result of human activity, such as oil spills, chemical spills, nuclear accidents ... These can have terrible consequences on people and the planet where they live: destruction of the biodiversity, increased mortality of the human and animal species, destruction of natural habitat, damage caused to the quality of soil, water and air.

Preventing pollution and protecting the environment necessitate the application of the principles of sustainable development. We have to consider how to satisfy the needs of today without compromising the ability of future generations to meet their needs. This means that we should remedy existing pollution, but also anticipate and prevent future pollution sources in order to protect the environment and public health. Any environmental damage must be punishable by law, and polluters should pay compensation for the damage caused to the environment.

Texts retrieved 21 February, 2014 from

[http://www.myenglishpages.com/site\\_php\\_files/reading.php#.UwfGuoXwnc4](http://www.myenglishpages.com/site_php_files/reading.php#.UwfGuoXwnc4)

### Appendix B

**Q. Using the print text read the following text on 'the effect of brain drain on developing countries'. Then paraphrase it in 10 sentences using your own words. You have 30 minutes to complete the task.**



Texts retrieved 21 February, 2014 from  
[http://www.myenglishpages.com/site\\_php\\_files/reading.php#.UwfGuoXwnc4](http://www.myenglishpages.com/site_php_files/reading.php#.UwfGuoXwnc4)

**Appendix C**

**Measuring writing and reading comprehension performance:**

All written tests with and without the iPad were graded according to standard rubric as seen below.

|  | EXCELLENT<br>4 pts  | GOOD<br>3 pts   | FAIR<br>2 pts   | NEEDS<br>IMPROVEMENT<br>1 pts   |
|--|---|---|---|---|
| Punctuation<br>Does the sentence contain the appropriate ending and other punctuation? | The sentence contains the correct ending punctuation. Commas and other punctuation marks are used correctly   | The sentence contains correct ending punctuation. There are 1-2 errors in comma and other punctuation marks.  | The sentence does not contain correct ending punctuation. There are 3-4 errors in comma and other punctuation marks.  | The sentence contains no ending punctuation. Commas and other punctuation marks are not used. |
| Sentence Structure<br>Are simple, compound, or complex sentence structures used?       | Simple sentences are used correctly to express one independent thought. Compound sentences are used with appropriate conjunctions and correct punctuation. Complex sentences are used correctly with appropriate dependent and independent clauses. The | Compound sentences are used but there are 1-2 errors in conjunction and punctuation usage. Complex sentences are used but there 1-2 errors in the use of dependent and independent clauses. | Compound sentences are used but there are 3-4 errors in conjunction and punctuation usage. Complex sentences are used but there 3-4 errors in the use of dependent and independent clauses. | There are no compound or complex sentences.   |

|                                   |   |  |   |   |
|-----------------------------------|---|--|---|---|
|                                   | sentence is punctuated correctly.   |  |   |   |
| COMPREHENSION<br>Original Thought | Some original thought is shown by elaborating on topic.                         | All of the sentences are in the student's words.                       | Most of the sentences are in the student's words.       | Some of the sentences are in the student's words. Some are exactly as written in the original text. |
| Accuracy of Information           | All key information is included and all is an accurate account of the original. | All information is correct and represents what the original contained. | Almost all of the key pieces of information are correct | There were places that it is evident the student did not fully understand what s/he read.           |

Rubric is taken from Rcampus retrieved from <http://www.rcampus.com/rubricshowc.cfm?code=C9664C&sp=yes&>

**Appendix D  
Survey Questions**

|  |                |       |         |          |                   |
|--|----------------|-------|---------|----------|-------------------|
| Thank you for taking part in this survey. Please select only one that applies to you.                      |                |       |         |          |                   |
| Q.1 Overall I welcome the opportunity to use an iPad in my English class.                                  | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.2 When you read the extract about pollution what learning opportunity did the iPad provide specifically. | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.3 Using the iPad helped me in looking up the definition of difficult words.                              | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.4 Using the iPad helped me check new word and phrases to increase my vocabulary.                         | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.5 Using the iPad helped me in checking my spelling.  | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.6 Using the iPad helped understand the general idea of the text.   | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.7 Using the iPad helped me in writing better sentences.  | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.8 Using the iPad helped me improve my test grade.  | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.9 Using the iPad made it easier for me to write.   | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Q.10 Using the iPad to read the text deepened my learning experience.                                      | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |