

**REPUBLIC OF TURKEY
ÇUKUROVA UNIVERSITY
THE INSTITUTE OF SOCIAL SCIENCES
DEPARTMENT OF ENGLISH LANGUAGE TEACHING**

**READING COMPREHENSION IN PAPER AND DIGITAL BASED ENGLISH
TEXTS: A COMPARATIVE STUDY**

Zekeriya KAZANCI

A PHD DISSERTATION

ADANA / 2018

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A PHD DISSERTATION

ADANA / 2018

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bildirir, aksi bir durumda aleyhime doğabilecek tüm hak kayıplarını kabullendiğimi beyan ederim. / / 2018

Zekeriya KAZANCI

ÖZET

BASILI VE DİJİTAL ORTAMLARDA İNGİLİZCE METİN OKUMA-ANLAMA YETİSİ: KARŞILAŞTIRMALI BİR ÇALIŞMA

Zekeriya KAZANCI

Doktora Tezi, İngiliz Dili Eğitimi Anabilim Dalı

Danışman: Prof. Dr. Erdoğan BADA

Nisan 2018, 110 sayfa

Okuma araçları önceden kil, deri ve papirüs gibi malzemelerden elde edilirken, sonrasında, uzunca bir dönem süren kâğıt ağırlıklı okumadan dijital ekranlara doğru yönelmeye başlamıştır. Okuma eylemi, günlük yaşamımızda önemli bir yere sahip iken, okuma araçlarının yalnızca okuduğunu anlamayı etkilemekle kalmayıp, aynı zamanda, belirli bir okuma aracına özgü tercihlerimizin belirlenmesi açısından bilinç kazanmamızı da desteklediği için, neyi nasıl okuduğumuz da oldukça önem kazanmıştır. Bu nedenle, çalışmamızın iki amacından biri, katılımcılarımız olan üniversite öğrencilerinin okuma aracı tercihlerini ortaya çıkartmaktır. Okumanın temel gayesinin *anlamak* olduğu kabul edilerek, ikinci ve ana amacımız ise, okuma araçlarının okuduğunu anlama üzerinde herhangi bir etkisinin olup olmadığını incelemektir. Bunun için, ilk aşama olarak, katılımcılarımız olan Çukurova Üniversitesi, Elektrik-Elektronik Mühendisliği ve İngiliz Dili Eğitimi alanlarından 170 lisans öğrencisine okuma tercihlerini ve bu tercihlerin nedenlerini araştıran bir anket uygulanmıştır. İkinci aşamada ise, okuduğunu anlama sınavı, sekiz haftalık bir ara ile dijital ekranlardan ve basılı kâğıttan uygulanmıştır. Katılımcıların tercihleri ve sınav başarı düzeyleri SPSS 20.0 istatistik programı ile betimleyici (frekanslar ve çapraz tablo) ve ilişkili örneklemeler için t-testi kullanılarak analiz edilmiştir. Çalışmanın bulguları, katılımcıların büyük çoğunluğunun, okuma etkinlikleri için dijital ekranlardan çok, basılı kâğıdı tercih ettiklerini ortaya çıkarmıştır. Tercihler açısından, Elektrik-Elektronik Mühendisliği ve İngiliz Dili Eğitimi öğrencileri arasında istatistiksel açıdan anlamlı bir fark bulunmaz iken, kadın katılımcıların

basılı kâğıdı daha çok tercih etmeleri açısından anlamlı farklılık gözlemlenmiştir. Okuduğunu anlama açısından, basılı kâğıttan okumanın genel olarak tüm katılımcıların ve özellikle İngiliz Dili Eğitimi katılımcılarının daha yüksek sınav başarısı sağladığı gözlemlenirken, yalnızca Elektrik-Elektronik Mühendisliği katılımcıları göz önünde bulundurulduğunda, iki okuma aracı arasında anlamlı bir farklılığın olmadığı görülmüştür. Bu çalışma, genel olarak tüm okuyucular, özelde ise, öğrenciler, öğretmenler, okul yöneticileri, politika belirleyicileri, elektronik okuma ve ilgili araçlarının tasarımcıları açısından önemli yansımalar sunmaktadır.

Anahtar kelimeler: Okuma, okuma araçları, basılı kâğıt, dijital ekranlar, okuyucu tercihleri.

ABSTRACT**READING COMPREHENSION IN PAPER AND DIGITAL BASED ENGLISH
TEXTS: A COMPARATIVE STUDY****Zekeriya KAZANCI****PhD Dissertation, English Language Teaching Department****Supervisor: Prof. Dr. Erdoğan BADA****April 2018, 110 pages**

Reading mediums, which were primitive materials like clay, leather, and papyrus, then paper dominated reading for a long period, now have been evolving into digital screens. While the act of reading constitutes a significant role in our daily lives, how we read what we read is very important, since platforms from which we read, do seem to affect not only our comprehension but also help us raise awareness about our reading preferences specific to a particular medium. Therefore, the first stage of this study is to identify preferences of university students who were treated as participants of the study. Considering that the main purpose of reading can be regarded as comprehension, the primary aim of this research is to investigate whether reading mediums have an impact on reading comprehension. For this, as a first stage, our participants, 170 undergraduate students from the Electrical-Electronics Engineering (EEE) and the English Language Teaching (ELT) departments at Çukurova University in Turkey, were administered a questionnaire inquiring about reading medium preferences and pertaining reasons. As a second stage, they were administered a reading comprehension test through digital screen and printed-paper with an eight-week interval between the two mediums. Participants' preferences and their test performances were analyzed through SPSS 20.0 utilizing descriptive statistics (frequencies and crosstabs) and a paired-samples t-test. The findings of the study indicate that the majority of participants preferred printed-paper over digital screen for their reading activities. While no statistically significant difference was found between preferences of the EEE and the ELT participants, a significant

difference, however, was observed in favor of females preferring printed-paper. In terms of reading comprehension, while reading from printed-paper was found to provide higher comprehension performance for overall participants in general and ELT participants, regarding comprehension performance of EEE participants, no statistically significant difference was observed between the two mediums. This study, by its nature, has significant implications for all readers in general, and specifically, for students performing academic work, teachers, school administrators, policy makers, and e-reading designers.

Keywords: Reading, reading mediums, printed-paper, digital screens, readers' preferences.



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DEDICATION

This thesis is dedicated to my dearest father, Halil Şeref KAZANCI, who never withheld his support all through my life, yet could not, alas, live long enough to see me completing this piece of work. May he rest in peace!



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LIST OF ABBREVIATIONS

CA	:	Computer-Assisted
CB	:	Computer-Based
CRT	:	Cathode Ray Tube
DL	:	Distance-Learning
EFL	:	English as a Foreign Language
EEE	:	Electrical-Electronics Engineering
ELT	:	English Language Teaching
IT	:	Information Technology
L1	:	First Language
L2	:	Second Language
LCD	:	Liquid Crystal Display
LED	:	Light Emitting Diode
ML	:	Mobile-Learning
P&W	:	Printing and Writing
PC	:	Personal Computer
P#	:	Specified Number of Participant
S#	:	Specified Number of Sentence
OLED	:	Organic Light Emitting Diode
ÖSYM	:	Ölçme, Seçme ve Yerleştirme Merkezi (Turkish National Test Board)
URL	:	Uniform Resource Locator
TÜİK	:	Türkiye İstatistik Kurumu (Turkish Statistical Institute)

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CHAPTER 1

INTRODUCTION

“Technology exists to either brighten your life, or darken it...”
BADA, 2018

1.1. Introduction

This chapter aims to explain and justify the reasons underlying the urge to study the specific subject matter of the dissertation. It is an undeniable fact that scientific research is expected to fill a niche in its fields, hence this chapter firstly, states how that niche was found and tried to be filled. Secondly, the research problems of the study are stated. Thirdly, the research questions of the study are presented in order to highlight the questions that this research seeks to answer. At the end of this chapter, certain limitations of the study are presented.

1.2. Background to the Study

Be one syllable of a word or volumes of books, the act of reading constitutes a significant role in our daily life. Since primary school, we consciously or unconsciously, read almost everything that we take a glance at in our vicinity. Although its purpose, size, style, or medium may have changed by time, reading is still one of the most frequent activity of contemporary people. Then, what is reading by definition? McArthur and McArthur (1992) briefly define reading as “the process of extracting meaning from written or printed language,” which can be in a form of various symbols. Although, we do not know for certain as to how early reading symbols were first utilized in the acquisition and transfer of information when conveying messages, it is usually accepted that around 3200 BC, Sumerians were the first civilization to use arbitrary symbols in a systemic fashion in creating meaning (Daniels and Bright, 1996; Glassner, 2003; Fischer, 2004). History shows us that, since then, human beings invented various methods and techniques to code and decode their messages. The journey of writing and reading started with simple marks on pebbles and knots on ropes; then, moved to clay, papyrus, parchment, paper and digital screens. These methods and mediums were frequently used in an interchangeable fashion during

the course of history in overlaying periods. While it could be a large bone of an animal, or baked clay tablet in the early era of writing and reading, the medium evolved to be papyrus in ancient Egypt or a sheet of a deer hide in Pergamum. The paper that we know thus has a history of only two thousand years. However, today's cutting-edge technology has provided a rather rich variety of reading mediums as never before. The variety in the methods may indicate that the medium that carries the message may be as important as the message itself in certain situations since it may affect the meaning itself. In other words, the mediums or tools that undertake the responsibility to bear the message may affect perception and comprehension of the message receiver.

As information technology (IT) shapes and reshapes everything we use in a digital environment, fortunately or unfortunately, it influences what we read, why we read and, more specifically, HOW we read. Besides traditional printed-paper reading materials, today, readers can read an article from a laptop, a newspaper from their smartphone or a novel from their electronic readers.

With the development of instructional technologies and emergence of digital learning environments such as Computer-assisted (CA), Computer-Based (CB), Distance-Learning (DL), Mobile-Learning (ML) etc., reading from digital screens is a more widespread option now – or rather than an option, in some certain cases, a necessity.

1.3. Statement of the Problem

Reading mediums, which started their evolution with primitive materials like clay, leather, and papyrus, then dwelled on paper for a long period, now have been evolving into digital screens. Digital devices have been integrated into our daily lives inevitably with their numerous functions, and now they provide us with reading facilities, faster, cheaper, and more ubiquitous than ever. Texts we used to read from paper, boards or similar surfaces, now are mostly present on digital screens.

Naturally, educational materials could hardly escape such a widespread transformation. While tablets and personal computers (PCs) have speedily replaced printed course books, projectors and smartboards are already being used in place of conventional blackboards and chalk. Although students today

may have the option to read from either printed textbooks or digital screens, in some instances, unfortunately, the option is strictly limited to digital screens only; many educational materials that were once on paper, have already gone digital or on the verge of being so.

This prevalent phenomenon and inevitable transformation from printed-paper to digital screens hardly escapes without producing some certain consequences and implications to work for or against readers and, more specifically, students actively involved in academic life. While this transformation enables individuals to have relatively free access to information, at a rather high speed, it also comprises ramifications and implications considering comprehension, perception, focusing, reading speed, or eye health, etc. While preference of readers and pertaining impact on comprehension constitute the backbone of our research, these issues will be dealt with based on department and gender variation, whereas department variation only will be considered in assessing performance regarding reading comprehension.

Relying on this premise, thus we believe it is crucial to investigate the effects and consequences of the transformation of reading materials from printed-paper to digital screens when and if we are to observe readers' benefits and wellbeing. Despite the overwhelming surge towards this technology which changes our reading habits rudimentarily, we strongly believe that, instead of yielding to such advances in human behavior, readers' actual preferences, needs, hesitations and expectations should all be examined with scrutiny, believing that the obtained data may prove to be helpful for all readers, educators, test administrators, parents, publishers, media developers, and technology manufacturers.

1.4. Aim of the Study

The primary purpose of this research is to determine the most efficient medium of reading when it comes to competence in comprehension: *printed-paper* or *digital screen*. Besides, preference of reading medium may differ depending on the discipline of readers; therefore, the study will also consider discipline variation as well as reasons for such preference difference among readers. Along with this aim, we will also delve into a comparison of stated preferences with surfacing comprehension success. Since stated preferences

may not reflect the reality, in such a case underlying reasons leading to any potential match/mismatch will also be investigated.

1.5. Research Questions

All these aims in mind, we will be seeking responses to the following research questions:

1. Which medium of reading do EEE and ELT participants prefer, digital-based or paper-based?
2. Does department variation affect reading preferences of participants?
3. Does gender variation affect reading medium preferences of participants?
4. What may be the potential reasons, if any, leading to a particular preference of a reading medium?
5. Does genre variation play a part in preferences of reading medium? If it does, what may be the potential reasons?
6. Considering department variation, which of the two mediums of reading, paper-based or digital-based, yields higher achievement results regarding reading comprehension?
7. To what extent stated preferences of reading medium are in line with participants' reading comprehension performance?

1.6. Significance of the Study

We have come to an age where our present technological advancement alas hardly leaves readers with any other choice but succumbing them to digital screens even when carrying out the simplest reading task. While this inevitable transformation occurs before our own eyes, it is essential to investigate if that is a choice of the very readers themselves or forces who continuously promote digital technology.

When reading for pleasure like novels, or reading for academic studies like textbooks, or even exams, readers today have been encouraged to read from digital screens more than ever before. However, although this may be the case, not many studies were conducted focusing on the actual effects (if there are any) of reading from digital screens and pertaining consequences by considering

certain variables. Besides, even there are some studies endeavoring to address this issue, these studies are in continuous need to be replicated due to rapid and radical changes not only in the field of technology but also in the perception of individuals towards technology.

While digital transformation affects grown-up individuals with certain challenges and adaptation issues, the new generation seems to be much more adept in utilizing such technological novelties. As a matter of fact, since members of the new generation were born into or grown with this technology, any concepts and/or tools pertaining to it are rather familiar to them. The implementation of these concepts and tools can clearly be observed in the field of education. For instance, in Turkey, an educational technology project titled FATİH was commenced in 2011 in order to equip classrooms with the latest educational technological materials and tools. While books and notebooks are on the verge of replacement by tablet PCs, blackboards and chalk have already been replaced by smartboards. This dramatic change has led students across the country to read and write through screens and keyboards instead of using conventional paper and pencil. Hence, today's students face digital screens not only during their favorite pass time (namely, social media), but also while trying to attain academic purposes. The pedagogical and academic consequences of this rapid transformation require further studies with participation of all stakeholders of education in order to address this issue from different perspectives.

Therefore, this study, with its scope, is considered to contribute to the literature in the field by identifying preferences of readers regarding department and gender differences, and primarily, by comparing readers' reading comprehension performance from printed-paper and digital screens considering department variation.

We hope that the results of this study will contribute to endeavors of the stakeholders of education and electronic reading designers cited below:

- a. Students (K to College)
- b. Teachers and school administrators
- c. Policy makers and curriculum designers
- d. E-book and E-reader designers

1.7. Limitations of the Study

This study has the following limitations:

1. As one of the four language skills (listening, speaking, reading, and writing), this study was limited to reading only.
2. The texts and reading comprehension questions were limited to the English Language only.
3. The participants of the study were limited to undergraduate students of the English Language Teaching (ELT) and the Electrical-Electronics Engineering (EEE) departments at Çukurova University, Turkey.
4. The study is limited to the Fall and Spring semesters of 2016-2017 academic year.

1.8. Summary

In this chapter, we attempted to present the foundation of the research by providing background to the study, statement of the problem, aim of the study, research questions, and significance of the study. Finally, we finished the chapter with certain limitations of the study. This chapter aimed to indicate the scientific niche that urged us to investigate the particular research topic and the aims we tried to attain.

CHAPTER 2

REVIEW OF LITERATURE

2.1. Introduction

This chapter presents a review of the literature in five sections. Firstly, the concept of *educational technology* was presented briefly. Secondly, definitions of reading were provided from the perspectives of various resources and scholars. Thirdly, significance and role of reading comprehension in English Language classes were discussed briefly. Then, the evolution of reading mediums and progress of technological devices related to reading were presented. Finally, literature on comparison of digital and printed reading mediums were provided in order to present concordant and discordant views.

2.2. Educational Technology

The history of educational technology does not date back that far, since it was first observed in the form of simple educational materials from its very beginning to the nineteenth century. In the 1950s, however, besides many other scholars, B.F. Skinner was accepted as one of the first and most significant contributors to the field of educational technology due to his *programmed learning* (Sharma, 2008). His approach was broadly followed in years to come in the development of curricula integrating technology into education.

Today, it is almost inevitable for stakeholders in the field of education not to adopt and/or adapt cutting-edge technology in almost every aspect of education for it is required as a facilitator and problem-solver. Such prevalent interaction and cooperation of education and technology lead to the emergence of the concept of “educational technology” as a standalone yet multidisciplinary study field. Among many others, one of the most comprehensive definitions of educational technology is that it is “... the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2013, p.1). The goal of educational technology is to collaborate tools, scientific research, and productions of design, media, and computing in order to optimize

teachers' efforts and students' learning (Newby, Stepich, Lehman & Russell, 1996). It is possible to observe this goal as an ambitious effort to promote educational technology for utilization of in-class (computer assisted learning, blended learning etc.) and out-of-class (distance learning, mobile learning etc.) activities around the world by policy makers and curriculum developers. Educators find or create methods to apply the latest technological inventions (audio-visual devices, computers and/or the internet and related tools such social media and Web 2.0 and Web 3.0 tools) into the field of education. Learners from all levels of education were encouraged and enabled to take advantage of convenient facilities of educational technology to some certain degree.

However, familiarity and ability of educators and learners in technology play a crucial role in the integration of educational technology into the teaching and learning process. In this context, educators and learners' features such as their access to technology, age and gender play a significant role in determining a successful implementation of this technology for teaching and learning activities. For instance, in their study investigating gender dependency in technology-enriched education, Mayer-Smith, & Woodrow (2000) sought to respond to the question whether female students viewed, participated, and achieved differently than their male counterparts in technology-enhanced science classrooms. The researchers discovered that women could enjoy and succeed well at learning science in technology-enhanced environment, and that gender did not constitute an issue leading to a superiority of one particular gender over the other in classrooms where computer utilization was common. Thus, in order to promote student engagement and success, it was not gender; rather, it was the availability of a technology-rich environment, which emerged as a significant factor.

In a similar study, emphasizing a gender gap in a computer programming course through *different perceptions* and *learning outcomes*, Rubio, Romero-Zaliz, Mañoso, & Angel (2015) designed and implemented methods and principles aiming to close such a gender gap successfully.

Although it is possible to observe positive and negative consequences of widespread phenomenon of educational technology, both theoretically (approaches and methods) and practically (devices and computers), Mayer (1997) claimed that the potential for computer-based aids to learning remained high, although current contribution of technology to pedagogic innovation was

rather low. Yet, the future of educational technology holds the potential to provide for teachers and learners a wide variety of tools and mediums owing to rapidly advancing innovations such as Web 3.0 tools, artificial intelligence, robotics, etc.

Within the scope of this dissertation, practical applications of educational technology concerning reading mediums were investigated in order to evaluate their pedagogical consequences and implications.

2.3. Reading

The famous Merriam Webster's Dictionary (1997) defines reading as: "to receive or take in the sense of (letters, symbols, etc.) especially by sight or touch". In another well-known reference book, The Oxford Companion to the English Language, McArthur & McArthur (1992) defines reading as: "the process of extracting meaning from written or printed language: one of the four language skills (listening, speaking, reading, and writing) and one of the two key aspects of literacy (reading and writing)" (p.847). These brief yet comprising definitions include ancient readings performed by symbols and readings of visually-impaired people who are able to read by touching. On the other hand, Williams (1991) suggests a simpler definition, stating that "... reading is a process whereby one looks at and understands what has been written". With that, Williams highlights the aim of this process as "to understand". According to Phillips (1984), the success of this process "... depends upon a combination of linguistic knowledge, cognitive skill, and general experience and knowledge of the world". While Johnson (2008) defines reading as "... the practice of using text to create meaning", he also specifies three basic features of reading: (1) Reading is a skill that can be improved through practice; (2) Reading includes both visual and nonvisual information since the visual found on the page combines with the nonvisual already existing in the brain; (3) Reading is an act of connecting ideas to create meaningful and sensible whole. In a much broader definition, Smith (2012) elaborates on reading as:

The word “reading” is properly employed for all manner of activities when we endeavor to make sense of circumstances; its original meaning was “interpretation.” We read the weather, the state of the tides, people’s feelings and intentions, stock market trends, animal tracks, maps, signals, signs, symbols, hands, tea leaves, the law, music, mathematics, minds, body language, between the lines, and above all—a point I must come back to—we read faces. (p.2)

Obviously, reading is a broad concept and process that has many facets based on how it is viewed. Moreover, the definition is varied depending not only on one’s view but also on a specific historical period. As Fischer (2004) stated, at the beginning of its history, reading was merely “...extracting visual information from any encoded system and comprehending the respective meaning” and then by time, it evolved into “...comprehending of a continuous text of written signs on an inscribed surface including an electronic screen”. Apparently, even this definition will probably evolve to encompass other characteristics as technology develops.

Despite such broad definitions (mostly on mechanical level), reading has much more to offer, such as joy or boredom and peace or struggle. In this sense, Nunan (1989) stated that “...reading is not an invariant skill, that there are different types of reading skills that correspond to the many different purposes we have for reading”. Thus, now it is time to ask the very basic question: why do people read? Grellet (1981) identified two main reasons for reading; (1) reading for pleasure, and (2) reading for information. Based on these reasons, he suggested four ways of reading:

Skimming: quickly running one's eyes over a text to get the gist of it.

Scanning: quickly going through a text to find a particular piece of information.

Extensive reading: reading longer texts, usually for one's own pleasure. This is a fluency activity, mainly involving global understanding.

Intensive reading: reading shorter texts, to extract specific information. This is more an accuracy activity involving reading for detail. (Grellet, 1981, p. 4)

Furthermore, Grabe (2009) listed the characteristics of reading in ten processes:

1. A rapid process
2. An efficient process
3. A comprehending process
4. An interactive process
5. A strategic process
6. A flexible process
7. A purposeful process
8. An evaluative process
9. A learning process
10. A linguistic process

As can be observed, during all these processes, reading plays a significant role in our daily lives, either consciously (reading for pleasure and information) or unconsciously (reading random texts in surrounding environment). However, the situation was not quite similar in ancient times when reading literacy had been in much lower percentages for many centuries. As a matter of fact, being able to read and write was a very rare skill that only appointed officers or members of the elite and aristocratic families had possessed. Owing to remarkable developments in writing and reading mediums that have become available for the multitudes, societies and institutions attached significant importance to reading. Apparently, the endeavors of almost all communities yielded rather positive results on the rate of illiteracy. According to the statistics of UNICEF (2018) globally, the literacy rate of youth increased from 83% to 91% over the last two decades, while the number of illiterate youth declined from 170 million to 115 million. Besides the efforts of stakeholders in the field of education, we owe these promising figures to technological developments in writing and reading mediums that enable us to access reading anytime and anywhere.

However, the fact that the ratio of literacy has been on the rise does not necessarily mean that people read more now than they did before. Odabaş, Odabaş, & Polat (2008) investigated reading habits of 304 university students and found that almost half of the students (46.1%) read 1-5 books a year while 4.6% did not read at all. When we look at the situation in the U.S.A., we can observe that the average amount of time Americans spend on reading for personal interest decreased from 27 minutes a day in 2005 to 21 minutes in 2015

(Humanities Indicator, 2016). This is the period during which the internet and social media have gained a boost. In this period, we see that there is a giant leap between 2010 and 2017 regarding social media utilization (Number of social media users worldwide from 2010 to 2021 (in billions), 2017). Based on this premise, we can surmise that readers of books may have switched to reading on-line rather than from books. Yet, how much and in what fashion readers read on-line? Research indicates that 55% of on-line page-views get only less than 15 seconds of attention and on-line visitors do only read about 28% of the text on the average page (Chartbeat, 2014; Weinreich, Obendorf, Herder, & Mayer, 2008). With a rather early foresight, Papert (1993) called the new generation with short attention span as “grasshopper minds”, which today best defines their surfing attitude on the net.

Yalman, Özkan, & Kutluca (2013) surveyed the reading habits of pre-service teachers. In their study, conducted with 220 participants, the researchers asked the basic question: “Do you like reading from books?”. According to the results, while 57.3% of the participants responded with “Yes”, 12.7% did respond with “No”, and the remaining 30% responses were “Partly and if I am interested”. These results revealed that even candidate teachers who were supposed to do significant reading in order to provide better service for their students, did not do so, due to lack of interest. In fact, school studies require individuals to be intensively involved in reading in order to gain optimum benefits from the curriculum, part of which being the language subjects.

2.3. Reading Comprehension in English as a Foreign Language

Either on traditional paper, or on digital screen, reading is one of the most important skills of a language. As was indicated previously, reading is a physical and mental activity performed to derive meaning from written, printed, and carved symbols; in other words, the main purpose of reading is *comprehension*.

Reading comprehension is “... the heart of what it means to really read by thinking and understanding and getting at the meaning behind a text” (Serravallo, 2010). Armbruster (2010) defines comprehension as the only reason to read, claiming that reading is not reading if readers can read words without grasping the meaning. Kruidenier (2002) perceived reading comprehension as “... an

active process and the reader must interact and be engaged with the text for it to work well.”

When it comes to learning a foreign language, reading comprehension becomes more a complex process, and requires much more effort. Since reading is a rather effective means of extending our command on the target language, reading comprehension exercises and drills cover a large space in foreign language classes. According to Nuttall (1996), the purpose of reading activities in language classrooms can be described as: “...to enable students to enjoy reading in the foreign language, and to read without help unfamiliar authentic texts, at appropriate speed, silently and with adequate understanding.”

Naturally, the path to this aim has many challenges and conveniences even if the language learner was already able to read and write in L1. For example, Nation (2009) remarks that L2 learners need very controlled texts and a greater amount of pre-reading activities although they already have language specific skills. They have preconceptions and attitudes towards reading and thus there will be interference and facilitation effects between the L1 and L2. Besides, L2 learners have greater metalinguistic and metacognitive awareness, which enable them to use more explicit approaches and tools like dictionaries.

Additionally, reading comprehension plays a significant role in the evaluation of competence in a language; hence, reading passages are indispensable in language proficiency exams.

2.4. Reading Mediums and Historical and Technological Outline

Reading mediums have been in a continuous evolution since their first invention. Following the drawings on the walls of the caves, people commenced utilizing more workable materials such as stones, wood, metal, ceramics, leaves, barks, cloth, papyrus and parchment as primitive surfaces. From the very beginning, writing and reading were interrelated, and both affected each other depending on the materials used. For instance, when writing on hard surfaces like stones and rocks, it was easier to write with straight sharp figures. It required brushes and pens to be able to write curved letter figures on softer surfaces like clay tablets, papyrus and paper (Fischer, 2001; Fischer, 2004; Yıldız, 2014). In fact, paper was a real revolution in the history of reading mediums with its

convenience in production, inscription and storage capacity and potential. Most of these reading mediums existed in overlaying times in human history as they were employed by various cultures in various geographic locations.

The evolution mentioned previously gained momentum in line with rapidly advancing technology. Today, we are able to write on and read from all kinds of surfaces ranging from the edge of a razor blade with nano-technology, to the highest mountains with giant letters. Yet, digital screens with their vivid colors and multi-functional gadgets invade our lives to the fullest.

As we are to present a historical background to reading mediums, it is important to determine what to consider as reading and reading medium. For example, can extracting meaning from primitive shapes on walls of caves be accepted as reading? How about Azilian people in France who were painting crosses and stripes on pebbles ten thousand years ago? Can deciphering such crosses and stripes be considered as a kind of reading? As initial and primitive efforts for writing and reading, people used various methods and materials in an endeavor to convey their messages or conduct their trade, for which they used sticks, flags, smoke, fire powders, reflections from polished metals, color-coded quipus knots, string and notch records (Fischer, 2004). Yet, can coding and decoding these symbols be regarded as reading? In order to distinguish between what is reading and what is not, it may be useful to cast a look on the past and examine “*writing*”, an activity preceding reading. In this sense, Fischer (2001) claimed that in order to accept a process as “reading”, the text should be a “complete writing”. Furthermore, he suggested three specific criteria to be fulfilled in order to accept the marks as a “complete writing”:

1. Complete writing must have as its purpose communication;
2. Complete writing must consist of artificial graphic marks on a durable or electronic surface;
3. Complete writing must use marks that relate conventionally to articulate speech (the systematic arrangement of significant vocal sounds) or electronic programming in such a way that communication is achieved.

In a similar vein, Coulmas (1991) as a linguist, defined a critical step in the evolution of writing as “...phonetization: that is, the transition from pictorial icon to phonetic symbol.”

Consequently, when the history of writing and reading studied, in spite of many more various and minor tools and methods, it is possible to outline five major mediums of reading: clay tablets, papyrus, parchment, paper, and digital screens.

2.4.1. Clay Tablets

Based on the above-mentioned premises established by Fischer (2001) and Coulmas (1991), Sumerians can be accepted as the first writers and readers with their systematically coordinated sounds and symbols. Ergo, their clay tablets, can be accepted as the first reading medium. Many other civilizations such as the Hittites, the Assyrians and the Babylonians adopted this *new technology* since it was rather convenient for that time (Yıldız, 2014).

These tablets were usually made of wet clay to imprint characters with a stylus. The characters were normally “... made by impressing the edge of the stylus downwards, leaving a mark like the heel of a shoe.” (Fischer, 2001). Firstly, they were dried in the sun or air that caused them to be quite fragile but also available to be soaked into water and recycled to produce new tablets. Later on, people learnt to fire these tablets to make them much more durable and easy to store, hence we have tens of thousands of written tablets remained intact until today (see Figure 1).



Figure 1. Clay tablets from Hittite Empire Period exhibited in Adana Museum.
Source: The Researcher

2.4.2. Papyrus

Although the word “paper” in English and “papier” in German and French were all derived from the Greek and Latin words *papuros* and *papyrus*, *papyrus* is not paper in true sense since it is not made from disintegrated fibre. Hunter (1978) defines *papyrus* as “... laminated substance made by cutting or slicing the stalks of the plant from end to end with a stone or metal knife and pasting the thin delicate boards together...” (p.6). Therefore it is rather different from the production of paper where plants were disintegrated down to their fibres and then filtered and dried to obtain thin and flat surfaces.

The *papyrus* plant (*Cyperus papyrus*), which used to grow profoundly alongside the Nile in Egypt, was used for production of *papyrus*. Almost concurrently with the Sumerians, the Egyptians had been reading from *papyrus* written with ink around 3300 BC (Fischer, 2004). When symbols transformed to signs around 3700 BC, pictorial writing transformed to phonetic writing. However, instead of arbitrary symbols, they used several hundred hieroglyphs (see Figure 2).

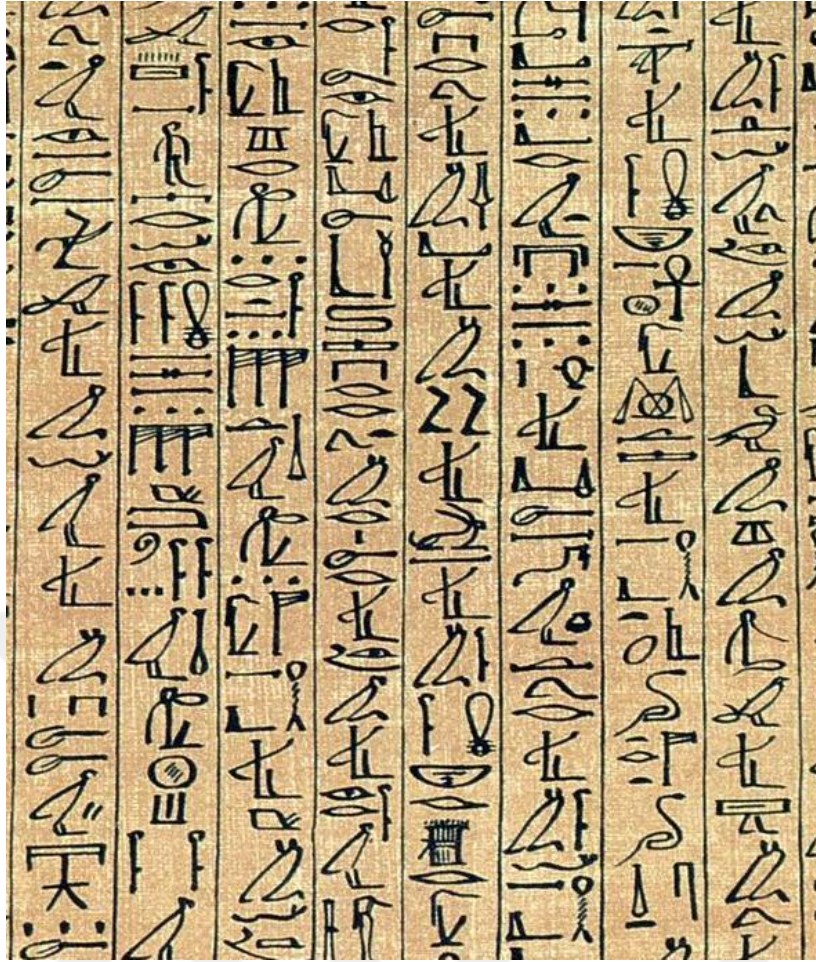


Figure 2. Ancient Egyptian cursive hieroglyphs written on papyrus.

Source: https://en.wikipedia.org/wiki/Cursive_hieroglyphs

2.4.3. Parchment

The word parchment was derived from Pergamum, which is an ancient city of Mysia in Asia Minor (Hunter, 1978). The invention of this writing and reading medium was credited to the King of Pergamum (197-159 B.C.) as rivalry to the papyrus in Egypt. Indeed, this kingdom was located in the west of today's Turkey and the city is called Bergama as a derivation of Pergamum. Papyrus had been very expensive, and very few people afforded to buy written texts. When parchment became available in larger quantities in the second century AD, it led to an increase in the production of written texts (Fischer, 2001). Parchment is made from animal hides such as sheep, goat, calf, etc. by stretching the hide in a four-sided wooden frame (see Figure 3). Eumenes II, the King of Pergamum, encouraged his experts to perfect the technique of stretching and drying the skin of sheep and goats. Although the life span of parchment in history was not rather

long comparing to other mediums, it is still in use today yet for nostalgic purposes and/or special occasions.



Figure 3. An ancient sample of parchment written in Paleo-Hebrew of the 6th century.

Source: <http://www.lebtahor.com/Archaeology/papyriscrolls/Qumran.htm>

2.4.4. Paper

Although paper is relatively a young invention compared to its predecessor mediums like clay or papyrus, which had been in use for thousands of years, its wide and vast use occupied almost all aspects of our lives.

Paper was defined by Webster's Dictionary as "a substance made in the form of thin sheets or leaves from rags, straw, bark, wood, or other fibrous material, for various uses". Paper got on the stage with relatively more convenient and easier production and utilization after the challenges of implementing symbols and letters on other surfaces such as stones, clay tablets, parchments and papyrus. The credit for the invention of paper was usually given to the Chinese who devised this material around 2000 years ago. In fact, disintegrated plant fibers and weave them to obtain a surface to write on has been experimented for a long time, yet Ts'ai Lun was generally accepted as the inventor of paper in AD 105 (Hunter, 1978) as he perfected this process and publicly announced.

(1978) describes true paper and its process of production as follows:

To be classed as true paper the thin sheets must be made from fibre that has been macerated until each individual filament is a separate unit; the fibres intermixed with water, and by the use of a sieve-like screen, the fibres lifted from the water in the form of a thin stratum, the water draining through the small opening of the screen, leaving a sheet of matted fibre upon the screen's surface. This thin layer of intertwined fibre is paper (p. 5).

This was the process employed by Ts'ai Lun approximately 2000 years ago, since then, despite the fact that the papermaking industry has developed its production line and machines, precisely the same principles of Ts'ai Lun are still in use. This technology, as it is in most countries, is also in place in Turkey, where the researcher of this study visited a paper mill, ranked the second biggest in the country, and observed the very same process yet with giant machines and rather complex and cutting-edge technologies functioning in papermaking (see Figure 4).



Figure 4. Giant screens to dry the refined paper pulp and rolls of paper.

Source: The Researcher

Since its invention, paper has been regarded as a significant and respected art, craft, and industry. In the eastern world, it has even sacred characteristics as it was used in printing reverential scripts, to the extent that ancient calligraphists saved even the left overs of their paper and reed pen.

Gutenberg greatly contributed to the prevalence of paper with his invention of the printing press with loose type in the middle of the 15th century. The moveable type he invented in 1455 enabled us to print new texts by merely

removing and re-organizing types. Before his invention, the production of book was a time-consuming and laborious activity in the medieval manuscript tradition since writers had to write every single copy of a book by hand. However, in the printing process, the building blocks of the text -- the characters or types -- are set or composed in a case that enables the writer (or printer) to edit or mark. These blocks were printed on sheets of paper by use of a press and ink. Then, these sheets were cut, sawn and bound to form printed books (Boone & Higgins 2003; Hillesund, 2005). By means of these processes, it was possible to produce and reproduce many books in much shorter time. Hence, paper ascended to the throne of reading mediums where it remained unchallenged until recently, only to face the threat of most cutting-edge digital technology with a prospect and potential to change not only the reading medium but also our reading habits.

Therefore, the need for paper does not seem to be that obligatory anymore. In a very recent newspaper, Unger (2017) reported that the worldwide demand for printing and writing (P&W) on paper has been in a continuous decline since 2008. Statistically, the demand for P&W paper decreased by 2.6% in 2015, 2.2% in 2016, and it is estimated that it will decrease by another 1.1% in 2017 and 2018. On the other hand, the paper finds its way, instead of P&W, paper is more required now for packing by the increase of on-line shopping. Humorously, Unger (2017) sums this situation as “The internet taketh away, and the internet giveth”.

2.4.5. Digital Screens

The history of digital screens started with CRT (Cathode Ray Tube) monitor, which was invented by Karl Ferdinand Braun, a physicist and an inventor, in 1897; yet, was not commercially introduced until 1922 (Parr & Davie, 1959; Hornbech, 1998). A CRT monitor consists of an electron gun that produces images by firing electrons onto a phosphor-coated screen. In the beginning, CRT monitors were monochrome and were in small sizes. While they were mostly used in oscilloscopes and black and white televisions initially, the first commercial color CRT was produced in 1954. These color monitors were the most popular display technology for more than half a century as they were used in television sets and computer monitors. The first screens were black and white or had very limited colors and they used to occupy a large space in spite of their small size

screens due to their cathode tube. Invention of LED (Light Emitting Diode) in 1961 and LCD (Liquid Crystal Display) in 1964, made it possible to produce flat screens which can be large yet rather thin like a framed painting (http://www.sky-technology.eu/fileadmin/media-archive/SKY-downloads/E-Book_The_History_of_Display_Technology.pdf). In Figure 5, we can see one of the first Macintosh computers (Macintosh Classic) with a 9" monochrome monitor (produced in 1990) versus a Samsung with 49" ultra wide curved monitor (produced in 2017) which reflects the improvement of digital screens within a 27 year-span.



Figure 5. A Macintosh Classic with 9" monochrome monitor vs. Samsung with 49" ultra wide curved monitor. Source: www.wikipedia.com and www.samsung.com

Another milestone in the history of display technology is "touch screen" which dates back to 1965. However, its real utilization gained momentum with its use in ATMs and ticketing kiosks by 1995. Touch screens provide us with direct interaction with the screen, which was possible only through a keyboard or a mouse previously. This interaction also made reading from digital screens easier and more comfortable. To begin with, we started touching digital screens like we touch paper, we only need to slide the screen in order to flip the page. Secondly, owing to omission of a keyboard and a mouse, the size of the device decreased dramatically.

Hence, we have palm-size tablet PCs (Personal Computers) that are able to perform almost like a regular size PCs, which can be considered as the very first step towards book-like digital reading materials. We have been reading from CRT, LCD and LED monitors but they were all cable connected to a computer case and required a certain sitting position in order to read. Yet, the light from

CRT monitors were more disturbing for the eyes compared to LCD and LED monitors. An interview with Dr. İbrikçi from the Electrical-Electronics Engineering at Çukurova University revealed that CRT monitors were more harmful to the eyes than LCD and LED monitors. Therefore, the LCD and LED monitors in Tablet PCs provided a relief both for the eyes and the whole body with their flexible use: one can read or watch in a lying position.

Despite the comfort and ease provided by tablet PCs, these devices were still problematic for reading. For instance, they were still over-illuminated, especially for night-time reading. The visions on their screens were not visible in direct light or sunlight - bad news for outdoor readers! Considering such problematic issues, the technology has produced electronic devices, such as e-readers enabling us to read e-books with great ease and minimized discomfort.

E-readers, into which we can now squeeze thousands of books, are on the way (if not already) to change our mode of reading rudimentarily. The e-books presented to us through these devices have already become an integral part of reading activities of those who may not even be that technology inclined. As a result of a comprehensive review, Subba Rao (2003) defines e-books as follows:

Text in digital form, or a book converted into digital form, or digital reading material, or a book in a computer file format, or an electronic file of words and images displayed on a desktop, notebook computer, or portable device, or formatted for display on dedicated e-book readers (pp. 86-87).

In sum, e-books are digital versions of printed books enhanced with more interactional features. Now that we have e-books, we need e-readers to be able to read them. In fact, any device that can display text on a screen can be accepted as an e-reader; however, a proper and inclusive definition of an e-reader can be "... a dedicated electronic device that is designed primarily for the purpose of reading digital books and periodicals" (Burk, 2001). Furthermore, Burk (2001) lists some of the advantages of e-readers as being able to (1) customize type size and font; (2) buy the books on-line and start reading them within minutes; (3) search the content of the e-book with specific keywords; (4) set-up a dictionary into the e-reader; (5) highlight, annotate, underline and bookmark; (6) adjust the backlight of the device, and (7) have the capacity to store tens of thousands of books based on the storage capacity of the device.

Ambitious efforts to approximate e-readers to printed books has yielded rather impressive results with the introduction of paper-like screen with e-ink technology (Hidalgo, 2017). Unlike LCD screens in mobile phones and tablet PCs, these lusterless screens with no back light provide readers to be able to read even in bright sunlight without a glare (see Figure 6). Additionally, in order to read in a dark environment, instead of backlighting, as it is with regular paper, these screens have certain lighting features that reflect the light from the screen to the eyes. In their experimental study, Siegenthaler et al., (2011) compared various e-reader devices with the participation of ten participants. Although the display of devices with e-ink technology looked very similar to printed-paper, the researchers wanted to inquire if the reading behavior was also equal to that of reading from printed book. They concluded that reading behavior of the readers when reading from an e-reader was very similar to that of when reading from printed-paper. However, contrary to LCD-displays, usually associated with impaired reading performance, e-ink displays were rather significant in the field of reading.

In spite of their certain limitations like B&W displays (at least for the time being), these paper like screens were a breakthrough in the reading medium technology.



Figure 6. A regular tablet PC versus an e-reader with anti-glare paper like screen.
Source: www.amazon.com.

The future of display technology promises astounding inventions with impressive advancements that can be observed day by day. For instance, screens with OLED (Organic Light Emitting Diode) technology uses organic materials that glow a particular color when on certain electric currents; additionally, pixels can be turned off completely for black and rather vivid contrast. In the very near future, we should not be surprised to see OLED screens being flexible enough as to be bent like plastic. Another approaching display technology will probably be foldable screens on mobile phones, tablet PCs and similar devices which will turn a smart phone into a TV size display and vice-versa. The farthest future we see in display technology is “holographic images” where images would be freestanding in midair without a screen for reflection. However, research indicates that there is still a long way for fully-fledged holographic displays, which hold the potential to redefine the future of display technology (Skytechnology, 2017).

As a matter of fact, these ubiquitous screens pervade our lives so fundamentally that everyone from every walks of life and from every age group is obliged to read not only from digital screens of computers, tablets, or mobile phones, but also from digital screens of refrigerators, washing machines, or air conditioners.

This widespread phenomenon leads researchers, with us included, to investigate (refining among many research topics) as to how much reading from a certain medium is our preference and how much such a preference affects our reading comprehension.

2.5. Printed-Paper vs. Digital Screens

As it was elaborated in the paragraphs in previous sections of this chapter, after sustaining their enduring evolution, reading mediums have now reached to two basic options: (1) reading from conventional printed-paper, and (2) reading from digital screens of various devices. As each medium has its own advantages, disadvantages and enthusiasts, we can see that some readers are loyal to traditional paper, some others are open to cutting-edge reading technology. Thus, here we face the question as to which of the two mediums would really prevail in the future: the printed-paper or the digital screen. Based on our observations and the present trend of the current, young generation, due to their intensive involvement in the social media, we can therefore predict that digital screens will outlive the paper as a reading medium. According to statistics, while 0.97 billion people used the social media in 2010, this figure reached to 2.46 billion people in 2017. Furthermore, future projections estimated that it will be 3.02 billion in 2021 (Number of social media users worldwide from 2010 to 2021 (in billions), 2017).

The very individuals who would speedily be utilizing this new reading technology are what Prensky (2001) calls “Digital Natives”, who were born into the world of information age of computers and the internet where they think and process information fundamentally differently compared to their predecessors, namely, “Digital Immigrants”. The metaphor of “digital immigrant” implies that someone immigrated to a foreign country can learn and speak the language of that particular country, yet will probably retain an accent of the language.

Similarly, the older generation (technology-wise; born before 1980) is able to use digital technology to some degree, yet may have a certain way of using technology with some kind of apprehension and hesitation due to lack of full integration into this new world. This generation is comparable to an immigrant speaking the host language with an accent. For instance, printing e-mails only because they cannot be read from the screen or calling someone to office only to show them a website instead of sending the URL (Uniform Resource Locator) via e-mail can be cited as characteristic of such an old generation. Since digital natives are usually accepted as individuals born in 1980 and in the following years, most of today's youth are members of this generation. Bennett, Maton & Kervin (2008) cite the distinctive characteristics of digital natives as follows:

1. Young people of the digital native generation possess sophisticated knowledge of and skills with information technologies.
2. As a result of their upbringing and experiences with technology, digital natives have particular learning preferences or styles that differ from earlier generations of students (p.777).

Therefore, can we presume that digital natives will be much more inclined to use digital screens for reading while their printed-paper preferences will disappear by time? While Crawford & Gorman (1995) claimed that "...the future of the print is not about print-on-paper versus electronic technology", and "it is about reading and best means to read ... and print-on-paper is the best for sustained reading leading to the acquisition of the knowledge", only six years later, Brown (2001) stated that "...new areas of functionality and preference for e-text will come to the fore and create new reading habits and expectations for dealing and interacting with text". More cautiously, Baron (2015) claimed that it was risky to call a winner in the midst of a revolution, by supporting his caution citing pros and cons of reading on paper and on screen. For Baron (2015), the main advantage of using e-reader is in its convenience by being able to carry a pile of books; and that the main drawback is the "distraction" caused by other functions (built-in applications) and internet-connected Tablet PCs. Readers preferring either medium have their own viable reasons such as particular preferences, reading speed, reading comprehension, comfort and joy of reading, etc, which all constituted the research areas of researchers in the field.

Firstly, as we are beginning to review these aspects, it would be appropriate to start with reading medium preferences in order to reflect readers' voices regarding this matter. Considerable number of researchers conducted studies on preferences of readers from different levels of education, although most of the research concentrated on undergraduate and graduate students. For instance, in their study with undergraduate students in Maryland/USA, Buzzetto-More, Sweat-Guy, & Elobaid (2007) found that the majority of students reported that they preferred paper books over e-books. In a similar study, Spencer (2006) investigated undergraduate and graduate students' preferences regarding reading from a printed-text and a computer screen, as a result of which she indicated that the majority of students preferred reading from printed-text based on reasons such as portability, reliability, annotation, highlighting, and ergonomics. In both studies, the participants similarly expressed their desire to have access to both mediums of reading. In the same vein, Liu (2006) conducted a research with undergraduate students in order to elicit students' perceptions, preferences and utilization of print or electronic resources. The researcher concluded that learners "...desire a hybrid information environment" considering that "digital libraries and traditional libraries have their unique advantages and limitations" (p.590).

In a longitudinal study which spanned over a period of 6 years (2008-2014) by Kazancı (2015), with 400 undergraduate students at Çukurova University in Turkey in 2008 and 392 in 2014 with different students yet from the same institution, the researcher investigated students' preferences concerning reading from printed-paper and digital screens. While the majority of the participants (78.5%) expressed views preferring paper in 2008, the inclination towards paper dropped to 77.3%, yet still in both occasions the readers overwhelmingly expressed tendency towards paper rather than digital screens. Given that the six-year interval did not have a considerable impact on students' reading medium preferences, it seems difficult to present a definitive projection on changes of reading medium tendency.

Besides preferences, Liu & Huang (2008) investigated if preferences changed depending on gender of individuals. With their study which was conducted with 203 undergraduate and graduate students, they found that while 12.5% of male participants preferred electronic media, this figure was only 5.7%

for female participants. Hence, while 51.3% of the male participants preferred printed media, for female participants, the percentage rose up to 73.2%. For those that either type would do, the percentage for males was 36.2%, and for females, 21.1%.

Naturally, the preference for printed-paper instead of digital screen is not without a reason. Some studies went beyond preferences, and questioned the reasons underlying such particular choices. In chronologically early studies, the reasons to prefer printed-paper were due to problems and inefficiencies of display and computer technology. For example, Dillon, McKnight, & Richardson (1988) reviewed the related literature, and they determined ten potential reasons for reading differences between reading from printed-paper and reading from digital screens. The reasons cited by the researchers are (1) orientation: readers can orient the paper as they wish, which is not possible with monitors; (2) eye movement: although reading from screen was measured to be slower than reading from paper, no significant insight was derived from eye movement; however, eye movement then was measured with photoelectric monitoring system; (3) visual angle: it was found that visual angle significantly affected reading speed and accuracy when reading from a digital screen; (4) aspect ratio: it is the ratio of width to height, and while it is usually vertical on paper, it is horizontal on screen; this though had little effect on reading; (5) dynamic variables: these are screen features like scrolling, jittering, and screen filling; (6) flicker: the refresh rate of CRT monitors cause characters to flicker, in fact, the study found that at least a 93 Hz refresh rate is required to provide a comfortable read; (7) image polarity: dark characters appearing on light screen (positive polarity) or light characters appearing on dark screen (negative polarity) constitute the polarity of the display and it was founded that positive polarity supported faster reading; (8) Display characteristics: format, type and size of characters on screen; (9) anti-aliasing: is the staircase-like or jagged appearance of the edge of the characters which may also affect the readers' comfort; and (10) user characteristics: it was reported that increased involvement in reading from screens would reduce performance deficit. However, the study was back in 1988 and display screens then were problematic CRT monitors discussed in the previous chapter. The cited difficulties mentioned here have been radically improved in recent years; and most of the problems expressed were later

eliminated with high-tech screens. On the other hand, a research conducted in 2008 by Tseng cites a few of the problems mentioned in previous studies. The focus of Tseng's (2008) study was on factors affecting reading medium choice of readers who happened to be EFL (English as a Foreign Language) students. In this concise study, the difficulties students faced when reading from digital screens were listed under five titles: (1) eye strain and blurred eyes after staring at computer screens; (2) bright background colors that make the eyes uncomfortable; (3) it was easy to skip lines on screen; (4) font sizes on screen were too small; and (5) other reasons like reading habits and radiation emitted from screen. A further research by the same researcher, more reasons like *inability to leave marks or make notes*, *tiredness* and *distraction* were added to previously mentioned reasons (Tseng, 2010).

Rockinson-Szapkiw et al. (2013) also focused on reasons of preferences of undergraduate and graduate students who were able to opt for reading from traditional printed textbook or from electronic book format. The participants were asked to cite the reasons for their particular choice. Those who preferred printed textbook expressed reasons such as *portability*, *familiarity*, and *useful features* such as *note taking*, and *dog earring pages*. On the other hand, those who preferred electronic textbooks reported reasons such as *portability*, *lower prices*, and *availability of alternatives*. In order to obtain more professional insights, Hillesund (2010) conducted a study with 'expert readers' namely, established humanist scholars and social scientists in order to elicit their preferences and views on reading from printed-paper and digital screens. This study revealed that the majority of participants preferred printed materials. When citing the reasons that led humanist scholars and social scientists to prefer printed-paper, the researcher underscored two challenges, the first replicating conditions for continuous imaginary reading, and the second creating favourable conditions for sustained reflective reading.

So far, the problems highlighted in the studies covered are related to technological misgivings and drawbacks, the majority of which will probably be eliminated thanks to technological advancement. For example, participants in such studies frequently complained about eye-strain caused by backlighting of digital screens. Thankfully, new generation electronic readers that employ e-ink technology do not require back lighting, and provide readers with paper-like

reading experience.

As for measurement of speed when reading from printed-paper and digital screens, Kurniawan & Zaphiris (2001) conducted a research with readers from a wide range of ages (18-65+) and focusing on reading speed. The researchers concluded that reading from digital screens was 10-30% slower than reading from printed-paper. In line with the results of this research, Baştuğ & Keskin (2012), in a study they conducted with 88 fifth-grade students, also concluded that reading from a digital screen was slower than reading from printed-paper. However, in another study conducted by Dündar & Akçayır (2012) with fifth-grade students, no statistically significant differences were found between the reading speeds from printed-paper and digital screens. Solak (2014) carried out an experimental research with 96 undergraduate students comparing certain aspects of these two mediums, and found that participants reading from printed-paper completed their assigned tasks 3.2 minutes earlier than the screen group. The fact that reading from digital screens was found to take much longer time than it did from printed-paper can be attributed to some significant reasons, one of which, undoubtedly, being restricted familiarity with digital screens. Since members of the new generation are immersed in digital technology, they are bound to carry out most of their pedagogical tasks through their digital devices. This, by nature, invites both teachers and researchers to keep abreast with most recent research in order to well define and identify the continuously evolving needs and preferences of these individuals. Therefore, a piece of research conducted at a particular time with a particular group of this generation, is soon to be outdated within a short span of time, thus requiring non-ceasing replication of research for sustained and effective educational delivery.

Whether printed-paper or digital screen, the medium that we utilize should enable us, the readers, to comprehend a piece of text with the greatest ease and efficiency possible. Therefore, comprehension lies in the heart of the matter. Viewed from this perspective, researchers in the field did not ignore the significance of this skill, and concentrated their efforts on investigating to what extent a particular medium, be it printed-paper or digital screen, has a greater potential of comprehensibility to offer to the reader.

To our knowledge, if not the first probably one of the earliest, in a study conducted by Kak (1981), a standardized reading test (the Nelson-Denny test)

was administered to participants on paper and on screen, yet both groups had answered the posed comprehension questions by hand on paper. The results showed no significant effect of the reading medium on comprehension. In a very similar study one year later, Muter et al (1982) asked 32 participants to answer 25 multiple-choice reading comprehension questions after two 1-hour reading sessions while half of the participants read from a television screen, the other half did the reading from printed book. Similarly, these researchers did not find any significant difference between the comprehension of groups reading from printed-paper and television screen. On the other hand, in another early study, Belmore (1985) conducted a similar research with 20 undergraduate students, and found that, compared to reading from printed-paper, it took 12% longer and 47% less comprehension reading from a computer screen.

In another early meta-analytic study, Dillon (1992) critically reviewed the empirical literature and reached the following conclusions:

...a typical high quality screen with effective manipulation facilities can provide an environment that holds its own in speed, comprehension and preference terms with paper, at least over the relatively constrained reading scenarios found in the researchers' laboratory. But if our desire is to create systems that improve on paper rather than just matching it in performance and satisfaction terms (as it should be) then much more work and a more realistic conceptualization of human reading is required.

When we reviewed more recent studies, we observed that while some researchers focused their research on lower education levels (namely, elementary or high schools), some others focused on higher education (namely, undergraduate and graduate). For example, Wright, Fugett, & Caputa (2013) conducted a study with second-grade students in order to compare their comprehension scores of reading from printed-paper and electronic book. The researchers' study concluded "...vocabulary and reading comprehension is consistent between the two reading methods" (p.367). In line with this conclusion, Ortlieb, Sargent, & Moreland (2014) employed both of the reading mediums for their study in a reading clinic with fourth-grade students. They concluded that digital reading environments could serve as a supplementary role in leading students towards comprehension development; yet, they refrained from recommending digital texts and/or digital reading environments as a primary

reading medium. In an elaborate research by Aydemir, Öztürk, & Horzum (2013, p.2272) with fifth-grade elementary school students, the focus was not only on the reading medium but also on reading types. The researchers concluded that "...reading comprehension of the students who read the informative text from screen were significantly higher than others. Moreover, there was no significant difference between the students reading the narrative texts from screen and printed material in terms of the levels of reading comprehension." Similarly, in their study with fifth graders, Dündar & Akçayır (2012) found no significant difference in comprehension levels of screen and paper groups. On the other hand, Mangen, Walgermo, & Brønnick (2013, p.61) conducted a study with 72 tenth graders in order to explore the effects of medium in reading comprehension. The researchers concluded that "...students who read texts in print scored significantly better on the reading comprehension test than students who read the texts digitally." The reason they cited for this conclusion is that paper provides "spatiotemporal markers" that help students to remember. In other words, anything related to paper seems to aid retrieval and recall of information significantly.

Regarding higher education levels, Taylor, (2011) conducted a study with 74 undergraduate psychology students to determine whether students learned equally well from digital as from paperbound texts. The study concluded that there were no significant differences concerning comprehension. Ackerman & Lauterman's (2012) study with engineering students employed time pressure variable in order to measure the level of comprehension when participants took a test on screen and on paper within a restricted time-frame. When the participants were under time pressure, their test scores on screen were lower than on paper. However, when the time pressure was lifted, there was no significant difference regarding their comprehension level.

Subramanian et al. (2013) conducted a research with undergraduate students by dividing them into three groups to perform a reading and reporting task. The first was *paper group*; the second, *computer group* (without printer and the internet); and the third, *computer group* (yet, with printer and internet). Despite the fact that participants expressed preferences for reading from paper, the researchers observed no significant difference between the performance of the first and the second group. On the other hand, the third group performed poorly

compared to the first and the second due to distraction caused by the internet.

Dykeman (1988) conducted a study with elementary school students by dividing them into three groups: above-average, average, and below-average readers. When the researcher compared students' reading comprehension scores obtained from paper-based and computer-based environments through a diagnostic reading test designed by Stanford University, she observed that the scores from the computer version, compared to paper-based, declined by 10% for the average; increased by 13% for the below-average, and did not change for the above-average. In a similar PhD dissertation, Eno (2011) studied with high-achieving adolescents to compare their computer-based and paper-based reading comprehension test scores. The researcher observed that students performed better on computer-based test than they did on the paper-based. This result was attributed to a positive attitude of high-achieving students towards a digital context. In another MA thesis, Kerr (2002) studied with 60 fifth graders, and found that children were more efficient in comprehension when reading from paper. In a rather recent MA thesis however, Kestel (2014) could not find any statistically significant difference between paper and e-reader groups of a study she conducted with sixth graders. In another PhD thesis, Long (2014) not only administered a reading comprehension test but also provided reading instructions to fifth-grade students for 10 weeks. The study also revealed no significant differences between the reading comprehension scores of e-reader and the traditional-paper text groups. In an MA thesis by Bahadır (2013), the researcher conducted an experimental study in which he instructed an IT course to two groups of undergraduate students: screen based and paper based. The researcher concluded that while reading from either medium did not affect the participants' comprehension level, the retention level, however, was found to be higher for the paper-based group than it was for the computer-based group. Eden & Eshet-Alkalai (2013) approached reading comprehension from a different angle: editing. The participants in this study, 93 university students, were asked to read, edit, recognize errors, and improve the quality of short papers in printed-paper and digital formats. The conclusion made by the researchers is as follows:

... in contrast to many recent reports about print versus digital reading, no significant differences were found between the performances of participants in the two formats. Similarly, no significant differences were found for all categories of text errors as well as for gender. It was found that the digital readers completed their tasks faster than the print readers but their performance was not lower (p.846).

In a study carried out by Kretzschmar et al. (2013, p.10), the researchers, with the participation of 57 adults (36 younger adults - mean age 25.7) and older adults (21 older adults - mean age 66.8), compared three reading mediums: printed-paper, tablet PC and e-reader. The researchers found no comprehension accuracy differences across the three mediums for the two groups. This study concluded that "...public opinion that digital reading media, though convenient, reduce the pleasure of reading is a cultural rather than a cognitive phenomenon." However, Kang, Wang, & Lin's (2009) study with undergraduate students revealed contradictory results. The researchers in this study found that reading from a "convenient book" (printed book) yielded a higher level of reading performance than reading from an e-book. Additionally, female participants were observed to demonstrate better reading performance than males while reading from either medium.

Naturally, readers' preferences and performance are bound to continuously change based on the developments and improvements in technology. Researchers in the field expressed views and concerns regarding reading mediums based on scientific research, which undoubtedly have the potential to shed light on further technological improvements of reading devices by designers, developers and manufacturers. For instance, Mercieca (2004) sought responses to the question "what will make users read on screen". With the participation of 14 graduate students in the study, the researcher thematized the answers into five categories: (1) the ability to search across the collection or across an individual e-book; (2) internal book navigation presented on the left side of screen; (3) chunking of the content into chapters and subsections; (4) saving money; and (5) content integration – namely being able to copy and paste texts into other texts. In an early attempt to categorize concerns about electronic books, Peek & Newby (1996) listed the following items:

1. Intellectual property—who owns the ideas, concepts, data, and so forth?
2. Economic property—who invests in the process and who profits?
3. Ethical conduct—does the digital format encourage plagiarism?
4. Egalitarianism or elitism (the digital divide)—does the digital format favor one group over another because of access issues?
5. Academic legitimacy—does a digital publication accord the same merit as one on paper?
6. Librarianship—what is the role of the library in archiving digital publications?
7. Social implications—how is the nature of work and the workplace or general quality of life affected

Another concern not voiced by Peek & Newby (1996) may have to do with aesthetics. When an electronic book is considered, the basic aesthetic concerns are related to *design* of the e-reader and the *typography* used for texts. The size and shape of printed symbols determine the legibility of text and have a crucial role in reading performance (Legge & Bigelow, 2011). In an experimental study, Larson & Picard (2005) investigated the effect of high quality typography on the mood of readers, and concluded that “...high quality typography appears to induce a positive mood, similar to earlier mood inducers such as a small gift or watching a humorous video.” Therefore, whether on paper or on screen the typography used for the text has the potential to affect the readers’ choice.

When designing an e-reader, Lin, Kang, Fan & Wen (2005) listed six considerations: (1) mobility: reduction of weight and size; (2) environment factors: used efficiently in all kinds of environment; (3) physical space: meeting ergonomic requirements; (4) information modality: accommodating a wide range of individual preferences and abilities; (5) mental space: keeping contents private; and (6) information capacity: storage capacity that could record a large amount of information.

Parallel to developments in electronic technology, digital screens now come in various options. Morris, Brush, & Meyers (2007) conducted a study comparing reading from printed-paper and various formats of digital screens (dual-monitor desktop system, pen enabled horizontal display surface, and tablet computer). When providing advantages and disadvantages regarding utilization of these digital screens, the researchers stated that “...by synthesizing users’ experiences with each system type, we proposed design recommendations for a hybrid system that would combine the strengths of vertical, horizontal, and

reconfigurable surfaces.” (p.85).

Along with technological development and the continuous change taking place in human’s behavior, naturally almost all researchers ended their research with recommendations and suggestions encouraging replication of their studies.

2.6. Summary

This chapter was designated to presenting a theoretical framework of the study. Firstly, definitions of reading were covered from different perspectives of various scholars. Then, the place of reading in the English language classroom was briefly dealt with. Following, history of reading mediums was provided in a chronological order. And, finally, as a backbone of the study, literature on the two reading mediums, ie printed-paper and digital screens, was presented by comparing and contrasting pertaining views.

CHAPTER 3

METHODOLOGY

3.1. Introduction

This chapter is dedicated to providing information about research design, participants, instrumentation and data analysis of this study. Firstly, the research design of the study was presented, and underlying reasons for adopting such a design was explained. Secondly, information about participants such as their gender, department, school settings, etc. was provided. Thirdly, we elaborated on the three instruments used for the study: (1) Questionnaire of Reading Medium Preference: Printed-Paper and Digital Screen; (2) Digital-based English Reading Comprehension Test; and (3) Paper-based English Reading Comprehension Test. Following, the procedure of the study was explained in detail. Lastly, the methods of statistical analysis used were delivered.

3.2. Research Design

One of the aims of this study is to investigate preferences of university students regarding choice of reading medium: printed-paper or digital screen. Yet, the main aim is to observe if reading from printed-paper or digital screen has any impact on reading comprehension levels of the participants. Lastly, the study does also aim to determine whether participants' reading comprehension scores are in-line with their reading medium preferences. Therefore, a mixed (descriptive - correlational comparative survey) method was used to elicit data about preferences of the participants. For the implementation part, reading comprehension scores were obtained twice with a ten-week interval between the two tests: once, from a digital screen, and once, from printed-paper.

3.3. Participants and Sampling

This study was conducted at Çukurova University in Turkey, founded in 1973 and is one of the major universities in the country with enrollment of more than 55 thousand students.

The participants of the study consisted of 170 undergraduate students in

total: 94 first-year students from the Electrical-Electronics Engineering (EEE) department of the Faculty of Engineering, and 76 first-year students from the English Language Teaching (ELT) department of the Faculty of Education (See Table 1). Since all participants of the study were born after 1980, they were defined as “digital natives”, to use Prensky’s (2001) term.

Table 1

Summary of Participants

Study and Department	Female		Male		Total
	f	%	f	%	
Pilot Study Participants from EEE	4	40.00	6	60.00	10
Pilot Study Participants from ELT	5	50.00	5	50.00	10
Main Study Participants from EEE	12	14.28	72	85.72	84
Main Study Participants from ELT	50	75.75	16	24.25	66
TOTAL	71	41.76	99	58.24	170

As can be seen in Table 1, 94 students from the EEE department (55 female and 21 male students), and 76 students from the ELT department participated in the study (16 female and 78 male students). At the very beginning of the research, a pilot study was administered with the participation of 10 students from each department; and no technical or academic inconveniences were experienced by the researcher with this group of participants. Therefore, the main study was carried out with the volunteering participants of convenient sampling, utilizing the method previously identified.

3.4. Instrumentation

Three different instruments were used in order to collect the data for this study. Firstly, a questionnaire of preferences was applied to participants in order to investigate a particular choice of reading medium and reason(s) underlying such a choice. With this questionnaire, we also tried to identify participants’ acquaintance with technology, social media, and reading (see Appendix 1, p. 85). Secondly, a reading comprehension test obtained with a written approval (see Appendix 2, p. 86) from the Turkish National Test Board (ÖSYM) was used in

order to measure their achievement in reading comprehension in English. The reading comprehension part of 2009 YDS (Yabancı Dil Bilgisi Seviye Tespit Sınavı = Foreign Language Proficiency Test) was separated from the whole test, and was printed on paper (see Appendix 3, p. 87) in order to prevent distraction of participants while they were expected to respond to only reading comprehension items. Thirdly, the very same reading comprehension test was converted to a digital format, and was applied through personal computers (see Appendix 4, p. 91).

3.4.1. Questionnaire of Reading Medium Preferences: Printed-Paper and Digital Screen

The questionnaire administered in this study was designed with amalgamation of questionnaires previously applied by different researchers: Scholnik, 2001; Lin, Kang, Fan, & Wen, 2005; Liu, 2006; Tseng, 2010; Solak, 2014; Kazancı, 2015. The questionnaire included semi-structured, multiple-choice and open-ended items (see Appendix 1, p. 85), which were categorized as below:

- a. Demographic items such as age, gender, department etc.
- b. General preference of reading medium and underlying reasons
- c. Acquaintance of participants with social media
- d. Acquaintance of participants with technology
- e. Acquaintance of participants with reading
- f. Preferences of reading medium for course books and pertaining reasons
- g. Preferences of reading medium for novels and pertaining reasons
- h. Preferences of reading medium for newspaper and pertaining reasons

3.4.2. Paper-based English Reading Comprehension Test

In order to assess the English reading comprehension level of participants, a reading comprehension test, obtained from ÖSYM with a special permission, was administered to all participants in paper version. The whole test comprised 100 multiple choice items, 21 of which constituting the reading comprehension section, which all were related to seven reading passages. The passages and

items were printed on paper observing the same format of the ÖSYM test system. A separate answer sheet requiring responses of multiple choice items was also provided for each participant.

3.4.3. Digital-based English reading comprehension test

In order to design the digital screen version of the reading comprehension test, the same items utilized in printed-paper version were transformed to a digital platform and uploaded to personal computers which provided participants with reading the items on screen where they could scroll up and down in order to move through items back and forth. They marked their responses directly on multiple-choice items on screen, and results were digitally saved. The results of the tests were transferred to SPSS program for statistical analysis.

Two computer laboratories, where participants could comfortably and separately sit on personal computers, were reserved to conduct the test.

3.5. Procedure

The prepared questionnaire was presented to seven professors at various departments including the ELT and EEE for feedback; and, in line with the suggestions and recommendations received, necessary changes and amendments were made to the questionnaire, which was printed and photocopied to be administered to participants.

A pilot study was conducted at the very beginning of the research, in which 10 participants from first-year ELT students and 10 from first-year EEE students volunteered to participate. Following completion of reading preference questionnaire, the ELT participants were administered the English comprehension test on screen in computer laboratories. The participants were allowed 40 minutes to complete the test in ratio with the timing of the whole test of ÖSYM. The exact same procedure was also repeated for the 10 participants of the EEE department. An interval of eight weeks was allowed before the administration of paper-based comprehension test, for which the participants had 40 minutes to complete the test.

After the pilot study, a very minor revision was needed on the questionnaire. Other than that, the application process of the study yielded no technical or academic problem at all.

Especially in the social sciences, motivating students to participate in an academic study is a rather challenging situation. Although explaining the importance of the study to scientific research and the significance of their role in such a research does help with the motivation to some extent, participants usually prefer to see solid benefits coming from it. For instance, providing extra credit regarding full participation and cooperation is one way to do so. Fortunately, professors of the participants from both departments agreed to reward the participants (who happened to be their students) with extra credit in addition to scores obtained from final tests, which did indeed act as rather high incentive concerning constructive collaboration between the participants and the researcher.

Therefore, when all 170 participants responded to the questionnaire, they were also asked if they would like to participate in a comprehension test, both in a digital format and printed-paper, as result of which, 170 participants volunteered to take part in the comprehension test.

The procedure observed for the pilot study was also roughly observed for the main study. During the December of 2016, the participants were administered the questionnaire on reading medium preferences, and subsequently, the reading comprehension test from digital screen. Two laboratories of the Computer Education and Instructional Technology department were allocated for the researcher to run the reading comprehension test. The computers in the laboratories were equipped with Intel i5 processor, 1 TB hard drive, 1 GB graphic card, 4 GB RAM and 19" flat screen LCD monitor and were operated by Windows 7 64 bit. Due to a crowded population and limited number of computers, the participants were led to the laboratories in groups of 25 (see Appendix 5, p. 98).

In order to apply the paper-based version of the test, an interval of eight weeks was allowed, during which the participants had their final exams and winter break, which we believe may have acted as a distraction from the first application of the test. The 170 number of participants who took the digital format dropped down to 147 for the paper format due to some reasons such as change of department, change of mind, drop offs, and (sadly) death. Therefore, these

participants' digital-platform tests were discarded from the study.

Following the interval, the participants were administered the paper-based version of the test in their own classrooms, in March, 2017 (see Appendix 6, p. 99). Similarly, the participants were allowed 40 minutes to complete both tests in line with the timing regulations of ÖSYM. Due to availability of computer labs and convenience in obtaining data, we found it necessary to conduct the digital test prior to the paper-based.

The results obtained from the three instruments (the questionnaire and two tests) were analyzed utilizing the statistical analysis software, Statistical Package for the Social Sciences (SPSS) 20.0.

3.6. Data Analysis

The current study comprises two main instruments to be analyzed: (1) a questionnaire with multiple-choice and open-ended items, and (2) a reading comprehension test with multiple-choice items. Therefore, we found it convenient to utilize various analysis methods. For multiple-choice questions in the questionnaire, we analyzed the frequency of the responses through a chi-square test for significance of dispersion, and for the open-ended items, we embraced a thematisation approach focusing on themes emerging in participants' responses. In order to enhance validity of thematisation, coding was crosschecked with two other researchers experienced in conducting research entailing content analysis.

For overall reading comprehension evaluation, we carried out a t-test in order to assess participants' performance by comparing the scores obtained from both printed-paper and digital screen tests. As a further step, we compared the performance of participants based on their departmental variation (EEE vs. ELT). For both of these procedures a paired samples t-test was utilized by employing SPSS 20.0. For the types of tests conducted, assistance of statisticians from the statistics department of Çukurova University was sought, and the procedure was carried out in line with their suggestions and recommendations.

Finally, based on preferences and reading comprehension scores, we looked into whether participants' choices of reading medium was in line with their reading comprehension achievement. For this procedure, no statistical analysis was

carried out; instead, an interpretation was made based on the comparison between stated preferences and reading comprehension scores.

3.7. Summary

In this chapter, we provided information about research design, participants, instrumentation and data analysis of the research. Besides, procedures of the study were presented in a step-by-step fashion.



CHAPTER 4

FINDINGS

4.1. Introduction

This chapter provides the results and tabulation of the findings of this study. The results were obtained from two instruments: (1) a questionnaire that surveys the reading medium preferences of participants, and (2) a reading comprehension test in English.

4.2. Analysis of Participants' Characteristics

As it was demonstrated in Table 1, the participants of the study consisted of 170 undergraduate students in total: 94 first-year students (16 female and 78 male) from the Electrical-Electronics Engineering (EEE) department of the Faculty of Engineering, and 76 first-year students (55 female and 21 male) from the English Language Teaching (ELT) department of the Faculty of Education, Çukurova University, Turkey.

In order to have insights into the results and conclusions of the study, it was considered significant to determine the acquaintance of participants with technological devices, the social media, and reading.

4.2.1. Acquaintance of Participants with Technological Devices

Since preferences for cutting-edge technological reading mediums with a digital screen or traditional printed-paper can be closely related to acquaintance of participants with technology, an item investigating ownership of technological devices was found necessary for inclusion in the questionnaire.

Table 2 demonstrates the ownership of technological devices by participants. All devices presented in the table are with a digital screen, and do provide a compatible medium for reading.

Table 2

Ownership of Technological Devices with Screen

DEVICES	N	%
Smartphone	160	94.12
Laptop PC	133	78.24
Tablet PC	59	34.71
Desktop PC	47	27.65
E-Reader	7	4.12
Others	4	2.35
Total	410	

As can be seen in Table 2, while smartphones are the most common technological devices preferred by the majority of the participants ($n = 160$; 94.12%), laptop PCs are the second most commonly used devices ($n = 133$; 73.24%), while tablet PCs were owned by 59 participants (34.71%). One fourth of the participants possessed a desktop PC ($n = 47$; 27.65%). On the other hand, the table also reveals that e-readers were not that common ($n = 7$; 4.12%).

Table 2 suggests that almost all of the participants owned at least one device with a digital screen, and most participants owned more than one device considering the total number of participants (170) and the 410 devices owned in total. It is obvious that the first three opted for digital devices were *portable* devices, which reveals that the majority of participants preferred devices that they could reach *anytime* and *anywhere*.

Although e-readers' popularity is on the increase in recent years, the majority of participants stated that they had not owned one yet. Despite the fact that most of the features of an e-reader (purely dedicated to reading) may be covered by other devices in the table, this device has its unique features, such as dimmed-screen and extended battery life.

4.2.2. Acquaintance of Participants with Social Media

Today, social media tools occupy a huge amount of space and time in the daily life of individuals, especially young ones, and make people spend hours before digital screens of a computer or a smartphone. The number of social media users increased from 0.97 billion people in 2010 to 2.46 billion in 2017. It was also estimated that it would reach to 3.02 billion in 2021 (Number of social

media users worldwide from 2010 to 2021 (in billions), 2017). People read and write on many incidents through social media, and naturally, all of these activities occur on digital screens. Therefore, with the item, *use of social media*, in our questionnaire, we aimed to identify participants' affiliation with social media tools considering that it may provide us with a basis regarding interaction with digital screens. For that matter, the participants were asked to state the social media platform(s) they used (if any), having the liberty to opt for more than one platform.

Table 3 reveals the most common social media platforms and their utilization opted for by participants during the conduct of the study.

Table 3

Utilization of Social Media Platforms

SOCIAL MEDIA	N	%
Instagram	134	78.82
Facebook	121	71.18
Snapchat	99	58.24
Twitter	91	53.53
Google+	86	50.59
Others	28	16.47
Pinterest	15	8.82
None	4	2.35
Total	578	

As can be observed in Table 3, it is clear that the majority of the participants used more than one social media tool considering that 170 participants used 578 social media platforms in total. Instagram (n = 134; 78.2%) and Facebook (n = 121; %71.18) were the leading platforms preferred by the majority of participants. Snapchat (n = 99; 58.24%), Twitter (n = 91; 53.53%), and Google+ (n = 86; 50.59%) were also very common while Pinterest (n = 15; 8.82%) was not that popular among participants. Although we made the effort to cover all the popular social media platforms in the questionnaire, there were some participants who marked the "others" option (n = 16; 8.82%) indicating that they used a social media platform other than those listed. Only a few participants (n = 4; 2.35%) did not prefer to use any social media platform.

As can be derived from Table 3, social media was observed to be very

common and popular among participants of this study given the fact that many of them used more than one social media platform, considered to be significant since it implied that participants spent ample time before a digital screen writing and reading through their electronic devices. Although verbal sections of these social media tools are limited (for instance up to 180 characters for Twitter), the frequency of their usage obliges individuals to be logged to digital screens for hours.

4.2.3. Acquaintance of Participants with Reading

The participants of this study, being university students, were supposed to read a vast amount of materials due to their academic studies. However, their relation with reading other than their academic material was also delved into in the questionnaire through two more items: “How many printed books did you read in the last two years other than course books?”, and “How many electronic books (pdf, e-pub etc.) did you read in the last two years other than course books?”. The analyses of the responses are presented in Table 4 for number of printed books, and Table 5 for number of electronic books.

Table 4

Number of Printed Books Read in the Last Two Years

NUMBER OF PRINTED BOOKS	N	%
Zero/Never	7	4.1
One-Two	17	10.0
Three-Four	37	21.8
Five-Six	38	22.4
Seven Plus	71	41.8
Total	170	100

Table 4 demonstrates that frequent readers who read more than seven books in the last two years ($n = 71$; 41.8%) constituted the majority of participants while moderate readers who happened to read five to six ($n = 38$; 22.4%) and three to four books ($n = 37$; 21.8%) were almost of equal frequencies. While rare readers who did not read any printed books in the last two years had a percentage of 4.1 ($n = 7$), and those who read only one to two were of 10.0% ($n = 17$).

Table 5

Number of Electronic Books Read in the Last Two Years

NUMBER OF ELECTRONIC BOOKS	N	%
Zero/Never	59	34.7
One-Two	46	27.1
Three-Four	27	15.9
Five-Six	12	7.1
Seven Plus	26	15.3
Total	170	100

As can be seen from Table 5, the participants who never read any electronic books in the last two years ($n = 59$; 34.7%) constituted the majority; and those who did only one to two ($n = 46$; 27.1%) came in next; and three to four third ($n = 27$; 15.9%); five to six, fifth ($n = 12$; 7.1%). And, the small minority who read more than seven e-books in last two years could be regarded as dedicated e-book readers ($n = 26$; 15.3%).

Looking at Tables 4 and 5, we can interpret the statistics as (1) reading was not a favorite pass time of the participants, and (2) considering the fact that the total number of those who did not read any e-books, or did only one to two, was more than half of all participants ($n = 105$; 61.8%), we can state that the majority had no or very limited experience with digital books.

In conclusion, together with their ownership of technological devices, the participants' prevalent use of social media implies that the majority of participants were acquainted with and even fond of technology. On the other hand, while the number of books the participants read in general was not that high, their interaction with digital books was far more limited.

These conclusions provide a basis for understanding the issues related to participants' reading medium preferences and pertaining impacts of such preferences on reading comprehension.

4.3. Participants' Preferences of Reading Medium and Pertaining Reasons

In this section, we will deal with participants' preferences of reading medium in general; participants' preferences of reading medium based on department; participants' preferences of reading medium based on gender; underlying

reasons of participants' reading medium preferences; participants' preferences of reading medium for course books and pertaining reasons; participants' preferences of reading medium for novels and pertaining reasons; participants' preferences of reading medium for newspaper and pertaining reasons; and, participants' reading comprehension scores on printed and digital mediums.

4.3.1. Participants' Preferences of Reading Medium in General

Following the demographic items dealt with above, the first and foremost general item of the questionnaire regarding preferences of reading mediums (printed-paper or digital screen) of participants was sought a statistical response here. Table 6 demonstrates these preferences of all 170 participants.

Table 6

Reading Medium Preferences of Participants

PARTICIPANTS' PREFERENCES	N	%	P
Printed-Paper	138	81.2	.000
Digital screen	32	18.8	

As can be seen in Table 6, while a vast majority preferred to read from printed-paper (n = 138; 81.2%), only about one fifth preferred to read from a digital screen (n = 32; %18.8).

This result suggests that although participants previously had revealed their familiarity with technological devices (see Table 2) and on-line social media platforms (see Table 3), they adhered to conventional printed-paper when it comes to reading.

4.3.2. Participants' Preferences of Reading Medium Based on Department

As was mentioned in the previous section, when preferences of participants to read from printed-paper or digital screen were analyzed regardless of their departments, we observed that the majority preferred printed-paper. Additionally, the questionnaire, with this item, aimed to reveal if departments of participants played a part in determining their preferences.

While Table 6, presented above, demonstrates the overall preferences of participants, Table 7 here displays these preferences based on department variation.

Table 7

Participants' Preferences of Reading Medium Based on Department

PREFERENCE AND DEPARTMENT	Printed-Paper		Digital Screen		χ^2	P
	N	%	N	%		
EEE Students	72	76.6	22	23.4	2.887	.089
ELT Students	66	86.8	10	13.2		

As we can see in Table 7, while 76.6% of the participants ($n = 72$) from the EEE department preferred to read from printed-paper, this figure rose to 86.8% for the ELT department ($n = 66$). Accordingly, while 23.4% of the participants ($n = 22$) from the EEE department preferred to read from digital screen, this figure decreased to 13.2% for the ELT department ($n = 10$). Although we observed a certain difference in the choice of participants based on their departments, the analysis did not yield statistically significant difference ($p = .089$) regarding reading medium preferences for both the EEE and the ELT departments.

We initially thought that department variation would be influential on determining preferences of participants since they were from relatively two distinct departments: applied sciences (EEE), and social sciences (ELT), however, this did not seem to be the case. By nature and profession, participants from the EEE department had more interaction with digital devices; and yet, we can assume, since they were involved in the social sciences, the ELT participants would have had less professional interaction with digital screens. Although this assumption were to be true, still it did not hold true as to display a significant difference in tendency of participants towards utilizing digital screens. With their extensive use of digital devices and social media access (see Tables 2 and 3), today's youth seemed to have not being affected by departmental variations when they stated their preferences regarding reading medium.

4.3.3. Participants' Preferences of Reading Medium Based on Gender

Another item in the questionnaire aimed to delve into whether gender of participants played an important part in preferring a reading medium. The responses received for this item yielded a slightly unbalanced approach. Table 8 shows preferences of participants based on their genders.

Table 8

Participants' Preferences of Reading Medium Based on Gender

PREFERENCE AND GENDER	Printed-Paper N	%	Digital Screen N	%	χ^2	P
Female Participants	63	88.7	8	11.3	4.555	.033
Male Participants	75	75.8	24	24.2		

Table 8 shows that while 88.7% of the female participants (n = 63) preferred reading from printed-paper, 75.8% of males (n = 75) preferred to do so. On the other hand, while 11.3% of female participants (n = 8) preferred reading from digital screens, this percentage has doubled (24.2%) for male participants (n = 24).

Consequently, our analysis suggests that gender variation did seem to have an impact ($p = .033$) on choice of reading medium. Although the tendency towards printed-paper did exist for both genders, females, compared to males, did opt for this medium by a 12.9% margin. Similarly, their tendency towards using digital screens was more than doubled by male users.

4.3.4. Underlying Reasons for Participants' Reading Medium Preferences

Naturally, participants' tendency towards the preference of a specific reading medium (if there is one) does necessitate a rather basic question: Why this preference? Thus, the questionnaire with this item aimed to elicit reasons from participants under two categories: (1) reasons for reading from printed-paper (see Table 9), and (2) reasons for reading from digital screen (see Table 10).

Table 9 provides the reasons of participants who preferred reading from printed-paper.

Table 9

Participants' Reasons for Printed-Paper Preference

REASONS FOR PAPER PREFERENCE	N	%	P
I understand better when I read from paper	105	17.2	
Paper is not tiresome for my eyes	102	16.7	
I like to take notes on paper	96	15.7	
I like underlining while reading	80	13.1	
I like the smell of books	74	12.1	
Paper requires no power	70	11.5	.000
I like having a bookshelf	62	10.1	
I don't like technological devices	10	1.6	
I have no/limited internet connection	8	1.3	
I have technophobia	4	0.7	
Other reasons	0	0.0	

As can be seen from Table 9, the most common reason expressed by participants for reading from printed-paper was that they could understand better when they read from printed-paper (n = 105; 17.2%). Other reasons cited are that paper was not tiresome for their eyes (n = 102; 16.7%); that they liked to take notes on paper (n = 96; 15.7%); that they liked underlining while reading (n = 80; 13.1%); that they liked the smell of books (n = 74; 12.1%); that paper required no power (n = 70; 11.5%); that they liked having a bookshelf of their own (n = 62; 10.1%); that they did not like technological devices (n = 10; 1.6%); that they had no/limited internet connection (n = 8; 1.3%); and that they had technophobia (n = 4; 0.7%).

The analysis of Table 9 suggests that reading comprehension was stated as a primary reason for opting for printed-paper, a medium they probably were accustomed to, and would thus understand better when they read from it compared to digital screens. The participants also expressed that reading from paper instead of vivid and bright digital screens was also more comfortable for

their eyes. Another common reason for reading from paper was that the participants enjoyed the freedom of taking notes and/or underlining their favorite sentences. The *smell of books* was also a significant reason for many participants to prefer printed-paper. The authentic fragrance of paper books had the advantage of appealing to one more sense (smelling) compared to the almost odorless technological device. Although technological devices comprised many built-in functions, the irony here, however, is that it is these functions that shorten the battery life itself, which eventually leaves us with no-efficiently-utilizable devices. Based on this premise, thus, some participants did choose printed books instead.

While the majority of participants expressed preferences towards reading from printed-paper, about one fifth, however, preferred the digital screen based on reasons presented in Table 10.

Table 10

Participants' Reasons for Digital Screen Preference

REASONS FOR DIGITAL PREFERENCE	N	%	P
I can refer to additional resources	24	16.9	.000
Electronic devices have more functions	22	15.5	
I can carry lots of books on me	19	13.4	
It's too heavy to carry printed books	17	12.0	
Technology is future	16	11.3	
E-readers are environment-friendly (trees are felled for paper)	16	11.3	
It's easy to use scroll bar on screen	8	5.6	
I think e-readers are up to date	4	2.8	
I understand better when I read from digital screen	3	2.1	
Other reasons	0	0.0	

Table 10 demonstrates that participants who preferred to read from digital mediums did so because they were able to reach additional resources (n = 24; 16.9%), and these devices offered more functions (n = 22; 15.5%). Additionally,

the participants stated that they were able to carry numerous books on digital devices ($n = 19$; 13.4%), whereas printed-paper books would be too heavy to carry ($n = 17$; 12.0%). For some participants, digital devices were considered to be the future of reading mediums ($n = 16$; 11.3%) and were environmentally friendly since they did harm trees ($n = 16$; 11.3%). Furthermore, while some participants stated ease ($n = 8$; 5.6%) and modern features of digital mediums ($n = 4$; 2.8%), only a few believed that they understood better from a digital screen ($n = 3$; 2.1%).

As can be derived from Table 10, functionality constituted the main reason as to why these participants preferred to read from digital screens. Today's technology that enables us to read from digital devices, provides us with not only an extended reading feature, but also with many additional functions and facilities such as referring to a dictionary, eliciting information from an encyclopedia, or utilizing a search engine. Participants who preferred digital screens also found these devices easy to use with thousands of books and other built-in practical features such as scrollbars, bookmarks, etc. Some participants based their reasons on environmental concerns by stating that they did not prefer paper since trees would be sacrificed for paper production. However, few probably are aware of the actual environmental harm caused during the production of such technological devices as well as the resulting waste incurred due to antiquated and useless machinery.

4.3.5. Participants' Preferences of Reading Medium and Pertaining Reasons Based on Genres

While Table 6 at the beginning of this chapter demonstrated reading medium choice of participants without specifying any genre like course books, novels, newspapers, etc., this item of the questionnaire aimed at revealing whether the genre of the material read had an impact on preferences of participants. It is assumed that, even though the reader is to be the same person, the reading medium choice could differ depending on what is being read. Therefore, we categorized the reading preferences of participants into three kinds of reads: course books, novels, and newspapers. Besides, within this item, we did not only

inquire about which medium they preferred but we also asked about the underlying reasons.

4.3.5.1. Participants' Preferences of Reading Medium Regarding Course Books and Pertaining Reasons

Considering that our participants were all university students, course books were one of the most frequently read genres by nature. Therefore, the item, "provided that your institution supplied your course books free of charge, which version would you prefer: digital or paper?" was posed in order to investigate the reading medium preferences regarding course books. Frequencies related to responses are illustrated in Table 11.

Table 11

Participants' Reading Medium Preferences Regarding Course Books

PREFERENCE IN COURSE BOOKS	Printed-Paper N	%	P
Paper Version	119	70.0	
Digital Version	29	17.1	.000
Either	22	12.9	

As can be observed from Table 11, the majority of participants ($n = 119$; 70.0%) preferred reading from printed materials while 29 participants (17.1%) preferred digital versions. On the other hand, 22 (12.9%) stated that they were able to study from either version.

Compared to the results displayed in Table 6, where we inquired about a general tendency towards reading mediums, we can observe parallel results in Table 11 to those illustrated in Table 6, in that in both instances the tendency was found to be towards printed material.

Stating their reasons concerning preferences for printed-paper course books, the participants' views regarding this matter are reflected in Table 12.

Table 12

Participants' Reasons for Preferring Printed-Paper Course Books

REASONS FOR PAPER COURSE BOOKS	N	%
Taking notes and underlining	39	34.8
Better comprehension from paper	18	16.1
More comfortable with paper	16	14.3
Paper is more effective and useful	14	12.5
Digital screens cause eye-strain	12	10.7
Paper is concrete	7	6.3
Paper provides better concentration	6	5.4

As demonstrated in Table 12, taking notes and underlining (n = 39; 34.8%) was the most common reason cited by participants to choose paper. While some participants (n = 18; 16.1%) claimed that they better understood from paper, some found paper to be more comfortable (n = 16; 14.3%). Besides, while 12.5% (n = 14) found paper more effective and useful, 10.7% (n = 12) preferred paper since it did not cause eye-strain. Only a few participants stated their preferences for paper considering it to be concrete (n = 7; 6.3%), and cited that paper provided better concentration (n = 6; 5.4%).

When the results in Table 12 are examined, we can observe that the participants who preferred paper wished to have a full command and control of the reading medium by holding it in their hands, writing on the side of the pages, and underlining what they think is worthy to do so. Therefore, they believed that only traditional paper provided them with better feel and comprehension. The statements (S1-S7) below reflect the reasons stated by participants from both the EEE and the ELT departments:

S1 (ELT-P39)

"Because I like taking notes or underlining on books when I am studying, I understand better."

S2 (ELT-P33)

“I understand better when I read from printed books since I cannot concentrate when I read e-books.”

S3 (EEE-P17)

“Printed-paper books are more comfortable to use.”

S4 (ELT-P45)

“I think studying from printed material is more effective.”

S5 (ELT-P62)

“I cannot keep looking at digital screens for a long time.”

S6 (ELT-P23)

“I like concrete things that I can hold in my hands.”

S7 (ELT-P33)

“I cannot concentrate when I read from electronic books.”

Although not as numerous as those stated for paper inclination, the reasons for digital preferences are illustrated in Table 13.

Table 13

Participants’ Reasons for Preferring Digital Course Books

REASONS FOR DIGITAL COURSE BOOKS	N	%
It’s easy to carry around	14	50.0
Digital books are environmental friendly	8	28.6
It’s easy to access digital books	6	21.4

As can be seen from Table 13, the ease in carrying digital books (n = 14; 50.0%) was the most frequently observed reason stated for opting for digital course books. Some participants (n = 8; 28.6%), however, considered that digital versions of course books were environmental friendly. According to some other

participants (n = 6; 21.4%), it was easier to access digital books owing to their digital characteristics such as copying, sharing and editing, etc. Below (S8-S10) are participants' stated reasons:

S8 (EEE-P85)

"It's easier to carry and I am able to look up a word on the digital book without having to consult a dictionary on my computer."

S9 (EEE-P51)

"Digital books save trees, and printed course books do not reflect today's technology."

S10 (ELT-P36)

"It's tiresome to carry printed course books every day, while it's easier to reach books through technological devices."

Although there were fewer participants preferring digital course books compared to those preferring paper, the reasons stated reflected that they were aware of the advantages of digital technologies, that they could carry as many books as possible on them without any physical burden, that they could enjoy the freedom of copying, sharing and editing these course books. Additionally, we observed that today's youth are concerned about environmental issues and thus preferred digital to reduce paper consumption.

4.3.5.2. Participants' Preferences of Reading Medium Regarding Novels and Pertaining Reasons

While reading for pleasure is one of the most common reading activity for dedicated readers, novels, in a similar way, constitute one of the most common genres of reading for pleasure. When conducting this activity, the medium may be a factor that increases or decreases the joy. Therefore, with this item of the questionnaire, participants of the study were asked to state their preferences regarding reading from printed-paper or digital screen when reading a novel (see Table 14).

Table 14

Participants' Reading Medium Preferences Regarding Novels

PREFERENCE IN NOVELS	Printed-Paper		P
	N	%	
Printed-Paper	145	85.3	.000
Digital screen	7	4.1	
Either	18	10.6	

As can be observed in Table 14, preference for printed-paper novels (n = 145; 85.3%) significantly surpassed that of digital screen version, which remained at 4.1% (n = 7). However, looking at the table, we can also see that the participants who stated either medium would do displayed a 10.6% (n = 18) tendency.

Compared to the preference concerning course books, the percentage of participants who preferred paper increased by 15% when they were reading for pleasure, and naturally, the percentage of those who preferred digital significantly decreased from 17.1% down to 4.1%.

Such a preference of participants is certainly not without reasons, which are illustrated in Table 15.

Table 15

Participants' Reasons for Preferring Printed-Paper Novels

REASONS FOR PAPER NOVELS	N	%
Digital screens cause eye-strain	38	28.8
Paper novels are more enjoyable	23	17.4
I like the smell of paper	21	15.9
I like the feel of paper	19	14.4
Better comprehension on paper	19	14.4
I like to own a bookshelf	7	5.3
Paper books have artistic value	3	2.3
Facility in taking notes and underlining	2	1.5

As it was illustrated in Table 15, the most common reason stated by participants regarding reading novel from printed-paper was that digital screens caused eye-strain ($n = 38$; 28.8%). Some participants also cited that paper novels were more enjoyable ($n = 23$; 17.4%). Senses also played an important role in such a choice: smell ($n = 21$; 15.9%), and touch ($n = 19$; 14.4%). Some participants ($n = 19$; 14.4%) also claimed that printed-paper provided a better comprehension. There were also a few participants who believed in an artistic value of printed books ($n = 3$; 2.3%), and thus they wished to own a bookshelf ($n = 7$; 5.3%). Verbatim sentences (S11-S18) of participants regarding this matter are presented below:

S11 (EEE-P22)

“Printed-paper books do cause eye-strain and also notifications from social networks cause distraction when reading from digital devices.”

S12 (EEE-P15)

“Touching books or flipping pages makes the act of reading more pleasurable.”

S13 (EEE-P11)

“I like the smell of a book.”

S14 (ELT-P13)

“I enjoy the fragrance of books and touching their pages while flipping, rather than scrolling up and down when I am reading a novel.”

S15 (EEE-P26)

“When reading from paper books, I can understand and follow the lines better.”

S16 (ELT-P20)

“I like adding new books to my bookshelf.”

S17 (ELT-P44)

"I like the cover design of printed-paper books."

S18 (ELT-P66)

"I take notes on margins of pages, especially when the book is in a foreign language."

Reading for pleasure is more of an emotional nature rather than logical, in that, every individual tends to read material that appeals to their feelings, emotions, and senses, as was also reflected through our participants as viable reasons to prefer paper over digital screens. While they mostly expressed logical and functional reasons for reading course books from printed-paper or digital version, participants' reasons for reading novels were observed to be mostly based on grounds of emotions and senses. Smell and feel of the paper itself seems to have constituted an important factor invoking pleasure. Participants expressed their wish to establish more physical and tangible contact with what they read. Comprehension was also stated as a significant factor although reading was being done for pleasure, believing that holding the paper book, made them understand the content better. Furthermore, some participants stated that certain physical features related to books, such as keeping a bookshelf and design of covers made the book indispensable and irreplaceable.

Only a few participants stated reasons for reading novels from a digital medium, which are presented in Table 16.

Table 16

Participants' Reasons for Preferring Digital Novels

REASONS FOR DIGITAL NOVELS	N	%
Seamless transition between pages	1	33.3
It's economical	1	33.3
It has built-in dictionary	1	33.3

As can be observed in Table 16, by providing seamless transition between pages (n = 1; 33.3%), and by being economical (n = 1; 33.3%), digital devices

were found to be functional with a built-in dictionary (n = 1; 33.3%). Participants' views regarding this matter are presented in S19-S21 below:

S19 (EEE-P3)

"It's problematic to flip pages; it spoils transition between pages."

S20 (ELT-P30)

"I have been reading my books from a digital screen for the last three years: very inexpensive for me."

S21 (ELT-P2)

"Especially, when I am reading in English, I do not have to refer to a dictionary."

Since the number of participants who preferred to read novels from digital screens was rather small, the reasons thus were rather limited. A participant found reading from an e-reader to provide an easy transition from one page to another. Another participant preferred digital novels because it was economical to purchase digital copies. As a matter of fact, when one tries to buy a novel from an on-line bookstore, they have the options to buy the same book in paper or digital version. However, the price of a digital version is usually 50-80% cheaper than the paper version. Another reason for choosing digital was stated by a participant for being able to refer to a built-in dictionary. Especially, when reading in a second language, easy-to-refer function of an integrated dictionary in electronic readers makes it possible to highlight a word in order to look it up in a dictionary.

4.3.5.3. Participants' Preferences of Reading Medium Regarding Newspapers and Pertaining Reasons

Periodicals such as newspapers, magazines and journals constitute a rather common and frequent reads in our daily lives. Since newspapers are the most frequently read and the easiest to access, we preferred to choose newspapers to survey the preferences of participants and pertaining reasons.

Table 17 presents the analysis of participants' preferences of reading newspapers.

Table 17

Participants' Reading Medium Preferences Regarding Newspapers

PREFERENCE IN NEWSPAPER	Printed-Paper		P
	f	%	
Printed-Paper	63	37.1	.565
Digital screen	52	30.6	
Either	55	32.4	

As it was demonstrated in Table 17, although the majority of participants preferred reading from printed-paper, compared to previously observed high preference rate regarding printed paper (70.0% for course books and 85.3% for novels), in this genre, however, we can see a dramatic fall in the tendency towards paper ($n = 63$; 37.1%). On the other hand, the percentage of those who preferred digital screen for this genre rose up to 30.6% ($n = 52$), and preference for either increased to 32.4% ($n = 55$).

Table 17 suggests that while participants still preferred printed-paper, "digital screen" preferences have dramatically approached this choice, and a statistical analysis suggests no statistically significant difference in either direction ($p = .565$). The statistics here indicate that while course book materials and novels still need a long way to be preferred in their digital versions, newspapers and/or other periodicals in their digital versions seem to have already attracted readers' attention.

Therefore, the question as to why newspapers in their printed-paper format attracted less attention compared to other printed material and course books gains significance here. Table 18 lists the reasons of participants who preferred newspaper in printed-format.

Table 18

Participants' Reasons for Preferring Printed Newspapers

REASONS FOR PRINTED NEWSPAPERS	N	%
It's more enjoyable to read printed newspapers	27	52.9
Better comprehension on paper	13	25.5
Digital screens cause eye-strain	5	9.8
It's traditional	3	5.9
It's a habit	2	3.9
I archive my newspapers	1	2.0

As can be seen from Table 18, the joy of reading was the most common (n = 27; 52.9%) reason to read newspapers from printed-paper. As in other genres of reads, some participants (n = 13; 25.5%) did also claim that they understood better on paper. While some participants mentioned eye-health concerns (n = 5; 9.8%) stemming from digital screens, others found this type of reading more traditional (n = 3; 5.9%) and habitual (n = 2; 3.9%). Only one (n = 1; 2.0%) participant stated that he archived printed-paper newspapers. Participants' verbatims (S22-S27) are as below:

S22 (ELT-P44)

"I don't like reading newspapers on small screens."

S23 (ELT-P34)

"I can understand better from printed-paper newspapers."

S24 (EEE-P71)

"Reading from a digital-screen for a long time causes eye-strain and I lose concentration."

S25 (EEE-P30)

"Some things should stay as they were invented."

S26 (EEE-P33)

"I love the feel of flipping pages."

S27 (ELT-P11)

"I archive my newspapers after reading."

The analysis of the results presented in Table 18 suggests that half of the participants chose printed-paper newspapers as a *joyful reading activity*. Apparently, parallel to the results presented in previous paragraphs, holding paper gives more pleasure to people. Eye-strain was also cited as a very common concern for those reading from digital screens. After spending long hours during their studies, or even for pleasurable activities in front of a digital screen, these participants preferred holding their newspapers in their hands.

Since it is the first time during this study that the participants who preferred digital screens have reached such a high percentage, their reasons intrigue more curiosity, which are presented in Table 19.

Table 19

Participants' Reasons for Preferring Digital Newspapers

REASONS FOR DIGITAL NEWSPAPERS	N	%
More newspaper options in digital format	12	25.5
Printed-paper newspaper is too large	11	23.4
It's easy to access digital newspapers	9	19.1
Digital newspapers are updated frequently	6	12.8
Digital newspapers are environmental friendly	5	10.6
They are economical	3	6.4
Visuals are vivid in digital newspapers	1	2.1

As can be observed in Table 19, the majority of participants preferred digital newspapers since they had more options (n = 12; 25.5%); and that printed-paper newspapers were too large (n = 11; 23.4%); that it was easier to access digital newspapers (n = 9; 19.1%); that digital newspapers were updated frequently (n = 6; 12.8%); that digital newspapers were considered environmental friendly (n = 5; 10.6%); that they were economical (n = 3; 6.4%), and that the visuals of digital newspapers were more vivid (n = 1; 2.1%). Below are sentences (S28-S34) reflecting participants' views in this regard:

S28 (ELT-P55)

"I can corroborate accuracy of information from various sources."

S29 (ELT-P76)

"Since their pages are too large, it is hard to read from printed-paper newspapers."

S30 (EEE-P19)

"It differs when it comes to newspapers; I prefer screen since I could choose interesting topics."

S31 (EEE-P62)

"The news on the internet are updated frequently."

S32 (ELT-P54)

"Reading from screen is more reasonable since printed-paper newspapers are published every day and lead to paper waste."

S33 (EEE-P78)

"I prefer screen since I do not have to pay for newspapers on the internet"

S34 (EEE-P35)

"There are many vivid visuals in digital newspapers."

The analysis in Table 19 suggests that the most common reason to read digital newspapers is having more options since almost all newspapers (even the small-sized local ones) have online digital versions now, and almost all of them are free of charge. Thus, instead of purchasing only one printed-paper newspaper, individuals are able to access all variety as long as they had internet access. Some participants found printed newspapers too large to handle while they could easily place their tablet PCs or smartphones in their palms. Owing to wide-spread internet access almost anywhere, ie house, school, or café, it is easier now than ever to reach digital newspapers. Participants also stated that they enjoyed updated news on digital media since events have the potential to change within minutes, while they had to wait a day or so to be updated about news covered in a printed-paper newspaper. Some participants believed that digital newspapers were environmental friendly; and due to their rapidly vanishing news freshness, printed-paper newspapers were disposed of frequently causing environmental pollution when not recycled appropriately. In addition, vivid visuals on digital screens made such devices more attractive.

The analyses of the results suggest that preferences of our participants reading from printed-paper or digital screens differed dramatically based on genres of reads. When they did academic reading (ie, course books) or for pleasure (ie, novels), a vast majority of our participants preferred reading from printed-paper (see Tables 11 and 14). However, when it came to reading periodicals (ie, newspapers) there was an almost equal distribution between digital screen and printed-paper versions (see Table 17). Consequently, the conclusion we can draw from these analyses is that what we read and why we read does seem to influence the choice of our reading medium.

4.3.6. Participants' Reading Comprehension Regarding Printed and Digital Mediums

This study was based on two pillars: (1) reading medium preferences: digital screen or printed-paper; and (2) effect of reading medium on reading comprehension. Now that we covered the preferences, on the following pages we will be focusing on reading comprehension. When stating their reasons regarding preferences of printed-paper, the majority of participants claimed that

they understood better from printed-paper (See Table 9). The theme, *comprehension*, with a significant percentage of occurrence, was mentioned in all reasons concerning all genres stated by participants regarding choice of reading medium. In that sense, having emerged as a common theme in all mentioned reasons, this particular theme bears a “*convergence-type*” characteristic (Bada, 2001). For this very reason, in order to observe whether reading from a particular medium would have supremacy over the other in terms of comprehension, as a further step, we concentrated on the existence of any potential relationship between preference and reading medium. Thus, participants were administered an English reading comprehension test from a digital screen, to be followed by a printed-paper test after an interval of eight weeks. The mean scores of these tests were compared in order to reveal if there was any statistically significant difference between the results obtained from both versions of tests.

Table 20 presents the mean scores obtained from both digital screen and printed-paper tests of participants from the EEE department.

Table 20

Reading Comprehension Mean Scores of Participants from the EEE Department

MEDIUM OF TEST	Mean Scores	P
Digital Screen	10.77	.596
Printed-Paper	10.94	

As can be observed in Table 20, while the mean of EEE scores from digital screen is 10.77, it is 10.94 for printed-paper. This analysis illustrates that a no significant difference between the scores of two versions of test ($p = .596$).

Although the majority of participants from the EEE department stated preferences favoring printed-paper (see Table 7), the results in Table 20 may be interpreted that the indicated preferences were mostly based on emotional and habitual grounds, with no significant effect on reading comprehension performance.

Table 21 presents the mean scores obtained from both digital screen and printed-paper tests of ELT participants.

Table 21

Reading Comprehension Mean Scores of Participants from the ELT Department

MEDIUM OF TEST	Mean Scores	P
Digital Screen	15.98	.000
Printed-Paper	16.87	

As can be observed in Table 21, while the mean score of the ELT participants regarding digital screen test is 15.98, it is 16.87 concerning printed-paper. When the two means of scores are compared, we can see a slight, yet statistically significant difference ($p = .000$; probably due to large sample size) in favor of printed-paper.

When the reading comprehension score analyses of the two departments are compared, it can be observed that, while the reading medium did not seem to affect reading comprehension of participants from the EEE department, however it did have some impact, albeit small, for the ELT participants. A plausible reason for this result may be that participants from the EEE department naturally spend more time in front of a digital screen for their academic studies while participants from the ELT department mostly conduct their reading activities from printed books. Therefore, it can be concluded that being accustomed to digital devices for carrying out academic tasks does seem to affect reading comprehension from digital screens.

Table 22 presents overall reading comprehension scores of all participants of this study.

Table 22

Reading Comprehension Mean Scores of Overall Participants from Both Departments

MEDIUM OF TEST	Mean Scores	P
Digital Screen	13.32	.012
Printed-Paper	13.85	

As can be seen in Table 22, while mean score of the test from digital screen is 13.32, it is 13.85 for printed-paper. As a matter of fact, although the means of reading comprehension scores are rather close, the statistical analysis suggests that there is a significant difference ($p = .012$) in favor of reading from printed-paper (Despite the closeness of means to each other, the significant difference in p-value is probably due to a large sample size of the groups).

Regardless of department variation, when reading comprehension scores are compared, it can be observed that there is a significant difference in favor of reading from printed-paper. This analysis suggests that the majority of participants do seem to understand better when reading from printed-paper, as they also previously stated in the questionnaire of this study. However, considering the closeness of score means, it can also be concluded that reading from digital screen or printed-paper does not seem to dramatically affect reading comprehension.

4.4. Summary

In this chapter, findings of descriptive and comparative analyses of the data collected through the preference questionnaire and reading comprehension tests were presented in detail.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1. Introduction

This chapter represents our discussion and conclusions regarding the findings of the study, and provides answers to the research questions posed in the Introduction Chapter. Firstly, we will approach each research question integrating the findings in the previous chapter, and will discuss these findings with related literature. Secondly, implications of the study for various stakeholders in the field of education will be discussed. Finally, certain suggestions for further research will be made.

5.2. Evaluation of the Research Questions

The current dissertation aimed to investigate reading medium preferences of participants, and to compare reading comprehension performance observed in digital screens with that in printed-paper. In order to reveal a potential impact (if any), department, gender and reading genre variations were also investigated. Therefore, this study sought responses to seven research questions, each to be dealt with below.

Research Question 1:

Which medium of reading do EEE and ELT participants prefer, digital-based or paper-based?

Owing to advanced technology, digital devices are getting smarter and becoming more reachable; moreover, printing facilities are getting cheaper and becoming more accessible. This phenomenon provided today's individuals with a significant flexibility and a hybrid learning environment where they can study from course books using digital devices and/or get a print out of what they read. However, in most cases, students of most levels today are usually introduced to one dominant medium: printed-paper or digital version. Therefore, with this research question, we aimed to identify reading medium preferences of university

students. The analysis of our findings revealed that the vast majority of the participants preferred reading from printed-paper while a smaller group of participants preferred digital screen (see Table 6). These findings showed similarities with Spencer's (2006) study in which she investigated undergraduate and graduate students' preferences and found that the majority of students preferred reading from printed-texts. Our results were also found to be parallel to a study conducted by Buzzetto-More, Sweat-Guy, & Elobaid (2007) with undergraduate students in Maryland/USA, where the researchers found that the majority of students reported that they preferred paper books over e-books. Although both studies were conducted more than 10 years ago, the preferences of today's readers did not seem to have changed much in spite of prevalent interaction with technological devices. Similar results were also found in a longitudinal study which spanned between 2008 and 2014 by Kazancı (2015), with 400 undergraduate students in 2008, and 392 in 2014. The study aimed to observe any potential change (if any) in university students' reading medium preferences. In this study also, the participants' views were in favor of paper (in 2008, 78.5%; in 2014, 77.3%). On the other hand, with slight differences, Liu's (2006, p.590) study with undergraduate students yielded more of a balanced preference, in that, that learners "...desire a hybrid information environment" considering that "digital libraries and traditional libraries have their unique advantages and limitations".

Consequently, we can infer from literature as well as from this study that even the new generation, identified as "digital natives" by Prensky (2001) since they were born into a digital world, have been mostly loyal to traditional printed-paper in expressing choice for reading platforms.

Research Question 2:

Does department variation affect reading preferences of participants?

In order to determine if participants' departments had a certain effect on their choice of reading medium, our participants consisted of students from the social sciences (English Language Teaching) and the applied sciences (Electrical-Electronics Engineering). The results obtained seem to have indicated no statistically significant impact of departments on participants' choice of reading

platforms (see Table 7). In fact, one may assume that participants from the Electrical-Electronics Engineering department would display more tendency towards reading from digital screens due to their academic studies that entail intensive utilization of electronic devices, yet this was not found to be the case. This result can be interpreted as that prevalence of digital devices and the social media across all professions seem to have mitigated departmental differences regarding choice of reading mediums. To our knowledge, there was no study looking into this matter from a departmental perspective.

Research Question 3:

Does gender variation affect reading preferences of participants?

Gender can be considered as a variation that holds the potential to affect reading medium preferences. Based on our observations, although not with certainty, today's youth irrespective of gender, do probably have similar access to technology, which, in turn, places individuals face to face with digital screens. Therefore, with this research question, we aimed to investigate whether the gender issue had an impact on preferences of reading medium of participants.

Our analyses in this regard, suggest that a significant difference did exist in favor of females embracing reading from printed-paper when compared to male participants (see Table 8). Similar findings were also observed in a study conducted by Liu & Huang (2008) who also sought to reveal whether gender affected preference of reading platform. In contrast to Jung et al. (2012), who did not observe any significant difference based on gender, our findings, however, did suggest that there was indeed a significant difference in favor of females.

Consequently, our findings suggest that although both female and male participants preferred reading from printed-paper, females preferred to do so in higher percentages than their male counterparts did.

Research Question 4:

What may be the potential reasons leading to a particular preference of a reading medium?

When participants expressed a certain preference of a reading medium, they did state that their preference was based on some viable reasons, which were categorized into two types: reasons to prefer printed-paper and reasons to prefer digital screen. As for reasons related to printed paper, the participants cited *reading comprehension, comfort for the eyes, taking notes on paper, underlining and highlighting, smell of printed-paper, 'unlimited battery life', cover design, and having a bookshelf of their own* as motivating factors opting for reading from printed-paper (see Table 9). Our participants, similar to Tseng's (2008), did also complain about eye-strain while working with digital screens. As for those preferring digital screens, the reasons are *availability of additional resources; utilizing extra functions of electronic devices; being able to carry numerous books in one device; environmental concerns; economical concerns; and keeping abreast with technology*. Our participants' reasons for choosing digital screens correlate with those highlighted by Rockinson-Szapkiw et al. (2013), who cited *portability, affordable prices, and experimenting with technological alternatives* as factors driving participants to choose digital devices (see Table 10).

Research Question 5:

Does genre variation play a part in preferences of reading medium? If it does, what may be the potential reasons?

In order to investigate whether the preferences of participants regarding reading medium differed based on genres, we introduced three genres: course books, novels, and newspapers. Preferences of participants regarding course books reading from printed-paper gained prominence over digital screen (see Table 11). Similarly, novels were also stated to be read significantly from printed-paper rather than digital screens (see Table 14). As for newspapers, unsurprisingly, both platforms (printed and digital) were given a balanced value regarding utilization (see Table 17).

As for the reasons regarding course books which are read from printed paper, the participants stated the ease in *taking notes and underlining*, and *achieving better comprehension* (see Table 12). Reasons for choosing digital course books are composed of *the ease in carrying numerous books in digital devices* and sensitivity towards environment (see Table 13).

When it comes to reading novels from printed-paper, the reasons expressed by participants are *eyestrains caused by digital screens*, *the pleasure felt*, *the smell emitted from paper*, and *the texture felt while touching paper* (see Table 15). Those who preferred digital devices for reading novels cited their reasons as *being economical*, *having built-in dictionaries*, and *offering easy transition between pages* (see Table 16).

Reading newspapers from printed-paper was found to be *more enjoyable*, *more comprehensible*, *a nostalgic activity* with almost *no eyestrain* (see Table 18). The motivation behind the digital version of newspapers, as was stated by participants, comes from *numerous options offered free of charge*, *frequent updates*, *manageable screen sizes*, and *environmental friendliness* (see Table 19).

The reviewed literature usually displays studies focusing on course-related reading materials. Almost no studies have been encountered with an interest in genre. For this very reason, this study, if not the first, is probably one of the few, which should have shed some light on this issue.

Research Question 6:

Considering department variation, which of the two mediums of reading, digital-based or paper-based, yields higher achievement results regarding comprehension?

One of the primary aims of this study was to investigate whether a particular reading medium yielded higher performance regarding reading comprehension, and whether department variation played a part in such a performance. Therefore, scores of reading comprehension tests (digital-based and paper-based) of participants from the EEE and the ELT departments were compared. Our analysis illustrated that while there was no significant difference for the EEE department in terms of reading comprehension when reading from printed-paper

or digital screen (see Table 20), there was a significant difference for the ELT department in favor of reading from printed paper (see Table 21). When reading comprehension scores were compared regardless of department variation, we observed that there was a significant difference in favor of reading from printed-paper (see Table 22).

As we reviewed the literature regarding this issue, although we could not find any research on department variation, there were, however, certain studies that compared the effect of reading medium on comprehension performance. Our results were found to be parallel to Belmore's (1985) study, which illustrated that participants' reading comprehension performance from printed-paper was found to be higher compared to digital screens. There are also other studies which support our findings; for instances, studies of Kerr (2002) with fifth graders, Mangen, Walgermo, & Brønnick (2013) with tenth graders, Kang, Wang, & Lin's (2009) with undergraduate students reported that reading from printed-paper yielded higher comprehension performance.

On the other hand, some studies such as Kak's (1981), found no significant effect of the reading medium on comprehension level. Similarly, in a study by Muter et al (1982) with 32 participants who took a multiple choice comprehension test from a digital screen and printed book, the results yielded no statistically significant difference between the two mediums. Taylor (2011) with 74 undergraduate psychology students, Lauterman (2012) with engineering students, and Subramanian et al. (2013) with undergraduate students found no significant differences in terms of reading from either medium.

However, while some studies conducted by Eno (2011) with high-achieving adolescents, and Dykeman (1988) with below-average elementary school students demonstrated that reading from digital screen yielded higher comprehension performance, in contrast to these studies, the findings of our research illustrated the opposite.

Consequently, our results indicate that the majority of participants, regardless of departmental affiliation, do seem to understand better when reading from printed-paper. However, considering the closeness of score means to each other, we can also conclude that reading from digital screen or printed-paper does not seem to have a considerable impact on reading comprehension performance. However, we should not ignore the fact that participants from the EEE department

performed equally well on both mediums, which may be attributed to their intensive involvement with digital devices.

Research Question 7:

To what extent stated preferences of reading medium are in line with participants' comprehension performance?

The findings of this study reveal that the majority of participants from both the EEE and the ELT departments expressed preferences of reading from printed-paper over digital screens (see Table 6). Additionally, the most commonly observed reason cited for such a tendency was the '*comprehension*' issue (see Tables 9, 12, 15, and 18). However, with this study, we also aimed to investigate to what extent participants' preferences were in line with their comprehension performance. In the analysis of our findings, we observed that the stated preferences were indeed in line with participants' reading comprehension performance (see Tables 6 and 22). However, although statistical analysis yielded a statistically significant difference between the performances obtained through the two mediums, the rather narrow gap of mean scores may be interpreted as that there was not an overwhelming dominance of one particular medium over the other when it serves as a platform for reading comprehension.

Consequently, we can infer from these findings that although the majority of our participants preferred printed-paper based on a concern about "reading comprehension", considering the close performance displayed on both platforms, such a concern does not seem to be well-grounded.

5.3. Implications

This study may have implications for anyone who somehow is involved in the act of reading, particularly for those who would be categorized as students performing academic tasks. University students, by nature, are supposed to do a great deal of reading from both printed-paper and digital devices, and thus, their stated views regarding this matter and their performances in our tests may shed some light on a number of implications and applications in this field. Parallel to technological developments, institutions aiming to equip their schools with

technology, and redesign their curriculum may benefit from the findings of this research. Students from K to College are mostly in a position to read from digital screens rather than printed-paper as a result of technological advancement. Therefore, our findings may have significant implications for different groups of society who would be involved in addressing educational matters which are closely related to technological advances.

a. Students (K to College): In line with other studies, our study also indicates that although being “native users” of digital technologies, today’s students still prefer printed-paper when it comes to reading. According to our study, this particular preference was based on emotional grounds, leading to statements such as: “I like paper”, “I like the smell of the paper”, “I enjoy touching paper and flipping the pages” etc. Thus, rather than well-grounded reasons, such an approach seems to overshadow the effective use of digital devices. For this reason, active involvement in and familiarity with digital technology may probably aid users in getting a better and more effective grip of such devices. Therefore, teaching activities that involve digital reading during and/or after class hours can be integrated into curriculum, and students should thus be made aware of the difference between using digital devices for fun activities and for more academic-oriented work.

b. Teachers and School Administrators: The majority of today’s teachers and school administrators would probably be categorized as “digital immigrants”, a term coined by Prensky (2001). Since this is the case, these groups may also benefit from the findings of this research, for they probably have a legitimate right to be aware of their students’ (relatively, “digital natives”) preferences and pertaining reasons regarding utilization of technology. Additionally, we can recommend that teachers and school administrators gain first-hand experience with such technologies by obtaining an e-reader to evaluate pros and cons for themselves.

c. Policy Makers and Curriculum Designers: While policy makers and curriculum designers try to equip students with technology, the issue of preferences and needs of individuals regarding reading materials and mediums

gains considerable prominence. For instance, the request of today's students for a hybrid reading environment (namely both printed and digital reading materials) should be addressed. Technological devices provided or suggested by educational institutions (ministry and/or schools) should accurately address pedagogical requirements of students. Additionally, the curriculum should include such reading activities that facilitate and promote digital reading. In this respect, with its content, this study offers significant insight.

d. E-Book and E-Reader Designers: As individuals get used to reading from digital devices, naturally, e-book publishers and e-reader manufacturers try to meet the arising demand. While meeting this demand, some certain issues, also raised in this study, seem to be rather important. To name a few inconveniences, *underlining*, *highlighting*, and *annotation* seem to require further improvement. Additionally, since learners request a hybrid environment, digital devices should provide a printer-friendly platform.

5.4. Recommendations for Further Research

With this study, we endeavored to address and cover certain aspects of this large issue related to reading mediums. Yet, there are some more significant issues that may be approached by researchers in the field.

The first recommendation for further research is conducting a qualitative study to interview participants through more open-ended items instead of structured and semi-structured questionnaires.

The second recommendation would be to carry out a similar study with K12 students in order to elicit their preferences and reading comprehension levels through different reading mediums.

A comparison of reading visually and listening to an audiobook can be made in order to reveal potential differences between the two.

As a further research area, it would be interesting to compare reading utilizing devices with digital screens as tablet PCs and dedicated e-readers.

5.5. Summary

In this chapter, we tried to respond to the posed research questions referring to the findings obtained from the study as well as discussing our findings relying on the covered literature. We, further, presented the implications of our study for various groups and institutions, followed by recommendations for further research.



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APPENDICES

APPENDIX 1: Questionnaire for Preference of Reading from Paper and Screen

Kâğıttan ve Ekrandan Okuma Tercih Belirleme Anketi																									
Sevgili Arkadaşlar, Bu anket, üniversite öğrencilerinin okumak istedikleri bir metni kâğıttan veya ekrandan okuma tercihlerini belirlemek amacıyla hazırlanmıştır. Bu anketten elde edilen veriler sadece bilimsel çalışma amacıyla kullanılacaktır. Maddeleri dikkatlice okuyup size uygun olan kutucuğa (x) işareti koyunuz. Teşekkür ederim. Öğr.Gör. Zekeriya KAZANCI																									
1. Fakülteniz ve bölümünüz: ☐ 1. E.F. İngiliz Dili Eğitimi ☐ 2. M.M.F. Elektrik-Elektronik Mühendisliği 2. Cinsiyetiniz: ☐ 1. Kız ☐ 2. Erkek 3. Yaşınız:																									
4. Bir metni (kitap, gazete, ders kitabı vb.) hem kâğıda basılı hem de dijital ekrandan (bilgisayar, tablet, akıllı telefon vb.) okuma seçeneğim olduğunda; (Birden fazla seçenek işaretleyebilirsiniz.) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> ☐ (1.) Kâğıttan okumayı tercih ederim çünkü: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. kâğıt gözlerimi yormuyor.</td></tr> <tr><td>2. kâğıdın kenarlarına not almak isterim.</td></tr> <tr><td>3. kâğıdın şarjı bitmiyor.</td></tr> <tr><td>4. kitap/gazete kokusunu seviyorum.</td></tr> <tr><td>5. teknolojik cihazlardan pek de hoşlanmıyorum.</td></tr> <tr><td>6. kitaplık oluşturmayı seviyorum</td></tr> <tr><td>7. teknofobim (teknoloji korkum) var.</td></tr> <tr><td>8. okurken altını çizmeyi seviyorum.</td></tr> <tr><td>9. internet erişimim yok veya çok sınırlı.</td></tr> <tr><td>10. kâğıttan okuduğum zaman daha iyi anlıyorum.</td></tr> <tr><td>11. diğer _____</td></tr> </table> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> ☐ (2.) Ekrandan okumayı tercih ederim çünkü: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. çok sayıda kitap ve yazıyı yanımda taşıyabiliyorum.</td></tr> <tr><td>2. bana daha ucuza mal oluyor.</td></tr> <tr><td>3. elektronik cihazların birçok başka işlevi var.</td></tr> <tr><td>4. teknolojik cihazlar geleceği oluşturuyor.</td></tr> <tr><td>5. basılı kitap materyaller taşımak için çok ağır.</td></tr> <tr><td>6. teknolojik cihazlar daha çevreci, ağaçlar kesilmiyor.</td></tr> <tr><td>7. ekrandaki kaydırma çubuğu kolaylık sağlıyor.</td></tr> <tr><td>8. yan kaynaklara başvurma olanağı sağlıyor.</td></tr> <tr><td>9. elektronik kitapları daha çağa uygun buluyorum.</td></tr> <tr><td>10. ekrandan okuduğum zaman daha iyi anlıyorum.</td></tr> <tr><td>11. diğer _____</td></tr> </table> </td> </tr> </table>		☐ (1.) Kâğıttan okumayı tercih ederim çünkü: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. kâğıt gözlerimi yormuyor.</td></tr> <tr><td>2. kâğıdın kenarlarına not almak isterim.</td></tr> <tr><td>3. kâğıdın şarjı bitmiyor.</td></tr> <tr><td>4. kitap/gazete kokusunu seviyorum.</td></tr> <tr><td>5. teknolojik cihazlardan pek de hoşlanmıyorum.</td></tr> <tr><td>6. kitaplık oluşturmayı seviyorum</td></tr> <tr><td>7. teknofobim (teknoloji korkum) var.</td></tr> <tr><td>8. okurken altını çizmeyi seviyorum.</td></tr> <tr><td>9. internet erişimim yok veya çok sınırlı.</td></tr> <tr><td>10. kâğıttan okuduğum zaman daha iyi anlıyorum.</td></tr> <tr><td>11. diğer _____</td></tr> </table>	1. kâğıt gözlerimi yormuyor.	2. kâğıdın kenarlarına not almak isterim.	3. kâğıdın şarjı bitmiyor.	4. kitap/gazete kokusunu seviyorum.	5. teknolojik cihazlardan pek de hoşlanmıyorum.	6. kitaplık oluşturmayı seviyorum	7. teknofobim (teknoloji korkum) var.	8. okurken altını çizmeyi seviyorum.	9. internet erişimim yok veya çok sınırlı.	10. kâğıttan okuduğum zaman daha iyi anlıyorum.	11. diğer _____	☐ (2.) Ekrandan okumayı tercih ederim çünkü: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. çok sayıda kitap ve yazıyı yanımda taşıyabiliyorum.</td></tr> <tr><td>2. bana daha ucuza mal oluyor.</td></tr> <tr><td>3. elektronik cihazların birçok başka işlevi var.</td></tr> <tr><td>4. teknolojik cihazlar geleceği oluşturuyor.</td></tr> <tr><td>5. basılı kitap materyaller taşımak için çok ağır.</td></tr> <tr><td>6. teknolojik cihazlar daha çevreci, ağaçlar kesilmiyor.</td></tr> <tr><td>7. ekrandaki kaydırma çubuğu kolaylık sağlıyor.</td></tr> <tr><td>8. yan kaynaklara başvurma olanağı sağlıyor.</td></tr> <tr><td>9. elektronik kitapları daha çağa uygun buluyorum.</td></tr> <tr><td>10. ekrandan okuduğum zaman daha iyi anlıyorum.</td></tr> <tr><td>11. diğer _____</td></tr> </table>	1. çok sayıda kitap ve yazıyı yanımda taşıyabiliyorum.	2. bana daha ucuza mal oluyor.	3. elektronik cihazların birçok başka işlevi var.	4. teknolojik cihazlar geleceği oluşturuyor.	5. basılı kitap materyaller taşımak için çok ağır.	6. teknolojik cihazlar daha çevreci, ağaçlar kesilmiyor.	7. ekrandaki kaydırma çubuğu kolaylık sağlıyor.	8. yan kaynaklara başvurma olanağı sağlıyor.	9. elektronik kitapları daha çağa uygun buluyorum.	10. ekrandan okuduğum zaman daha iyi anlıyorum.	11. diğer _____
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5. Kullandığınız sosyal medya araçları hangileridir? (Birden fazla seçenek işaretleyebilirsiniz.) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Facebook</td></tr> <tr><td>2. Twitter</td></tr> <tr><td>3. Instagram</td></tr> <tr><td>4. Snapchat</td></tr> <tr><td>5. Google+</td></tr> <tr><td>6. Pinterest</td></tr> <tr><td>7. Diğer _____</td></tr> <tr><td>8. Hiçbiri</td></tr> </table>	1. Facebook	2. Twitter	3. Instagram	4. Snapchat	5. Google+	6. Pinterest	7. Diğer _____	8. Hiçbiri	6. Sahip olduğunuz dijital ekranlı cihazlar hangileridir? (Birden fazla seçenek işaretleyebilirsiniz.) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Masaüstü bilgisayar</td></tr> <tr><td>2. Dizüstü bilgisayar</td></tr> <tr><td>3. Tablet PC</td></tr> <tr><td>4. Akıllı telefon</td></tr> <tr><td>5. E-kitap okuyucu (Kindle vb.)</td></tr> <tr><td>6. Diğer _____</td></tr> <tr><td>7. Diğer _____</td></tr> <tr><td>8. Diğer _____</td></tr> </table>	1. Masaüstü bilgisayar	2. Dizüstü bilgisayar	3. Tablet PC	4. Akıllı telefon	5. E-kitap okuyucu (Kindle vb.)	6. Diğer _____	7. Diğer _____	8. Diğer _____								
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7. Üniversiteniz size ders kitaplarını ücretsiz olarak e-kitap veya basılı kitap şeklinde sunsa, hangisini tercih edersiniz? 1. E-kitap () 2. Basılı () 3. Fark etmez () Neden? _____																									
8. Roman gibi kitapları zevk için okurken hem kâğıttan hem de ekrandan okuma seçeneğiniz olsa hangisini tercih edersiniz? 1. Kâğıt () 2. Ekran () 3. Fark etmez () Neden? _____																									
9. Gazete okurken hem kâğıttan hem de ekrandan okuma seçeneğiniz olsa hangisini tercih edersiniz? 1. Kâğıt () 2. Ekran () 3. Fark etmez () Neden? _____																									
10. Son 2 yıl içerisinde ders ve test kitabı dışında kaç tane basılı (kâğıt) kitap okudunuz? 1. Bir-iki () 2. Üç-Dört () 3. Beş-Altı () 4. Yediden fazla () 5. Hiç ()																									
11. Son 2 yıl içerisinde kaç tane e-kitap (pdf, epub vb.) okudunuz? 1. Bir-iki () 2. Üç-Dört () 3. Beş-Altı () 4. Yediden fazla () 5. Hiç ()																									

APPENDIX 2: Written Approval from Turkish National Test Board to Use Reading Comprehension Test



T.C.
ÖLÇME, SEÇME VE YERLEŞTİRME MERKEZİ BAŞKANLIĞI
Dış İlişkiler ve İş Geliştirme Daire Başkanlığı



Sayı : 63282839-824.01.01-E.38747

04/11/2016

Konu : Akademik Çalışma

Sayın Öğr.Gör.Zekeriya KAZANCI
Çukurova Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Bölümü 01330
Balcalı/Sarıçam/ADANA

İlgi : 05/10/2016 tarihli dilekçeniz.

ÖSYM Başkanlığının 03.11.2016 tarihli ve 63282839-824.01.04-E.38575 sayılı oluru ile, merkezimiz tarafından yapılan sınavlarda çıkmış soruların akademik araştırmalarda kullanılması, 5846 sayılı Fikir ve Sanat Eserleri Kanunu kapsamında bedelli veya bedelsiz olarak telif hakkı devri yapılmayacak, başka bir yolla da yayımlanmasına izin verilmeyecek ve ticari amaçla kullanılmayacak şekilde, yapılan akademik çalışmalarda "Bu soruların her hakkı ÖSYM'ye aittir. Hangi amaçla olursa olsun, tamamının veya bir kısmının kopya edilmesi, fotoğraflarının çekilmesi, herhangi bir yolla çoğaltılması ya da kullanılması, yayımlanması ÖSYM'nin yazılı izni olmadan yapılamaz." ibaresine yer verilmesi kaydıyla uygun görülmüştür.

İlgi dilekçenizde belirtilen 2016 YDS Sonbahar Dönemi sorularının Merkezimiz internet sitesinde yayımlanan kısmını, yukarıda belirlenen çerçeveye sınırlı kalmak kaydıyla akademik çalışmanızda kullanmanızda bir sakınca bulunmamaktadır.

Bilgilerinize rica ederim.

Ramazan ÇELİKKAYA
Daire Başkanı V.

BELGENİN ASLI
ELEKTRONİK İMZALIDIR

7.11.2016

Bu evrak 5070 sayılı Elektronik İmza Kanunu'na göre elektronik olarak imzalanmıştır. Evrak doğrulama adresi:
<https://ds.osym.gov.tr/Home/Dogrulama/dd70ecf4-68c1-4432-843a-e086c26aac31>

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Telefon :
E-Posta : sule.kahraman@osym.gov.tr

Ayrıntılı Bilgi : Şule KAHRAMAN - Firma Personeli
Fax :
Elektronik Ağ : www.osym.gov.tr

APPENDIX 3: Reading Comprehension Test on Printed-Paper

1. - 3. soruları aşağıdaki parçaya göre cevaplayınız.

The Olympic Games were first held in Olympia in ancient Greece to honour the Greek god Zeus. These ancient Olympics began in the year 776 B.C. and continued until 392 A.D., that is, for more than 1,000 years. Only male athletes competed in these games. They competed in different sports activities, but there were competitions also in poetry, music and other arts. At the beginning and end of the Games, animals were killed and offered to Zeus. When people stopped believing in the Greek gods, the Olympic Games were cancelled. The Olympic Games were brought back in 1896, when the first modern Olympic Games were held in Athens, the capital of Greece. Only nine countries with about 250 athletes participated in these first modern Games, and again all the athletes were male. Today, about 10,000 athletes from about 200 countries compete in the Olympic Games, and nearly half of them are women.

1. According to the passage, the first Olympic Games

- _____.
- A) were held 1,000 years ago
- B) continued for 392 years
- C) were for male and female athletes
- D) were held all across Greece
- E) were held for religious purposes

2. The ancient Olympic Games were cancelled because _____.

- A) animals were killed and offered to Zeus
- B) poetry, music, and other arts became more popular
- C) female athletes did not want to join the races
- D) Zeus and the other gods were no longer important in Greek society
- E) people did not enjoy the games

3. It can be understood from the passage that _____.

- A) few female athletes took part in the first modern Olympics
- B) the original Olympics concentrated on sports only
- C) participation in the modern Olympics has grown considerably since they were brought back in 1896
- D) animals were killed and offered to Zeus in the first modern Olympics
- E) 250 athletes from each country take part in the modern Olympics

4. - 6. soruları aşağıdaki parçaya göre cevaplayınız.

New Yorkers are often regarded as being unkind. Actually, this is not a fair attitude. They are willing to help people who need help, but experience has taught them a lot of people don't want to be helped. Are New Yorkers less kind people - less caring on the inside - than city dwellers in other places? Not at all. When you talk to them about this, many give good reasons for their reluctance to help strangers. Most have been taught early on that reaching out to people you don't know can be dangerous. To survive in New York, they were taught that they should avoid even the potentially suspicious. Some also express concern that others might not want help, that the stranger, too, might be afraid of outside contact or might feel insulted. Many tell stories of being abused for trying to help. As one woman explains, she saw an elderly man with a walking stick who appeared unable to cross a busy street. When she gently offered to help, he replied angrily, "When I want help, I'll ask for it. Mind your own business." Over and over, New Yorkers say that they care deeply about the needs of strangers, but that the realities of city living prevent them from reaching out. People speak with nostalgia of the past, when they would pick up hitchhikers or arrange a meal for a hungry stranger.

4. The aim of the passage is to _____.

- A) show that the people of New York are not basically unkind
- B) explain why people in New York are so kind
- C) to encourage people to be more helpful
- D) help us to understand why the old man in the story was so angry
- E) show that the old man was not angry but afraid

5. In the story, a woman offers to help an old man in a kind and friendly way, _____.

- A) but he decides not to cross the road
- B) and he accepts her help gratefully
- C) and this surprises him
- D) but he refuses her help in an unpleasant way
- E) and then they cross the road together

6. We understand from the passage that people who seem to be in need of help _____.

- A) are not always ready to receive help
- B) can easily look after themselves
- C) enjoy being helped by strangers
- D) are very uncommon in New York
- E) prefer to be helped by a woman than by a man

7. - 9. soruları aşağıdaki parçaya göre cevaplayınız.

When sunlight heats the earth, it also heats the atmosphere. As hot air rises, cooler and heavier air rushes in to fill its place, thus creating wind. For more than 2,000 years, people have captured this energy with windmills and used it to do useful things, such as grinding grain or pumping water. By the late 19th century, windmills were also being used to produce electricity, mostly in rural areas. Compared with traditional windmills, however, modern wind turbines are far more efficient.

7. The major focus of the passage is on ____.

- A) traditional windmills
- B) wind and wind energy
- C) modern wind turbines
- D) the connection between hot air and cool air
- E) the need for electricity in rural areas

8. The passage informs us that ____.

- A) grain grinding and water pumping are two of the functions of windmills
- B) sunlight heats the atmosphere, not the earth
- C) wind is created when cool air rises and hot air sinks
- D) windmills have always been more decorative than useful
- E) windmills have been used to produce electricity for thousands of years to produce electricity

9. From this passage, we can see that ____.

- A) there is almost no difference between windmills and wind turbines
- B) earlier people failed to capture the wind's energy
- C) in earlier times people needed electricity more in rural areas, not in urban areas
- D) wind turbines supply electric power more efficiently than do windmills
- E) it is difficult to make use of wind energy

10. - 12. soruları aşağıdaki parçaya göre cevaplayınız.

Travelling east along the coast to Antalya, you may easily miss the great Lake of Köyceğiz lying behind the orange trees. Visitors at nearby Dalyan sail regularly back and forth between the famous small peninsula of sand where turtles build their nests and the ancient ruins of Caunus four miles away. They may even visit the mud baths at the tip of the lake. Yet they seldom try to swim in the lake itself, which is strangely hidden away from both the highway and the tourist crowd; this has helped the lake to evolve into a rare area of ecological importance.

10. The passage is largely concerned with the ____.

- A) historical ruins around Köyceğiz
- B) great Lake of Köyceğiz
- C) sandy beaches around Köyceğiz
- D) turtles nesting in Dalyan
- E) tourist attractions on the way to Antalya

11. From the passage, we understand that ____.

- A) Köyceğiz, Dalyan and Caunus are close to one another
- B) visitors visit the lake more than other places in the area
- C) the turtles nest in the mud at the tip of the lake
- D) one has to travel to Antalya in order to see the Lake of Köyceğiz
- E) Caunus is a modern settlement

12. The passage states that the main reason why the Lake of Köyceğiz has become an important ecological area is that ____.

- A) it is surrounded by orange trees
- B) visitors prefer to see Dalyan and Caunus rather than the lake
- C) it is hidden away from the main road and the crowds of tourists
- D) visitors going to Antalya rarely stop there
- E) there are mud baths at either end

13. - 15. soruları aşağıdaki parçaya göre cevaplayınız.

Various estimates suggest that by 2050 nearly one third of the world's energy needs could come from renewable sources such as solar power, wind power, geothermal power and hydrogen fuel cells. This leaves the other two thirds to come from conventional fossil fuels such as oil and gas. We have to find a balance between the need to protect people's way of life and the environment, and the need to provide them with affordable energy; and also between the cost of developing new technology to get the most from fossil fuels, and the cost of developing new power sources.

13. This passage is largely about ____.

- A) the necessity of balancing the use of fossil fuels and renewable energy sources
- B) the harmfulness of fossil fuels to people's way of life and the environment
- C) the advantages of using renewable energy sources such as wind power
- D) the usefulness of renewable energy sources to people's way of life and the environment
- E) new power sources which have to be developed to replace conventional fuels

14. The passage suggests that ____.

- A) traditional fuels are renewable, so we should go on using them
- B) after 2050 only one third of the world will use fossil fuels, and the remaining two thirds will use renewable energy
- C) by 2050 it could be possible for renewable energy sources to supply 33% of the world's power needs
- D) new power sources are to be developed at all costs
- E) one should protect the environment even if this causes fuel prices to rise

15. The passage points out that ____.

- A) no estimates have been made about the future use of energy sources
- B) developing new technology to obtain fossil fuels costs less than developing new power sources
- C) fossil fuels will exist as long as the world exists, but they are harmful
- D) the use of oil and gas helps us to protect the environment
- E) the type of energy needed and the cost of producing it are related problems

16. - 18. soruları aşağıdaki parçaya göre cevaplayınız.

In the years following the Chernobyl reactor disaster in 1986, nuclear power was seen as a dying industry. Public support had lessened because of safety fears, and many countries decided to put a halt to new reactor construction. But there has recently been a dramatic revival of interest in nuclear energy, thanks to the twin threats of climate change and energy insecurity. Nuclear reactors do not emit CO₂ when they generate electricity, so governments are increasingly seeing the construction of such reactors as a way to bring down carbon emissions and generate stable supplies of electricity.

16. Based on the passage, we may conclude that ____.

- A) stable supplies of electricity can be generated without the aid of nuclear reactors
- B) threats of climate change and energy insecurity have recently caused a lack of interest in clean energy
- C) as nuclear reactors emit CO₂ when they generate electricity, governments are considering bringing down their numbers
- D) people were worried about safety conditions after the Chernobyl disaster
- E) in reaction to the Chernobyl event, many countries decided to have new reactors constructed

17. The main subject emphasized in the passage is ____.

- A) the public's fears about safety
- B) nuclear power as a dying industry
- C) the twin threats of climate change and energy insecurity
- D) the dangers of CO₂ created by nuclear reactors
- E) the renewed interest in nuclear reactors and the reasons for it

18. We learn from the passage that governments are now becoming ____.

- A) less worried about climate change
- B) more aware of the dangers of nuclear power
- C) less interested in producing stable electricity supplies
- D) more supportive of nuclear energy
- E) less concerned about carbon emissions in their countries

19. - 21. soruları aşağıdaki parçaya göre cevaplayınız.

A newspaper is a daily or weekly publication containing news and comments on the news. News-sheets appeared after the invention of printing and were introduced in 1609 in Germany and in 1616 in the Netherlands. In 1622, the first newspaper appeared in English. Improved printing and cheap paper and a growing reading population led to a growth in newspapers, but they were expensive. In the 20th century, production costs fell with the introduction of new technology.

19. According to the passage, a newspaper not only gives news ____ .

- A) though this is its main function
- B) but also offers some discussion of the news
- C) as few people are really interested in the news
- D) but provides entertainment, too
- E) but also illustrates the news with photographs

20. It is clear from the passage that newspapers ____ .

- A) came into existence with the invention of printing
- B) were published in the Netherlands long before they were in Germany
- C) encouraged more and more people to learn to read
- D) are not as popular now as they were
- E) soon spread from Europe to the rest of the world

21. We understand from the passage that 20 century technology ____ .

- A) has led to a lack of interest in newspapers
- B) helped newspapers to collect news from distant places
- C) made it possible to print cheaper newspapers
- D) has made newspapers an essential part of everyday life
- E) has improved news reporting worldwide

APPENDIX 4: Reading Comprehension Test on Digital Screen

Reading Comprehension Test (ELT)

Lütfen öncelikle daha önce yanıtladığınız ankette kullandığınız e-mail adresini giriniz.
Aşağıdaki paragraf sorularını cevaplamak için toplam 40 dk süreniz vardır.

* Gerekli

E-posta adresi *

E-posta adresiniz

1. - 3. soruları aşağıdaki parçaya göre cevaplayınız.

The Olympic Games were first held in Olympia in ancient Greece to honour the Greek god Zeus. These ancient Olympics began in the year 776 B.C. and continued until 392 A.D., that is, for more than 1,000 years. Only male athletes competed in these games. They competed in different sports activities, but there were competitions also in poetry, music and other arts. At the beginning and end of the Games, animals were killed and offered to Zeus. When people stopped believing in the Greek gods, the Olympic Games were cancelled. The Olympic Games were brought back in 1896, when the first modern Olympic Games were held in Athens, the capital of Greece. Only nine countries with about 250 athletes participated in these first modern Games, and again all the athletes were male. Today, about 10,000 athletes from about 200 countries compete in the Olympic Games, and nearly half of them are women.

1. According to the passage, the first Olympic Games ____.

- ☐ A) were held 1,000 years ago
- ☐ B) continued for 392 years
- ☐ C) were for male and female athletes
- ☐ D) were held all across Greece
- ☐ E) were held for religious purposes

2. The ancient Olympic Games were cancelled because ____.

- ☐ A) animals were killed and offered to Zeus
- ☐ B) poetry, music, and other arts became more popular
- ☐ C) female athletes did not want to join the races
- ☐ D) Zeus and the other gods were no longer important in Greek society
- ☐ E) people did not enjoy the games

3. It can be understood from the passage that ____.

- ☐ A) few female athletes took part in the first modern Olympics
- ☐ B) the original Olympics concentrated on sports only
- ☐ C) participation in the modern Olympics has grown considerably since they were brought back in 1896
- ☐ D) animals were killed and offered to Zeus in the first modern Olympics
- ☐ E) 250 athletes from each country take part in the modern Olympics

4. - 6. soruları aşağıdaki parçaya göre cevaplayınız.

New Yorkers are often regarded as being unkind. Actually, this is not a fair attitude. They are willing to help people who need help, but experience has taught them a lot of people don't want to be helped. Are New Yorkers less kind people - less caring on the inside - than city dwellers in other places? Not at all. When you talk to them about this, many give good reasons for their reluctance to help strangers. Most have been taught early on that reaching out to people you don't know can be dangerous. To survive in New York, they were taught that they should avoid even the potentially suspicious. Some also express concern that others might not want help, that the stranger, too, might be afraid of outside contact or might feel insulted. Many tell stories of being abused for trying to help. As one woman explains, she saw an elderly man with a walking stick who appeared unable to cross a busy street. When she gently offered to help, he replied angrily, "When I want help, I'll ask for it. Mind your own business." Over and over, New Yorkers say that they care deeply about the needs of strangers, but that the realities of city living prevent them from reaching out. People speak with nostalgia of the past, when they would pick up hitchhikers or arrange a meal for a hungry stranger.

4. The aim of the passage is to ____.

- ☐ A) show that the people of New York are not basically unkind
- ☐ B) explain why people in New York are so kind
- ☐ C) to encourage people to be more helpful
- ☐ D) help us to understand why the old man in the story was so angry
- ☐ E) show that the old man was not angry but afraid

5. In the story, a woman offers to help an old man in a kind and friendly way, ____.

- ☐ A) but he decides not to cross the road
- ☐ B) and he accepts her help gratefully
- ☐ C) and this surprises him
- ☐ D) but he refuses her help in an unpleasant way
- ☐ E) and then they cross the road together

6. We understand from the passage that people who seem to be in need of help ____.

- ☐ A) are not always ready to receive help
- ☐ B) can easily look after themselves
- ☐ C) to encourage people to be more helpful
- ☐ C) enjoy being helped by strangers
- ☐ D) are very uncommon in New York

7. - 9. soruları aşağıdaki parçaya göre cevaplayınız.

When sunlight heats the earth, it also heats the atmosphere. As hot air rises, cooler and heavier air rushes in to fill its place, thus creating wind. For more than 2,000 years, people have captured this energy with windmills and used it to do useful things, such as grinding grain or pumping water. By the late 19th century, windmills were also being used to produce electricity, mostly in rural areas. Compared with traditional windmills, however, modern wind turbines are far more efficient.

7. The major focus of the passage is on ____.

- ☐ A) traditional windmills
- ☐ B) wind and wind energy
- ☐ C) modern wind turbines
- ☐ D) the connection between hot air and cool air
- ☐ E) the need for electricity in rural areas

8. The passage informs us that ____.

- ☐ A) grain grinding and water pumping are two of the functions of windmills
- ☐ B) sunlight heats the atmosphere, not the earth
- ☐ C) wind is created when cool air rises and hot air sinks
- ☐ D) windmills have always been more decorative than useful
- ☐ E) windmills have been used to produce electricity for thousands of to produce electricity

9. From this passage, we can see that ____.

- ☐ A) there is almost no difference between windmills and wind turbines
- ☐ B) earlier people failed to capture the wind's energy

- ☐ C) in earlier times people needed electricity more in rural areas, not in urban areas
- ☐ D) wind turbines supply electric power more efficiently than do windmills
- ☐ E) it is difficult to make use of wind energy

10. - 12. soruları aşağıdaki parçaya göre cevaplayınız.

Travelling east along the coast to Antalya, you may easily miss the great Lake of Köyceğiz lying behind the orange trees. Visitors at nearby Dalyan sail regularly back and forth between the famous small peninsula of sand where turtles build their nests and the ancient ruins of Caunus four miles away. They may even visit the mud baths at the tip of the lake. Yet they seldom try to swim in the lake itself, which is strangely hidden away from both the highway and the tourist crowd; this has helped the lake to evolve into a rare area of ecological importance.

10. The passage is largely concerned with the ____.

- ☐ A) historical ruins around Köyceğiz
- ☐ B) great Lake of Köyceğiz
- ☐ C) sandy beaches around Köyceğiz
- ☐ D) turtles nesting in Dalyan
- ☐ E) tourist attractions on the way to Antalya

11. From the passage, we understand that ____.

- ☐ A) Köyceğiz, Dalyan and Caunus are close to one another
- ☐ B) visitors visit the lake more than other places in the area
- ☐ C) the turtles nest in the mud at the tip of the lake
- ☐ D) one has to travel to Antalya in order to see the Lake of Köyceğiz
- ☐ E) Caunus is a modern settlement

12. The passage states that the main reason why the Lake of Köyceğiz has become an important ecological area is that ____.

- ☐ A) it is surrounded by orange trees
- ☐ B) visitors prefer to see Dalyan and Caunus rather than the lake
- ☐ C) it is hidden away from the main road and the crowds of tourists
- ☐ D) visitors going to Antalya rarely stop there
- ☐ E) there are mud baths at either end

13. - 15. soruları aşağıdaki parçaya göre cevaplayınız.

Various estimates suggest that by 2050 nearly one third of the world's energy needs could come from renewable sources such as solar power, wind power, geothermal power and hydrogen fuel cells. This leaves the other two thirds to come from conventional fossil fuels such as oil and gas. We have to find a balance between the need to protect people's way of life and the environment, and the need to provide them with affordable energy; and also between the cost of developing new technology to get the most from fossil fuels, and the cost of developing new power sources.

13. This passage is largely about ____.

- ☐ A) the necessity of balancing the use of fossil fuels and renewable energy sources
- ☐ B) the harmfulness of fossil fuels to people's way of life and the environment
- ☐ C) the advantages of using renewable energy sources such as wind power
- ☐ D) the usefulness of renewable energy sources to people's way of life and the environment
- ☐ E) new power sources which have to be developed to replace conventional fuels

14. The passage suggests that ____.

- ☐ A) traditional fuels are renewable, so we should go on using them
- ☐ B) after 2050 only one third of the world will use fossil fuels, and the remaining two thirds will use renewable energy
- ☐ C) by 2050 it could be possible for renewable energy sources to supply 33% of the world's power needs
- ☐ D) new power sources are to be developed at all costs
- ☐ E) one should protect the environment even if this causes fuel prices to rise

15. The passage points out that ____.

- ☐ A) no estimates have been made about the future use of energy sources
- ☐ B) developing new technology to obtain fossil fuels costs less than developing new power sources
- ☐ C) fossil fuels will exist as long as the world exists, but they are harmful
- ☐ D) the use of oil and gas helps us to protect the environment
- ☐ E) the type of energy needed and the cost of producing it are related problems

16. - 18. soruları aşağıdaki parçaya göre cevaplayınız.

In the years following the Chernobyl reactor disaster in 1986, nuclear power was seen as a dying industry. Public support had lessened because of safety fears, and many countries decided to put a halt to new reactor construction. But there has recently been a dramatic revival of interest in nuclear energy, thanks to the twin threats of climate change and energy insecurity. Nuclear reactors do not emit CO₂ when they generate electricity, so governments are increasingly seeing the construction of such reactors as a way to bring down carbon emissions and generate stable supplies of electricity.

16. Based on the passage, we may conclude that ____.

- ☐ A) stable supplies of electricity can be generated without the aid of nuclear reactors
- ☐ B) threats of climate change and energy insecurity have recently caused a lack of interest in clean energy
- ☐ C) as nuclear reactors emit CO₂ when they generate electricity, governments are considering bringing down their numbers
- ☐ D) people were worried about safety conditions after the Chernobyl disaster
- ☐ E) in reaction to the Chernobyl event, many countries decided to have new reactors constructed

17. The main subject emphasized in the passage is ____.

- ☐ A) the public's fears about safety
- ☐ B) nuclear power as a dying industry
- ☐ C) the twin threats of climate change and energy insecurity
- ☐ D) the dangers of CO₂ created by nuclear reactors
- ☐ E) the renewed interest in nuclear reactors and the reasons for it

18. We learn from the passage that governments are now becoming ____.

- ☐ A) less worried about climate change
- ☐ B) more aware of the dangers of nuclear power
- ☐ C) less interested in producing stable electricity supplies
- ☐ D) more supportive of nuclear energy
- ☐ E) less concerned about carbon emissions in their countries

19. - 21. soruları aşağıdaki parçaya göre cevaplayınız.

A newspaper is a daily or weekly publication containing news and comments on the news. News-sheets appeared after the invention of printing and were introduced in 1609 in Germany and in 1616 in the Netherlands. In 1622, the first newspaper appeared in English. Improved printing and cheap paper and a growing reading population led to a growth in newspapers, but they were expensive. In the 20th century, production costs fell with the introduction of new technology.

19. According to the passage, a newspaper not only gives news

_____ .

- ☐ A) though this is its main function
- ☐ B) but also offers some discussion of the news
- ☐ C) as few people are really interested in the news
- ☐ D) but provides entertainment, too
- ☐ E) but also illustrates the news with photographs

20. It is clear from the passage that newspapers _____ .

- ☐ A) came into existence with the invention of printing
- ☐ B) were published in the Netherlands long before they were in Germany
- ☐ C) encouraged more and more people to learn to read
- ☐ D) are not as popular now as they were
- ☐ E) soon spread from Europe to the rest of the world

21. We understand from the passage that 20 century technology

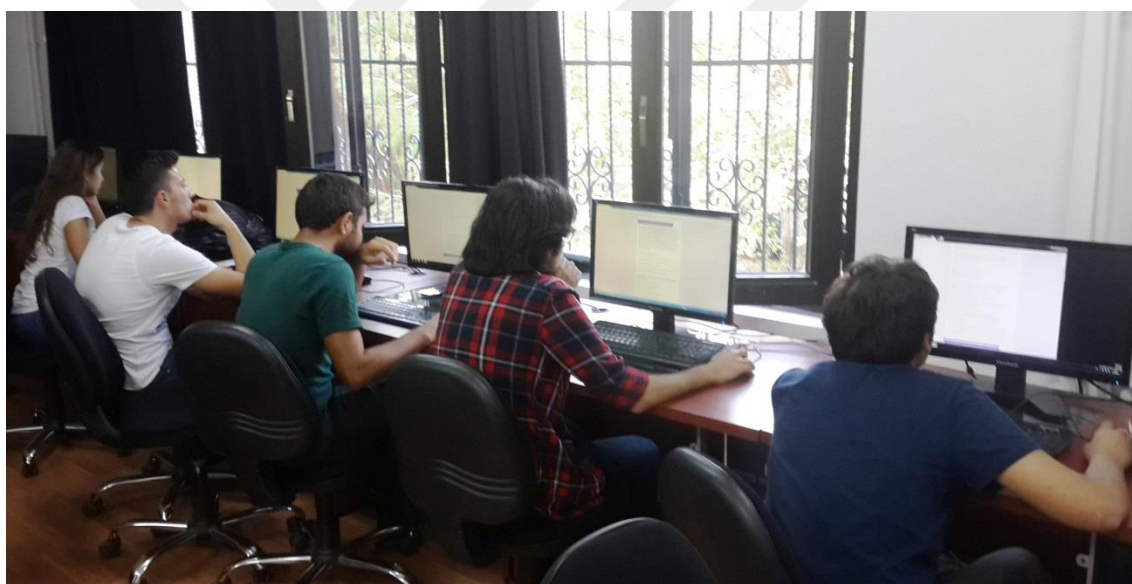
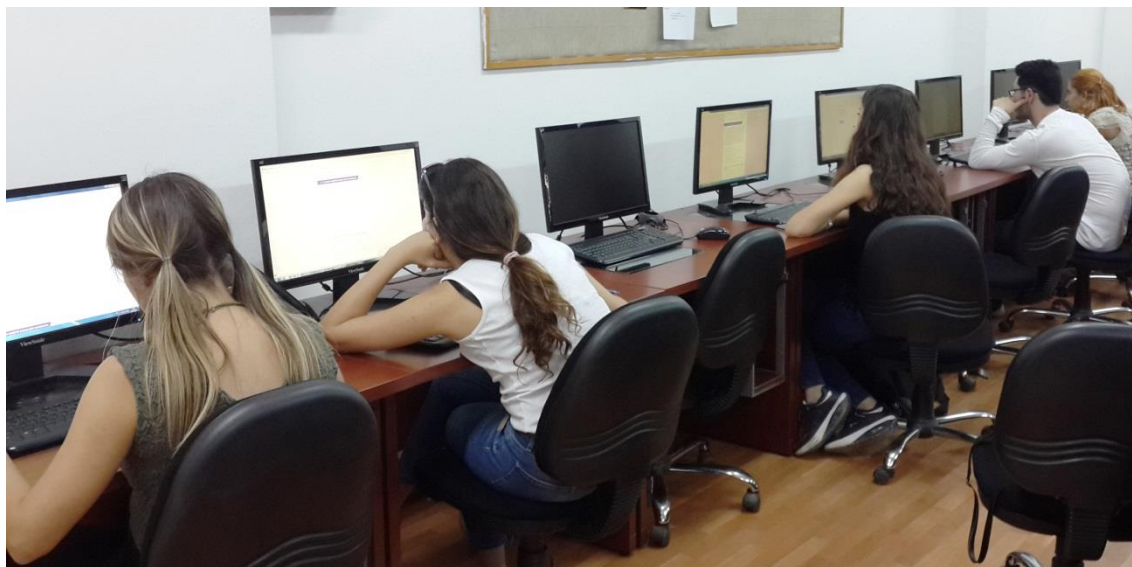
_____ .

- ☐ A) has led to a lack of interest in newspapers
- ☐ B) helped newspapers to collect news from distant places
- ☐ C) made it possible to print cheaper newspapers
- ☐ D) has made newspapers an essential part of everyday life
- ☐ E) has improved news reporting worldwide

Yanıtlarınızın birer kopyası, belirttiğiniz e-posta adresine gönderilecek.

GÖNDER

APPENDIX 5: EEE and ELT Students Taking Their Reading Comprehension Test on Digital Screen



APPENDIX 6: EEE and ELT Students Taking Their Reading Comprehension Test on Printed-Paper



APPENDIX 7: Reading Comprehension Test Scores of Participants from the EEE Department from Digital Screen and Printed-Paper

The Electrical-Electronics Engineering Department			
#	Participants	Reading Comprehension Score from Screen	Reading Comprehension Score from Screen
1	Participant_01	18,00	17,00
2	Participant_02	9,00	7,00
3	Participant_03	9,00	13,00
4	Participant_04	9,00	11,00
5	Participant_05	7,00	8,00
6	Participant_06	14,00	16,00
7	Participant_07	11,00	14,00
8	Participant_08	11,00	12,00
9	Participant_09	15,00	17,00
10	Participant_10	7,00	6,00
11	Participant_11	6,00	6,00
12	Participant_12	8,00	11,00
13	Participant_13	4,00	7,00
14	Participant_14	5,00	5,00
15	Participant_15	13,00	18,00
16	Participant_16	13,00	8,00
17	Participant_17	14,00	11,00
18	Participant_18	12,00	12,00
19	Participant_19	17,00	14,00
20	Participant_20	9,00	12,00
21	Participant_21	10,00	11,00
22	Participant_22	12,00	14,00
23	Participant_23	12,00	18,00
24	Participant_24	7,00	9,00
25	Participant_25	9,00	9,00
26	Participant_26	15,00	18,00
27	Participant_27	15,00	16,00
28	Participant_28	12,00	16,00
29	Participant_29	16,00	17,00
30	Participant_30	15,00	19,00
31	Participant_31	13,00	9,00
32	Participant_32	6,00	9,00
33	Participant_33	8,00	8,00
34	Participant_34	15,00	16,00
35	Participant_35	5,00	7,00

36	Participant_36	6,00	6,00
37	Participant_37	8,00	7,00
38	Participant_38	14,00	16,00
39	Participant_39	4,00	4,00
40	Participant_40	8,00	6,00
41	Participant_41	7,00	4,00
42	Participant_42	13,00	15,00
43	Participant_43	6,00	4,00
44	Participant_44	11,00	10,00
45	Participant_45	12,00	9,00
46	Participant_46	10,00	8,00
47	Participant_47	14,00	13,00
48	Participant_48	14,00	13,00
49	Participant_49	13,00	13,00
50	Participant_50	15,00	17,00
51	Participant_51	9,00	13,00
52	Participant_52	9,00	9,00
53	Participant_53	9,00	9,00
54	Participant_54	12,00	11,00
55	Participant_55	11,00	10,00
56	Participant_56	12,00	12,00
57	Participant_57	8,00	10,00
58	Participant_58	9,00	15,00
59	Participant_59	10,00	13,00
60	Participant_60	12,00	8,00
61	Participant_61	11,00	9,00
62	Participant_62	12,00	13,00
63	Participant_63	11,00	4,00
64	Participant_64	13,00	13,00
65	Participant_65	13,00	12,00
66	Participant_66	6,00	6,00
67	Participant_67	9,00	7,00
68	Participant_68	18,00	14,00
69	Participant_69	12,00	4,00
70	Participant_70	9,00	11,00
71	Participant_71	11,00	6,00
72	Participant_72	16,00	20,00
73	Participant_73	8,00	9,00
74	Participant_74	14,00	10,00
75	Participant_75	8,00	7,00

APPENDIX 8: Reading Comprehension Test Scores of Participants from the ELT Department from Digital Screen and Printed-Paper

The English Language Teaching Department			
#	Participants	Reading Comprehension Score from Screen	Reading Comprehension Score from Paper
1	Participant_01	19,00	17,00
2	Participant_02	19,00	21,00
3	Participant_03	15,00	18,00
4	Participant_04	18,00	21,00
5	Participant_05	15,00	17,00
6	Participant_06	17,00	12,00
7	Participant_07	12,00	15,00
8	Participant_08	19,00	20,00
9	Participant_09	19,00	19,00
10	Participant_10	11,00	14,00
11	Participant_11	13,00	16,00
12	Participant_12	12,00	12,00
13	Participant_13	15,00	15,00
14	Participant_14	18,00	16,00
15	Participant_15	18,00	18,00
16	Participant_16	14,00	18,00
17	Participant_17	17,00	20,00
18	Participant_18	17,00	16,00
19	Participant_19	17,00	15,00
20	Participant_20	18,00	18,00
21	Participant_21	14,00	15,00
22	Participant_22	16,00	19,00
23	Participant_23	17,00	16,00
24	Participant_24	18,00	17,00
25	Participant_25	17,00	13,00
26	Participant_26	15,00	19,00
27	Participant_27	14,00	17,00
28	Participant_28	12,00	14,00
29	Participant_29	13,00	15,00
30	Participant_30	18,00	20,00
31	Participant_31	17,00	20,00
32	Participant_32	18,00	20,00
33	Participant_33	9,00	11,00
34	Participant_37	15,00	14,00
35	Participant_38	19,00	18,00
36	Participant_39	16,00	17,00

37	Participant_40	17,00	19,00
38	Participant_41	16,00	19,00
39	Participant_43	16,00	17,00
40	Participant_44	15,00	17,00
41	Participant_45	17,00	16,00
42	Participant_46	18,00	18,00
43	Participant_47	19,00	16,00
44	Participant_48	20,00	19,00
45	Participant_49	14,00	16,00
46	Participant_50	13,00	15,00
47	Participant_51	16,00	19,00
48	Participant_52	21,00	21,00
49	Participant_53	11,00	10,00
50	Participant_54	16,00	20,00
51	Participant_55	12,00	13,00
52	Participant_56	15,00	15,00
53	Participant_57	17,00	20,00
54	Participant_58	17,00	20,00
55	Participant_59	18,00	18,00
56	Participant_60	14,00	16,00
57	Participant_61	14,00	12,00
58	Participant_62	16,00	19,00
59	Participant_63	18,00	20,00
60	Participant_64	17,00	14,00
61	Participant_65	16,00	17,00
62	Participant_66	20,00	20,00
63	Participant_67	21,00	21,00
64	Participant_68	14,00	13,00
65	Participant_69	17,00	20,00
66	Participant_70	17,00	18,00
67	Participant_71	13,00	13,00
68	Participant_72	16,00	14,00
69	Participant_73	16,00	20,00
70	Participant_74	17,00	18,00
71	Participant_75	14,00	14,00
72	Participant_76	12,00	15,00

CURRICULUM VITAE

A. Personal Information

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Date of Birth : 09.10.1977
Place of Birth : Kahramanmaraş
Marital Status : Married
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B. Educational Background

Date	University/Department	Field	Degree
2007-2018	Çukurova University, Institute of Social Sciences	English Language Teaching	Doctor of Philosophy
2001-2004	Çukurova University, Institute of Social Sciences	Computer Education and Instructional Technology	Master of Arts
1996-2001	Çukurova University, Faculty of Education	English Language Teaching	Bachelor of Arts

C. Professional Background

Date	Institution	Occupation
2005-present	Çukurova University, Faculty of Education	Instructor
2003-2005	State Elementary School	English Teacher
2001-2003	Private Elementary School	English Teacher

D. Academic Work

i. Papers presented at International Conferences and/or Published in Proceedings

Kazanci, Z., & Bada, E. (2017). University Students' Reading Platform Preferences and Potential Reasons. 9th Annual International Conference on Education and New Learning Technologies Barcelona (Spain). 3rd - 5th of July, 2017

ii. Articles Published in International Journals

Kazanci, Z., & Okan, Z. (2009). Evaluating English Language Teaching Software for Kids: Education or Entertainment or Both?. *TOJET: The Turkish Online Journal of Educational Technology*, 8(3).

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