THE EFFECTS OF TEXT ANNOTATION ON SECOND LANGUAGE READING COMPREHENSION IN THE CONTEXT OF MOBILE ENVIRONMENT

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ABSTRACT

THE EFFECTS OF TEXT ANNOTATION ON SECOND LANGUAGE READING COMPREHENSION IN THE CONTEXT OF MOBILE ENVIRONMENT

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Mobile technologies provide second language learners with many opportunities to develop their second language reading comprehension skills. This thesis investigated the effects of text annotation upon intermediate learners' second language reading comprehension in the context of mobile learning.

The study employed a mixed method research with embedded design. The data were collected through reading comprehension scores and interviews from L2 learners attending from a private language school. For the quantitative part, the same group of 40 L2 learners was exposed successively to two similar reading texts in two different conditions: traditional paper-based form and annotation supported mobile application. Participants' pre-measure and post-measure reading comprehension scores were analyzed by using paired-sample t-test. In the qualitative part, the interview data were gathered from 16 learners who participated to the quantitative part of the study. Qualitative coding was applied to draw themes and sub-themes from the transcripts.

The qauntitative results of the study showed that reading comprehension scores in the first condition were not significantly different from those in the second condition. However, qualitative results revealed that learners found and considered the mobile-assisted annotation module quite beneficial and useful.

Keywords: Text Annotation, Mobile Learning, Reading Comprehension, Second Language Learning

ÖZ

MOBİL OKUMA ORTAMLARINDAKİ AÇIKLAMA NOTLARININ YABANCI DİL ÖĞRENENLERİNDE OKUDUĞUNU ANLAMAYA ETKİSİ

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Mobil teknolojiler yabancı dil olarak ikinci dil öğrenenlerine ikinci dilde okuduğunu anlama becerilerini geliştirmek için birçok fırsat sunmaktadır. Bu tez, mobil okuma ortamlarındaki metinsel açıklama notlarının orta düzey yabancı dil öğrenenlerin okuduğunu anlamaya etkilerini araştırmaktadır.

Çalışma karma araştırma yöntemlerinden gömülü tasarım modelini kullanmıştır. Veriler, özel bir dil kursunda İngilizce öğrenen öğrencilerden okuduğunu anlama testi ve yarı yapılandırılmış görüşmeler yoluyla toplanmıştır. Çalışmanın nicel bölümünde, ikinci dil öğrencisi olan 40 kişi, birbirini izleyen iki farklı okuma metnine, geleneksel kağıt ortamında ve metinsel açıklama destekli mobil uygulama ortamında olmak üzere iki farklı duruma maruz bırakılmıştır. Katılımcıların her iki durumdaki okuduğunu anlama puanları örneklem t-testi kullanılarak analiz edilmiştir. Çalışmanın nitel bölümünde, çalışmanın nicel kısmına katılan 16 öğrenciden nitel veriler toplanmıştır. Toplanan bu nitel veriler daha sonra nitel kodlama yöntemi kullanılarak analiz edilmiş, temalara ve alt temalara ayrılmıştır.

Araştırmanın nicel sonuçları birinci durumdaki okuduğunu anlama puanlarının ikinci durumdakilerden anlamlı olarak farklı olmadığını göstermiştir. Ancak, nitel sonuçlar,

öğrencilerin mobil destekli metinsel açıklama modülünü oldukça faydalı bulduğunu ortaya koymuştur.

Anahtar Kelimeler: Açıklama Notu (Belirtim), Okuduğunu anlama, Mobil Öğrenme, İkinci Dil Öğrenimi

To My Family

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LIST OF ABBREVIATIONS

YDS	YDS is a language proficiency test arranged and held by Turkish Higher Education to assess language skills based on well-established standards.
ESL	English as Second Language.
L2	It refers to the non-native language learner. Generally, the expression of second language is used.
Annotation/Gloss	A short definition of meaning presented to a requested unknown second language word during reading.
Reading Comprehension	Learners are expected to infer the main idea of the text after reading it by answering open-ended or multiple choice comprehension questions.

CHAPTER 1

INTRODUCTION

It has always become an effort-demanding process for people who are trying to learn English as their second language. Language learning necessitates learners getting proficient in several parts. One of them is reading comprehension. A number of factors could play a role in acquiring and developing reading comprehension skills. Previous second language (L2) learning studies have stated that reading is an important part of English language curriculum (Hsu, Hwang & Chung, 2010). To comprehend a reading context, L2 vocabulary knowledge is demonstrated as a primary factor. For example, Laufer (1991) has stated that increase in vocabulary shows the enhancement of reading comprehension. In addition to many studies which have already supported the powerful relationship of vocabulary knowledge and reading comprehension, L2 learners themselves admit that the biggest reason of failing in understanding reading text is limited vocabulary knowledge (Yorio, 1971).

To prevent the limited vocabulary knowledge which impacts comprehension of the text, annotations can be used. An annotation or gloss is namely an explanatory note, by definition (Wolfe, 2002). Annotations provide accessing the authentic information (Wolfe & Neuworth, 2001). Computer Assisted Language Learning (CALL) studies have shown that immediate access to the meaning of a word with annotation provides eliminating lower level processes and increasing it to a higher level processes (Chun, 2006).

Research on the effectiveness of electronic glosses on L2 reading has revealed various results. Some studies show that annotations have limited effect on L2 reading comprehension. To illustrate, Slimmer's (2002) meta-analysis study

revealed that the effects of annotation to L2 reading comprehension were so small. Sakar and Ercetin's (2005) study indicated that there was a negative relationship between reading comprehension and use of annotation. On the contrary, many studies show the effectiveness of annotation on reading comprehension. Ko (2005) stated that L2 annotations provided smoother and faster reading comprehension. In addition, the quantitative results of Ko's study revealed that just L2 annotation–not L1 – affects the reading comprehension. As a result, there are some contradictions among studies about the impact of annotation on reading comprehension. Therefore, here is a need to conduct more studies with different methods about the effects of annotation in reading comprehension.

Mobile devices are the most popular technological tools for learning. They have been recognized as among the most efficient language learning tools by means of its feature to be used anytime and anywhere (Hwang & Tsai, 2011). In literature, there are very limited studies about the use of annotation in mobile environments. Chang and Hsu (2011) developed a CALL on Personal Data Assistant (PDAs) and the study showed that L2 learners perceived the usefulness and ease-of-use for annotations on reading comprehension. However, this study remained narrow in the area as Chang and Hsu (2011) recommended that reading researches on mobile devices should be conducted and encouraged. There was another study about the use of annotation on mobile learning conducted by R. Shadiev et al (2011). They stated that the findings of their study cannot be generalized to a broader community because of the limitations which were the relatively small sample size and shortterm exposure of the technology to aid learning.

1.1 Background of the Study

As a definition, annotation is an explanatory note especially in literary works. As an aim of language learning, - in a motivating environment – interactive language practices emerge with online annotations (Wolfe, 2002).

The previous studies that examined the effects of annotation on reading comprehension differ in terms of their results. A study by Ariew and Ercetin (2004) showed that participants' proficiency level is an important factor which affects reading comprehension. There is a study that students' level, that is being high or low level, is not significant in terms of reading comprehension (Chun, 2001). The study conducted by Leffa (1992) examined the effectiveness of electronic glossary for beginning level learners' reading comprehension. The results showed that when electronic glossary was used, reading time was more efficient and reading comprehension tasks were performed significantly better. Another study included three conditions which were no annotation; annotation for second language (L2) learning; and annotation for native language development (Ko, 2005). The results of both quantitative and qualitative analysis showed that L2 learning annotations were significantly better on reading comprehension. However, Roby (1999) and Davis and Lyman-Hager (1997) examined annotations in computer based environments and use of dictionaries to show the word meaning. The results indicated that annotations had no meaningful effect on the reading comprehension. And interestingly, according to Sakar and Ercetin (2005), results revealed that annotations had negative effects on adult second language learners. The underlying cause of different results within these studies may be participant' age, the proficiency level and target audience. Therefore, the demographic factors are clearly determined in the current study.

In recent years, the development and emergence of wireless technology and the set of mobile device innovations have led to use of those technologies in the field of education since the features of those technologies like portability, social connectivity, context sensitivity, and individuality may not be offered in desktop computers. Thus, their usage in education field have taken great attention of researchers, teachers and practitioners in education area (Chinnery, 2006). Authentic context is important for learning. Mobile devices also contribute to the context authenticity because they provide the occupation of learning experience that can be accessed at any time or place (Hwang et al., 2014). Therefore, the current study was applied based on a

mobile device with an application for annotation supported readings. In addition to that, the place of annotation on the mobile screen is important for authenticity. Shadiev et al. (2011) stated that multimedia aids – can be thought as annotation – should be placed at the same screen in learning environments to provide a clear picture of learning scenario. By this way, learners' focus is on the necessary information and cognitive capacity is used increasingly (Mayer & Moreno, 2003). This information also contributes to the importance of an authentic context in learning environments.

1.2 The Problem Statement

It might be possible to boost second language vocabulary acquisition by using the annotation support method. However, the results of the previous studies regarding the the effect of annotation on reading comprehension are inconclusive. For example, Ko (2005) conducted a research and according to the results of qualitative analysis, reading comprehension became more fluent and faster with the use of annotation. But Slimmer (2002) conducted a meta- analysis and stated that using glosses significantly supported reading comprehension but its effect was not remarkable. Conversely, Sakar and Ercetin (2005) found that there was not a direct relationship between annotation and reading comprehension. Therefore, the scant information about the effects of annotation on reading comprehension needs further investigation. It is crucial to mention that the majority of the studies conducted to understand the effects of annotation on reading comprehension were not based on mobile environments. Chang and Hsu (2011) also stated that research about reading via mobile devices should be conducted and encouraged because there is limited information in the literature about the effect of using annotation system on reading comprehension in mobile environments. Moreover, Gauerdau et al. (2014) stated that because of the distracting effects by offering irrelevant materials during learning, mobile devices may produce negative learning effects. While there are some contradictions and threats in the literature, the information is needed to understand that whether annotation supported reading environment is effective in terms

of reading comprehension in mobile environment or not and the participants'attitude towards using it.

1.3 Purpose of the Study

Leveraging mobile environment for helping second language learners increase their gain in reading comprehension through annotation have not been comprehensively investigated. Therefore, the purpose of this study is to extend the accumulated knowledge on the effects of annotation on reading comprehension acquisition. More specifically, the current study investigates the effects of annotation based mobile reading environment on learners' reading comprehension and their attitudes towards it. In other words, through the embedded mixed method study, it was aimed to explore the impact of reading annotation in mobile context and how it affects.

1.4 Significance of the Study

Firstly, the study can provide the needed information on the verbal annotation on second language reading comprehension. Secondly, it might shed a light on the use of verbal annotation in mobile environments for second language learning. The study also can contribute to forming the emerging research field of mobile-device assisted language learning (MALL). Thirdly, it was expected to make contribution to the limited literature about the effects of annotation based support on reading comprehension in mobile learning environment. Lastly, it can provide practical information to language teachers and instructional designers who need to make solid decisions about multimedia programs to improve second language reading comprehension. Another important reason for this study was that currently there has ben a big gap in the literature on using annotation in mobile platforms. Thus, this study can provide the information about what should be noted when using annotation in mobile environment. The focus of this study is reading comprehension; therefore, other aspects of second language learning were excluded. The participants were intermediate level learners of English as a foreign

language. Therefore, the learners from other proficiency levels were excluded. Both reading texts and reading comprehension tests applied to participants were appropriate for intermediate level second language learners.

1.5 Theoretical Framework

A number of authors assert that annotation provides the meaning of unfamiliar vocabulary immediately while the reading process continues. Accordingly, the reading flow cannot be broken and text comprehension occurs. This study, however, provided a step closer about understanding annotation in mobile reading environment. Most of annotation studies rely on the cognitive load theory as theoretical approach because of the multimode annotation systems. But in this study, there was just observed the textual annotation type. Therefore, the negative effect of cognitive load theory is limited. Besides, attention lose which is the subject of Cognitive Load Theory is eliminated (Sweller et al., 1990) because the annotation minimizes to apply an external source due its integrated structure.

In addition, second language reading theories are the main bases to frame this study theoretically. There are the second language reading approaches which analyze the second language reading process; called as bottom-up, top-down and interactive (Grabe and Stoller, 2002). While bottom-up is the activity of detailed translating and then guessing the meaning, top-down is just guessing the meaning by means of the background knowledge of learner. Thirdly, interactive reading approach is the blended mode of bottm-up and top-down. These approaches are used for text processing to comprehend the text and in that point, annotation has powerful relations
with the reading approaches because of its facilitative role in the text processing (Nation, 1990).

Additionally, thesecond and important point that is related with this study is schema theory. The theory suggests that readers gain the view of the text by

generating meaning with the existing knowledge (Carrell and Eisterhold, 1988). Consequently, there is the need to relate the activity between reader's existing knowledge and reading text (Carrell and Eisterhold, 1988). In that point, Jonassen (1985) put forward a model in which one's own knowledge can be activated by a triggering medium. This medium can be defined as annotation in the current study.

1.6 Limitations

Several limitations are posed in this study. Therefore, the results obtained should be cautiously treated and considered. First, imposing a time constraint on reading comprehension tests might have restrained subjects from using annotations whenever they need. Second, the number of subjects might have not been as large as it could be in order to ascertain or detect the true effects of intervention on reading comprehension. Third, allocating the same group of subjects to condition 1 (paper-based reading) and condition 2 (mobile-assisted annotation reading) might have created a confounding effect on the result because of carryover effects. Finally, individual learners' interaction with a reading text might be interfered with other factors such familiarity with smart phone and mobile application, learning styles, interest in the topic and reading strategies.

1.7 Delimitations

The study was conducted in Akın Language School in Turkey where English language was taught. In the school, learners were grouped according to their scores they took from the last YDS (Foreign Language Measurement Exam). Therefore, the participants included those who took average 60 points from the last YDS exam. Therefore, the study cannot not be generalized to all students who are preparing YDS exam.

1.8 Research Questions

The following research questions are investigated throughout the study;

1. Does annotation supported reading environment lead to higher student reading comprehension in mobile learning context?
2. What are students' opinions towards annotation based reading?

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

Due to the increasing use of mobile devices (Kukulska-Hulme, 2009) learning and instruction with mobile devices have become popular in the 21st century (Traxler, 2007). Having access to the learning materials in anytime and anywhere via mobile devices and ease of use are the strongest parts of the learning environments which are supported by mobile technologies. Learners also have a chance to make practice in any time by using mobile devices for educational purpose.

The purpose of this study is to review the literature in order to see the relationship between vocabulary annotation and reading comprehension. Moreover, the aim of this section is to review the literature to see the effects of annotation supported texts on reading comprehension in mobile reading environment.

This section includes ICT approaches and second language learning, ICT and Reading comprehension, annotation structure in reading passages, the relationship between vocabulary knowledge and reading comprehension, effects of annotation on reading comprehension, and, use of annotation and reading comprehension in mobile context and lastly theoretical base of this study.

2.2 ICT and Second Language Learning

CALL, which stands for Computer Assisted Language Learning, can support learners in various ways like advanced interaction modes, personalized instruction, effective feedback, and collaboration (Lee, 2000). Ashinida et al. (2004) states that CALL has an important effect on development of students' second language ability.

Gamper and Knapp (2002) divided the CALL studies into the categories. One of the main category is language and its sub components of translation machine. Because reading is the main activity while learning a language, and performing it needs to a translator or looking at the meanings word by word, A CALL system functions like a translation machine with the annotations or glosses (Davis & Lyman-Hager, 1997). Thus, CALL systems mostly functione like translation machines or they have features of translation.

Many technological tools have been developed for second language learning, especially for reading activities and vocabulary learning (Chiqito et al. 1997). There is the gloss concept while conducting the reading activity for better comprehension purpose. In addition, by means of whole process, there is the occurrence of incidental vocabulary learning.

Chapelle (2002) reported that in second language learning area, there is the popularity of technology usage. A number of studies were conducted about the relation of second language learning and technology. Even, Brett (1998) put forward the quality list of multimedia that aims to teach second language. Some of those qualities are the accessibility of the data and media, ability of different source media reach to the learner, interactivity between the different resources and providing different kind of data with variety of media.

2.3 ICT and Reading Comprehension

Reading handling is a complicated process and needs proficiency. But there are the media tools and technology which facilitate the reading practices (Liu, 2005). McNabb et al. (2002) ad McPherson (2005) said that digital tools brought reading activities in a fun format. They helped to raise the motivation, participant, fluency and comprehension of the students. McNabb et al. (2002) expressed the four factors that were organizing, comparing, contrasting and synthesizing while conducting the online reading and added that not only those factors were developed but also there were the occurrences of reaching the kind of digital tools and resources.

Dictionaries are important supports while conducting reading activities. AlSeghayer (2001) and Chun & Plass (1996) pointed out that instead of bulky using of printed dictionaries, there is the electronic texts and digital practical dictionaries by means of technology.

Technology provides the facilitative alternatives for reading practices like digital annotation tools that are not included in traditional printed texts. There is also the printed annotation but it is not beneficial in terms of usability. Therefore, there is the new technique named as annotation or gloss even different kind of modes like textual, audio, pictorial and video (Chun & Plass, 1996).

2.4 Annotation

Online annotations provide learners to practice their second language by interactive opportunities which increase motivation of the learners. Moreover, with online annotations, they also facilitate broad access to authentic information and rapid exchange of information (Wolfe, 2002; Wolfe & Neuwirth, 2001). Annotation or Gloss is an explanatory note which supports learners literally while reading the text (Wolfe, 2002). Sometimes, annotation is defined as synonym or brief definition (Nation, 2001). Glosses are placed in different parts of the texts. In traditional texts, glosses are

located at the end of the texts or they are placed in a box at the upper right corner of the page. Sometimes, difficult words in terms of meaning are put in the margin or at the bottom of the page. According to Roby (1999) all glosses should be located in a box at theleb lower right corner of the screen. Other researchers (Stark, 1990) stated that gloss should be embedded within the texts that provide users to see glossed word's in a context. Frenckner (1990) claimed that loss location and its presentation method influenced reading comprehension. Jacobs et. al. (1994) examined students' view about the presentation of vocabulary glosses' location in the text (in the margins, at the bottom of the page, or at the end of the text). As a result, glosses are often located in the right margin or at the bottom of the page. Students prefer to see glosses in the margin to access them easily. Another study which was conducted by Chun and Plass (1997) proposed that teachers and practitioners should take the negative effect of attention split between the location of the glosses and the reading text into consideration. Another study (Payne & Ross, 2005) concluded that especially for beginning and intermediate level learners, basic language processes like lexical access should be examined with caution while reading.

2.5 Vocabulary Knowledge and Reading Comprehension

Previous studies show that reading is the most important part of the English curriculum while learning it as a foreign language (Hsu, Hwang, & Chang, 2010). In order to understand a reading passage, firstly readers should grasp the meaning of the text and its content (Mokhtari & Reichard, 2002). To understand authentic texts, second language vocabulary knowledge should be satisfied as a primary factor. In a text, 95% to 99% of words should be recognized and decoded automatically to comprehend the reading passage (Laufer, 1997; Nation, 2001). Researches on second language reading indicated that there was a close relationship between vocabulary knowledge and reading comprehension (Stahl, 1990). In many researches, it has been consistently indicated that vocabulary knowledge impacts reading comprehension strongly more than other factors such as familiarity with the topic and

grammar knowledge. In the survey study of Anderson and Freebody (1981), vocabulary knowledge variable is more highly predictive than inferencing ability, ability of grasping the main idea and the structure of sentence variable (i.e., the grammatical complexity of a sentence). Increase in reading comprehension can sometimes be attributed to the improvement in vocabulary knowledge (Beck et al., 1982; Kameenui et al., 1982; & Stahl, 1983). Accordingly, Laufer (1991) found significant correlation between reading comprehension and vocabulary knowledge of second language learners. Coady et al. (1993) conducted two experiments about vocabulary knowledge and reading comprehension. He indicated that there was a positive correlation between proficiency in vocabulary and reading proficiency. Moreover, L2 learners confessed that limited vocabulary knowledge was the main barrier for them to comprehend authentic texts while reading (Yorio, 1971). Previous studies indicated that there were many variables correlated with reading comprehension proficiency such as context, character recognition and vocabulary (Singer & Crouse, 1981). Scholars found that vocabulary acquisition was dependent upon the degree to which the reader comprehends the text. Due to poor vocabulary knowledge, L2 learners supposed that reading activities in foreign language were very difficult and complex (Lin, 2002; Segler, Pain, & Sorace, 2002). Previous researches has shown that if there are too many unknown words in the reading passage, L2 learners process the text slowly and intensively. Thus, their reading activity turns into the study activity which may discourage them to read texts in foreign languages (Waring & Nation, 2004). This situation may result in losing the connection between the context and content while reading (Laufer & Hill, 2000). Furthermore, some studies have shown that it is difficult to grasp the literature and the context of the article with poor vocabulary knowledge (Laufer, 1997; Singer & Crouse, 1981). Anderson and Freebody (1981) state that vocabulary knowledge is the strongest predictor for reading comprehension. Nagy (1988) suggests that vocabulary teaching should be the crucial part of the language education because vocabulary knowledge is the fundamental factor to comprehend text. Taylor et al. (2009) also claim that explicit vocabulary support and vocabulary strategies enable learners to comprehend any text they encounter. Other

researchers propose that teaching vocabulary in context and that teaching discreet vocabulary items would not be of much benefit to learners. Vocabulary knowledge helps learners to comprehend reading texts. In order to grasp the meaning of the text, learners should be at sufficient vocabulary knowledge level. Researches indicated that there was a relation between vocabulary knowledge and reading comprehension level (Freebody, 1981; Laufer, 1997; Nation, 2001). Yorio (1971) stated that low level of vocabulary knowledge is an important barrier for learners to comprehend the reading passages. Reading activities in foreign language becomes more difficult and less fluent because of having poor vocabulary knowledge (Segler, Pain & Sorace, 2002).

2.6 Annotation and Reading Comprehension

Although vocabulary knowledge level is fundamental factor to comprehend the text, to deduce unknown words from the authentic text is the biggest challenge for L2 learners. Computer Assisted Language Learning (CALL) studies have examined the effects of immediate access to the meaning of the unknown words in reading passage via glosses (Chun, 2006; Plass & Jones, 2005; Van de Poel & Swanepoel, 2003). Schmitt (2000) stated that a noticing annotation contributes to learners' psychological readiness. More technically, "gloss is thought to provide fast and easy access to the meaning of unknown words and to compensate for insufficiently automatic lower- level processes and thus allows the reader to attend to higher level processes" (Chun, 2006, p. 70).

The results of the study which aims to reveal the effectiveness of electronic glosses on L2 reading activities are inconclusive. Leffa (1992) compared the effectiveness of electronic glossary and traditional dictionary support for beginner learners' comprehension level of the text. The results showed that learners who have electronic glossary support while reading did not only have significant success on grasping the text, but also they spent less time to read the text. Jacobs (1994) also found the positive effect of verbal annotation on reading comprehension. The annotation supported group remembered 30% more idea from text in second language. On the other

hand, Roby (1991) (as cited in Roby 1999) with regard to reading comprehension, there was no significant difference among the four experimental groups who used dictionary and glosses on paper and computer (paper dictionary, paper dictionary and glosses, computer dictionary, computer dictionary and glosses). Likewise, according to Davis and Lyman-Hager (1997)' study, there was no significant relationship between reading comprehension and immediate access to annotation while reading. However, Lomicka (1998) found that learners who had full glossing access (i.e., L1 translations, L2 definitions and pronunciations, images, references and questions) were better in reading comprehension than learners who had limited glossing access (i.e., L1 translation and L2 definitions) and no glossing situation. He also searched in what ways multimedia annotation support affected reading comprehension level. The results showed that full glossing enabled learners to comprehend. Furthermore, some studies showed that glosses affected learning limitedly in reading. For example, Slimmer (2002) conducted meta- analysis about students' achievement within different hypermedia and hypertexts in terms of their learning styles. The results indicated that technology-enhanced learning environment influenced achievement of the students. In addition, using glosses significantly supported reading comprehension of the students. However, the significance of the effect was not remarkable. On the other hand, treatment period influenced the significance of the findings that while the duration of the intervention increased, the significance of the effect increased.

The results of Sakar and Ercetin (2005)'s study indicated negative relationship between annotation use in reading and reading comprehension. This may stem from the interruption by annotations in the reading process (De Ridder, 2002). Ariew and Ercetin (2004) conducted a research on 84 intermediate and advanced adult ESL learners about electronic expository text. They provided learners two types of glosses which were lexical and topical information. Negative correlations between picture and video glosses and reading comprehension were found. However, there was no correlation between reading comprehension and other types of glosses.

Using annotations within the text provides learners to immediate access to the meaning of the unknown words. Electronic glossary systems improve comprehension of the texts and help L2 learners to spend less time while the reading the passages (Leffa, 1992). However, Robby (1991 in Roby 1999), Sakar and Ercetin (2005) and Lyman-Hager (1997) found no significant relationship between reading comprehension and annotation use while reading. Some learners may feel interrupted while using annotation in reading. It can be the reason of insignificant relationship between using gloss and reading comprehension. In addition, language proficiency of the learners can be a predictor for this result. Ko (2005) studied with 106 Korean undergraduate students about the effectiveness of annotations on reading comprehension. There were three groups in the study that students have English reading text with no gloss, L1 gloss and L2 gloss. According to the results of qualitative analysis, by the use of L1 gloss and L2 gloss, students' reading comprehension became more fluent and faster. However, the data from quantitative analysis showed that only L2 glosses had an impact on reading comprehension. But, Taylor (2006) stated that levels of the learners may be determinant for glossing effect on reading comprehension. In multimedia annotation learning environment, language proficiency level is one of the most important predictors (Ariew & Ercetin, 2004; Akbulut, 2007b). Students in higher level use more annotations (Hwang, Wang & Sharples, 2007). However, according to Chun's (2001) study, despite higher level students used less annotations than lower level students, there were no significant difference between them in reading comprehension.

2.7 Mobile Learning

The definition of the Mobile Learning can be made as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" (Traxler, 2005 reference). A mobile device is "any device that is small, autonomous and unobtrusive enough to accompany us in every moment" (Trifanova & Ronchetti, 2003, p.3).

In recent years, mobile technology and devices are used in informal learning environments and it supports mobility of the users while learning (Sharples, 2006). Thus, any portable and handheld devices such as tablets and mobile phones are used in mobile learning environments.

Due to its widespread use and practicality, mobile phones are the most popular and commonly used device in learning environments (Pęcherzewska & Knot, 2007; Tayebinik & Puteh, 2012). According to researches, mobile phones are like a catalyst in instruction (Roschelle, 2002). Mobile technologies empower ubiquitous learning (Squire, Jan, & Mathews, 2007) and expand the horizons in learning (Squire & Dikkers, 2012).

According to Kukukska-Hulme and Shield (2008), mobile learning occurs as independent from time and place by means of the mobile devices. Therefore, mobile learning is fed by any portable devices, tablets and mobile smart phones. Recently, the focus of mobile learning is the out of classroom times and its learner's mobility (Sharples, 2006). In addition to that, for language learning skill development, there is a huge demand because mobile devices are the tools that are effective and make increase motivation (Rosell-Aguilar, 2007; Huang & Lin, 2002).

There is a study for language learning in mobile environment named as MALL which stands for Mobile Assistant Language Learning. Empirical studies show that MALL affects the second language vocabulary learning positively (Ogata, Yin, El-Bishouty, & ano, 2010) as it enables learner to learner collaboration, an increase in communication and interaction as well as motivation (Cooney & Keogh, 2007).

Chen and Hsu (2008) developed personalized intelligent mobile learning system (PIMS) to provide mobile learning for EFL college students. They can read news which is

recommended by the system according to their reading ability. The system supports learners in terms of unfamiliar vocabulary knowledge. Students can review the words they have learnt. Results showed that via PIMS, students' vocabulary knowledge was improved.

Mobile dictionary apps are the most popular used ones by the language learners. Interactive tools and broad range of rich content features make mobile dictionaries better choice instead of traditional printed one (Joseph & Uther, 2009). In addition, mobile dictionaries have the features that bring the word by searching it in a practical and useful way and enable to gather visual and audio search results by easily interacting while searching (Joseph & Uther, 2009). Also, there was a study that compared the paperback dictionaries and mobile ones in language learning context and the results showed that learners who used mobile dictionary made their language level increased than other learners who used traditional paperback ones (Rahmi & Miri, 20014). Mobile advantage cannot be evaluated with just mobile dictionaries but in terms of the other mobile language learning apps's functionalities. According to Steel (2012), language learning mobile apps can be downloaded from online application stores and can be used in appropriate times in action as place independent. Because time is limited in class hour, those language learning apps can be used outside classroom. Moreover, because of the language learning nature, out of classroom activities – informal practices – are great opportunities (Kukulska-Hulme, 2012). As a result, as mobile learning has its unique facilities like portability, lightness, wireless functioning and cheap costs, it provides important possibilities to teachers and students (Chinnery, 2016).

For their study, Chang and Hsu (2011) developed CALL system as Personal Data Assistant (PDA) for EFL college students to examine reading comprehension. Learners use mobile device for the purpose of translation and annotations to support their reading comprehension of the material. The results of the study revealed the usefulness and ease of use of the vocabulary support system perceived by EFL college students. While, usefulness of mobile language learning systems was found more practical for passive

learners, the ease of use of such systems was more important for passive learners (Huang, Huang, & Lin, 2012). In another study conducted by Chen and Hsu (2008), personalized intelligent mobile learning system was implemented for English language learners as college students. There was the reading news presented according to the learner's level in a personalized way according to the learner logs. At the end, students were satisfied with the mobile learning system in terms of reading comprehension and unfamiliar word acquisition. Mobile environments and collaboration was also observed by the researchers. For example, Chang and Hsu (2011) conducted a research that learners annotated to the unknown word and inferred from text in mobile reading environment. So collaboratively, learners annotated the words and they could see each other's annotations. There were the control and treatment groups in the study, then after the treatment, the results showed that group with three members can efficiently comprehend the text collaboratively.

2.8 Theoretical Base

While performing the reading activity with a secondary language, if confronted with an unfamiliar word on the text, there is a need to leave the text and look at the dictionary to find the meaning of the word. Therefore, this process requires applying two distinct source and lose of attention, which is the subject of Cognitive Load Theory occurs (Chandler & Sweller, 1991, 1992; Sweller & Chandler, 1991, 1994; Sweller et al., 1990; Tarmizi & Sweller, 1988; Mousavi et al., 1995).

To eliminate the problem of attention shifting and lose associated with cognitive load theory, there is a technique which is about physically integration of the disparate sources of information (e.g., Chandler & Sweller, 1991, 1992; Sweller & Chandler, 1994; Sweller et al., 1990; Ward & Sweller, 1990). That is, explanatory notes or verbal annotation can be located within a text and also near the unfamiliar word so that the learner has direct access to the meaning.

In addition to that, there should be looked at the second language reading theories. There are three approaches; bottom-up, top-down and interactive models. Grabe and Stoller (2002) define bottom-up approaches that the reader creates piece by piece or word by word translation of the information in the reading with minimum contribution of prerequisite information. Simply, the reading activity is the decoding process. Different from bottom-up approach models, top-down approach models do not need detailed translation of the text; rather, the readers need to handle the enough text to make guesses with the contribution of prior knowledge and clues (Goodman, 1968). And lastly, there is the interactive approaches model. In fact, interactive approaches model includes bottom-up and top-down approaches (Carrell, 1988; Eskey 1988). The reader translates the text piece by piece and also uses his/her prior knowledge about the reading (Grabe, 1988).

There are three models and all models include the text processing. Therefore, it is important to note that second language proficiency, reader's background knowledge and reader's difficulty level which are the components of the text processing are important for successful comprehension of the text (Denine1988; Clarke1988). Due to the nature of the reading activity, annotation support has the facilitative effect to process the text by means of simplifying a text, providing the meaning and increasing the flow of the reading (Luppescu & Day, 1993; Watanabe, 1997; Nation, 1990).

Another important point in second language reading is schema theory. Schemata may be expressed as background knowledge (Urquhart & Weir, 1998). The theory suggests that readers gain the view of the text generating meaning with the existing knowledge (Carrell and Eisterhod, 1988). According to Carrel (1988), there is the activation process in which the background or schematic knowledge is used. Actually, the reader's schema is activated and the first step of comprehension is completed and then relation of being read is performed. Jonassen (1985) mentioned the term of medium in his model that one's own knowledge may be activated by a triggering medium. This medium helps to

relate schema to the text being read. To develop an own medium is about the ability to use a reading strategy and the approaches.

2.9 Conclusion/ Summary

This chapter investigated the theoretical situations related to annotation and reading comprehension in mobile environment. Previous studies suggested that annotation was useful in mobile environment to comprehend the text for second language learners. Most of the studies on effectiveness of annotation in reading environment for second language learners revealed that verbal annotation had a positive effect on grasping text. However, some studies conducted in desktop based computer environment found that there was no significant difference between annotation support and reading comprehension. Also, the results were affected by the type of annotation like verbal, visual, audial or video.

The review of second language reading suggested that while performing the reading activity, it was important to have reading strategy by using the approaches model like top-down, bottom-up or interactive model. In that point, because interactive approach model is text and reader based, it is suggested to use the models included in the interactive approach. In a holistic view, selecting a reading strategy by applying an approach model involves providing detailed analysis on the text to the reader while reading. Annotation support facilitates this text processing. Thus, it is important to note that reading comprehension is about the background knowledge. Reader's own schemas should work to relate background knowledge to what was being read. And there is the medium that makes connect schema and the reading matter. In that point, annotation support played the role of this triggering medium. Annotation not only provides the triggering effect to comprehend the text, it also eliminates the cognitive load by servicing meaning of the word by means of physically integration to the reading.

In conclusion, in order to understand the effect of annotation to reading comprehension, conducting new studies are necessary by framing some factors

like environment as mobile platform and annotation type like verbal one. This study intends to respond these questions. The next chapter discusses the methodology of the present study.

CHAPTER 3

METHODOLOGY

The current study designed to investigate the effects of text annotation on second language learners' reading comprehension. In this methodology chapter, the necessary information was provided related to the type of the research and research design adopted in the study, sampling method, measurement instrument, data collection procedures and data analysis methods. The following was the detailed presentation of each section mentioned above.

3.1 Research Design

This study employed embedded design, which is one of the mixed method research designs that permits the collection of both quantitative and qualitative data (Creswell & Clark, 2007). Specifically, two research methodologies, namely quantitative and qualitative, made contributions to the design of the study. As part of quantitative approach, this study used non-repeated measures design, taking reading comprehension score as independent variable. Non-repeated measures design, also called within subject design, is considered to be a convenient and effective method to measure the difference between pre-test and post-test reading comprehension scores which were collected from the same group of participants (Field, 2009).

In the research design model of this study, as clearly showed in figure 1, the qualitative data were embedded within the experimental design to allow researcher to interpret the results considering both qualitative and quantitative data. Even if the interpretation of both data types helped to come up with the research findings, the quantitative part of the study, on which the main emphasis was given, was subservient to the qualitative part.

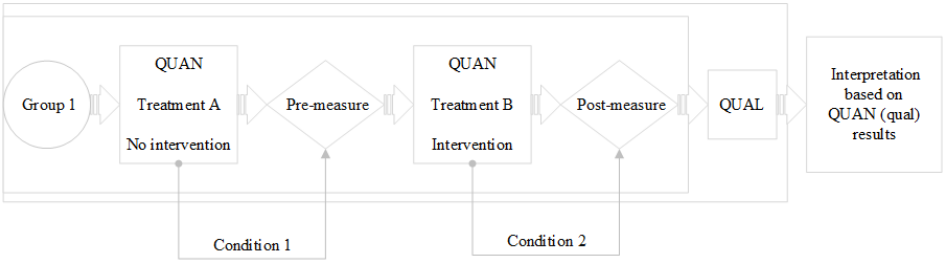

Figure 3.1 Schematic representation of research design model used in the study

As represented in figure 3.1, one group of subjects or participants participated to both condition 1 and condition 2. In condition 1, the subjects get Treatment A in which no intervention was given. However, in condition 2, the same subjects get Treatment B in which intervention was given. The difference between the scores measured in condition 1 and condition 1 was examined to find out the effects caused by intervention on the scores. Additionally, two conditions were compared through interviewing.

Consequently, using the embedded mixed methods research design, this study attempted to address the following research questions:

- Does annotation supported reading environment lead to higher student reading comprehension in mobile learning context?
- What are students' opinions towards annotation-based reading?

3.2 Sampling

The participants of this study consisted of 40 L2 learners from a private language school in Ankara, Turkey. All of the participants, whose age ranged from 20 to 27, had intermediate level in English proficiency. In addition to that, they all studied and graduated from a university where the medium of instruction is Turkish. In terms of gender, the number of female and male participants was 28 and 12 respectively.

A purposive sampling method was used to identify participants and recruit them (Fraenkel, Wallen, & Hyun, 2012). This sampling method allows researcher to use their judgement as to the sample to be included in the study. Criteria for selecting the subjects were as follows:

- Those who got the score between 50 and 60 out of 100 from foreign language exam (acronymed YDS in Turkish).
- Those who did not previously take Test of English as a Foreign Language Internet-based Test (TOEFL).
- Those who could comfortably use mobile devices with either android or IOS operation system.

Among the students who were purposively chosen and participated to the study, 16 of them indicated their willingness in participating to the interviewing. As it could be understood from the previous sentence, the gathering of participants for the semi-structured interviews was accomplished through a convenience sampling method. Despite the likelihood of producing a biased sample, convenience sampling is advantageous if a certain group of people who are available is to be selected (Fraenkel et al., 2012).

3.3 Measurement Instrument

The measurement instruments used in the study included reading texts and semi-structured interview protocol. As indicated in figure 3.2, paper-based and mobile-based reading text were the two instruments applied in the study's experimental design part. While the reading text 1 was carried out in paper-based form, the reading text 2 was administered in mobile-based form. Two reading texts, each was accompanied by seven multiple choice questions that measure learner's reading comprehension, were directly taken from the previously conducted TOEFL tests. Despite being different from each other in terms of the content, the same or very similar language level was strived to keep for both reading texts.

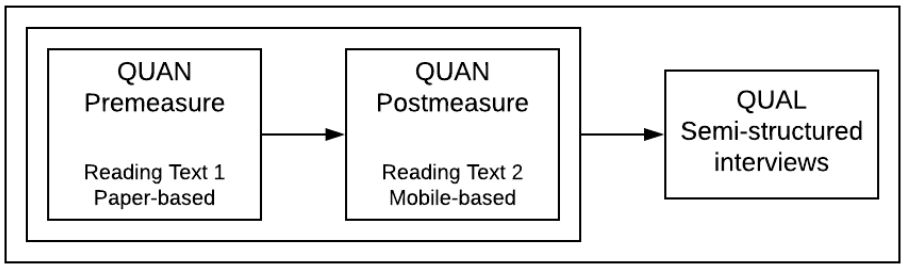

Figure 3.2 The types of the instruments used in different part of the study

Since the study's purpose was to reveal the effects of mobile application-assisted annotation on L2 learners' reading comprehension, while selecting a sample of reading text from TOEFL a great deal of consideration was given to the balance between the level of language used in both reading texts. Because, unbalanced reading texts in terms of language level are doomed to produce biased results and thus undermine the validity of the study. Therefore, the language of both reading texts was compared and reviewed by two Turkish-English bilingual university instructors independently to ensure and determine that they had the same language level. The researcher applied only the reading texts that were approved by both instructors to present the same language difficulty.

The reading text that was applied with paper-based form has the title of “Green Icebergs” (Appendix A). It consists of seven paragraphs with 666 words. On the other hand, the reading text that was applied with mobile-based form has the title of “Meteorite Impact and Dinosaur Extinction” (Appendix B). It consists of seven paragraphs with 687 words.

As to the instrument in qualitative part of the study, a semi-structured interview protocol was applied (Appendix C). The questions in interview protocol were prepared and designed in collaboration with a university instructor who have lots of experiences in writing interview questions and conducting mixed methods research. Interview protocol composed of seven questions. The first three questions were designed to take demographic information from interviewees whereas the remaining four questions were designed to elicit their experiences and opinions. In order to make sure that the questions in interview form were clear and understandable, a pilot study was conducted with three undergraduate students whose English language proficiency was roughly the same as with the participants of the study.

3.4 Data Collection Process and Procedures

The data collection process and procedures were initiated after the necessary permissins were obtained from Middle East Technical University (METU) Ethics Committee (Appendix E). As it could be seen in figure 3.3 below, data collection process started with the collection of participants reading comprehension scores on reading text 1, continued with the collection of the same participants reading comprehension scores on reading text 2, and ended with the collection of qualitative data. Detailed information about each data collection phase were provided below.

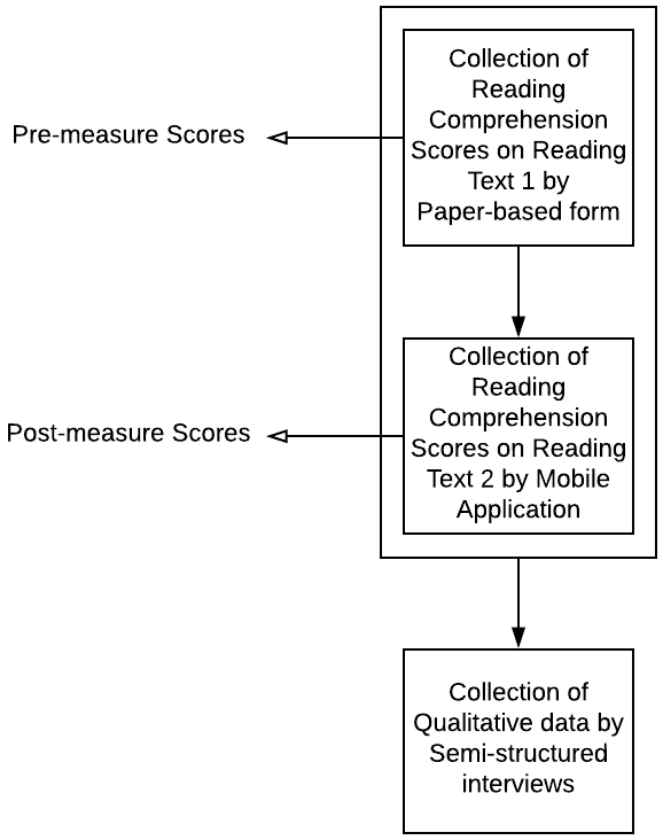

Figure 3.3 Data collection process followed in the study

Besides, Table 3.1 below presented the information about the type of instrument, data and participant along with the number of participants and duration it took to complete the study tasks.

Table 3.1 The characteristics of instruments, data type and participants involved in the study

Data collection instrument	Data type	Participant type	Number of participants	Duration (minutes)
Reading text 1 with seven multiple choice questions	Quantitative	L2 learners	40	20
Reading text 2 with seven multiple choice questions	Quantitative	L2 learners	40	20
Semi-structured interview	Qualitative	L2 learners	16	5 - 10

3.5 Reading Comprehension

Participants' pre-measure and post-measure reading comprehension scores were measured on reading text 1 and reading text 2 respectively. While the first reading text (Treatment A) was applied in traditional paper-based form, the second reading text (Treatment B) was applied through a mobile application where participants could benefit from the support of annotation. Both treatment A and treatment B were administered to the same group of 40 L2 learners in a language classroom on July 27, 2016. The duration it took to complete reading text 1 and reading text 2 as well as answering related questions ranged from 5 to 10 minutes (see Table 3.1). More detailed information about how annotation technique was worked and afforded by mobile application was presented after the section of data collection process.

In the first process of collecting pre-measure scores, a document containing the reading text 1 with a list of seven multiple choice questions was given to the participants. The researcher informed participants about the implementation of the reading texts and reading comprehension tests in advance. Participants were asked to firstly read the text and then answer the corresponding questions. Multiple choice questions served to measure participant reading comprehension. Participants were informed to answer all questions as much as possible and put a mark only next to one

item instead of more than one item on a multiple choice list. Based on their response, they had either correct or wrong answer. The correct answer was denoted by one (1), the wrong answer was represented by zero (0). The completion of first reading comprehension text in traditional paper pencil format was followed by second reading comprehension text in mobile application-assisted annotation or translation. Accordingly, in the second process of collecting post-measure scores, the same process as with the preceding one was followed, except that instead of reading text on the paper, participants read the text on a mobile application that was specifically designed to allow participants to check out the meaning of the words they did not know by just clicking on them.

There were 40 L2 learners and all of them had a mobile device with internet connection. The mobile application developed to assist subjects with annotation was installed on every mobile device. Before the treatment the participants were informed and instructed about the mobile application-assisted annotation by providing a show regarding how to access a reading and open annotation panel.

3.6 Interviewing

Semi-structured interviews were conducted with sixteen candidate participants in order to provide answers to the research questions specified in the study. While carrying out interviews, the researcher of this study benefited from the interview guiding steps suggested by Creswell (2012). Following this steps, the researcher performed all interviews and the duration of each interview was approximately between five and ten minutes (see Table 3.1).

Interviews with the participants were carried out immediate after their engagement in experiencing annotation supported reading text on the mobile application. The interview questions were accompanied by some probing questions such as “What were the contributions of mobile annotation support?”, “Why was it effective?” and “What were the feelings about that?”. The reason to use probing questions soon after the intervention finished was to gain more insight into the interviewee’s experiences

while they were still fresh and clear. Furthermore, the interview environment was so appropriate and fully comfortable that the interviewee could freely express their experiences and opinions. In addition to that, the researcher developed empathy with the interviewee to get more honest and trustworthy responses to the questions.

3.7 The Mobile Application-Assisted Annotation for Supporting Reading

An interactive mobile application was designed and developed by the researcher to investigate how intermediate L2 learners' reading comprehension was changed when they switched from paper-based reading text to mobile application-based reading text.

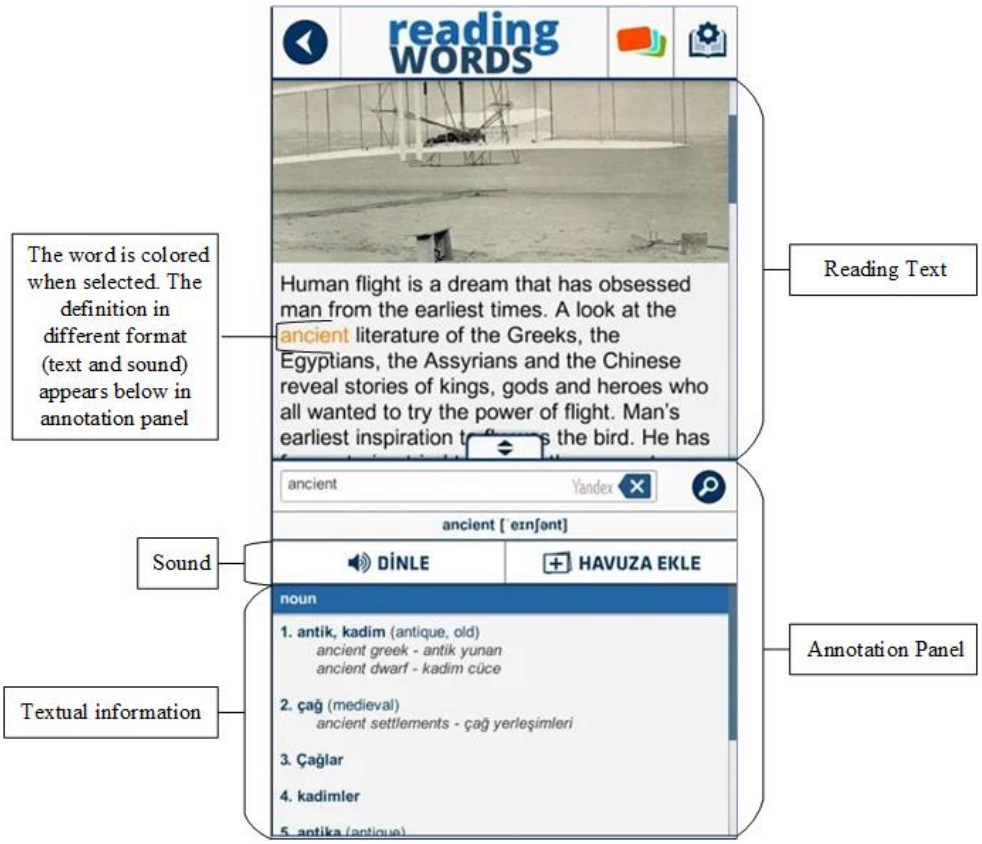

Figure 3.4 A screen shot showing the layout of developed mobile application

The program basically provides students with annotation by touching the unknown words on mobile application. The annotation screen shows up at the bottom of the device screen by sliding or swiping. Figure 3.4 shows the layout of developed mobile

application. As it could be seen in the figure, the program works as follow: When clicking on a word in the text on the screen of mobile application, the word is colored and the edge of annotation panel appears at the bottom of mobile device screen. In order to see full annotation panel, a slight slide or swiping needs to be made with hand over the appeared edge of annotation panel. The definition of the selected word is presented in different format like text and sound.

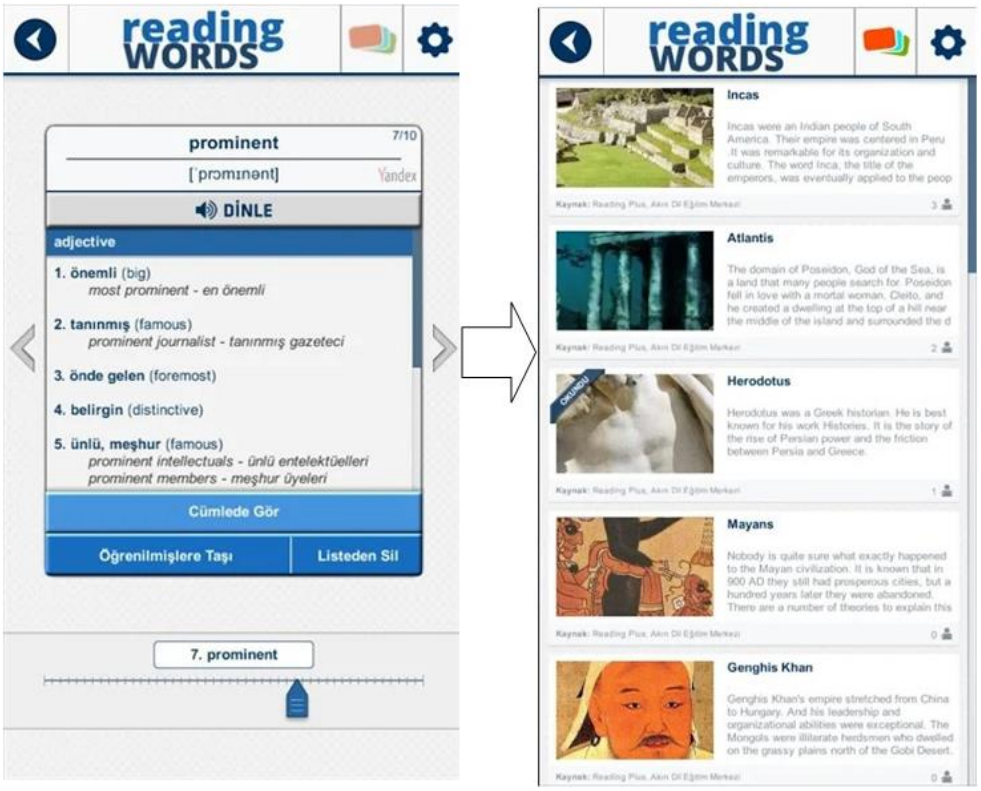

Figure 3.5 A sample screen showing how use of a word is presented in different context

The program does not only present Turkish translation of the unknown English word but also bring sample texts from a wide range of sources (e.g. newspapers, and academic) in which the is presented along with how it is used (see Figure 3.5). For example, if the unknown English word have multiple meaning, the program shows all of the word meanings at the same annotation panel with Turkish translation along with the sample texts.

The mobile application was written in Unity engine and C# was chosen as programming language. The content displayed in sliding annotation panel is

requested from Yandex Dictionary. However, Yandex Dictionary cannot bring the word with apostrophe. Therefore, plural words cannot be presented with its meanings when requested. Yet, there is an input field on the annotation panel to edit the unknown word by hand so the participants will be able to delete the apostrophe character and request the meaning of the word from Yandex again.

3.8 Data Analysis Techniques and Procedures

This study was conducted in two phases: qualitative and quantitative. In quantitative phase, one group of participants was exposed successively to two conditions: condition 1 and condition 2. Participants' reading comprehension scores were collected on two different conditions through multiple choice questions. The reading comprehension scores in both conditions were compared and analyzed using IBM Statistics software version 24. Paired-sample t-test was used to examine the difference between the responses of participants at two different occasions. Since there was one group of subjects and the collection of data under two different conditions, paired-sample t-test was considered to be a suitable statistical technique to explore the impact of intervention on participants' reading comprehension scores (Pallant, 2010).

While entering data into the analysis, the reading comprehension scores (pre-measure and post-measure) was treated as dependent variable, the conditions (condition 1 and condition 2) were taken as one categorical independent variable. Before running the analysis, the basic assumptions for t-test was checked. According to Pallant (2010), in paired-sample t-test, a normal distribution is required for the difference between the two scores measured on two different occasions. Moreover, previous authors suggest that the data is considered to have normal distribution when the value of skewness and kurtosis is in the range of +3.00 to -3.00 (Hair, Anderson, Tatham, & Black, 1998).

In order to check the assumptions related to the paired-sample t-test, preliminary data analyses were conducted. In this regard, the data were inspected in terms of missing

data, outliers, and normality. The analyses results indicated that the score of difference between post-measure and pre-measure had the value of .08 and -.19 for skewness and kurtosis respectively, meaning that the data the score difference was normally distributed. Furthermore, histogram and boxplot of the scores were used to detect outliers. No outliers were identified when both charts were examined. In addition to that, analysis result showed that there was no missing cell in the dataset.

As for qualitative data analysis, all transcripts of the data collected by interviews were analyzed in accordance with the coding techniques provided by Creswell (2012). Qualitative data analysis software Nvivo 10 was used to analyze the data. The qualitative data analysis started with inspecting the transcript of the first participant in terms of themes, concepts, dimensions and properties. After completing to inspect the first transcript, the transcript of the second participant was analyzed using the coding scheme developed during the inspection of first transcript. The data analysis proceeded like this until the last participant transcript was analyzed. During the detailed analysis, the data were condensed into themes and sub-themes.

In order to ensure validity and reliability of qualitative data, some strategies were followed. First of all, two experts reviewed interview questions with respect to grammatical structure and what they were measuring. Based on the feedback from the experts some questions were deleted, some of them were changed and some words added to some questions. Secondly, a pilot study was conducted with three students in advance to make sure that interview questions were clear and understandable. Finally, the codes emerged from qualitative data analysis were cross-checked. In addition to the researcher, one intercoder independently analyzed each student's interview transcript. The coding process was finalized after the interrater agreement or a consensus was established on codes between researcher and the other intercoder.

CHAPTER 4

RESULTS

This chapter of the study dedicated to the report of qualitative and quantitate data analysis results. First of all, the results of statistical data analysis techniques were reported, together with the statistical tables and figures. After that, the results of qualitative data analysis were delineated. While presenting qualitative findings, the relevant quotes drawn from the transcript data were provided both in Turkish and English

4.1 Quantitative Findings

4.1.1 Distribution of Responses in Condition 1 and Condition 2

Table 4.1 below showed descriptive statistics related to the number of correct and incorrect answer given to the multiple choice questions. In condition 1, where the paper-based reading was applied, the number of participants who correctly answered the second question was quite higher than of those who gave correct answer to the other questions. When it comes to the wrong answer, it was seen in the table that majority of participants gave wrong answer to the forth question followed by third question. On the other hand, in condition 2, where annotation supported reading through mobile application was applied, more than half of the participants correctly answered the seventh question, which was followed by sixth question. As for wrong answer given to the questions, a large cohort of participants answered fourth question wrongly.

Table 4.1 Distribution of correct and wrong responses in terms of participant number in condition 1 and condition 2

	Q1		Q2		Q3		Q4		Q5		Q6		Q7	
Status	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Condition 1														
Correct	14	35	28	70	10	25	7	17.5	11	27.5	11	27.5	16	40
Wrong	26	65	12	30	30	75	33	82.5	29	72.5	29	72.5	24	60
Condition 2														
Correct	15	37.5	14	35	16	40	10	25	13	32.5	19	47.5	21	52.5
Wrong	25	62.5	26	65	24	60	30	75	27	67.5	21	52.5	19	47.5

4.1.2 The effects of mobile application-assisted annotation environment on L2 learners' reading comprehension

Paired samples t-test statistical method was conducted to investigate whether L2 learners' reading comprehension scores in condition 2, where they used annotation supported reading on a mobile application, were significantly better than that in condition 1, where they used traditional paper-based reading. There was no statistically significant difference in reading comprehension scores in condition 2 (M = 2.70, SD = 0.91) to condition 1 (M = 2.38, SD = 0.99), (t (39) = -1.80, p > 0.05, Cohen's d = 0.08). The mean decrease in reading comprehension scores 1.14 with a 95% confidence interval ranging from -.69 to 0.04.

Based on the results provided, it could be concluded that supporting L2 learners' reading with annotation on mobile application instead of giving them reading on paper may not be likely to create a significant impact on their reading comprehension skills.

4.2 Qualitative Results

In this section, qualitative data analysis results, which were organized by the coding scheme, were provided. These findings described the participants' opinions, thoughts and experiences towards mobile application-assisted annotation-based annotation reading. The presentation of the findings was organized in accordance with the emerging themes and related concepts. This section was divided into four subsections. First, the results of how participants utilized annotation supporting mobile application were reported. Second, the results of how participants benefitted from using mobile application for translation were presented. Third, the new features participants wanted to see in mobile-assisted annonation enviroenment were delineated. Finally, a summary of qualitative results was provided.

4.2.1 Utilization of Annotation Supporting Mobile Application

The engagement of participants in making use of annotation supporting mobile application was sought in terms of the number of times they attempted to use the application while reading the text. The remarks expressed by participants showed that the frequency of using annotation panel varied among them. To be more clear, participants were asked to answer the question which was "How many times they used annotation panel?". Analysis of responses given to the question showed that the number of times to use annotation panel by each participant was in the range of 20 to 25, 5 to 10, 10 to 15, and 1 to 5. This variation could be due to their level of reading comprehension skills and understanding in English language. Because, it is more likely that the more proficiency they have in English language, the less attempts they would have for the annotation panel in order to look at the meaning of the words.

4.2.2 The benefits or advantages of using annotation supporting Mobile Application

A number of benefits was expressed about using Mobile Application-assisted annotation module. All of the participants who were interviewed found the

annotation panel quite useful. The other benefits that were expressed by participants reported below.

One of the advantages using annotating panel was related to the understanding in meaning of the words. The comments below illustrated that Mobile Application was helpful for participants to understand the meaning of the sentence.

> "It was helpful in understanding the sentence that you were reading"
>
> "We can reveal the meaning of the sentence that include the words we do not know"

The other benefit stated by participants was its practical use. The participants commented below that the reason the annotation supporting Mobile Application was helpful is because it is practical to use it.

> "Annotation panel had contributions, just because it was practical…"
>
> "Annotation panel helpful because of being practical"
>
> In addition, one of the participant, as clearly indicated in the following quote, mentioned that the annotation panel was helpful while reading the piece of text because it showed the other meanings of the word.
>
> "Indeed it was useful because it showed the other meanings of the words"

One participant different from the others emphasized derivatives of the words. Derivative of a word refers to a word that has been produced from another word. Knowing the derivatives of the words via annotation panel helped participant to better understand the reading text.

> "I also found it beneficial for giving the meanings of the new words derived from the original one."

The other emerged concept was about the benefit of annotation panel in translating the sentences. As expressed by one participant in following quote, the meanings of unknown words brought by annotation panel to the participant helped him figure out the meaning of the whole sentence.

> "The Annotation panel is helpful in telling the meaning of the words I did not know at the point of translating sentences."

Similar to the previous participant's remark, it was also pointed out how bringing the meaning of key words in a sentence helped to solve what was being told in the sentence. One participant expressed that annotation panel gave the meaning of the words that played a key role in understanding the sentence.

> "There are some words in a sentence which could be enough to understand what you are reading when you know only the meanings of that words. Annotation panel was beneficial in that respect because of proving the meanings of such key words."

Participants found the annotation supporting mobile application useful in terms of minimizing the time spent on reading the text and keeping the unity of the sentence. The following excerpt was obtained from one of the participant who expressed that annotation panel keep you away from spending much time on reading and help you drop your attention on the sentence.

> "If I had a dictionary and looked at the meaning of the unknown words used in the phrase, I would have missed the meaning of the paragraph until I found the meaning of that phrase."

Another participant mentioned that even though you do not know the sentence structures, knowing the meaning of the words, which was ensured with the help of annotation panel, facilitated the process of understanding the sentence.

> "it was useful. Despite not knowing grammatical structures, knowing the meaning of the word can make understanding of the sentence easier and by this way we can understand the paragraph completely."

4.2.3 The new features that could contribute to the understanding of what is being read

A number of new features participants expressed to be useful and have great contributions on their understandings of reading if added to the annotation supporting mobile application. One of those features was related to feedback. As seen in the

following quote, it would be better for participants to understand the sentence if the feedback is given on sentence structures and phrases.

> "Not only words but also sentence structures and phrases that could facilitate in understand the sentence can be presented as additional feedback."

It was also suggested that together with the meaning of a word, a feature showing both synonyms and antonyms for that word should be added to the application.

> "While presenting the meaning of a word, a synonym for that word… should also be presented"
>
> "It could be antonyms"

Two participant highlighted the demonstration of how words are used in various sentences. According to participants, in addition the existing sentence in which the word is used, different sentences showing different usage of the same word should be presented.

> "while presenting the meaning of a word and a structure that support the use of same word in a different sentence should be presented."
>
> "It would be nice to give another exemplary sentence which belongs to that word."

Besides, one participant suggested that it would be better if connotation of the worlds is provided along with the word meaning.

One participant complained that the annotation supporting mobile application did work when you wanted to check the meaning of some words especially the plural one with (-s) suffix. They also added that this feature should be added.

> "The application could not present the meaning of some words. It should have been. The application could not give the meaning of words with prefix or suffix, for instance words with –s"

One of the other feature wanted by participants to be included to the application was related to the selection and translation of more than one word. One participant wanted program to be capable of allowing user to select phrase or more than one word at the same time and also showing the translation of that words being selected.

> "In somehow the program should present the meaning of the word-phrases by giving the opportunity of selecting two words"

It was also expressed that the textual description explaining the meaning of the word should be accompanied by visual aids.

> "not only the meaning of the word but also a picture relevant to that could be presented."

One participant, as seen in the following quote, suggested that in addition to the features already present in mobile application, a feature that brings the description or meaning of transitional words and phrases should be added to the mobile application.

> "it would be nice to someway show transitional words like not only but also…"

4.3 Summary of the Qualitative Results

The following was a summary of the qualitative results. In this section of the summary, the main points drawn from analysis of qualitative data were presented.

The benefits or advantages of using annotation supporting Mobile Application

- understanding the meaning of a sentence
- showing the other meanings of the words
- showing the meanings of new words derived from the original one
- being practical
- being useful
- giving the meaning of unknown words in the point of translating the sentence
- providing the meaning of the words that play a key role in understanding the sentence
- being time efficiency or saving
- assisting in keeping the unity of the paragraphs
- knowing the meaning of the words through panel makes understanding the sentence easier
- being helpful as a supplementary resource independent of time and place

The new features that need to be added to contribute to the understanding of what is being read

- proving feedback on sentence structures and phrases
- giving synonyms for the words
- giving antonyms for the words
- providing how the same word is used in a different sentence
- presenting connotations of the words
- proving transitional words and phrases
- provide the meaning of plural words or word with (-s) suffix
- allowing to select two words at the same time
- getting the meaning of the phrases
- Accompanying a relevant picture to the meaning of the word

CHAPTER 5

DISCUSSION AND CONCLUSION

1.9 The Effects of Mobile-Assisted Annotation on Reading Comprehension

This study investigated the effects of mobile application-assisted annotation on second language (L2) learners' reading comprehension. As part of this study, a mobile application was designed and developed to assist L2 learners with annotation so as to facilitate their reading comprehension. Using embedded design principles, this study employed a mix of qualitative and quantitative approaches. Adoption of non-repeated measures design allowed to compare a group of leaners' reading comprehension scores measured at two different conditions or times. In one of the condition L2 learners were exposed to a traditional reading approach where they engaged in reading an English text on paper; however, in the other condition the same L2 learners were exposed to a mobile application-assisted annotation environment where they interacted with an English reading text on mobile device screen using annotation panel for the words they did not know the meaning. Examination of the difference between L2 learners' reading comprehension scores was followed by inquiring their opinions and thoughts regarding the effectiveness of mobile application-assisted annotation system.

The experimental results showed that a mobile-assisted translation annotation module did not result in a significant improvement or enhancement on L2 learners' reading comprehension, implying that intervening with intermediate level adult English as a second language (ESL) learners' reading comprehension through mobile-based annotation and translation may not end up with a productive result. This finding is consistent with that of Ariew and Ercetin (2004) who reported no

relationship between L2 learners' multimedia annotation use and their reading comprehension. This finding is also supported by Sakar and Ercetin (2005) who found that the use of multimedia annotations was negatively associated with reading comprehension. On the other hand, there are some studies in literature whose findings do not match those observed in the quantitative part of this study. For instance, in his study, Lin (2014) examined the effects of a mobile-assisted extensive reading program on L2 adolescent learners' reading comprehension, comparing mobile tablet PCs to desktop PCs. The study results indicated that the mobile group had higher reading performance than the PC group. Even if the effect was found to be non-significant and the result was corroborated by previous studies, it might better to be cautious about making generalizations to other participants and settings. Because, unanticipated factors or factors playing a major role in the study might not be considered in advance of the study and thus could have had an enormous influence on the study results. Therefore, further replications are suggested to come up with more strong evidence that either support or refute the study result.

Besides, there are some experimental studies whose findings do not accord with the experimental finding of this study. For instance, in a study conducted by Leffa (1992), the effectiveness of an electronic glossary on a group of beginning students' reading comprehension was investigated using a computer-mediated electronic glossary instead of mobile application. Students with the electronic glossary outperformed than those with the traditional dictionary. Based on both supportive and opposite findings it is suggested that adding mobile application for assisting L2 learners' reading comprehension through annotation might not be a good strategy to help L2 learners enhance their reading comprehension competency.

Even though the analysis of the data from quantitative part of the study did not end up with a significant effect of the mobile-assisted translation use on reading comprehension, the data coming from interviews in qualitative part of the study revealed that leaners found and perceived the mobile-assisted translation annotation module quite beneficial and useful, especially for helping them learn the meanings of the words they did not know and in turn figuring out what was being told in the

whole sentence. These qualitative results are in agreement with those obtained by Ariew and Ercetin (2004), Sakar and Ercetin (2005) and Chang and Hsu (2011). As for further improvements or features suggested to be included in mobile application, similar to the finding by Sakar and Ercetin (2005), participants of this study in the interviews preferred see different types of annotations like a relevant picture attached to the meaning of the word. Furthermore, according to the participants' expressions, a mobile application that is devised for the purpose of providing annotation or translation support should be capable of giving synonym, antonym and connotation of the words inspected, proving transitional words and phrases, allowing to select two words at the same time, providing how the same word is used in a different sentence and proving feedback on sentence structures and phrases.

1.10 Implications and Suggestions for Further Research

This study has several implications for English teachers, L2 learners, and mobile content developers. The findings from this study could be helpful for teachers while designing their teaching and instructional materials for L2 leaners. Furthermore, if a mobile application environment is to be developed to raise l2 learners reading comprehension skills, these findings, especially in qualitative part, might provide leading clues and keys regarding design of the environment and the features that should be available in the mobile application.

The developed mobile application used Yandex Dictionary to bring the meanings of the words to the users. However, if the word selected had apostrophe or some kind of affixes, Yandex Dictionary did not permit the mobile application to bring the meaning of that word to the annotation panel. For that reason, in further studies it is suggested to use a dictionary API in mobile application which can provide each vocabulary with its all context by touching on it. In addition to that, the time interval between two successive conditions (condition 1 and condition 2) was short and participants were exposed to merely one reading text in each condition. It is suggested in further studies to take the time interval longer and give more than one reading text to the subjects so that solid evidence could be achieved. Furthermore, this study used one type of annotation, meaning that only textual information was

given to describe the meaning of the words. Therefore, further studies should investigate the effects of different kinds of annotations (i.e., graphics and/or videos) on L2 learners reading comprehension in the context of mobile environment. Moreover, a study can be carried out to compare desktop platform and mobile platform in terms of their effects on reading comprehension and vocabulary learning.

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APENDIX A

READING TEXT 1: GREEN ICEBERGS

(Par. 1) Icebergs are massive blocks of ice, irregular in shape; they float with only about 12 percent of their mass above the sea surface. They are formed by glaciers – large rivers of ice that begin inland in the snows of Greenland, Antarctica, and Alaska –and move slowly toward the sea. The forward movement, the melting at the at the base of the glacier where it meets the ocean, and waves and tidal action causes blocks of ice to break off and float out to sea.

(Par. 2) Icebergs are ordinarily blue to white, although they sometimes appear dark or opaque because they carry gravel and bits of rock. They may change color with changing light conditions and cloud cover, glowing ping or gold in the morning or evening light, but this color change is generally related to the low angle of the Sun above the horizon. However, travelers to Antarctica have repeatedly reported seeing green icebergs in the Weddell Sea and, more commonly, close to the Amery Ice Shelf in East Antarctica.

(Par. 3) One explanation for green icebergs attributes their color to an optical illusion when blue ice is illuminated by a near-horizon red Sun, but green icebergs stand out among white and blue icebergs under a great variety of light conditions. Another suggestion is that the color might be related to ice with high levels of metallic compounds, including copper and iron. Recent expeditions have taken ice samples from green icebergs and ice cores –vertical, cylindrical ice samples reaching down to great depths –from the glacial ice shelves along the Antarctic continent. Analysis of these cores and samples provide a different solution to the problem.

(Par.4) The ice shelf cores, with a total length of 215 meters (705 feet), were long enough to penetrate through glacial ice –which is formed from the compaction of snow and contains air bubbles – and to continue into clear, bubble-free ice formed from seawater that freezes onto the bottom of the glacial ice. The properties of this

clear sea ice were very similar to the ice from the green iceberg. The scientists concluded that green icebergs form when a two-layer block of shelf ice breaks away and capsizes (turns upside down), exposing the bubble-free shelf ice that was formed from seawater.

(Par. 5) A green iceberg that stranded just west of the Amery Ice Shelf showed two distinct layers: bubbly blue–white ice and bubble-free green ice separated by a one-meterlong ice layer containing sediments. The green ice portion was textured by seawater erosion. Where cracks were present, the color was light green because of light scattering; where no cracks were present, the color was dark green. No air bubbles were present in the green ice, suggesting that the ice was not formed from the compression of snow but instead from the freezing of seawater. Large concentrations of single-celled organisms with green pigments (coloring substances) occur along the edges of the ice shelves in this region, and the seawater is rich in their decomposing organic material. The green iceberg did not contain large amounts of particles from these organisms, but the ice had accumulated dissolved organic matter from seawater. It appears that unlike salt, dissolved organic substances are not excluded from the ice in the freezing process. Analysis shows that the dissolved organic material absorbs enough blue wavelengths from solar light to make the ice appear green.

(Par. 6) Chemical evidence shows that platelets (minute flat portions) of ice form in the water and then accrete and stick to the bottom of the ice shelf to form a slush (partially melted snow). The slush is compacted by an unknown mechanism, and solid, bubble-free ice is formed from water high in soluble organic substances. When an iceberg separates from the ice shelf and capsizes, the green ice is exposed.

(Par. 7) The Amery Ice Shelf appears to be uniquely suited to the production of green icebergs. Once detached from the ice shelf, these bergs drift in the currents and wind systems surrounding Antarctica and can be found scattered among Antarctica’s less colorful icebergs.

1. According to paragraph 1, all of the following are true of icebergs EXCEPT:

   a. They do not have a regular shape.

   b. They are formed where glaciers meet the ocean.

   c. Most of their mass is above the sea surface.

d. Waves and tides cause them to break off glaciers.

2. According to paragraph 2, what causes icebergs to sometimes appear dark or opaque?

   a. A heavy cloud cover

   b. The presence of gravel or bits of rock

   c. The low angle of the Sun above the horizon

   d. The presence of large cracks in their surface

3. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

   a. One explanation notes that green icebergs stand out among other icebergs under a great variety of light conditions, but this is attributed to an optical illusion.

   b. One explanation for the color of green icebergs attributes their color to an optical illusion that occurs when the light from a near-horizon red Sun shines on a blue iceberg.

   c. One explanation for green icebergs attributes their color to a great variety of light conditions, but green icebergs stand out best among other icebergs when illuminated by a near –horizon red Sun.

   d. One explanation attributes the color green icebergs to an optical illusion under special light conditions, but green icebergs appear distinct from other icebergs under a great variety of light conditions

4. According to the paragraph 4, ice shelf cores helped scientists explain the formation of green icebergs by showing that

a. the ice at the bottom of green icebergs is bubble-free ice formed from frozen seawater

b. bubble-free ice is found at the top of the ice shelf

c. glacial ice is lighter and floats better than sea ice

d. the clear sea ice at the bottom of the ice shelf is similar to ice from a green iceberg

5. Why does the author mention that “The green ice portion was textured by seawater
erosion”?

a. To explain why cracks in the iceberg appeared light green instead of dark green

b. To suggest that green ice is more easily eroded by seawater than white ice is

c. To support the idea that the green ice had been the bottom layer before capsizing

d. To explain how the air bubbles had been removed from the green ice

6. Which of the following is NOT explained in the passage?

a. Why blocks of ice break off where glaciers meet the ocean

b. Why blocks of shelf ice sometimes capsize after breaking off

c. Why green icebergs are commonly produced in some parts of Antarctica

d. Why green icebergs contain large amounts of dissolved organic pigments

7. The passage supports which of the following statements about the Amery Ice Shelf?

a. The Amery Ice Shelf produces only green icebergs.

b. The Amery Ice Shelf produces green icebergs because its ice contains high levels of metallic compound such as copper and iron.

c. The Amery Ice Shelf produces green icebergs because the seawater is rich in a particular kind of soluble material.

d. No green icebergs are found far from the Amery Ice Shelf.

APENDIX B

Reading Text 2: Meteorite Impact and Dinosaur Extinction

(Par. 1) There is increasing evidence that the impacts of meteorites have had important effects on Earth, particularly in the field of biological evolution. Such impacts continue to pose a natural hazard to life on Earth. Twice in the twentieth century, large meteorite objects are known to have collided with Earth.

(Par. 2) If an impact is large enough, it can disturb the environment of the entire Earth and cause an ecological catastrophe. The best-documented such impact took place 65 million years ago at the end of the Cretaceous period of geological history. This break in Earth's history is marked by a mass extinction, when as many as half the species on the planet 10 became extinct. While there are a dozen or more mass extinctions in the geological record, the Cretaceous mass extinction has always intrigued paleontologists because it marks the end of the age of the dinosaurs. For tens of millions of years, those great creatures had flourished. Then, suddenly, they disappeared.

(Par. 3) The body that impacted Earth at the end of the Cretaceous period was a meteorite with a mass of more than a trillion tons and a diameter of at least 10 kilometers. Scientists first identified this impact in 1980 from the worldwide layer of sediment deposited from the dust cloud that enveloped the planet after the impact. This sediment layer is enriched in the rare metal iridium and other elements that are relatively abundant in a meteorite but 20 very rare in the crust of Earth. Even diluted by the terrestrial material excavated from the crater, this component of meteorites is easily identified. By 1990 geologists had located the impact site itself in the Yucatán region of Mexico. The crater, now deeply buried in sediment, was originally about 200 kilometers in diameter.

(Par. 4) This impact released an enormous amount of energy, excavating a crater about twice as large as the lunar crater Tycho. The explosion lifted about 100 trillion tons of dust into the atmosphere, as can be determined by measuring the thickness of

the sediment layer formed when this dust settled to the surface. Such a quantity of material would have blocked the sunlight completely from reaching the surface, plunging Earth into a period 30 of cold and darkness that lasted at least several months. The explosion is also calculated to have produced vast quantities of nitric acid and melted rock that sprayed out over much of Earth, starting widespread fires that must have consumed most terrestrial forests and grassland. Presumably, those environmental disasters could have been responsible for the mass extinction, including the death of the dinosaurs.

(Par. 5) Several other mass extinctions in the geological record have been tentatively identified with large impacts, but none is so dramatic as the Cretaceous event. But even without such specific documentation, it is clear that impacts of this size do occur and that their results can be catastrophic. What is a catastrophe for one group of living things, however, may create opportunities for another group? Following each mass extinction, there is a sudden evolutionary burst as new species develop to fill the ecological niches opened by the event.

(Par. 6) Impacts by meteorites represent one mechanism that could cause global catastrophes and seriously influence the evolution of life all over the planet. According to some estimates, the majority of all extinctions of species may be due to such impacts. Such a perspective fundamentally changes our view of biological evolution. The standard criterion for the survival of a species is its success in competing with other species and adapting to slowly changing environments. Yet an equally important criterion is the ability of a species to 50 survive random global ecological catastrophes due to impacts.

(Par. 7) Earth is a target in a cosmic shooting gallery, subject to random violent events that were unsuspected a few decades ago. In 1991 the United States Congress asked NASA to investigate the hazard posed today by large impacts on Earth. The group conducting the study concluded from a detailed analysis that impacts from meteorites can indeed be hazardous. Although there is always some risk that a large impact could occur, careful study shows that this risk is quite small.

1. In paragraph 2, why does the author include the information that dinosaurs had flourished for tens of millions of years and then suddenly disappeared?

a. To support the claim that the mass extinction at the end of the Cretaceous is the best-documented of the dozen or so mass extinctions in the geological record

b. To explain why as many as half of the species on Earth at the time are believed to have become extinct at the end of the Cretaceous

c. To explain why paleontologists have always been intrigued by the mass extinction at the end of the Cretaceous

d. To provide evidence that an impact can be large enough to disturb the environment of the entire planet and cause an ecological disaster

2. Which of the following can be inferred from paragraph 3 about the location of the meteorite impact in Mexico?

a. The location of the impact site in Mexico was kept secret by geologists from 1980 to 1990.

b. It was a well-known fact that the impact had occurred in the Yucatán region.

c. Geologists knew that there had been an impact before they knew where it had occurred.

d. The Yucatán region was chosen by geologists as the most probable impact site because of its climate.

3. According to paragraph 3, how did scientists determine that a large meteorite had impacted Earth?

a. They discovered a large crater in the Yucatán region of Mexico.

b. They found a unique layer of sediment worldwide.

c. They were alerted by archaeologists who had been excavating in the Yucatán region.

d. They located a meteorite with a mass of over a trillion tons.

4. According to paragraph 4, all of the following statements are true of the impact at the end of the Cretaceous period EXCEPT:

a. A large amount of dust blocked sunlight from Earth.

b. Earth became cold and dark for several months.

c. New elements were formed in Earth's crust.

d. Large quantities of nitric acid were produced

5. Paragraph 6 supports which of the following statements about the factors that are essential for the survival of a species?

a. The most important factor for the survival of a species is its ability to compete and adapt to gradual changes in its environment.

b. The ability of a species to compete and adapt to a gradually changing environment is not the only ability that is essential for survival.

c. Since most extinctions of species are due to major meteorite impacts, the ability to survive such impacts is the most important factor for the survival of a species.

d. The factors that are most important for the survival of a species vary significantly from one species to another.

6. According to the passage, who conducted investigations about the current dangers posed by large meteorite impacts on Earth?

a. Paleontologists

b. Geologists

c. The United States Congress

d. NASA

7. Which of the sentences below best expresses the essential information in the following sentence? Earth is a target in a cosmic shooting gallery, subject to random violent events that were unsuspected a few decades ago. Incorrect choices change the meaning in important ways or leave out essential information.

a. Until recently, nobody realized that Earth is exposed to unpredictable violent impacts from space.

b. In the last few decades, the risk of a random violent impact from space has increased.

c. Since most violent events on Earth occur randomly, nobody can predict when or where they will happen.

d. A few decades ago, Earth became the target of random violent events originating in outer space.

APENDIX C

INTERVIEW PROTOCOL (BOTH IN ENGLISH AND TURKISH)

Demographic Questions

1. What is your age?
2. What is your gender?
3. What is the mean of instruction of your current or graduated higher education?

Interview Questions

4. How many times did you need to use annotation panel during your reading experience approximately?
5. In mobile environment, do you think is there any contribution of annotation support on reading comprehension? If there, what are these contributions?
6. How was your feeling about bringing the word definitions which are immediately and easily while reading the text on mobile environment?

a. If the response is positive,

Why do you think annotation supported mobile reading environments are efficient for better reading comprehension?

7. Would you like to see an additional feature which aids reading comprehension on annotation panel? If there is, how does it support your reading comprehension?

Demografik Sorular

1. Yaşınız?

2. Cinsiyetiniz?

3. Devam eden ya da tamamlanan üniversite lisans eğitiminizin öğretim dili İngilizce midir?

Görüşme Soruları

4. Mobil cihazdan okuma deneyimi sırasında annotation paneli okumada geçen bir sözcük anlamını görmek üzere yaklaşık olarak kaç kez kullandınız?

5. Mobil cihazınızda annotation desteğinin İngilizce metinlerde okuduğunu anlamaya bir katkısı olduğunu düşünüyor musunuz? Var ise, nedir bu katkılar?

6. Mobil ortamda okuma deneyiminiz sırasında metinde geçen bir kelimenin anlamını hızlı ve kolay bir şekilde görmek hususunda ne hissediyorsunuz?

a. Yanıt olumlu ise, Peki, hangi neden ya da nedenlerden dolayı mobil ortamlarda sunulan okuma parçalarına yönelik olarak annotation desteğinin daha iyi okuduğunu anlama için verimli olduğunu düşünüyorsunuz?

7. Annotation panelde, kelime anlamına ek olarak okuduğunuz metni anlamaya olumlu etkisi olacağını düşündüğünüz başka bir ek özellik görmek ister miydiniz? Eğer ek bir özellik görmek istiyorsanız, bu durum okuduğunuzu anlamayı nasıl olumlu yönde etkileyecekti?

APENDIX E

PERMISSION OF METU-ETHICAL COMMITTEE

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İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın : Prof.Dr. İ. Soner YILDIRIM;

Danışmanlığını yaptığınız yüksek lisans öğrencisi Cengizhan GÖKBEN'in "Mobil platformlarda metinsel Annotation destekli okuma ortamlarının okuduğunu anlamaya etkileri" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2016-EGT-121** protokol numarası ile **09.08.2016-10.09.2016** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımızla sunarız.

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ODTÜ 2015

BU BÖLÜM, İLGİLİ BÖLÜMLERİ TEMSİL EDEN İNSAN ARAŞTIRMALARI ETİK ALT KURULU TARAFINDAN DOLDURULACAKTIR.

Protokol No: 2016-EGT-121

İAEK DEĞERLENDİRME SONUCU

Sayın Hakem,

Aşağıda yer alan üç seçenekten birini işaretleyerek değerlendirmenizi tamamlayınız. Lütfen "Revizyon Gereklidir" ve "Ret" değerlendirmeleri için gerekli açıklamaları yapınız.

Değerlendirme Tarihi: 03.05.2016

Ad Soyad:

☒ **Herhangi bir değişikliğe gerek yoktur. Veri toplama/uygulama başlatılabilir.**

☐ **Revizyon gereklidir**

- ☐ Gönüllü Katılım Formu yoktur.
- ☐ Gönüllü Katılım Formu eksiktir.

  Gerekçenizi ayrıntılı olarak açıklayınız:
- ☐ Katılım Sonrası Bilgilendirme Formu yoktur.
- ☐ Katılım Sonrası Bilgilendirme Formu eksiktir.

  Gerekçenizi ayrıntılı olarak açıklayınız:
- ☐ Rahatsızlık kaynağı olabilecek sorular/maddeler ya da prosedürler içerilmektedir.

  Gerekçenizi ayrıntılı olarak açıklayınız:
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