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# The Effect of Computer Literacy on the Participants' Writing Ability in TOEFL iBT

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**Abstract**—One major concern in language testing relates to computer based and Internet based tests of second language. Performance on these tests is influenced by many different factors other than language ability. One of these factors relates to the participants' speed to use the Internet. This study investigated the effect of computer literacy on TOEFL-iBT scores by comparing a paper-based and internet based test. The comparison of groups' performance on both TOEFL-iBT and pBT revealed that computer literacy significantly affects writing performance on the exam. Writing skill of candidates with higher computer literacy was significantly better than those with lower computer literacy. Both groups' performance was equally the same when they took the paper based type of test. Participants who lack proficiency in computer skills often might use most of their mental power and cognitive resources on working with the computer rather than focusing on what they are actually being tested on. This would lead to inability to perform fully on the language test and consequently to lower scores.

**Index Terms**—TOEFL iBT, TOEFL pBT, computer literacy, writing skill

## I. INTRODUCTION

### A. Introduce the Problem

Language test scores are important, whether they are for immigration, education, or applying as a skilled worker. Different institutes depend on language tests as an indicator of language proficiency. With the growth of technology, computers have found their way into language testing. This issue brings up an important matter, which requires attention in English language tests such as TOEFL. It is not clear whether testing language skills by computer is an advantage or disadvantage for participants of TOEFL. No research on whether computer literacy affects participants' performance on TOEFL iBT has been performed in Iran. Research needs to be done to see whether participants' performance is the same in computer based or paper based TOEFL tests.

### B. Describe Relevant Scholarship

#### 1. TOEFL History

TOEFL test has been used for admission to many different universities worldwide. TOEFL was first designed in the 1960s but it has undergone many changes due to advances in technology and variations in teaching methods. The latest change was the introduction of TOEFL iBT, initiated in 2005. It included many new features like using integrated tasks which tests different language skills at the same time. The new version is believed to be more similar to the actual use of language in academic setting.

#### 2. TOEFL iBT and TOEFL pBT

Previous research on TOEFL iBT was mainly related to the attitude of the participants toward different versions of the test. A study done on Iranian EFL learners revealed that most of the participants in the study had a positive attitude toward TOEFL iBT and it was also found that the candidates' gender had no significant role in their attitudes towards TOEFL iBT test (K. H. Soureshjani, P. Riahipour, and A. Safikhani 2012). However, Honaker (1988) had claimed that the two version of TOEFL test (CBT and P&P) are not equivalent.

Mead and Drasgow's study indicated that in a power test there was not a significant difference between students' performance on a computer based test and paper based test. However, their performance varied in a speed test indicating that the medium does affect the test results (Mead & Drasgow, 1993). In their study they have concluded that there should be a great concern when comparing scores of a paper based speed test with the scores of the computerized versions. Another caution to be considered is that the empirically inferred validity of a paper based test shouldn't be generalized to its computerized version.

Computer-based tests like TOEFL are used vastly nowadays; therefore, many concerns have appeared concerning the validity of scores from such tests (Chapelle & Douglas, 2006; Wolfe & Manalo, 2005) showed the influence of different modes or approach in computer-based tests, they explained that presentation mode is effective in taking such tests. They further showed how computer skills can have a significant role in performing the task.

One of the main concerns when performing such tests is whether the medium of administration (computer-based/internet based and paper based) would result in equal performance scores about the test takers' language ability (Bennett, 2003; Burke & Cizek, 2006). The second main concern is whether the test takers' performance while taking a computer-based test is influenced by his/her computer skills. Test scores on language tests vary according to test takers language ability. However, if test takers take these tests on a computer, scores become an indication of both language and computer competences (Taylor et al., 1998). According to Taylor et al., in such cases it is not clear whether the scores is the result of language skill or computer skill which introduces a new inappropriate variance into the assessment. This risk is particularly greater when it comes to writing. When test takers answer multiple-choice questions, the risk is less important than when the same participants perform a writing task since writing tasks needs greater computer skills (Bennett, 2003; Burke & Cizek, 2006; Green & Maycock, 2004; Wolfe & Manalo, 2005).

Barkaoui (2014) examined the correlation between test-taker keyboarding skills and performance on the TOEFL-iBT writing tasks and found that the effects of keyboarding skills on TOEFL-iBT writing task scores, though significant, are weak. Taylor et al. (1998) delved into the effect of computer skills on the receptive skills of TOEFL test and found that computer skills had no significant effect on these skills. On the other hand, other researchers contended that the effect of computer knowledge on test performance remains a potential threat to test scores (Wang, Eignor, & Enright, 2008). Wang et al. found a positive relationship between the frequency of computer use and TEFL iBT scores. Wang et al. claimed that the results of their study did not mean computer skills are the only influential factor for poor performance on language test. Taylor et al. (1998) further proposed that we should reflect on other variables like language proficiency before jumping to any conclusions about the influence of computer skills on computer based TOEFL. Wang et al. claimed that more research needs to be done to investigate the effect of computer skills on scores on TOEFL-iBT writing tasks. Following this line of research this study aimed at comparing the results of paper based TOEFL test and internet based TOEFL test and took into account the level of computer literacy participants have.

### **3. Writing in TOEFL iBT**

The writing section in TOEFL-iBT includes two different sections. In the first section, that is the independent section, participants write an essay that explains their opinions on the topic. This section takes 30 minutes to complete. The second part is called integrated writing. In this section, test takers read a text for about three minutes, which follows by a listening part in which they listen to a speaker on the same topic from a different perspective. Participants can take notes while listening; when the listening passage is finished the previous text appears on their computer screen. In this part participants start writing a review of the most important points from the listening passage and relate them to the key points in the written text. All the responses should be about 150–225 words and participants have 20 minutes to respond to this task. The scoring procedure for independent writing is based on the overall quality of the writing, scores of integrated task is based on the overall quality of writing as well as completeness and accuracy of the content.

The independent writing task is scored by an E-rater and a human rater for the TOEFL iBT independent writing task. The integrated writing task is scored by inter-raters, consequently the writing test scores will be assessed by an automated rating and three human ratings. Taking advantage of the natural language processing methods the E-rater evaluates the linguistic features of an essay. (Enright & Quinlan, 2009). Writing is a complex task that requires the bringing together a wide range of different cognitive processes that can compete for limited cognitive resources (Fayol, 1999; Torrance & Galbraith, 2006). Some processes are more challenging than others, so those performances which are based on the same cognitive process may suffer (Alves et al., 2007; Connelly et al., 2007; McCutchen, 1996; Olive & Kellogg, 2002). Considering a cognitive point of view if computer skills become automated, that is if they occur without voluntary control they would have the least interference with the writing process. Therefore, the participants would give their full potential to performing the writing task (Torrance & Galbraith, 2006), no intentional resources are required and, consequently, will not strict or have any effect on the writing process and its outcomes (Fayol, 1999; Torrance & Galbraith, 2006). However, lack of keyboarding skills may have a negative effect on the participants writing, not being familiar with motor activities such as typing compel participants to fully or partly adapt their cognitive attention to activities such as typing. As a result, other prerequisite processes like planning, drafting, revising, and editing would not be attended which causes poorer quality of writing and lower marks (Alves et al., 2007; Connelly, Gee, & Walsh, 2007; Fayol, 1999; Horkay et al., 2006; Wolfe & Manalo, 2005). There are also researches reporting that when writers are instructed to write using a new method such as typing or using capital letters, writers are more likely to write slower or have more pauses during their writing (Bourdin & Fayol, 1994; Olive & Kellogg, 2002).

These influences are enhanced when low computer ability L2 writers are writing on a computer under test conditions. These writers waste their test time, and because of poor keyboarding skills lose their self-confidence which consequently affects their task performance regardless of their writing ability (Wolfe & Manalo, 2005). In this case, the conclusions would be that the test-taker has poor L2 writing ability; while low scores are a consequence of incompetency in completing writing tasks on the computer (Bennett, 2003; Burke & Cizek, 2006; Chapelle & Douglas, 2006). Many studies have compared participants' performance on paper-based and computer-based writing tasks, while only few studies have examined the influence of computer skills on computer based writing performance (Douglas & Hegelheimer, 2007).

Wolfe and Manalo (2005) investigated the impact of the mode of writing (paper-based and computer-based) and computer skills on writing. The results of this study indicated that test takers with higher computer familiarity received higher scores on their computer-based writing task.

Russell and Haney (1997) uncovered that students' typing ability lead to higher scores, these students had better marks when they performed their writing on a computer compared to the time they used paper and pencils. Horkay et al. (2006) study regarding the writing scores of CB and PB versions of a writing test taken by eighth-grade showed no significant differences across the two modes. However, Students with higher keyboarding skills scored better than those with lower skill on computer-based tests. Burke and Cizek (2006) also found that the students' scores varied on different writing tasks, so students with different computer abilities performed differently on different writing tasks.

#### **4. Computer Experience and Familiarity**

Early studies presumed that the use of computers produced poorer results than the use of paper and pencil tests in writing tests (Weir, Yan, O'Sullivan, & Bax, 2007). In another study on the effect of computer on society it was indicated that writing on a computer seemed to be more disordered than the writings performed with conventional tools. The quality of writing declines when the performance of people writing on a computer is compared to their performance writing with a pen (Daiute 1986). Although Daiute accepts this was not proved, he argued that computers caused more 'sloppy errors' and consequently lower scores.

Russell and Haney (1997) gave strong support that proved the opposite; their subjects achieved significantly better scores in computer-based approach compared to paper-based approach. Russel and Haney's student were skilled computer users to the extent that their handwriting was poor. Consequently, when comparing two version of the TOEFL test there are two possibilities: first using computers are either beneficial for the test takers or they might be a disadvantage for them. This is an important point which cannot be overlooked. In fact Russell, in a follow-up study, accepted that in their first study he and Haney had been unable to completely provide for this important issue in their preparation. In their study no information concerning the degree to which students used computers or the ability with which students used computers was available. Thus it was impossible to investigate the mode of delivery effect across different levels of previous computer use. Russell actually did not find any relation between computer familiarity and the result of writing test (Russell 1999).

In another study by Taylor et al (1998) they reported that looking at the computer-based TOEFL test, there is no relation between the testes' familiarity with computers and their performance in writing on a computer. They administered a computer tutorial while there was control over language ability in a way that the participants were not exposed to any language and their language ability was kept stable. The analysis of their data indicated that there was no adverse effect of lack of computer skills on the writing ability of the participants.

In summary, while the indication points to the view that computer expertise alone may not have a significant effect on TOEFL iBT's test results, as McDonald notes (2002), it cannot be disregarded when comparing P&P and CBA tests.

#### *C. Research Question*

What is the effect of computer literacy on test-takers writing score in TOEFL-iBT writing tasks?

## II. METHOD

### *A. Participants*

Out of 69 questioners given to participants taking TOEFL-iBT at Isfahan Industrial University only 60 responded. Participants' age ranged between 20-30, all participants' have at least a bachelor's degree. They were asked to complete the questioner in order to find out about the level of their computer literacy. After receiving the results on TOEFL-iBT they were asked to email their writing score on the TOEFL test. All participants had attended TOEFL preparation classes at different institutes in Isfahan. They had all taken TOEFL test to predict their future performance at those institute. They also sent us the score of their writing skill on preparation exam which was paper based.

### *B. Instruments*

All the participants filled out the questioner including 17 items to see how familiar each participant is with computers. The participants were then divided into 2 groups of high computer literacy (HCL) and low computer literacy (LCL). Those who were categorized in the high computer literacy group used computer for at least 2 hours a day (they played games, used chat rooms, surfed the net, wrote essays, etc.) and those who were placed in the low computer literacy group very rarely used computers (they seldom or never used chat rooms, didn't search or play with computers at all).

### *C. Data Collection*

The participants in this study had all attended TOEFL preparation classes at different institutes and they had taken paper based TOEFL mock tests in those institutes in order to get ready for the actual test. The participants filled out the questioner on the day of TOEFL iBT exam, just before starting the exam. They were asked to write their email address on the questioners for further questions or additional information. After 14 days, they were contacted to get their writing scores, and also they had to give their paper based TOEFL scores that they had received before. The mean score of the

TOEFL-pBT was calculated, their score on TOEFL-iBT was recorded and all the information was analyzed using SPSS software.

#### D. Data Analysis

To analyze our data we ran multiple analyses of variance (MANOVA) to avoid repeated comparisons that increase the probability of type 1 error.

TABLE 1  
DESCRIPTIVE STATISTICS

groups		Mean	Std. Deviation	N
Pbt	LCL	22.2667	1.50707	30
	HCL	22.6667	1.64701	30
	Total	22.4667	1.57810	30
iBT	LCL	18.2333	2.06253	30
	HCL	23.9000	2.05695	30
	Total	21.0667	3.51205	60

Table 1 shows descriptive statistics. This table gives us information about the different groups of the dependent variable. The first group low computer literacy (LCL), and the second high computer literacy (HCL), these groups have two sets of scores paper based and iBT. In the second column, we have the mean score for each group. The mean score for LCL on paper-based test was 22.26 and the mean score for HCL on paper-based test was 22.66. The two groups mean score on TOEFL-pbt was very close to each other. But they did differently on TOEFL-iBT. The mean score for LCL on iBT was 18.23 and for HCL group was 23.90.

TABLE 2  
MULTIVARIATE TESTS<sup>a</sup>

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.997	8579.132 <sup>a</sup>	2.000	57.000	.000	.997
	Wilks' Lambada	.003	8579.132 <sup>a</sup>	2.000	57.000	.000	.997
	Hotelling's Trace	301.022	8579.132 <sup>a</sup>	2.000	57.000	.000	.997
	Roy's Largest Root	301.022	8579.132 <sup>a</sup>	2.000	57.000	.000	.997
Groups	Pillai's Trace	.662	55.849 <sup>a</sup>	2.000	57.000	.000	.662
	Wilks' Lambada	.338	55.849 <sup>a</sup>	2.000	57.000	.000	.662
	Hotelling's Trace	1.960	55.849 <sup>a</sup>	2.000	57.000	.000	.662
	Roy's Largest Root	1.960	55.849 <sup>a</sup>	2.000	57.000	.000	.662

a. Exact statistic

b. Design: intercept+ groups

Table 2 is the table of multivariate tests. This table shows the effect of independent variable on dependent variable. The intercept term is a test of whether the grand means is different from zero. Because all the dependent variable scores are positive, the grand mean is different from zero. Therefore, the test of intercept is not of interest to us and we must look at the second row. Here we have four different significance tests. The significance of the tests shows that the performance was significantly different in the two groups of HCL and LCL.

TABLE 3  
TESTS OF BETWEEN-SUBJECTS EFFECTS

Source	Dependent Variable	Type III sum of squares	df	Mean Square	F	Sig.	Partial Eta Squared
CorrectedModel	pbt	2.400 <sup>a</sup>	1	2.400	.963	.330	.016
	iBT	481.667 <sup>b</sup>	1	481.667	113.533	.000	.662
Intercept	pbt	30285.067	1	30285.067	12153.140	.000	.995
	iBT	26628.267	1	26628.267	6276.508	.000	.991
Groups	pbt	2.400	1	2.400	.963	.330	.016
	iBT	481.667	1	481.667	113.533	.000	.662
Error	pbt	144.533	58	2.492			
	iBT	246.067	58	4.243			
Total	pbt	30432.000	60				
	iBT	27356.000	60				
CorrectedTotal	pbt	146.933	59				
	iBT	727.733	59				

a. RSquared=.016(AdjustedRSquared=-.001)

b. R Squared= .662 (Adjusted R Squared= .656)

The third table shows the effect of independent variables and their interaction on the dependent variables. Looking at this table, we notice that the groups were different in their TOEFL-iBT test. The two groups with different computer literacy performed differently on TOEFL-iBT, but their performance was equally the same on TOEFL-pBT.

### III. RESULTS AND DISCUSSION

Looking at the data analysis above it is evident that the effect of computer literacy on writing skill is significant in TOEFL-iBT. Comparison of groups' performance on both TOEFL-iBT and pBT revealed that computer literacy significantly affects performance on the exam. Candidates with higher computer literacy performed better than those with lower computer literacy in TOEFL-iBT. Both groups' performance was equally the same when they took the old paper based type of test. In writing, there is a lot of pressure on the candidates to think and produce ideas as well as concentrate on language to produce their ideas correctly and appropriately. Taking the new version of the test, another barrier is added to the task of writing. Not being familiar and confident with computers can debilitate candidates' ability to write and perform well in tasks using computers. Although all the participants in this study were educated and had passed at least two courses of computers during their education, they did not perform well in the test due to lack of confidence with computers. Those in the low literacy group rarely used computers and when they did, it was mainly for watching movies or photos. Some just used it to talk on Oovoo or Skype. Therefore, not match typing was performed during their work with computers.

#### IV. CONCLUSION

This study focused on the effect of computer literacy and writing skill in TOEFL-iBT. The result of this study revealed that computer literacy influences the result of participants TOEFL test. TOEFL-iBT candidates should work on their computer literacy as well as language skills in order to perform well in internet based tests. More research can be carried out to see the effect of computer literacy on other skills in TOEFL-iBT.

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