ENGLISH LANGUAGE TESTING ON IPADS:

ADVANTAGES AND DISADVANTAGES

by

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Dedication

This modest piece of work is dedicated to my precious son, Adam. I hope it inspires you to work hard and be the best that you can be.

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Abstract

Recently, tablet computers, such as iPads, have been incorporated into many school curricula, and studies have been conducted to explore the effectiveness of iPads as educational tools. This study goes one step further and investigates how iPads are being used for testing. In particular, the study investigates whether the advantages of testing on iPads outweigh the disadvantages. A small-scale study was carried out at an institution of higher education in the Middle East where students and teachers in the language program use iPads regularly for all classroom tasks and assessments. Questionnaires were distributed to students and teachers and interviews were conducted with teachers to help identify their perspectives. To evaluate how students' experiences of testing on iPads compare with testing on paper and desktop computers, two different language tests were administered using different modes of delivery, and students' feedback was obtained through notes taken during guided in-class discussions. Results from the combined data indicate that both students and teachers are in favor of computer-based assessment (CBA) in general, but there are reservations about the iPad's effectiveness as an assessment tool. The main concerns among students are technical difficulties and typing. Teachers are also concerned about technical problems but are even more apprehensive about the time involved in setting up iPads for assessments, as well as the issue of test security. Students also seem to have different attitudes towards the various modes of testing, with some favoring tests on iPads, and others preferring tests on paper. There is agreement among teachers that for testing, laptops and desktops remain superior to iPads.

Search Terms: iPads, tablet computers, testing, computer-based assessment, advantages, disadvantages

Table of Contents

List of Tables

Chapter One: Introduction

Technology in education has evolved in recent years to the point that it is no longer a trend but rather a fixed feature of the modern classroom. As educational institutions find ways to incorporate technology into their curricula, learning and teaching take on new forms that were unimaginable only a couple of decades ago. In many cases, Smart Boards have replaced traditional chalkboards, while laptops and tablets are used instead of notebooks and textbooks. Today's student no longer has to carry a stack of books because he or she now has access to e-books. Furthermore, teachers are no longer "the bearers of all knowledge" because students can "google" any information they need. Students can even sit in virtual classrooms while they interact with teachers and peers from across the globe.

In recent years, computer-based assessment (CBA) has been featured as a complement to technologically driven curricula. Numerous benefits have been attributed to CBA, not least of which is the amount of time and effort saved in marking test items. For students, the main benefits lie in receiving immediate results and the ability to take the test from a remote computer when it is not possible to physically be present in a classroom.

Needless to say, there are also several challenges associated with CBA. One of these is the amount of time initially required to produce the test. CBA may be even more challenging for teachers and test developers who themselves are not proficient users of computers. Another challenge is the test taker's level of computer literacy. Although many students today are computer literate, computer familiarity among different groups of learners remains unclear (Taylor, Jamieson, & Eignor, 2000). Another challenge that teachers face is technical support. Technology is not always reliable, and when it fails, teachers need to feel that they have support (Baylor & Ritchie, 2002). An institution that promotes technology also needs to provide the technical support to tackle issues that may arise. This is especially important when high stakes assessments are concerned.

Many institutions have now introduced tablet computers, such as iPads, as an integral part of their instruction and assessment (Gawelek, Spataro, & Komarny, 2011; Schaffhauser, 2012). Since the launch of the iPad in 2010, millions of devices have been sold worldwide. It was not long before the iPad found its way into classrooms and replaced personal laptops to become the main computing tool for

teachers and students. Part of its popularity is due to its small size and portability. Students can access electronic books and stored documents on one single device that can easily be carried wherever they go. They can also send and receive emails and search the internet through Wi-Fi connectivity.

Statement of the Problem

The research in this thesis focuses on an institution of higher education in the Middle East region which incorporates technology into all of its academic programs. For the sake of anonymity, the institution will be referred to as the Middle East Institution (MEI) throughout this paper. The classrooms at MEI are fitted with technological equipment and include Smart Boards, projectors, a teacher PC and Wi-Fi connectivity. All students possess either a laptop or an iPad. In the fall semester of 2012, the language program at MEI required all students to have an iPad on which they would perform classroom tasks, homework, research and assessments. When the iPads were introduced, extensive teacher training was conducted, and teaching materials used by the institution were adapted to accommodate the iPads. However, since the introduction of iPads, both teachers and students have had mixed reactions towards their use, especially where assessment is concerned.

Prior to the current research, in the spring semester of 2014, a study was carried out to determine teachers' and students' attitudes towards testing on iPads. The study revealed that, in general, the majority of students and teachers were in favor of using iPads in the classroom, but there were reservations among both groups about using iPads for testing. The main concerns for students were technical issues experienced during exams and difficulty with typing. Teachers also expressed their concern over technical matters, but they were even more apprehensive about the time-consuming process of setting up individual iPads for exams.

Purpose of the Study

While the investigation of the effectiveness of iPads for classroom instruction and learning continues to develop, to date, there is very little research on the practicality of iPads as testing tools. Nevertheless, there appear to be several pressing challenges one needs to consider when administering formal assessments on iPads. This research aims to explore whether the advantages of using iPads to assess learning

outweigh the disadvantages. In particular, it will be guided by the following research questions:

(1) What are the advantages of testing on iPads from teachers' and students' perspectives?
(2) What are the disadvantages of testing on iPads from teachers' and students' perspectives?
(3) How does the testing experience on iPads compare with the testing experience on paper and personal computers?

Significance of the Research

Until newer technologies are developed, it is doubtful that we will witness the demise of iPads in the near future. Whenever anything new is introduced, it is likely that it will create new opportunities as well as raise challenges that were not anticipated. The current research hopes to provide insight on using iPads as assessment tools and may be beneficial for other institutions considering adopting iPads for their own assessments.

Overview of the Chapters

Chapter two of the research reviews the literature on computer-based assessment, focusing mainly on the advantages and disadvantages. It also reviews the available literature on iPads and how they are being used in educational settings. Chapter three describes the design of my research. It provides a description of the institution, the participants and the data collection tools. Chapter four examines the data collected from the questionnaires, the students' feedback on the tests, and the teacher interviews. Chapter five concludes with a discussion of the implications and areas for further research.

Chapter Two: Review of the Literature

The main purpose of this research is to determine whether the advantages of testing on iPads outweigh the disadvantages and to investigate how the testing experience on iPads differs from testing on paper or personal computers. To answer my research questions, I look into available literature on language testing, in general, and discuss how the concepts of reliability and validity apply to computer-based assessment. I also give some examples of computerized language tests and discuss some of the advantages and disadvantages of these tests. The discussion then leads into mobile technology and how iPads are being used in educational settings. I attempt to analyze some potential advantages and disadvantages of iPads when used for educational purposes. I end with a few examples of iPad initiative projects and how iPads are used for testing.

An important part of any language learning experience is how learning is going to be measured or evaluated. The content of the test may be one of the main priorities of the test developer, but equally important is the testing method. Due to advances in technology, educational institutions have made great progress in their testing methods. Although paper-and-pencil is still quite a popular testing mode, many institutions are now opting for computerized testing. The increased interest in computers as assessment tools can be attributed to their efficiency. "Computers are capable of delivering tests efficiently, and can produce immediate scores for both the test takers and the score users" (Fulcher, 2010, p. 203).

Reliability and Validity

A test's effectiveness is heavily rooted in its reliability and validity. *Reliability* refers to how consistent a test is, whereas validity refers to how well a test measures what it is supposed to measure (Davies, 1990). Davies (1990) and Bachman (1990) both emphasize the importance of a test possessing both qualities.

Factors that may affect the reliability of a test are *rater reliability*, *test reliability* and *test administration*. Rater reliability could be threatened when an individual rater is inconsistent with scoring due to inexperience, carelessness or biases, or when multiple raters yield completely different results (Brown & Abeywickrama, 2010; Fulcher, 2010; McNamara, 2000; Weir, 2005). Test reliability

is related to the nature of the test itself. For example, poorly written items or too many test items that test more than what is required could negatively affect reliability. Additionally, timed tests could have a negative impact on students who do not perform well on tests with a time limit (Brown & Abeywickrama, 2010). Test administration is related to the conditions under which the test is administered (Davies et al., 1999). Test administration factors that could affect the reliability of a test are outside noise, room temperature, and lighting in the room.

In examining validity, we tend to look at several different aspects. *Face validity* is "the degree to which a test appears to measure the knowledge or abilities it claims to measure" (Davies, Brown, Elder, Hill, Lumley, & McNamara, 1999, p.59). Another component of validity is *content validity* which is related to how well the test measures what it is supposed to measure and is usually higher when the test directly measures a given performance or objective (Davies, 1990). *Construct validity* indicates how representative an item is of an underlying theory of learning (Davies et al., 1999). In other words, a test item that possesses construct validity represents a model of what we want to measure. Another area concerning validity is "that of the consequences to the educational system or society of using test results for a particular purpose" (Bachman, 1990, p. 283) and is known as *consequential validity*. Weir (2005) suggests that tests may have dramatic effects on people's lives and could be used as tools of power and control. Equally important is *washback*, or the effect testing has on teaching and learning which may be either positive or negative (Davies et al., 1999). Weir (2005) warns "No single validity can be considered superior to another. Deficit in any one raises questions as to the well-foundedness of any interpretation of test scores" (p. 13).

Compared to paper-based tests, rater reliability with computer-based tests is considerably higher since inconsistencies and biases are eliminated. Similarly, test administration reliability is likely to be greater with computer-based tests since all examinees experience similar conditions. Test reliability, on the other hand, could be threatened if technical difficulties are experienced by some and not others.

Furthermore, computerization of a test has the potential to affect the validity of a test (McNamara, 2000). Content validity is going to be threatened if a test taker who is less than comfortable with technology has to demonstrate computer skills as

well as language ability. Fulcher (2003) argues that problems related to usability may also pose a threat to construct validity.

> In CBTs a poor interface design that is difficult to use for the test-taking population or some important subgroup of the population, may easily become a source of construct-irrelevant variance, thus threatening the score users' ability to make meaningful inferences from test scores. (pp. 384-385)

The notion of *construct-irrelevant variance* is prevalent in language testing and refers to factors that may affect the score of a test taker for reasons unrelated to the construct being tested (Fulcher, 2010). Given the relative newness of CBA, not all test takers will react to a computerized test in the same way. When a test taker's scores are misrepresented because of factors related to the mode of testing, there may also be unintended consequences. Fulcher (2003) emphasizes the importance of good interface design and proposes a process model consisting of three distinct phases: planning and initial design, usability testing and fine tuning. He claims that following such a process is likely to minimize the effect of interface construct irrelevant variance.

The importance of good interface design is supported by Ricketts and Wilks (2002) who suggest that computer-based assessment has the potential to improve student performance. In their study, the authors showed that student performance actually decreased initially when computer-based tests were introduced into their program. At the time, the test consisted of a set of multiple choice questions which students had to scroll through on a single web page. However, when the interface was changed so that questions appeared one by one, performance increased dramatically. Moreover, students' attitudes regarding computer-based assessments also improved after the changes were made, implying positive washback as well.

With regards to washback, Chapelle and Douglas (2006) believe that computerized testing may have the potential for more positive feedback "if one considers the benefits that many believe are associated with regular access to technology during second language learning" (p. 18). However, there is also likely to be negative washback if test takers are not completely comfortable with technology and experience great anxiety. Although computer illiteracy is becoming less of a problem, the impact that computerized testing may have on learners is a factor that should be considered when using CBA (McNamara, 2000).

Adoption of Computers for Testing

One of the first computers used to score multiple-choice items was the IBM Model 805 Test Scoring Machine which was introduced in the 1930s (Chapelle & Douglas, 2006, and Fulcher, 2010). Test takers marked their answers on a special sheet which was later fed into the IBM machine. The machine allegedly worked ten times faster than a human rater and with much more accuracy (Chapelle & Douglas, 2006). Fulcher (2010) also asserts that similar machines are still widely used today, albeit with more advanced technology.

As for open-ended questions or oral assessments, it is still possible to use computers for scoring, but the task becomes more complicated and requires more advanced technologies (Chapelle & Douglas, 2006; McNamara, 2000). Although these technologies are still being developed, there are, currently, some very capable programs that are being used to assess written and spoken language. Criterion, for instance, is a system that was developed by the Educational Testing Service (ETS), the same organization that developed TOEFL, to assess extended written responses. The program uses an "e-rater" to assign a holistic score based on syntactic structure, discourse structure and vocabulary. The program can be used alone or in conjunction with a human rater. For example, an essay can be scored by both the e-rater and a human rater, and if the scores are relatively close, the final score is the one produced by the human rater. However, if the scores are far apart, another human rater looks into the discrepancy and determines a final score. By using computer technology to assess students' writing, a faster and more accurate assessment is reached.

The Copi (Computerized Oral Proficiency Instrument) is another computer-based test that is used to assess oral proficiency (Chapelle & Douglas, 2006). Raters listen to test takers' responses online while a computer-mediated scoring system automatically assigns a score based on an algorithm, thus "combining the capabilities of computer and human raters to evaluate constructed responses" (p. 38). The program grants a certain degree of flexibility by allowing the test taker to select a level. Speaking tasks are then selected from that level in addition to a higher level (Jamieson, 2005). The Versant Speaking Test is another example of a computer-based speaking test. It uses speech processing technology that recognizes the rhythms and pronunciations of native and nonnative English speakers. The program assigns independent scores based on content (the words the speaker has used) and manner

(pace, fluency and pronunciation of the words in phrases and sentences), and the overall score is a combination of the subscores.

Some standardized tests such as the Test of English as a Foreign Language (TOEFL) and Test of English for International Communication (TOEIC), developed by Educational Testing Services (http://www.ets.org/), are paper-based tests but use optical scanners to read and score answer sheets. Although optical scanners are not a new technology, they are certainly appreciated for the amount of time and effort saved in marking multiple choice questions by hand. The TOEFL is also offered as an internet-based test, known as TOEFL iBT. Although the speaking and writing components are scored by human raters, having the test administered online has allowed the developers to broaden their customer-base and reach millions of test takers from all over the world.

The latest development in computerized language testing is Computer-adaptive Language Testing (CALT). Unlike other computerized tests that merely replicate a paper-based test, "a computer-adaptive test selects and presents items in a sequence based on the test taker's response to each item" (Chapelle & Douglas, 2006, p. 7). If the first question is answered correctly, the program selects a more difficult question. If the next question is answered correctly, an even more difficult question is presented, and so on. The opposite is also true, so that if the test taker answers incorrectly or misses a question, an easier question is presented in the sequence. In this way, the program "adapts" to the test taker's ability.

Computer-adaptive testing (CAT) appears to be an efficient testing method. By adapting the test to the test taker's ability, the test targets the examinee's actual ability, thus providing more reliable results. Chapelle and Douglas (2006) claim that questions which are too difficult or too easy do not offer a true picture of the test taker's abilities. Furthermore, by eliminating these challenging and easy questions, fewer questions are needed to assess the test taker. McNamara (2000) suggests that another advantage of CAT is that test security is less of a problem since test items are selected from a pool of questions which are adapted to each individual test taker. Therefore, each test taker would receive a different set of questions, assuming that the test item pool is large enough to offer a variety of question items (Fulcher, 2010).

While great advances have been made with regards to CBA, it is probable that CAT is mostly limited to standardized language tests. Bodmann and Robinson (2004)

claim that the challenges associated with CAT, in conjunction with teachers' limited resources, are likely to steer teachers and administrators towards non-adaptive tests. That is, classroom CBAs used for formative and summative purposes are likely to merely replicate paper-based tests in format and content.

Benefits of CBA

Scorability is probably one of the most desirable features of computerized tests, especially when using objective items such as multiple-choice questions. The greatest advantages of using computers over human raters to score multiple-choice questions are speed and accuracy. Not only do computers score more quickly than any human can, but they can also do it much more efficiently (Chapelle & Douglas, 2006).

Another positive aspect of CBA in general is the amount and type of data that can be generated after a test is administered. Invaluable information about the test itself as well as the test taker can be obtained from a CBA that would otherwise be extremely difficult with a paper-based test. Technology has made it easier and faster to conduct test item analysis to determine "good" or "bad" test items, compare students' scores within a group, compare students' scores across groups and determine the amount of time students spent on particular test items. All of this data can eventually help test developers enhance their tests to make them more effective.

The fact that CBAs eliminate the need for paper means that they are also environment-friendly alternatives to paper and pencil exams. This is especially significant when large numbers of test takers are involved.

Computerized testing may also have a positive effect on student performance and morale as indicated in the study by Ricketts and Wilks (2002). Zakrzewski and Bull (1998) found similar results in their study and reported an air of "calm concentration and activity" among students in a computer-based testing environment. In a comparability study of a paper-based test and a computer-based test by Chua (2012), there was no significant difference in performance among the two tests, but there were significant differences in testing time and motivation. According to the author, CBA significantly reduced testing time and increased students' motivation. Although the reduction of testing time is not necessarily an indication of performance, it is worth mentioning since most tests are timed.

Challenges Related to CBA

Because classroom assessments are likely to be non-adaptive as suggested by Bodmann and Robinson (2004), tests designed for classrooms purposes are probably restricted in the type of questions used. Test items may be limited to multiple-choice formats to allow for easier scorability. Though there are numerous benefits to these types of questions, test developers are limited in what can be tested.

The effort involved in developing a computerized test is another factor which could affect attitudes towards CBA. Computerized assessment may initially require extensive time and training, and teachers may be discouraged because of the amount of effort it requires. Those who appreciate the fact that technology can actually make assessment easier, faster and more consistent are more likely to have positive attitudes towards computers (Zakrzewski & Bull, 1998), whereas negative attitudes can hinder the adoption of CBA.

When CBA is used for classroom purposes, there is usually an assumption that all those involved, from students to teachers to administrators, are familiar with technology. This may be true for the majority of today's learners and teachers, but it may not be the case for many others. For many teachers, especially more mature teachers, using technology is a skill that has to be learned. Teachers may very well avoid using new technology in the classroom because they have not received proper training, which may foster some apprehension (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). To make matters worse, many educational institutions today are incorporating mobile technology into all aspects of teaching and learning, obliging teachers to use it on a daily basis. Having technology enforced upon teachers only increases their anxiety, and ultimately, their resistance to it.

While today's young students are probably quite comfortable using technology, there may be some who are disadvantaged when taking computerized test. They may be mature students who have never had the opportunity to use computers, or they may not have had the financial means to use or purchase a computer. Suddenly sitting for a high stakes exam using a computer can be a daunting experience and affect the validity of the results.

Chapelle and Douglas (2006) suggest that computer-adaptive testing may pose risks to test security. When standardized tests allow test takers the convenience and flexibility of taking tests online, it is important to ensure the identity of the test taker.

While this may be true of high stakes exams such as the TOEFL, it may not be so much of a problem for lower stakes exams like classroom formative assessments. In fact, for low stakes assessments, CBA could be an advantage as it allows the test administrator to easily randomize questions, thus reducing the chance of cheating.

Mobile Technology

One definition of mobile learning is "the processes of coming to know through conversations across multiple contexts among people and personal interactive technologies" (Sharples, Taylor, & Vavoula, 2007, p. 225). This definition takes into account conversation as a constructive process that goes beyond individuals and "makes no distinction between people and interactive systems such as computers" (p. 227). It also points to learning as not only occurring in a context, but also creating contexts through continual interaction. The authors argue that context is dynamic. In a traditional classroom, context may appear to be stable because there is a fixed location, set resources, an agreed upon curriculum and one teacher. However, with mobile learning, these features of the traditional classroom context may not exist, thus new contexts are created.

A more simplistic definition of mobile learning refers to the ability to learn anywhere at any time facilitated by mobile devices such as computer tablets, Personal Digital Assistant (PDA) devices and mobile phones (Traxler, 2009). It is this simplified definition that will be adopted throughout this paper. Mobile technology, therefore, is the technology that enables users to take advantage of handheld devices utilizing high band width infrastructure and wireless technology to create individual learning spaces that promote e-learning in an anytime/anyplace environment (Triantafillou, Georgiadou & Economides, 2008).

Recently, educational institutions have started integrating mobile technology into their courses. More specifically, tablet computers such as iPads are replacing personal computers and laptops (Gawelek, Spataro, & Komarny, 2011; Schaffhauser, 2012; Wakefield, & Smith, 2012; Miller, 2012). Specifically, iPads are currently the preferred choice for educators who have already adopted or plan to adopt mobile technologies for their classrooms (Ackerman, 2013). Like other tablet computers, the iPad appeals to a majority of users because it allows users to easily access the internet,

send emails, take notes and pictures, utilize electronic textbooks, as well as view multimedia content (Mang & Wardley, 2013).

Advantages of iPads in Education

The biggest advantage of the iPad is probably its size. It is smaller and lighter in weight than the average laptop, making it more easily transportable. The screen ranges in size from 7.9 inches to 12 inches, while the weight ranges from .64 of a pound to 1.57 pounds (http://www.apple.com/ipad/compare/). The size and weight of the iPad is what makes it particularly attractive to students as they can easily access material wherever they may be. The iPad also has a relatively long battery life compared to a laptop. Users can expect up to ten hours of usage from a fully charged device (http://www.apple.com/ipad/compare/). For students this is especially important as it eliminates the need to carry a charger for their devices.

Another advantage is that the iPad makes it easier to engage with class material. Users can annotate documents easily by using a finger or stylus to write directly on documents. They can then save the documents with the annotations for later use. The built-in camera also allows students to take screenshots of handwritten texts and drawings (Mang & Wardley, 2013).

Compared to laptops, iPads are also likely to create more collaborative working spaces. In their study on student interaction among learners using iPads, Fisher, Lucas and Galstyan (2013) found that iPads "serve as a public center of communication in which multiple students can view, discuss, and interact with the device simultaneously (p. 176). Laptops, on the other hand, are larger in size, creating more private work areas and inhibiting the kind of interaction afforded by iPads.

Disadvantages of iPads in Education

Due to their small size, accessing the keyboard can be problematic. To input data, the on-screen keyboard needs to be activated, and this keyboard can obscure half of the screen making typing quite difficult. External keyboards are available, but that would mean adding weight and bulk to the device. The size of the screen could also be a concern when reading longer texts, requiring students to continuously scroll up and down the screen to read lengthy texts.

Furthermore, word-processing, spreadsheet and presentation software for iPads does not offer users the same features as those available for traditional computers. Although numerous applications have been designed specifically for the iPad, they often lag behind those written for personal computers (Mang & Wardley, 2013). Moreover, many of the applications seem to focus on content delivery rather than productivity. Hence, they do not seem to revolutionize teaching and learning (Murray & Olcese, 2011). It appears, therefore, that we need to look beyond the applications designed for iPads to realize the full potential of these mobile devices.

Another drawback is that the storage capacity of iPads is quite limited compared to personal computers, limiting the amount of data that can be stored on the device. Currently, the latest models have a maximum storage capacity of 128 GB (http://www.apple.com/ipad/). No doubt this is quite impressive for such a small device, and users can purchase additional storage space on the "cloud" or utilize document repositories such as Dropbox and Google Docs (Murphy, 2011). However, this is considered a disadvantage because the additional storage space is not on the actual device and one would need internet access to retrieve any stored documents.

Another consideration is the various software updates. There have been numerous updates to the operating system since the iPad was first launched. While these updates were made to enhance the performance of the device, older models may soon become outdated and may not support the updates. The first version of the iPad, for example, is now obsolete, and owners would have to upgrade to a newer model to take advantage of the enhanced features. Furthermore, applications that were designed to work on a particular version of the iOS software may not function on other versions, so learners would need to ensure that their software is updated regularly. This is especially important when the devices are used for assessment.

Adoption of iPads in Tertiary Education in the Middle East

Several institutions of higher education in the Middle East region, particularly in Qatar (Ally, 2013; Ally, Grimus, & Ebner, 2014; MacLeod, 2015) and the United Arab Emirates (Gitsaki, Robby, Priest, Hamdan, & Ben-Chabane, 2013; Hargis, Cavanaugh, Kamali, & Soto, 2014), are trialing or have already adopted iPads for their classrooms. Initial reports have shown favorable attitudes from teachers and students towards the implementation. Some of the positive outcomes included greater

communication between teachers and students (MacLeod, 2015), more student engagement (Hargis, et al., 2014), easier access to course material (Ally, 2013) and an increase in informal learning (Ally, 2013; Hargis, et al., 2014). There were also several concerns regarding the implementation, and these included, but were not limited to, insufficient training of teachers and students to use the devices and applications (Hargis, et al., 2014; MacLeod, 2015) and slow connectivity (MacLeod, 2015).

Testing on iPads

While there is currently a large amount of literature on iPad implementation projects (Gawalek et al., 2011; Fisher et al., 2013; Wakefield, & Smith, 2012; Miller, 2012; Mang & Wardley, 2013), there seems to be a shortage of research on testing using iPads. This is likely due to the relative newness of iPad technology and the fact that the devices have only recently been introduced in schools. It is also likely that the research has given priority to how iPads are used for learning and teaching, and given less importance to testing on iPads for the time being. Nevertheless, testing and evaluation are crucial components of any curricula, and it would be unreasonable to evaluate the implementation of iPads in classrooms without investigating how they are used as testing tools.

Triantafillou et al. (2008) describe the design of a computerized test delivered on Personal Digital Assistants (PDAs). Their choice of PDAs was based mainly on its portability and touch-sensitive screen, as well as eliminating the need for designated computer labs. They found the test to be an effective assessment tool, with students expressing satisfactory opinions. While many language tests are linear in that they imitate paper-and-pencil tests and present them in a digital format, the test in mention was a computer-adaptive test (CAT) which was tailored to each test taker's ability. Weaknesses identified in this study were related to the adaptive aspect of the test and not the device. Although PDA devices are quite different from iPads, they share a common element: mobility. It was mostly this feature that the students in this particular study appreciated the most.

Santos' 2013 study, carried out in the United Arab Emirates, describes how mobile devices, mainly smartphones, were used in the formative testing of a group of undergraduate students. The researcher delivered short interactive quizzes to promote

class discussion and to support students' learning of the course material. The findings reflected positive outcomes; not only did the quizzes encourage discussion inside and outside the classroom, but students reported that the quizzes were useful for revising lessons and actually made them study more. Santos points out, though, that the integration of the mobile devices was not driven by technology alone. She believes that the experience was positive because "the quizzes were planned with a pedagogic purpose in mind" (p. 12), i.e. using mobile devices as learning tools. This is quite significant because it takes into account the pedagogical aspect of technologically-driven curricula. It also confirms what experts in the field have already indicated regarding computer-based assessment. Computers are merely a vehicle for delivering tests and raise questions about what new language tests are measuring, the construct validity of these tests, how the results are interpreted, and the impact they may have on teaching and learning (Chapelle & Douglas, 2006; Fulcher, 2010).

Chapter Three: Methodology

This chapter describes the design of the research. I begin with a brief overview of the context and then explain my choice of research method. I follow this with a detailed description of the participants and the procedures that I used to collect the data. These included the distribution of two questionnaires to students and teachers, the administration of two language tests, students' feedback on these tests, and interviews with teachers.

Overview

The literature suggests that there are great benefits from using iPads as teaching and learning tools. However, there is currently limited research on the use of iPads specifically for testing. This study sets out to investigate whether the advantages of testing on iPads outweigh the disadvantages. In particular, the study aims to explore the views of teachers and students who have been using iPads regularly in their classrooms. It also aims to evaluate how the experiences of students compared when testing on iPads, paper and desktop computers. To determine the feasibility of testing on iPads, a small-scale study was carried out in the language program at Middle East Institution (MEI) in the Gulf region.

MEI is an institution of higher education that offers diplomas and bachelors programs in various disciplines. Use of technology is a major component of all academic programs at MEI. In the language program at the institution, iPads are used for all classroom activities and assessments. When the data was collected in the spring semester of the academic year 2014-2015, the iPad implementation project had been in its third year. Consent to carry out this research was obtained from the institution, and participation was completely optional.

Research Method

Although there are quantitative elements that are apparent in the questionnaires, the research is exploratory in nature and a qualitative approach is used to analyze the data.

The Participants

Twenty six female students took part in the study. The selection of participants was based on convenience sampling. Although both males and females study at the institution, the females were more readily accessible to the researcher. The students were all lower intermediate ESL learners, enrolled in Level 2 of the four-level language program. The demographics section of the questionnaire revealed that nineteen students were in their first semester in the language program, while seven students had been enrolled in the program for up to two years. The students ranged in age from eighteen to thirty five, with the majority (73%) being 18-20 years of age. The number of hours per day that students spent on an iPad for educational purposes varied; the least amount of time was one hour, whereas the most amount of time was seven hours. The number of hours they used an iPad for entertainment also varied, from only one hour to seven hours per day. However, some participants did not indicate a specific number; two stated that they only used it sometimes, and one stated that she rarely used it.

Twenty two male and female teachers also took part in the study. There were eleven male teachers and eleven female teachers, all of whom were teaching in the language program at the same institution. Sixteen of the teacher participants (72%) were above the age of forty. The teachers varied in their experiences; only four participants were new to the institution, and the majority had been at the institution for two to five years, indicating that most of the teachers had been using iPads in the classroom since the implementation project started in 2012.

Procedures

Data for the study was collected from questionnaires distributed to students and teachers, students' written feedback on two formative tests delivered on iPads, paper and desktops, as well as interviews with teachers. The combined data provides both quantitative and qualitative elements. Creswell (2008) suggests that a mixed methods approach "provides a better understanding of the research problem and questions than either method by itself (p. 552). By collecting data from various sources, I was also able to triangulate the findings and provide an interpretation which is as valid and credible as possible (Creswell, 2008).

Questionnaires

Since the students' experience of assessment on iPads is that of test taker while the teachers' experience is one of test creator or administrator, two different questionnaires (Appendices A and B) were administered to each group. Items used in the questionnaires were based on findings in the literature as well as the researcher's own classroom observations. Both questionnaires were made electronically available through SurveyMonkey®. The closed-ended items of both questionnaires were analyzed quantitatively, whereas the open-ended responses were analyzed qualitatively and coded inductively for patterns.

The questionnaires were used to answer the first research question, "What are the advantages and disadvantages of testing on iPads from teachers' and students' perspectives?" The first questionnaire (Appendix A) was designed to evaluate students' prior experiences with testing on iPads. The questionnaire was distributed to twenty nine students and twenty six completed the questionnaire (a response rate of almost 90%). The student questionnaire was in English, but an Arabic translation was provided to minimize any misinterpretations by low-proficiency students. They had the option of answering in either English or Arabic. The questionnaire consisted of ten closed-ended items. Each of these items required the students to answer "yes" or "no". There were also two open-ended questions asking students to expand on what they believe are the advantages and disadvantages of using iPads for assessment. A final question asked the participants to indicate a preference for tests administered on iPads, desktops or paper and asked them to provide an explanation for their choice.

The second questionnaire (Appendix B) was sent out to thirty two teachers and twenty two responded (a response rate of about 69%). The teacher questionnaire consisted of nine closed-ended items and was similar in format to the student questionnaire. This questionnaire also had two open-ended questions asking teachers about the perceived advantages and disadvantages of testing on iPads. Similar to the student questionnaire, teachers were also asked to indicate their preference for tests administered on iPads, desktops and paper. At the end of the questionnaire, the participants were asked to indicate their willingness to take part in an interview.

Students' Feedback on Language Tests

In order to answer the second research question, "How does the testing experience on iPads compare with the testing experience on paper and personal computers?" two different formative tests, one grammar and the other reading, were created (see Appendices C and D). The purpose of having students take the tests in different formats was not to evaluate students' performance. Rather, the main focus of the tests was to evaluate the students' experiences of each testing mode, i.e. iPads, paper and desktop computers. The tests were first reviewed by two other teachers at the institution and minor changes were made to the question items and texts. The tests were then piloted with a group of seventeen students who were not part of the main study. No major problems were reported with either the test or the test administration, and both tests were deemed to be suitable tools for the research.

The final grammar and reading tests were administered to two different groups of students studying the same English course. These were the same students who had previously responded to the questionnaire. The tests were designed to mimic summative tests that students take on a regular basis throughout the course. The students were informed that these were formative or "practice" tests, and that the results would not be counted in their overall course grade. They were informed, though, that they should approach the tests seriously and do their best to answer all the questions.

The first test, the grammar test (Appendix C), consisted of twenty questions and had three question types: multiple-choice, short answers, and matching questions. The grammar test was administered to one group, Section A, first using iPads and immediately after that using paper. The same grammar test was also administered to the second group, Section B, first on paper and then on iPads. By giving the students the exact same test in succession, I suspected that students would not give the second mode of test the same attention that they did for the first and merely mark their answers randomly without reading the questions again. Furthermore, there was the possibility of test order affecting students' attitudes towards a particular test. Since my focus was on the way students reacted to each test and not their actual scores, I decided to alternate the order of the tests for each group of students. By alternating the order of which test was administered first, I was able to compare the scores of both groups to further ensure that the tests were treated equally by the students. A

comparison of the scores of both groups of students could help identify patterns of behavior, and any discrepancies in the scores could indicate that the students did not give each mode of test its due attention or that the order of the test may have affected their attitude towards that particular test.

The second test, the reading test (Appendix D), also consisted of twenty questions and included multiple-choice, short answers, and matching questions. Similar to the previous grammar test, it was administered to both groups, but this time using iPads and desktop computers. Again, the order of the tests was alternated so that Section A took the reading test on desktops first and then iPads, whereas Section B took the same test on iPads first and then desktops. A computer lab at the institution was used for the reading tests.

All the tests were conducted under strict exam conditions, following the same protocols called for in summative tests. Typical MEI test procedures on iPads are outlined below:

Before the test. Students need to ensure that they have updated their iPads to the latest operating system (During the study, students were using iOS 8.0). They also need to ensure that they have installed the app Lockdown Browser. They are required to fully charge their devices before the test, but plenty of electrical outlets are available in each classroom, so students can charge their iPads in class if needed. Major assessments such as final exams are piloted and test administrators are asked to report any problems with the test itself or the administration process.

During the test. Students are seated in rows, and there is a distance of a desk's length between students. There are usually two invigilators in the room during any given test. In addition to monitoring students during the test, they also sometimes deal with minor technical difficulties. When any test is administered, the Guided Access feature on the iPad is used to "lock" students' iPads to prevent them from accessing the internet or other documents during a test. To activate the feature, students must first go to the settings on their iPads and turn on Guided Access. The next step is to enter a passcode. They then open the "Lockdown Browser" app which they have pre-installed. They need to select the learning management system pertaining to their institution (In this case, it is BlackBoard Learn version 9.1). Then

they tap the home button three times in quick succession to activate the Guided Access feature. Once they do this, their iPads are locked, giving them access only to BlackBoard. They log in using their credentials and go to the exam which requires a password. When the administrator has checked that everyone is logged in and ready to begin, he or she sends out the password and students begin the exam. Every exam is timed, and students can view the time remaining on their screens.

With the exception of writing tests, all tests are conducted online. However, part of a test may be on paper, and students transfer their answers to BlackBoard. In the case of Reading, for example, students receive the reading passages on paper, but all questions are viewed and completed online. This is to avoid having students continuously scroll up and down or jump from page to page to read the text and answer the questions. A listening test, however, is first administered on paper. This is to allow students to write quickly while they listen, since typing on the iPad's keyboard tends to slow students down. After all the recordings have been played and students answer the questions on paper, they are then given the password to the online test. At this point, they are only given fifteen minutes to transfer their answers from paper to computer (For the electronic tests carried out in this study, the grammar test was completely computer-based, whereas the reading test was similar to the summative tests, so students received the reading passages on paper and answered the questions online).

After the test. When students have completed a test, they save their answers and submit the test. If they do not complete it before their time is finished, the program automatically saves their answers and forces submission. After the test is completed, the administrator checks that the exam has been submitted. The student then de-activates Guided Access by tapping the home button again three times, enters the Guided Access password and closes the program. Once this process has been completed, the student can leave the testing room. For low-stakes weekly quizzes, students can view their results on BlackBoard immediately after submission. However, for high-stakes summative assessments, students usually receive their results after a few days.

Testing procedure for grammar and reading tests. For the grammar test which was administered on paper, students were required to mark all their answers on the test paper, and the test administration followed standard testing procedures. As for the reading test administered on desktop computers, students first needed to access the Lockdown Browser application which was preinstalled on all the computers in the lab. They then logged in to BlackBoard and accessed the test from their institutional course. After they had all logged in, they received a paper copy of the reading passages and the password to the test.

The decision to use iPads and paper for the grammar test and iPads and desktops for the reading test was random. Table 1 illustrates the test administration process:

Table 1: Test Administration Process

Steps	Section A		Section B	
Order of Test	1st	2nd	1st	2nd
Grammar Test	iPads	paper	paper	iPads
Reading Test	desktop	iPads	iPads	desktops

Administering the tests in different formats allowed the participants to reflect on the test-taking, test-administration and test-scoring process of each mode. After each test administration, students took part in an in-class evaluation of the testing process.

Right after students had completed the grammar test on iPads and paper, students were arranged into groups and asked to discuss their experiences. In particular, they were asked to compare the two modes of testing, iPads and paper, in terms of what they liked and did not like about each one and any problems they might have experienced. There were a total of seven groups of students with three or four students per group. Guiding questions were provided (see Appendix E) to stimulate discussion as well as provide written feedback on the different modes of testing. After students had had time to compare and discuss their experiences with their group

members, a whole class discussion ensued to allow students to elaborate on the comments they had made. During the class discussion, I took notes of these additional pieces of information and compiled the results along with the written feedback.

Similarly, right after the reading test on iPads and desktops, students were again placed into groups and given a set of guiding questions (see Appendix F). This time there were a total of eight groups of students with three or four students in each group. Students were asked to document their responses and another class discussion followed in which I again documented students' oral feedback. A compilation of the students' written feedback and their additional comments during the class discussions on the grammar tests and the reading tests are presented in the findings.

Teacher Interviews

After the questionnaires and tests were administered, interviews with six teachers were conducted (see Appendix G for interview questions). The purpose of the interviews was to allow the participants to comment more freely on issues discussed in the questionnaire and their experiences with the different test formats. The interviews were semi-structured to allow for more flexibility, and a list of topics were prepared in advance to help probe into certain areas. The interviews were conducted individually and took place in a private office at the institution. They lasted about twelve to fifteen minutes each and were recorded on the researcher's iPad with the participants' permission. When analyzing the data, the researcher listened to each recording twice. The first time was to gain a general idea of the participants' perspectives. The second time was to assess more thoroughly the reasons behind these perspectives. The interviews were not transcribed but notes were taken from the recordings and these notes were coded for emerging patterns.

Chapter Four: Data Analysis and Findings

In this chapter, I examine the data collected from the questionnaires, the students' feedback on the tests, and the teacher interviews. I begin with an analysis of the student questionnaire and compare the findings with the teacher questionnaire. I then discuss students' feedback on the different modes of testing they had experienced. Finally, I discuss the results of the teacher interviews.

Analysis of the Questionnaires

Student Questionnaire

The student questionnaire aimed to elicit students' views on using iPads in general and using iPads for testing in particular. The questionnaire contained ten closed items asking the participants to indicate either *yes* or *no* to each of the items. The first three of these items were related to using iPads in general, while the last seven closed items were related to testing on iPads. Table 2 below shows all responses to the closed items.

Table 2: Student Responses to Closed Items (n=26)

#	Item	Yes	No
1	I am comfortable using an iPad in the classroom.	22 85%	4 15%
2	I find it easy to read on an iPad.	22 85%	4 15%
3	I can type easily on an iPad.	10 38%	16 62%
4	The iPad's screen is suitable for test-taking.	18 69%	8 31%
5	I find it easy to take English language tests on an iPad.	16 62%	10 38%

6	I like receiving my results immediately after taking a test.	26 100%	0 0%
7	Sometimes I have technical problems when taking a test on an iPad.	19 73%	6 23%
8	I find it easy to answer **multiple-choice** questions on an iPad.	24 92%	2 8%
9	I find it easy to write **short answers** to questions on an iPad.	22 85%	4 15%
10	I find it easy to answer **matching** questions on an iPad.	15 58%	11 42%

Item #1 enquired whether students were comfortable using iPads in the classroom. Twenty two out of the twenty six participants (85%) indicated that they were comfortable using iPads, and only four stated that they were not. Item #2 and #3 pertained to reading and typing respectively. The majority of participants (85%) found reading on iPads easy, but 62% indicated that typing on iPads was problematic. Moreover, 69% of the participants felt that the iPad's screen was suitable for test taking.

Item #6 asked whether students liked receiving their results immediately after taking a test, and all twenty six students stated that they did. Item #7 was concerned with technical problems students may have experienced during a test on an iPad. About three fourths of the participants (73%) confirmed that they had experienced technical difficulty during a test.

The last three items were related to the type of questions encountered on computer-based tests. The majority of students found answering multiple choice questions and short answer questions easy (92% and 85% respectively), but fewer participants (58%) felt it was easy answering matching questions on iPads.

The next two items on the questionnaire were open-ended items and were aimed at determining the participants' views on the perceived advantages and disadvantages of testing on iPads (see Appendices H and I for all of the participants' responses). There were seventeen responses to each of these open-ended items. Some of the responses were originally in Arabic, so I have translated these into English to

the best of my ability and have indicated that the comments are translations of the originals in Arabic.

Regarding the advantages, nine participants stated that receiving test scores immediately after the test is an advantage. Another benefit, according to the participants, is that iPads are easy to use, and this was mentioned by seven of the participants. Four participants stated that taking tests on iPads is faster, and one student mentioned the iPad's ability to save answers.

As for the disadvantages, the main concern among the student participants was the wireless connection. Seven students mentioned loss of Wi-Fi connectivity during a test as a major problem. Another disadvantage, according to the students, is that iPads are harmful to the eyes, and this was mentioned by four of the participants. Other disadvantages that were mentioned are students' ability to cheat, difficulty writing on the iPad, and having to charge the battery.

The last item on the student questionnaire (see Appendix J for all responses to Item #13) asked the participants to choose their preferred testing mode from among iPads, desktop computers/laptops, and paper. Fourteen of the participants preferred tests on iPads, while twelve preferred paper tests. None of the participants favored desktop computers/laptops as a testing mode. The main reasons for choosing iPads were ease of use, immediate feedback, and speed of the test-taking process. However, the main reasons cited for preferring paper tests were ease of writing and not having to depend on the internet.

Teacher Questionnaire

Similar to the student questionnaire, the teacher questionnaire also aimed to gauge the participants' views on using iPads for testing. The questionnaire contained nine closed items which focused on different aspects of testing on iPads. Table 3 below shows all of the teachers' responses.

Table 3: Teacher Responses to Closed Items (n=22)

#	Item	Yes	No
1	I am comfortable using an iPad in the classroom.	21 95%	1 5%
2	I have adequate training in using iPads for assessment.	21 95%	1 5%
3	I receive the support I need when administering tests on iPads.	20 91%	2 9%
4	I have encountered technical problems when administering tests on an iPad.	19 86%	3 14%
5	It is easier for students to cheat when taking a test on an iPad.	8 36%	14 64%
6	Setting up iPads for assessments is an easy process.	7 32%	15 68%
7	**Multiple-choice** type questions are suitable for tests on iPads.	22 100%	0 0%
8	**Short answer** type questions are suitable for tests on iPads.	12 55%	10 45%
9	**Matching** type questions are suitable for tests on iPads.	21 95%	1 5%

The responses to the teacher questionnaire indicate that the majority of teachers are comfortable using iPads in the classroom. Only one participant indicated otherwise. Item #2 was concerned with receiving training on iPads, and again, only one participant stated that he or she had not received adequate training in using iPads for testing. On a similar note, twenty of the participants (91%) felt that they received sufficient support during test administration.

Item #4 asked whether the participants had experienced any technical problems during test administration. Nineteen out of the twenty two participants (86%) mentioned that they had encountered difficulties during tests. Item #5 was related to cheating, and over a third of the participants believed that it was easier for

students to cheat when tests were administered on iPads. Furthermore, only about one third (32%) of the participants felt that setting up iPads for a test was an easy task.

The last three closed items asked the participants about the types of questions which they believe are suitable for testing on iPads. All of the participants stated that multiple choice questions are suitable for tests on iPads, and 95% felt that questions which require students to match items are also suitable. However, just over half (55%) felt that short answer type questions are suitable.

The open-ended items on the teacher questionnaire also asked the participants to indicate the perceived advantages and disadvantages of testing on iPads. All twenty two participants responded to the open-ended items (see Appendices K and L for all the responses to these two items).

According to the teacher participants, there are many benefits to using iPads as testing tools. The greatest advantage is the instantaneous scoring, and this was mentioned by fifteen out of the twenty two teachers. Another advantage mentioned by seven teachers is increased test security which is enhanced by the randomization of questions. Participants also mentioned that statistical analysis of test scores is more readily available, and computer-based tests are more environmentally friendly than paper-based tests. However, one participant indicated that there are no clear advantages to using iPads for testing.

The teacher participants also cited numerous disadvantages to testing on iPads. The findings indicate that the biggest problem with testing on iPads is the device's susceptibility to technical failure. The devices do not always perform the way they should, and the screen sometimes freezes. Related to technical problems is the issue of Wi-Fi connectivity. Administering tests online requires an internet connection, and servers cannot always handle large amounts of traffic. Another problem associated with testing on iPads is setting up the devices for tests. In addition to being time-consuming, there is sometimes inconsistency regarding how the devices are set up, giving some students an advantage over others and subsequently affecting the validity of the test or even test security. Another major problem, according to the participants, is the type of questions that can used for an iPad administered test. Question items which require students to type long texts are not well suited for iPads because of the difficulty of typing on iPads. This, therefore, limits the type of test questions and is

likely to affect the validity of the test. Two teachers also mentioned that iPads are unhygienic and are likely to spread disease.

The teacher participants were also asked to select their preferred testing mode from among iPads, desktop computers/laptops, and paper (see Appendix M for all responses to Item #12 of the teacher questionnaire). An equal number of participants preferred iPads and desktop computers/laptops (ten participants each) as testing tools and only two preferred testing on paper. The main reasons for choosing iPads were convenience since students already had them, practicality because they are highly portable, and ease of marking. However, the main reasons given for preferring tests on desktop computers or laptops were ease of typing, ease of marking, greater security, fewer problems than iPads and easier to set up.

A comparison of the students' and teachers' responses on the questionnaires reveals several elements in common between the two groups. Both students and teachers appear to be quite comfortable using iPads in the classroom. This could be because iPads had been in use for almost three years at the Middle East Institution when the research was carried out, indicating that both students and teachers had had time to adjust to using iPads. Furthermore, both groups mentioned experiencing technical difficulties during assessments. Students and teachers also believed that multiple-choice type questions were well suited for tests on iPads.

However, there were quite a few differences in the responses of students and teachers. Although both groups seemed to agree that multiple choice questions were suitable for tests administered on iPads, they differed in their opinions regarding the other question types. The majority of students believed that short answer type questions were suitable for tests on iPads, while about half of teachers did not. Similarly, the majority of teachers felt matching type questions were suitable for tests on iPads, whereas almost half of students did not. The differences in their opinions could be due to the fact that the students experience the tests differently than teachers. Matching type questions require the students to manipulate the screen, usually by scrolling up and down. Students, as test takers, would be more aware of the difficulty involved in answering this type of question, hence the relatively large number of students who felt it was not easy answering this type of question. However, teachers would be better informed of how effectively the short answer type questions were answered. As test administrators, teachers have access to the statistical analysis of the

tests, and they would be in a better position to evaluate how the questions are answered and the types of mistakes students make. Students may think that they have provided the correct short answers, but teachers would be able to see that the students' answers may not be an exact match, usually because of spelling or punctuation errors.

An analysis of the perceived advantages of testing on iPads revealed some common categories among students and teachers. According to students, the main advantages are receiving immediate feedback, ease of use, and faster testing. "Getting test scores immediately" and "easier to use" were mentioned repeatedly by the students. Teachers also believed that the immediate feedback after a test was an advantage since it does not require teachers to mark test papers. Therefore, the greatest advantage of testing on iPads, according to teachers, is reduced marking. Other categories that emerged were immediate statistical analysis, the ability to randomize questions easily, thus offering greater test security, and greater environment-friendliness than paper. However, some teachers also commented that tests on iPads were similar to other computer-based tests. As one teacher stated, "[iPads have] all the advantages of online testing - instant marking, security features, easy stats. It's green - no paper!"

Students and teachers also seemed to agree on the disadvantages of testing on iPads. The issue that was raised the most was technical failure, whether related to the device itself or the wireless connection needed during online tests. One teacher commented, "Can be time consuming especially if there are technical problems. Most tests depend on an internet connection, type of browser you're using and update for functionality and that could prove to be a huge problem." Other concerns mentioned by both students and teachers were difficulty typing, the negative effect on the eyes, and cheating. However, teachers also pointed out administrative issues such as the difficulty with setting up iPads for testing, test security, the hassle of updating software, and the limited question types afforded on iPads.

As for the preferred testing mode, students and teachers differed greatly. Students were almost equally divided between iPads and paper as test delivery modes, and not a single student selected desktop computers/laptops. In contrast, teachers were equally divided between iPads and desktops/laptops, and only two teachers preferred paper tests. The reason for the discrepancy could be related to past experiences. Since all of the student participants had joined the language program after iPads had been

implemented, they had only experienced tests on iPads since joining the institution and tests on paper from their days of formal schooling. Teachers, however, had experienced all three methods. The majority of teacher participants had been working at the institution since before the iPad initiative project. Before iPads were introduced, all students had laptop computers on which they performed all of their student tasks and tests. Since most of the teachers had experienced the transition from laptops to iPads, it was understandable that their opinions would differ from those of the student participants who had not experienced testing on laptops or desktop computers.

Student Feedback on Different Modes of Testing

Grammar Test on iPads and Paper

Students expressed different opinions of the grammar test on iPads and on paper. A compilation of students' written feedback and notes taken during the in-class discussion revealed the following:

iPads. According to the students, the most favorable aspect of taking the grammar test on iPads was the predictive text feature which allowed them to correct their spelling. Predictive text was one of the new features that were introduced to iPads with the iOS 8 update, and it cannot be controlled by Guided Access. That is, predictive text can be enabled even while the iPads are in Guided Access mode, making the deactivation of the spell check feature redundant. Most students are aware of this and use it to their advantage.

Another aspect of testing on iPads that students favored was the built in timer. The test was timed, and a small box was constantly present on the top of the screen throughout the test indicating the time remaining for the test. They mentioned that this was extremely helpful as it helped them keep track of time.

Students also stated that test submission on iPads was convenient. The test was designed to save and submit answers automatically once the time had finished, even if students had not saved the answers themselves. Another feature of the submission process which students liked was the reminder to complete all questions. If a student tried to submit and there were questions which were left unanswered, a message appeared informing the student of the questions they might have forgotten.

Some students felt that taking the test on iPads was much faster than on paper, so it saved time. They also felt that the questions were clearer on the iPad's screen. Reading from paper was somewhat more difficult than reading from a screen since the brightness of the screen can be adjusted.

On the other hand, students also mentioned some difficulties with the grammar test on iPads. The major problem was the amount of time it took to set up the iPads for the test. They felt that going through the process of enabling Guided Access and starting Lockdown Browser to get to the test was a waste of time.

They were also concerned about not being able to review the test once it was submitted. Sometimes they submit the test in haste, and there is no way of going back to review or change any answers.

Students also mentioned technical problems as one of the drawbacks of taking the test on iPads. Some students mentioned that the Wi-Fi connection was sometimes a problem. They either could not connect to the internet immediately, or they lost the connection during the test and had to restart the test. One student also mentioned the hassle of charging the battery. Students do not always remember to charge their iPads before a test, and having to charge the device during the test could cause a distraction.

Students also stated the difficulty of writing answers that would be an exact match to the answer key. One student mentioned that she was often in the habit of adding an extra space at the end of a word, and she was worried that her answer would be marked wrong because the computer program would read it differently. The student's concern is warranted because experience has shown that our students often do add extra characters such as a full stop or a space at the end of an answer, deeming the answer to be incorrect if it was not accounted for in the program's answer key. While it is easy to manage the case sensitivity of responses on BlackBoard, which we use for all of our tests, accounting for other variations requires manual input of all acceptable answers. The issue then is whether adding a space or a full stop results in an incorrect answer or not, and one which the test designer needs to decide.

Paper. Although some students felt it was easier to type on iPads, others felt writing on paper was easier and faster. They mentioned that they were more comfortable writing by hand, and it allowed them to remember their answers more easily. Some also stated that the matching questions on the paper test were easier to

answer. On the iPad test, the items appear in a drop-down menu, and students select the corresponding answer. This requires the student to manipulate the touch-sensitive screen and creates room for error. On the paper test, however, students just need to write the letter that corresponds to the correct match.

Another aspect of the paper test that they liked was that they could see all the questions at once; the iPad test required students to constantly scroll up and down the screen. Not having to scroll through the page also made it easier to review their answers.

Students did not report any major problems with the paper test, but they did express the dissatisfaction of not receiving their scores immediately. This supports the comments they made previously on the questionnaire and in the statements above about the test on iPads. The majority of students cited immediate feedback as the greatest advantage to testing on iPads.

I was interested in what students felt either hindered or enhanced their ability to achieve a higher score, so I asked whether they believed they received the same scores for both the grammar test on iPads and the grammar test on paper. Most students believed that they did better on the iPad test, mainly because of the predictive text feature which allowed them to correct possible spelling mistakes.

When asked to rate the overall experience of the two tests, there was no distinct preference. Out of the seven groups of students, one group decided that the paper exam was a better experience, two groups felt that the iPad test was better, and four groups could not decide at all. They acknowledged that each experience was different and that each test had its merits and drawbacks.

Reading Test on iPads and Desktop Computers

Similar to the grammar test, students had quite different opinions of the reading test which was administered on iPads and on desktop computers.

iPads. Again, students mentioned the predictive text feature on iPads as an added bonus. They could correct words which they thought were misspelled, which would help them get higher scores on the test. They felt that spelling was a major problem for them, and having their spelling mistakes corrected allowed for a better evaluation of their reading abilities.

They also mentioned that they were comfortable using iPads since they have been using the devices for all of their classwork. They did not feel that taking a test on iPads was any different than doing their everyday classroom tasks. In fact, some students felt it was easy typing on the iPad. They commented that they liked typing on the embedded keyboard, and there was no need for a mouse.

However, students mentioned technical problems during the test. For one student, the fact that her answers did not save until the very end of the test caused a great deal of anxiety. Another student commented that her iPad froze and she could not get into BlackBoard. She had to restart her iPad which required a few minutes.

Several students complained about the setting up process. For some, Lockdown Browser took a considerable amount of time to load on their iPads which made them frustrated. "The lockdown is bad because it always work slowly," stated one of the students. One student had to delete the Lockdown Browser app and reinstall it. This caused a delay for everyone else because passwords were only distributed when everyone was ready.

Although Lockdown Browser is essential for test security, numerous problems arise when accessing the program. In some instances, the program refuses to load. The first step to overcoming this problem is to close the app and then reopen it. This usually solves the issue, but if it does not, switching off the iPad and then restarting it may fix the problem. Sometimes even this does not work, and the only other option is to delete the app and reinstall it from the App Store, similar to what happened to one of the students during the reading test. This would require the student to enter her Apple ID and password. It is not uncommon for students to forget their passwords, which raises another problem altogether. For high stakes exams, there are usually a few spare iPads on hand for situations like this.

Desktop computers. Students seemed to favor the large screen of the desktop computers they used for the reading test. As one student commented, "The screen is big and can see good." Several students also mentioned their preference for a mouse and keyboard. They felt it was easier to answer multiple choice and matching type questions with a mouse. This is in contrast to some who actually favored the iPads for the built-in keyboard and not having to use a mouse.

Students also liked that Lockdown Browser worked much better on the desktops. They did not experience the same difficulties they did when they took the test on iPads. They also mentioned that they did not need to set up the computer, so time was not wasted. They just went directly to BlackBoard by accessing Lockdown Browser. No technical problems were reported during the test on desktops, and the internet connection remained stable throughout the test.

Although the desktops' large screens were mentioned by several students as being more favorable than the iPads' screen, some students complained about the visibility. "The screen big but the font very small," mentioned one student. Another student complained that the desktop screen was too bright.

When asked if they thought they would receive the same scores on both tests, all but one group of students thought that the results would be the same. The group which did not agree with the others felt that their scores on the desktop test would be higher because the screen was bigger, clearer, and easier to read.

As for their overall opinion of the two different experiences, three out of the eight groups favored testing on iPads, two groups preferred testing on desktop computers, and three groups were undecided. The results indicate that the experiences are quite different, and students seem to understand that each mode of testing holds advantages and disadvantages.

I believe it is worth mentioning that prior to this research, the student participants had not experienced testing on desktop computers. They were accustomed to traditional pen-and-paper tests while at school, and they are now used to taking tests on iPads. This one-off experience of testing on desktops may not have been enough to allow for a fair evaluation of their testing experience.

Teacher Interviews

For the sake of anonymity, pseudonyms have been used to refer to each of the six interviewees.

Laura

Laura was one of the newer faculty members at MEI, and she stated that she had been using an iPad before joining the institution. Personal use of the iPad involved reading, watching videos, and accessing maps when traveling. She also used

it briefly at her previous teaching position. The most useful feature of iPads, according to Laura, is access to the internet. She felt that iPads were much easier to use than smart phones.

As for testing on iPads, Laura liked that data could be uploaded quickly, there was no marking to do, and there was no processing of paper. She believed that iPads were convenient for low-stakes in-class tests. However, for high-stakes assessments, she felt that they were a source of stress. She claimed that iPads do not always cooperate, and they sometimes crash during an assessment. She also found the numerous software updates a hassle to deal with. Another problem she mentioned is the time involved in setting up iPads for assessment. She also claimed that students' iPads are not always ready for an assessment. Students might not have downloaded the required apps, and they do not always have their Apple ID credentials with them, which causes further problems.

Laura stated that "a lot can go wrong," but she is usually able to solve these problems on her own. However, there have been times when students were not able to take an in-class assessment because a problem could not be resolved. For high-stakes assessments, she has called the IT department. She also said that she always runs into difficulties and has never administered a test without any problems.

Facing these problems have caused her a great deal of frustration. Laura asked, "Why do we have to do testing on iPads?" She stated that a testing should be conducted in a dedicated facility with dedicated equipment, as is done in many institutions. She thought this would eliminate all of the problems we are currently facing. She added, "I feel like I have a bad attitude about having to deal with it because, you know, there's going to be problems, and you're going to have to run around."

When asked to choose from among iPads, desktops, laptops, and paper as modes of testing, she chose desktops. She commented that there was no real benefit of having a test on iPads over desktops because they achieve the same things. Using iPads wastes time and adds strain to the system. She felt that testing could be simplified if we were to use desktops. She agreed that iPads add a dimension of learning that cannot be achieved through other methods, but for testing, they were not suitable tools. She added, "There's a difference between instruction and assessment.

In terms of authentic assessment, there's nothing that can be accomplished on iPads that can't be done in another way. For me, it doesn't add anything as a teacher."

Peter

Peter had been working at MEI before iPads were introduced. Before the implementation of iPads, students and teachers used laptops for all classroom tasks and assessments. Unlike Laura, Peter had not used an iPad before the devices were introduced at the institution. He claimed that he would have never used it if he had not been forced to use it. However, he now enjoys using his iPad and carries it with him everywhere he goes. He downloads books on the device so that he can read without the need for an internet connection. He also uses it instead of a personal computer for his everyday needs such as banking or locating places when traveling.

Peter mentioned several features about iPads that he liked, the main one being its portability. He also liked that iPads are bigger than smart phones, which is better for his eyes, since he can zoom in and out of the screen. He also mentioned that he could read on his iPad while in bed, eliminating the need for an extra light.

As for classroom use, Peter said that he did use his iPad a great deal. The main reason he gave was that iPads are portable. They allow the teacher to move around in the classroom and away from the front of the room. He commented, "[iPads] certainly transformed the way things happen in the classroom. I wouldn't necessarily say for the better, but they have definitely changed the way they happen."

With regards to using iPads for testing, Peter felt that it was more difficult for students to cheat from each other when testing on iPads because the screen is relatively small and the devices are laid flat on the desks during exams. He recalled how he was once invigilating an exam for another department and students were taking their test on laptops. It was very easy for the students to cheat because the screens were so exposed and visible to the other students.

In general, though, Peter stated that he was not sure that he liked administering tests on iPads. He argued that the element of security needed to be considered. He added that laptops were better because they still eliminated the need to score tests and allowed for statistical analysis of tests, typical of any computer-based test, but they were more secure than iPads. He commented, "I've always felt that there's a real danger with the iPads because of the Guided Access – too many steps to go through.

At one point, something's going to be missed during the set up because it's so complicated. It could easily come back on the teacher." He felt that using Lockdown Browser on laptops was much easier and more secure.

Peter acknowledged that he was not sure how Lockdown Browser worked on iPads. He was aware that students could exit the test at any time, and the teacher would document it. Lockdown Browser on laptops works differently. He remembered the first time he used it on iPads. A student had gone out of Lockdown Browser and said that she was "thrown out". She went back into Lockdown Browser and resumed the test. Later, when he checked with the testing coordinator, he learned that the student had gone out of the test three times. He added, "For what reason, we don't know. There's no way of knowing."

Another aspect of testing on iPads that Peter did not like was that the testing process was "fiddly". He claimed that there were so many steps one had to go through to set up the device. He also commented on the technical issues, though he felt that these could usually be solved. After having using iPads for some time, he believed that he was able to rectify most problems he encountered. When he could not, he had had to call in someone from the IT department or use a backup paper test.

Similar to Laura, Peter did not believe there was a time when he had to administer a test on iPads and there were no problems. He stated that if there ever was a test with no problems, it would be so rare that he could not remember. However, in contrast to Laura, he claimed that he did not particularly worry about problems during tests. He commented,

> I feel comfortable knowing that there are a few things I could do to solve minor problems, and if that doesn't work, there's always IT. We have a pretty good IT department, and it's not ever going to be your problem. I don't walk into a test thinking I'm nervous because I've got to administer a test on iPads and I don't know what's going to happen. (Peter)

This comment is quite significant because it reflects the importance of having proper training in using technology and receiving adequate support from the institution, as suggested in the review of the literature (Ertmer et al., 2012). Laura joined the institution after iPads had been implemented, suggesting that she did not receive the same intensive training as those who were present from the start. Peter, however, had received the initial training and had been using technology for much

longer, which may explain why he was more comfortable dealing with issues which may arise.

As for the mode of testing he would prefer, Peter felt that laptops were best for assessments. He believed laptops were much simpler to use than iPads and they had all the benefits of computerized assessment. He added, "I used to think it was paper, but I'm not sure anymore. iPads are too tricky. Laptops cover all the bases. Lockdown Browser for iPads is a step in the right direction. It's less time consuming. I'm hopeful that there will be something soon that will do everything we want it to do."

Peter's comment above about Lockdown Browser for iPads being a step in the right direction is a reference to a previous state of testing on iPads. Right before the data for this research was collected, setting up iPads for assessments was quite a complicated process. Teachers had to lock individual iPads by first going to the settings, deactivating the spell check and predictive text features, enabling Guided Access and entering a passcode. They then had to go into a specially designed assessment app which took the student to BlackBoard. Guided Access was then activated, and the test password was distributed once everyone was ready. After the test was completed, the teacher had to re-enter the password on each individual iPad to exit the test. Not only was it very time consuming, sometimes the whole process took longer than the test itself. While using Lockdown Browser eliminates the need for the teacher to lock each iPad individually, it does pose other problems mainly that of test security, since students lock the iPads themselves and can easily unlock them if the teacher is not paying attention, similar to the incident that Peter mentioned.

Lisa

Lisa had had very little exposure to iPads before using them at MEI. Usage was limited to leisurely activities such as taking photos and videos, email, Skype and social media. She mentioned that she enjoys using her iPad.

The most useful feature for Lisa is the quick access to her mailbox. She liked that she could set up the iPad so that several email accounts could be checked without having to log in every time she wanted to send or read her emails. She also used her iPad at home to listen to the radio.

As for testing, Lisa admitted that there was not much she liked about testing on iPads. The only thing she did like, and which was not exclusive to iPads, was that

there was very little marking involved. Tests have been set up so that they are automatically marked. “The results are almost instantaneous. I don’t have to mark it. The results are very quick. It’s very satisfying for everyone,” she commented.

Lisa disliked the fact that testing on iPads is not secure. She added that even with Guided Access and Lockdown Browser in place, students could still leave the test, and access other pages on the iPad. She also felt that setting up the iPads so that teachers feel they are secure, even though they are not, is very time consuming. However, she believed that most students do not have the time or inclination to cheat because they are usually very focused on the test. She did not think that locking iPads would make much of a difference during a test, but the fact that so much time goes into setting up the devices is rather annoying. Another drawback is that handling so many devices is unhygienic. During tests, teachers sometimes have to hold the devices to address technical issues, and they are usually very dirty, which can spread disease. She also felt that iPads were bad for students’ eyes because the screens are so small.

Lisa mentioned that she often faced technical problems during tests, although not every time a test was administered. She stated that the problems were usually easily remedied, and sometimes the students were able to solve the problems on their own. When she had used laptops in the past, she also faced technical problems, but admitted that Lockdown Browser for laptops was much more effective and reliable. She felt it was also easier to monitor students when they were working on laptops because the screens were upright. She did admit, though, that it was also easier for students to cheat when testing on laptops, confirming what Peter had mentioned about cheating on laptops.

Lisa’s preference for a testing mode was laptops or desktops. Her main reason was that they offer all of the advantages of computerized testing such as immediate scoring. Although laptops and desktops do not eradicate all of the problems associated with technology, she felt that they were more secure than iPads and could easily be monitored. She added that in the past, when students were tested in a dedicated computer lab, there was software that was used to centrally monitor each individual computer, so it was much more difficult for students to cheat. However, she believed that paper tests were the most secure, but from a teacher’s point of view, “if you’re

then going to be marking the test, I like the technology because of the marking and the immediacy of the results."

A final note from Lisa was that she would be very interested to see if there was a way to make iPads more secure. For the time being, she felt that only paper should be used for high stakes exams.

Stephen

Stephen had no prior experience with iPads when they were introduced at the institution. He stated that use of the iPad was limited to the classroom, and even then, he did not use it much. "It certainly has its place, but given a choice between sitting down to, sort of, browse the internet on an iPad or on a laptop, I'd much rather have a laptop," he commented. He found certain apps which were designed specifically for iPads quite useful, though. His favorite app was Educreations which students used for productivity.

As for testing on iPads, Stephen felt that iPads did not hold any advantages over other modes of testing. He stated, "It does the job, I suppose, and we've sort of gotten better at it, or gotten on top of the disadvantages. It's an adequate experience. It's not a brilliant solution to anything." He felt the surface area of the iPad was too small to carry out tasks such as writing. He also said that reading was problematic, and students often complained of headaches and eye strain. He mentioned that students always asked for paper when they had to do any kind of reading, even when they were using laptops in the past. Now that they were using iPads, reading was even more difficult.

Stephen felt that the problems teachers have encountered with iPads were not much different than those experienced with laptops. He believed that there would always be technical issues with any computerized test, and he has not witnessed any major problems with iPads so far. Although he had experienced technical difficulties with almost every test he has administered, he stated that there was never a problem he could not solve on his own. He was also reassured that a back-up copy of high stakes exams was always available in the form of a paper exam.

When asked to choose between iPads, laptops, desktops, and paper for testing, Stephen chose laptops as the preferred testing tool. He noted that "laptops were not suitable vehicles for writing tests, and iPads were even worse." Because he enjoyed

the advantages of computerized testing in terms of instant scoring and test analysis, he felt laptops were overall, more satisfactory than iPads. He stressed, though, that writing should only be done on paper, especially since our students would eventually need to take the IELTS exam on paper. He added that holding a pen or pencil promoted engagement with the text, something today's students are losing out on.

Stephen also noted that desktops would be a good option and there is not much difference between laptops and desktops, except that desktops take up more space. Connectivity on desktops would also be better, but the fact that we would need so many desktops and dedicated spaces to run exams would be problematic. He, therefore, felt that laptops would be a good compromise.

Mary

Mary joined MEI after iPads had been introduced, but she had been briefly exposed to the devices at her previous place of employment. In her personal life, she uses her iPad mainly to compose and listen to music. She also uses it to check email and browse social networking sites.

For Mary, the most favorable feature of the iPad is its portability. It is small and light enough to carry around. She also mentioned the many useful apps which help her develop her artistic abilities.

As testing tools, Mary stated that iPads are quite suitable as they are environment-friendly options and deliver all the benefits of computerized assessment. However, for some programs such as the engineering program, she could see laptops as being a better option because they allow students to do more design work. She attributed this to the laptop's keyboard, and added that students may be able to do the same on iPads if they had external keyboards. For our English language assessments, she believed that iPads were adequate.

Her main concern with testing on iPads was the wireless connection. She felt that there was always a risk involved, and teachers needed to have a plan in place in case the internet was not working properly on the day of the test. She also felt that iPads were not especially suited for students with visual impairment. She claimed that the devices had to be set up in a special way for the text to be enlarged, and this was not always an easy task. She added, "I think it has its limitations when it comes to

special needs testing. There are still some things to work out." For that reason, she felt that laptops were a better option.

Similar to the other interviewees, Mary claimed that she had encountered problems with almost every test she had administered. For each assessment, she could usually expect difficulties with at least two students. Problems were usually related to the screen freezing or students being thrown out of the test. She recalled one incident in which a major problem could not be fixed, and the test administrator had to reset the test for the student, so the student had to start all over.

When asked to choose from among the different modes of testing, Mary chose iPads. She believed iPads served our needs as a language program and were more convenient than the other modes.

Margaret

Margaret was the most experienced teacher of all the interviewees, but admitted that she was the least "tech savvy" teacher in the department. She had not used an iPad before they were introduced at MEI, but she enjoys using it. She especially liked the iPad's portability and believed that this was its most appealing characteristic. She mainly used her iPad to check news sources, read emails and take pictures.

In terms of testing, Margaret stated that the advantage of testing on iPads, from an administrative perspective, was that tests could easily be checked because everything was saved online. However, she felt that this was also possible with laptops and desktops, so iPads did not have any real advantages over these other methods of testing.

One aspect that Margaret did not particularly like about testing on iPads was the numerous steps involved in setting up the devices. She claimed that the process was very time-consuming. She also felt that iPads were unhygienic, similar to how Lisa felt about touching students' iPads. Previously, when teachers had to set up each individual iPad, it was easy to spread germs and catch an illness. Now that we are using Lockdown Browser, physical contact with students' iPads is minimized, but teachers still have to handle students' iPads at times.

Margaret also felt that teachers were limited in terms of the question types they could use on such exams. She elaborated, "With some testing instruments, the

target that you want to test is manipulated in order to fit the limitations of the iPad…I think it can be a case of, you know, the tail wagging the dog, that you write a test so that it fits, that it's compatible with what the iPad can do. For me, it's a big reservation." She felt that the only types of questions which were suitable for testing on iPads were multiple choice questions and true and false type questions. She referred to the IELTS reading tests as an example and claimed that there are about fifteen different question types on the reading test. She believed that tests on iPads would not be able to deliver all of those types of questions.

Similar to the other interviewees, Margaret confirmed that she had encountered difficulties with almost every test she had administered. The problem was usually one of connectivity, but sometimes the problems were related to student issues such as passwords rather than technical issues. Although she was usually able to solve minor difficulties, she occasionally needed someone from IT to help.

When asked to choose a preferred testing mode, Margaret could not give a definite answer. She commented, "I don't really see why they have to exclude each other." She believed that writing tests and open-ended questions should only be administered on paper. However, tests on iPads would have to be limited to multiple choice questions.

Summary of Teachers' Perspectives

The teacher interviews revealed some rather interesting findings. One of the patterns that emerged from the discussion with teachers was that iPads have become a part of teachers' lives, not only in the classroom, but also in their personal lives. With the exception of Stephen, all of the teachers interviewed seemed to engage with their iPads outside of the classroom, using the devices to read, check emails, look up maps, take photos, and create videos, plus many more everyday activities.

Another pattern which was witnessed was that technical failure was present in almost all of the tests administered on iPads. However, it was reassuring to hear the teachers say that they were quite confident in resolving these technical issues on their own. This is probably an indication that they are comfortable using technology in general and have received adequate training in using iPad technology in particular. It was also reassuring to know that teachers felt the IT department could be relied on when issues could not be resolved by the teachers themselves. This information

triangulates with the findings of the teacher questionnaire (Item #2 related to having adequate training in using iPads and Item #3 related to receiving adequate support during assessments) in which over 90% of teachers responded with “yes”. The only teacher who expressed anxiety during the administration of exams was Laura, and that was probably because she was one of the newer faculty members and did not receive the same training as the others and did not have as much experience in testing on iPads.

Moreover, the preferred testing mode for teachers was laptops or desktops. Peter and Stephen preferred laptops, Laura preferred desktops, Lisa preferred either laptops or desktops, Margaret could not decide but seemed to favor paper, and only Mary believed that iPads were the most appropriate. These are strong indications that iPads are not the first choice when testing is concerned.

Chapter 5: Conclusions and Implications

Summary of Results

The main aim of this study was to identify teachers' and students' views regarding testing on iPads and determine whether the advantages of testing on iPads outweigh the disadvantages. The combined data from the questionnaires, teacher interviews, and student feedback can be used to answer the first research question:

What are the advantages of testing on iPads from teachers' and students' perspectives?

We can conclude that the main advantages are:

- Immediate access to test scores
- Ease of use
- Increased test security through randomization of question items
- Instantaneous access to statistical test analysis data
- Not needing a dedicated testing facility
- A more environmentally friendly alternative to paper-based tests

As for the second research question:

What are the disadvantages of testing on iPads from teachers' and students' perspectives?

The main disadvantages could be summarized as follows:

- Technical issues such as loss of internet connection, malfunction of the device, and software updates
- Health risks related to the eyes
- Threat to test security due to the students' unlocking of devices
- Difficulty of typing
- The need to charge the devices
- The additional time required to set up the devices for testing
- Inconsistency in setting up devices, which may affect test validity
- Limitation of question types

- Lack of hygiene
- Possible unsuitability for special needs students

With regards to the final research question:

How does the testing experience on iPads compare with the testing experience on paper and personal computers?

The results of the study indicate different opinions towards the three modes of testing. Students seemed to favor the predictive text feature iPads allowed for, believing it helped them obtain higher scores on open-ended test items. Though not limited to iPads, students also seemed to like having a timer visible during online tests. Another feature which they particularly appreciated was having a reminder when some items were left unanswered. On the other hand, students were frustrated by the technical difficulties they encountered during the tests on iPads.

There were no significant preferences among students for testing on iPads, desktops, or paper. They acknowledged that each mode of testing was unique, and each had its advantages as well as disadvantages. It should be noted, though, that not one single student preferred testing on desktops or laptops in the questionnaire administered at the beginning of the study. This could be because they had not up until then experienced that mode of testing. However, after they had had the chance to experience a test on desktops and compare it to the other modes, some of them actually preferred the desktop test over the iPad and paper tests. This implies that students tend to favor what they are used to.

Although the advantages and disadvantages are not limited to iPads alone, it appears that iPads do not offer any major advantages over other forms of online testing. In fact, it seems that the disadvantages actually overshadow the advantages, making iPads a less desirable option for language testing.

Limitations of the Study and Areas for Further Research

This study is not without its limitations. One of these is the scope of the study. Data was collected from a very small group of students and teachers at one particular institution which is not representative of the larger population. A study on a larger

scale which included other institutions may shed light on how others are coping with the technology. This could be an area for further study.

Previous studies of standardized exams have indicated that there is no significant difference in student performance when examinees take a computer-based exam or a paper-based exam (Chapelle and Douglas, 2006). It would be rather interesting to compare students' results on an iPad-administered test with that of a laptop-administered test. This could be another area for further study.

Another limitation is the rapid advances in technology. With the frequent updates that are required for iPads, it was very difficult to maintain consistency throughout the data collection process. For example, during the planning stage of the research, iOS 7 was in use, which was very different from iOS 8 that students were using during the data collection phase. In fact, the process of setting up the iPads for testing at the institution was also completely different. By the time I was ready to collect my data, teachers had been instructed by the institution to update their iPads to iOS 8 and follow the new procedures for testing, which included Lockdown Browser. I, therefore, decided to administer the tests under the new conditions. At present, we are using iOS 9.1, and it is very likely that newer updates will be released soon, impacting the way we conduct our assessments.

A further limitation is that, to date, there is a lack of literature on iPads used for testing. This is probably because iPads are still relatively new devices and are even newer as educational tools. As the technology continues to develop, we may witness more institutions incorporating iPads into their curricula. We may even witness more solutions to the problems we are currently experiencing as educators and learners.

Implications of the Study

Overall, iPads seem to be convenient educational tools which can do almost anything that a laptop can do. They possess many qualities which may even make them preferable to other computing devices. The iPad's popularity as an educational tool, in general, could be attributed to its small size, portability, distinctive touch screen, relatively large storage capacity, long battery life and adaptability. However, as a testing tool, iPads do not appear to hold any significant advantages over other

computing devices such as personal computers or laptops. In fact, testing on iPads could be more problematic than beneficial, as this study has indicated.

One possible solution is to continue using iPads in the classroom but resort to pen and paper when students are to be tested, especially when high-stakes assessments are concerned. These assessments already carry a high level of anxiety, and using iPads to administer the tests would only add to the stress associated with these tests. Although using paper and pen would involve extra marking on the teacher's part, it may relieve some of the difficulties associated with test administration on iPads.

Another possible solution is to go back to using laptops. Laptops have the element of portability which many of the teachers and students liked about iPads, but they appear to be more practical and less troublesome than iPads. Furthermore, laptops do not require a dedicated testing facility like desktops, so students could be tested in the classroom. However, it would be unreasonable to require students to purchase both an iPad and a laptop as that could be a financial burden. This is not an easy decision to make, and one that needs to be considered carefully.

Students could also be trained to use the predictive text feature which is available with the latest software package. While many students are aware of the feature and use it regularly, others have not yet realized that the feature can be activated while their iPads are locked, giving them an unfair disadvantage. This is also likely to affect the validity of test scores.

This study has revealed the importance of adequate training in using iPads for testing. Those teachers who received intensive training during the launch of the iPad initiative seemed to be better able to deal with the difficulties that arose during exams. It is essential to offer the same training to all new teachers to help them overcome problems and possibly reduce any negative feelings they may have towards using iPads in the classroom and during assessments. Having the confidence to use the technology is likely to create a more positive experience for all those involved.

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Appendix A: Student Questionnaire

American University of Sharjah
College of Arts and Social Sciences
Arwa Abdelhamid
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English Language Testing on iPads: Advantages and Disadvantages

This study examines the advantages and disadvantages of using iPads for assessment. Your responses will help in gaining an understanding of your experience using iPads in the classroom. The survey is completely anonymous and will not be traced back to you in any way. It will require 10-15 minutes of your time. Your cooperation is highly appreciated!

Part A: Student Background Information

1. Age _____
2. When did you join the college? Month ____ Year ____
3. How many hours per day do you use an iPad for studying? _____
4. How many hours per day do you use an iPad for fun? _____

Part B: Choose the response that best represents your opinion regarding testing on iPads.

		Yes	No
1	I am comfortable using an iPad in the classroom.		
2	I find it easy to read on an iPad.		
3	I can type easily on an iPad.		
4	The iPad's screen is suitable for test-taking.		

5	I find it easy to take English language tests on an iPad.		
6	I like receiving my results immediately after taking a test.		
7	Sometimes I have technical problems when taking a test on an iPad.		
8	I find it easy to answer **multiple-choice** questions on an iPad.		
9	I find it easy to write **short answers** to questions on an iPad.		
10	I find it easy to answer **matching** questions on an iPad.		

Part C: Please provide your opinion on the following:

11. What are the advantages of taking tests on iPads?

_____

_____

12. What are the disadvantages of taking tests on iPads?

_____

_____

13. I would like all my tests to be on:

iPads ☐ desktop computers/laptops ☐ paper ☐

Why?

_____

_____

Thank you for your time and effort.

Appendix B: Teacher Questionnaire

American University of Sharjah
College of Arts and Social Sciences
Arwa Abdelhamid
g00019285@aus.edu

English Language Testing on iPads: Advantages and Disadvantages

This study examines the advantages and disadvantages of using iPads for assessment. Your responses will help in gaining an understanding of your experience using iPads in the classroom. The survey is completely anonymous and will not be traced back to you in any way. It will require 10-15 minutes of your time. Your cooperation is highly appreciated!

Part A: Teacher Background Information

1. Age:
   □ under 30 □ 30-39 □ 40-49 □ 50-59 □ 60 or over
2. Gender:
   □ male □ female
3. Duration of employment at college
   □ less than 2 yrs. □ 2-5 yrs. □ 6-10 yrs. □ 11-15 yrs. □ more than 15 yrs.

4. How long have you been using an iPad for teaching? _____

Part B: Choose the response that best represents your opinion regarding testing on iPads.

		Yes	No
1	I am comfortable using an iPad in the classroom for assessment.		
2	I have adequate training in using iPads for assessment.		

3	I receive the support I need when administering tests on iPads.		
4	I have encountered technical problems when administering tests on an iPad.		
5	It is easier for students to cheat when taking a test on an iPad.		
6	Setting up iPads for assessments is an easy process.		
7	**Multiple-choice** type questions are suitable for tests on iPads.		
8	**Short answer** type questions are suitable for tests on iPads.		
9	**Matching** type questions are suitable for tests on iPads.		

Part C: Please provide your opinion on the following:

10. What are the advantages of testing on iPads?

_____

_____

11. What are the disadvantages of testing on iPads?

_____

_____

12. I would like all tests to be administered on:

iPads ☐ desktop computers/laptops ☐ paper ☐

Why?

_____

_____

Are you willing to participate in a short interview?

Yes ☐ No ☐

If yes, please provide your name and contact information.

Thank you for your time and effort.

Appendix C: Grammar Test (on iPads and Paper)

Section A: Choose the correct answer.

1. That picture is nice, but _____ picture over here is not so nice.
   a) that
   b) this
   c) these
   d) those

2. I _____ enough money to buy a new car.
   a) not have
   b) do not have
   c) does not has
   d) am not have

3. Maryam and Khalid have two boys. _____ school is in Ajman.
   a) They
   b) There
   c) Their
   d) Them

4. I was born _____ July 15, 1995.
   a) in
   b) on
   c) to
   d) at

5. Amel and Maha always _____ together.
   a) travel
   b) travels
   c) traveling
   d) is travel

6. Noora usually has a cup of tea _____ the afternoon.
   a) in
   b) on
   c) at
   d) to

7. Ahmed and I took _____ children to the cinema.
   a) we
   b) us
   c) our
   d) ours

8. Where _____?
   a) she works
   b) she does work
   c) do she work
   d) does she work

9. What time _____ you usually sleep?
   a) is
   b) are
   c) do
   d) does

Section B: One of the underlined words is wrong. Correct it and write it in the space below.

10. My **<u>teacher</u>** **<u>aren't</u>** from the UAE. They **<u>come</u>** from many different countries.

11. The **childrens' toys** are under the **table**.

12. **Ahmed** father **is** a doctor. He **works** in Al Qasimi Hospital.

13. **Our** exam is **in** Monday **at** 11:00 am.

14. I water **this plants** every week. They don't **need** a lot of water.

Section C: Negatives

15. Change the sentence below into a **negative sentence**. Write the whole sentence in the space below.

My teacher speaks 3 languages.

16. Change the sentence below into a **negative sentence**. Write the whole sentence in the space below.

English grammar is easy.

Section D: Match each sentence in Column A with a sentence from Column B so that they have the same meaning.

Column A	Column B
17. Salma eats fish **3 times a week**.	_____ Salma **never** eats fish.
18. Salma eats fish about **3 times a year.**	_____ Salma **rarely** eats fish.
19. Salma eats fish **every day**.	_____ Salma **sometimes** eats fish.
20. Salma **doesn't eat fish at all**.	_____ Salma **always** eats fish.

Appendix D: Reading Test (on iPads and Desktop Computers)

The Soap Sisters

Paragraph A

Hannah, Rachel, and Sarah Monroe make soap. Their parents, Gina and Randy Monroe, are part of the soap-making business too. How did it happen? Well, it's a nice story. Gina and Randy met and got married in California, but they wanted to raise their family in a rural area. They worked and saved for their dream ranch. Finally, they found it: a small piece of land of 20 acres, in the Wynoche Valley near Montesano, Washington. The land was overgrown with weeds and bushes, but the Monroes have never feared work. Besides, the farm was close to town and the price was right.

Paragraph B

The Monroes wanted to be independent people. Part of their goal was to grow their own food. So after they bought the farm, they went to work on it. First they cleared the land for some buildings. They cleared space for a house, a garden, a greenhouse, a barn, and a chicken coop. They also cleaned up a large open area for a hayfield. And they started building. Now they grow most of their own food. They grow them in a big garden, 15 meters by 6 meters. They also have a greenhouse for some smaller plants. And they **raise** goats. They have ten of them, and each goat is a member of the family. The three girls, ages 10, 12, and 16, are responsible for the goats. They have to milk the goats twice every day. Together they use the milk to make cheese, butter, and yogurt. They also use goat's milk to make soap.

line 17

Paragraph C

How did they start making soap? Well, it started with a magazine article. At first they tried it just to make some soap for themselves. Through trial and error, they came upon a perfect recipe. They joke about using all the "errors," the early mistakes that they made with the soap. Now, however, they know the process very well. Each member of the family does part of the job. It's Sarah's job to mix the ingredients. It takes her several hours to get everything ready. She and her mother heat the alkaline- and acid-based parts of the recipe to the exact temperature. They add vegetable oil and goat's milk. They want their soap to smell nice, so **fragrances**, all natural, go into the mixture too. Then they mix it gently-they don't want any bubbles. When the thickness is "just right," they pour it into a wooden box with plastic inside it. They leave it on a shelf to cool.

line 30

Paragraph D

A day later, Randy cuts the block of soap into bars. At this point it is like a big block of cheese. Then he trims the bars so that they are the right shape. The soap

is still soft enough for him to put on a stamp, like a brand. The stamp reads, "Three Sisters Soap." The bars then sit for four weeks on a board to dry and harden. Gina explains that soap gets harder and milder as **it** sits and dries. Three Sisters Soap is very mild. It is only slightly alkaline. It is nearly neutral, and certainly less alkaline than factory-made soaps.

line 37

Paragraph E

The three girls wrap each bar of soap by hand. They put the bars in boxes to send to the stores that sell it. There are a dozen local stores that handle it, and more goes to California, Utah, and Tennessee. The price is $2.99 a bar.

line 43

Paragraph F

The first year in business, **they** made 600 bars of soap. The second year, they made 1,500 bars. And each year the number increases. The holiday season, from October to December, is the busiest time of the year. Many people like to give gifts of really special soap. And that's what the Monroes make. You can buy Milk and Honey soap, Lemon Cream soap, and Tangerine Cream. They all smell good, and they are very gentle. They are like the mild and gentle people who make the soap, the three sisters and their parents.

(Adapted from *Steps to Academic Reading 2* – Unit 18)

Items 1-4

*Complete the notes below with **ONE word and/or a number**.*

The Soap Sisters	
Example: Name of family	Monroe
1. Location of farm	close to _____, Washington
2. Where food is grown on farm	garden and _____
3. Animals on farm	chickens and _____
4. Products made from the milk	cheese, butter, _____ and soap
5. Price of one soap bar	$_____

Items 6-9

Read the passage again and look at the statements below. Write:

TRUE	*if the statement is true*
FALSE	*if the statement is false*
NOT GIVEN	*if the information is not given*

6. The Monroes sell eggs. _____

7. They saw the soap idea in a magazine. _____

8. Mrs. Monroe cuts the soap into bars. _____

9. All the family members help with the business. _____

Items 10-17

*Read paragraphs **A – F**. Choose the correct answer, **a**, **b, c** or **d**.*

10. How often are the goats milked?
- **a.** once a day
- **b.** twice a day
- **c.** three times a day
- **d.** once a week

11. The word **raise** on line 17 is closest in meaning to
- **a.** lift up
- **b.** collect money for
- **c.** clean
- **d.** take care of

12. The word **fragrances** on line 30 is closest in meaning to
- **a.** perfumes
- **b.** boxes
- **c.** goats
- **d.** jobs

13. Which of the following is **NOT** used by the sisters to make soap?
- a. oil
- b. fragrance
- c. butter
- d. milk

14. The word **it** on line 37 refers to

a. cheese
b. the soap
c. the stamp
d. board

15. The word **they** on line 43 refers to

a. the soap
b. the customers
c. the stores
d. the family

16. We can infer from the passage that in the third year of business, the Monroes sold about _____ bars of soap.

a. 400
b. 600
c. 1500
d. 2400

17. This passage is about

a. how to make soap
b. a family that makes soap
c. keeping goats on a farm
d. different kinds of soap

Items 18 - 20

Reading passage 2 has six paragraphs, ***A – F****. Questions* ***18 to 20*** *give the main ideas of two of the paragraphs. Match the paragraphs to the main ideas and write the letter of the paragraph next to the main idea. Here is an example:*

EXAMPLE
preparing the soap to be sold in shops
Paragraph E

18. a business that is growing **Paragraph _____**

19. building the farm **Paragraph _____**

20. the start of soap making **Paragraph _____**

Appendix E: Student Feedback Form

Grammar Test on iPads and Paper

Group members: _____

1. **What did you like about taking the grammar test on the iPad?**

_____

_____

2. **What did you like about taking the grammar test on paper?**

_____

_____

3. **Were there any problems with the iPad test? If yes, what were they?**

_____

_____

4. **Were there any problems with the paper test? If yes, what were they?**

_____

_____

5. **Do you think you received the same score on both tests? Why or why not?**

_____

_____

6. **Overall, which was a better experience?**

   Grammar test on iPad ☐

   Grammar test on paper ☐

Appendix F: Student Feedback Form

Reading Test on iPads and Desktop Computers

Group members: _____

1. **What did you like about taking the <u>reading</u> test on the <u>iPad</u>?**

_____

_____

2. **What did you like about taking the <u>reading</u> test on the <u>desktop computer</u>?**

_____

_____

3. **Were there any <u>problems</u> with the <u>iPad</u> test? If yes, what were they?**

_____

_____

4. **Were there any <u>problems</u> with the <u>desktop</u> test? If yes, what were they?**

_____

_____

5. **Do you think you received the same score on both tests? Why or why not?**

_____

_____

6. **Overall, which was a better experience?**

   Reading test on iPad ☐

   Reading test on desktop computer ☐

Appendix G: Teacher Interview Questions

1. Did you use an iPad before joining the college?
2. In general, do you enjoy using an iPad?
3. Other than teaching, what are some things you use it for?
4. In your opinion, what is the most useful feature of iPads in general?
5. What do you like about administering tests on iPads? Why?
6. What do you dislike about administering tests on iPads? Why?
7. Have you ever experienced problems while administering tests on iPad? Explain?
8. If you were given a choice between iPads, paper and desktops, which would you rather use to administer tests? Why?

Appendix H: Student Responses to Open-ended Item #11 on Questionnaire

Item # 11: What are the advantages of taking tests on iPads?

1	Obtaining results right after the test. In addition, it makes working on projects easier and allows students to communicate more easily with teachers and administration. *(original in Arabic)*
2	Getting my test scores at the same time. *(original in Arabic)*
3	It's easier and faster, and we get the scores immediately. *(original in Arabic)*
4	Getting test scores immediately. *(original in Arabic)*
5	It gives us the results right away. *(original in Arabic)*
6	Easy to use and fast
7	Nothing but sometimes easy ti used not along time.
8	It give the results immediately.
9	Obtaining results immediately. *(original in Arabic)*
10	Saving time, getting results quickly, answering questions easily *(original in Arabic)*
11	Excellent *(original in Arabic)*
12	Vocab – grammar
13	Saving answers *(original in Arabic)*
14	It's fast and you get your results immediately *(original in Arabic)*
15	Easier *(original in Arabic)*
16	Answering questions is easier *(original in Arabic)*
17	Easy to use *(original in Arabic)*

Appendix I: Student Responses to Open-ended Item #12 on Questionnaire

Item # 12: What are the disadvantages of taking tests on iPads?

1	It is very bad for the eyes. It leads to poor eyesight, pain in the eyes, and headaches. It also negatively affects the ability to write. In addition, productivity is affected when the Wi-Fi connection is lost or when the battery runs out. We need to charge the battery every day, and when we use the iPad, the battery runs out quickly. There is also the negative effect of electromagnetic waves on the body. *(original in Arabic)*
2	Sometimes during a test, I cannot connect to the internet, and this is really bad because the test is timed. *(original in Arabic)*
3	Problems such as technical failure, and we have to write slowly to avoid making mistakes. *(original in Arabic)*
4	Some students can exit the test and cheat. *(original in Arabic)*
5	We lost marks when the computer Correct the questions.
6	The iPad doesn't function or the battery is low *(original in Arabic)*
7	Sometimes we cannot connect to the internet *(original in Arabic)*
8	No connection.
9	Not be reivew question in the test.
10	Cheating *(original in Arabic)*
11	The internet *(original in Arabic)*
12	Affects the eyes
13	When we lose the internet connection *(original in Arabic)*
14	The iPad's screen *(original in Arabic)*
15	It is bad for the eyes *(original in Arabic)*
16	It is easier *(original in Arabic)*
17	It hurts the eyes *(original in Arabic)*

Appendix J: Student Responses to Open-ended Item #13 on Questionnaire

Item # 13: I would like all my tests to be on:

iPads	Easy and fast *(original in Arabic)*
	Because I can get my results *(original in Arabic)*
	Because it is easier and gives us the scores *(original in Arabic)*
	Easy to use
	Easier to use *(original in Arabic)*
	Easier to write *(original in Arabic)*
	Easier to use and carry, and does not get dirty like paper *(original in Arabic)*
	Easier *(original in Arabic)*
Paper	Ease of use *(original in Arabic)*
	Paper tests do not require internet or locking *(original in Arabic)*
	Because it very easy to arrive information
	Easy to write
	Easier *(original in Arabic)*
	Paper tests are easier *(original in Arabic)*
	Can write more easily and faster, and have more time to answer to questions *(original in Arabic)*
	Because it is easy
	Easier *(original in Arabic)*

Appendix K: Teacher Responses to Open-ended Item #10 on Questionnaire

Item # 10: What are the advantages of taking tests on iPads?

1	1. secure 2. saves paper 3. auto grades 4. can zoom in for visually challenged students.
2	Marking is quick for Reading, Listening, Vocabulary and Grammar tests. Results and statistics are available almost immediately.
3	all the advantages of online testing - instant marking, security features, easy stats. It's green - no paper!
4	we don't need to grade the exam
5	The questions can be scrambled. The answers are saved and checked instantly in the case of discreet answers.
6	Students work on their own.
7	Practicality of getting results quickly, randomizing questions, instant feedback to students
8	None.
9	For short answer questions they are fine.
10	automatic grading
11	Same advantages as other online testing, i.e. automatic marking, central collection and analysis of scores, plus greater freedom of choice of venues - anywhere with wifi, or even mobile data
12	Security Randomisation of questions
13	Materials on iPads are usually linked to an automated online assessment grading system (less work for teachers/more focus on learning) Students' familiarity with iPad may help with taking the fear out of the test Testing on iPad is practical if you discount technical problems
14	Ease of marking. Statistical feedback.
15	quick marking and results test and question stats are easily generated
16	The test questions order can be randomized. It is computer scored, so it saves time and prevents human error or bias. The use of this technology

	gives the student more technical experience which is needed and beneficial in the modern workplace. If set up in advance, students can enlarge certain texts to meet their specific needs.
17	easily transportable, interactive formats
18	environmentally friendly
19	Most of the marking is done during the time of the test and the results are immediate. It saves paper
20	easier to grade, easier to randomize, easier to set up
21	No pens or paper. But then laptops don't need them either.
22	marked electronically easier to create students can zoom in to read

Appendix L: Teacher Responses to Open-ended Item #11 on Questionnaire

Item # 11: What are the disadvantages of taking tests on iPads?

1	1. Pre setup and post turning off take time. 2. small screen size 3. high traffic for servers causes freezing of screens 4. difficult to write essays on ipad 5. nothing can be done if power/internet is out.
2	Time to set-up iPads for tests, and writing tests - students should not be typing a writing test on an iPad. This will not help them for IELTS.
3	Set up used to be difficult before Lockdown
4	students lose a lot of points because their answers must be written in a specific way which can be unfair.
5	They are not great for writing.
6	Technical problems may complicate taking the test. Open questions are not suitable for iPads.
7	Technical issues like connectivity, ipads on low battery
8	1. spread illness 2. takes forever to set up 3. some kids have ipads that refuse to cooperate and then they can't be secured and the kids can cheat. 4. they are awful at typing words 5. ipads have timeout issues, internet connectivity issues, and updating program issues that all result in lost tests.
9	In most cases teachers are required to touch and handle the iPads which is an unhygenic practice. Technology shouldn't require this of a teacher if it's good. Only certain question types are suited to iPads so they limit the validity of a test.
10	technical problems can delay or prevent the test
11	Difficult to prevent access to other data sources: much better with the latest Lockdown Browser and Guided Access, but still a chore. Also, as with other online testing devices, susceptible to technical failures of the device or the network.
12	Wifi dependency - if power drops out the test cannot proceed Setting up lockdown browser and guided access takes a long time

13	Can be time consuming especially if there are technical problems. Most tests depend on an internet connection, type of browser you're using and update for functionality and that could prove to be a huge problem. Depending on students' maturity level, students can easily be distracted by other content Sometimes the ipad hand gesture do not work well and students end up with the wrong answer when in fact they have it right
14	Difficult and time consuming to setup. Errors in "locking" iPads could compromise test security.
15	security tech issues: ie internet and connectivity issues writing long texts on an iPad--ie an essay--is difficult and completely unnatural
16	The primary disadvantages are the iPad can malfunction or it can be damaged prior to a test. The tests require students to be connected to the Internet most of the time. For students with certain special needs, it may not be adaptable enough. In certain settings or circumstances, the cost of the iPad may be a hardship for the student and family and those without one may be stigmatized.
17	easy to cheat, occasional IT problems, power supply
18	doesn't work Stds have not down loaded software prior Can be stressful - can crash
19	It is time consuming to set up. It isn't secure and it is bad for the student's eyes.
20	tech difficulties like when the wifi is down; it is also dependent on students more than paper tests, i.e., the main testing tool should be brought by the student fully charged, and with all needed apps. That's a big responsibility that not all students handle well.
21	Set up I am not convinced that all teachers set up in the same way, despite instructions, therefore the test is not valid as students are working on different formats. Security
22	difficult to set up lots of technical problems occur all the time

Appendix M: Teacher Responses to Open-ended Item #12 on Questionnaire

Item # 12: I would like all tests to be administered on:

iPads	iPads - reading, listening and vocabulary: as mentioned above for ease of marking; paper - writing: while the requirement for exiting foundations is the IELTS test, the students must do the writing test on paper
	Reasons given in #10
	because I don't have to grade it and students can see their score right away
	Though I also favor laptops for exams, I picked ipads in this questions because it eases facility related issues. ipads are lighter to carry and smaller in size. Students are comfortable with using them. Once they are taught what steps to follow in assessments, they can smoothly take their exam on ipads.
	convenience
	Actually, not necessarily "all" but the question doesn't allow "most". Because of the flexibility they offer, especially when all of our students have them anyway.
	All things considered, they are a better fit for our students and definitely more practical than computers and papers. Moreover, we're saving on paper (helping the environment), expense (computer are more expensive) and increasing access and success (practical to carry around/ students more likely to practice and do better on their tests)
	I would have preferred the answer choice off "other" for that is truly my response, but since that was not an option I chose iPads. I think of the given options, iPad are the best choice since they are portable. With more attention to adaptations for special needs learners, the iPad can facilitate testing and improve security and feedback time.

	the future of education
	easier to mark
Desktops/ Laptops	Larger screen sizes and mouse is more accurate. Set up is also faster. Writing should always be done on paper.
	They have the advantages of iPads but are better for writing and easier to set up.
	Students can actually type.
	Easier on them, easier on us, fewer problems, less stress.
	It is easier to set up a secure environment
	Easier to setup. More secure - Lockdown browser
	There's only one choice, so I said desktop as a compromise between paper and an iPad. The desktop provides quick marking and the capability for generating stats and it's easier to write a longer text.
	I would like to see iPads replaced with laptops
	Laptops have a larger screen and are more secure.
	Can be more secure, better more robust software available.
Paper	Although there are many advantages to doing short quizes on iPads for serious high stakes exams paper is still the best option.
	I prefer iPads, but sometimes with iPad tests, students do need to have the same test on paper to help with skimming and scanning.

Vita

Arwa Abdelhamid is a bilingual educator who has been teaching English as a second language for the past twenty years. She began her career teaching English to primary students, but most of her experience has been at the tertiary level. She obtained her bachelor's degree in 1995 from Petra University in Jordan. Her degree was in English/Arabic Translation as well as English Literature, and she graduated with honors. In 2001, she attained her first master's degree in Educational Studies from the University of Sheffield in the UK. The topic of her thesis was Teacher Development through Peer Observation. In 2014, she began a master's program in Teaching English to Speakers of Other Languages at the American University of Sharjah.

Arwa's main interests lie in materials development and testing. Recently, she has become interested in integrating technology with teaching. She hopes to be able to create a set of interactive materials that students can use as part of their independent learning.