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THE EFFECTS OF STUDENTS' ATTITUDES TOWARDS DIGITAL TECHNOLOGY ON ENGLISH VOCABULARY LEARNING VIA MOBILE DEVICES

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Abstract

The developing technologies have been increasingly surrounding every aspect of our lives. Education is one of the most affected areas from these developments. Educators from different disciplines use various types digital technologies in learning environments. Mobile learning is one of the developments occurred as a result technological developments in education. A number of studies show that mobile learning is beneficial for language learning and vocabulary learning in particular.

There is an expanding tendency to use mobile learning devices in education; however, the question if it is appropriate to use the mobile learning technologies in every learner group is still not answered. There can be a number of factors that affect the benefits of mobile learning technologies.

This study was done on high school students to find out if the students' attitudes towards digital technology is an influential factor on the effectiveness of vocabulary learning via mobile devices. The results of the study indicated that using mobile devices has an obvious positive effect in vocabulary learning. Furthermore, the results showed that there is a positive correlation between students' attitudes towards digital technology and the vocabulary learning process; however, not every sub factor has a remarkable effect on the learning process. As the learning technologies develop day by day, there are still several factors to be examined. Consequently, the study will be helpful for new studies to find out the influencer factors of English vocabulary education via mobile devices.

Keywords: Digital Technology, Mobile Learning, Vocabulary Learning, Attitudes

Özet

Gelişmekte olan teknolojiler gün geçtikçe artarak hayatımızın bütün alanlarında yer edinmektedir. Eğitim de bu gelişmelerden en çok etkilenen alanlar arasında yer almaktadır. Dijital teknolojiler farklı kademelerdeki eğitim ortamlarında yer edinmiştir. Mobil öğrenme, eğitimdeki bu gelişmelerin sonucunda oluşan gelişmelerden biridir. Yapılan birçok çalışma, mobil öğrenmenin dil öğrenimindeki ve özellikle kelime öğrenimindeki faydalarını ortaya koymuştur.

Eğitimde mobil öğrenme teknolojilerinin kullanımına yatkınlık giderek artmakta ve yaygınlaşmaktadır; bununla birlikte, mobil öğrenme teknolojilerinin eğitim ortamındaki her gruba kullanılmasının uygun olup olmadığı sorusu hala cevaplanmamıştır. Çünkü, mobil öğrenmenin verimliliğini etkileyen birçok faktör olabilir.

Bu çalışma, lise öğrencilerinin dijital teknolojiye yönelik tutumlarının, mobil cihazlar vasıtasıyla İngilizce kelime öğrenimine etkisini araştırmaktadır. Çalışmanın sonucunda elde edilen veriler incelendiğinde, mobil cihazların kelime öğrenimi üzerinde olumlu etkisi olduğu gözlemlenmiştir. Bununla birlikte, öğrencilerin dijital teknolojiye yönelik tutumları ile kelime öğrenme süreci arasında pozitif korelasyon gözlemlenmiştir. Eğitim teknolojilerinin gün geçtikçe geliştiği günümüzde, öğrenme sürecine etki eden ve incelenmesi gereken birçok faktör karşımıza çıkacaktır. Sonuç olarak, bu araştırma mobil cihazlar aracılığıyla İngilizce kelime öğrenmeye etki eden faktörlerin incelenmesi için yapılacak yeni çalışmalara yol gösterecek ve yararlı olacaktır.

Anahtar kelimeler: Dijital Teknoloji, Mobil Öğrenme, Kelime Öğrenimi, Tutum

TABLE OF CONTENTS

5. **DISCUSSION**
6. **CONCLUSION AND RECOMMENDATIONS**
7. **APPENDIX**
8. **REFERENCES**

LIST OF FIGURES & IMAGES

LIST OF TABLES

1. INTRODUCTION

Globally, as the technology has developed, it has taken a place in every aspect of our lives. That rapid increase has been shortening the period of generations; furthermore, it has brought innovations to many different areas in our lives.

Technological improvements have an obvious effect on education. Educators from different areas arrange learning environments in which they use digital technologies. Therefore, digital technologies make different senses for different individuals (Avcı, 2013). Digital technology, which has an active role in education as much as other areas, could be described as the applications that save, forward and electronically monitor the information on a screen (Cabı, 2016). Digital technology is important for young people to be adapted to changing norms and have digital literacy skills. Moreover, it is believed that digital technology usage in classes is beneficial for taking the students' attention (Erten, 2019). Improving the learners' positive attitudes towards digital technology plays an essential role in reaching the targeted levels in education programs and raising modern individuals. (Cabı, 2016). The Digital in 2017: Global Overview magazine reported that more than half of the Wold's population use at least one smart phone. Furthermore, the report shows that %51 of population in Turkey use computers and spend 3 hours using internet on mobile phones (Kemp, 2017). The statistics show that mobile phones and generally digital technologies have an important place in our lives. Mobile phones are also widely used in education because of their benefits and advantages. Considering accessibility, mobility, evaluation and feedback advantages, it is important to take educational power of mobile learning technologies into account (Aslan, 2016). Therefore, mobile learning is defined as learning through mobile devices that provides learning progress happens anywhere and anytime via internet and other wireless technologies (Suwantarathip, Orawiwatnakul, 2015). Mobile learning is also believed

to be useful and practical in vocabulary learning for allowing the learners to be exposed to spaced repetition of vocabulary items (Mahdi, 2018).

Attitude is one of the strongest factors that have an effect on individuals' success in usage of information systems(Cabı,2016). Another definition of attitude describes it as a psychologic structure which is considered as a vital and critical predictor of behaviour with its cognitive, affective and behavioural aspects (Erkuş, Sanlı, Bağlı, Güven, 2000). According to an early definition, attitude is a habit or tendency of behaviour towards a person, thing or an event (Hançerlioğlu, 1979). Students' studies on computer areas are highly influenced by their attitudes towards digital technology (Cabı, 2016). Attitude is one of the affective functions take an important place in education technology. Attitude states the tendency of an individual to be in reaction to the environmental phenomenon or thing. That reaction includes mental, behavioural and emotional symphony in itself. (Günbatar, Gökçearslan, 2017)

Considering the importance of technologic devices in education, it is necessary to determine the students' attitudes towards the technologic educational devices and and to create learning environments accordingly. (Cabı, 2016) This study will investigate how the achievement is affected due to the students' attitudes towards digital technology on English vocabulary learning via mobile devices. Results of the study will shed light on the importance of attitudes towards digital technology and show whether usage of mobile learning devices in English vocabulary education is affected by students' attitudes towards digital technology or not.

2. BACKGROUND

2.1 Technology in Education

Technology is a term that is as old as the humanity. It had already existed much before the scientists' attempts of collecting information to control the nature. (Aşkar, 2003) There are many definitions of technology (Phaal, Farrukh, & Probert, 2004). Simon describes technology as a rational discipline that was designed by human to lead the nature (Simon, 1983). Another study describes technology as a functional structure that is developed by setting the skills earned thanks to education to work (Alpar, Batdal, Avcı, 2007).

Technology is the solutions that are put forward by scientific knowledge to facilitate, support and improve the life. (Cabı, 2016) Technology changes the ontology of the environment, in which it occurs and takes part, in human perception. (Günay, 2017) Changing living conditions, technologic developments and facilitation of reaching information thanks to the technologic developments made insufficiency of traditional teaching methods understood; therefore, these changes have changed the expectations for education. The current generation's access to technology, knowledge and digital media is more than the previous generations. (Kardaş, Yeşilyaprak, 2015)

In modern world, human is deeply affected by the rapid development on technology and science in every aspect. To catch up with these developments and to be salutary for technology and science, human needs to have an appropriate education and be more and more tend to the education. (Batdal, 2005)

Contemporary human regards technology as a very important element of the life. Science and technology are the most demonstrative specifications of the modern culture. It this way, it is obvious that education also needs to be acquired scientific and technological characteristics. (Erbil, 2006)

Day by day, developing technological developments has led to remarkable changes in education likewise other areas. The new developed learning technologies have taken the place of old fashioned and ordinary learning applications. Today, it is not possible to even compare the current rate of development in technology and science with a hundred years ago. (Şahin, 2003) Therefore, making a permanent agreement on 'the most effective learning technology' has been being more difficult day by day. While some educators suggest that new learning technologies are more useful, there are many educators who have opposing views about the usage of technologies in education.

Printing press and electronical devices are the milestones of the technological education system in the history. (Aşkar, 2003) The most remarkable characteristic of the new learning technology is that it changes and develops rapidly. Unlike the traditional learning resources which took hundreds of years to be developed such as books and black board, the new learning technologies have come around just in less than 10 years. (Short, 2002)

2.1.1 Game Based Learning and Gamification

Learning and game are not opposite terms; nevertheless, they could be considered as directly proportional concepts. (Uluğ,1997). Students prefer enjoyable activities during learning. Playing games is an enjoyable occupation for students from all age groups. Learning with games helps students learn without being bored. Using games during a lesson might catch even the low motivated students' interest and get them to attend the lesson. Therefore, using games in learning environments will encourage students to be more active during the lesson (Tural, 2005).

Considering the new generation students and their high interest in computer games, a learning environment which includes computer, internet and even video games is needed to fulfil the students' needs. Hence, educational games are important for making students eager and motivated. (Güntepe, Usta, 2017)

Gamification is using video contents such as points, leader lists and badges to increase user experience or to keep the user in touch with the non-game environment. (Deterding, Sicart, Nacke, O'Hara ve Dixon, 2011).

Gamification and game-based learning are different terms (Karataş, 2014). According to Kim,Park and Baek (2009) game based learning makes students reach to the education targets by playing games. That kind of education provides pre-learning or substitutes for learning. On the other hand, gamification doesn't substitute for learning; conversely, it focuses on making learning more contributed and letting students overcome the difficulties by themselves. (Codish, Ravid, 2014).

Gamification is associated to the terms such as game-based technologies, entertaining interaction and educational games. Gamification is still confused with educational games. It shows that studies on gamification are still not at an adequate level. Considering the description and functions of gamification, it can be concluded that game is a name and gamification is a verb (Karataş, 2014).

With a suitable software, gamification usage for educational purposes can make students become more active. Moreover, applications and educational websites are being more and more popular day by day (Çeker, Özdamlı, 2017).

Considering the definition of gamification, this study takes Quizizz into account as a gamification tool. Because, Quizizz has non-game contexts that are combined with game design elements. Therefore, this study reveals the effects of Quizizz as a gamification tool on English vocabulary learning.

2.2 Mobile Learning

Using the technologies such as internet in education, a new and increasingly developing term has emerged: e-learning. (Aslan, 2006) E-learning can be described as a web-based learning system which is provided through internet or computer networks. (Aytaç, 2000)

E-learning is to be regarded as a supportive factor rather than an alternative to education. The activities which cannot be done in a traditional classroom are made possible to be done by use of e-learning. For instance, ‘‘Learning-Content Management Systems’’ which increases its popularity gradually, is an e-learning technology that provides content creation possibility which doesn’t exist completely or adequately in traditional learning systems (Yalvaç, Bayraktutan, 2004). Using e-learning, a more permanent education can be realized. What is more, it is observed that e-learning reduces not only the time spent on education but also the cost of learning. (Duran, Önal, Kurtuluş; 2006)

The rapid and remarkable developments on e-learning technologies have come up with a new term: mobile learning. Describing in a more detailed way; mobile learning can either be described as the learning realized by the learner while he/she takes the advantages of every kind of opportunities provided by mobile technologies; or can be described as every kind of learning that is happened in an uncertain place or a temporary place. (O’Malley, Vavoula, Glew, Taylor, Sharples, Lefrere, 2003)

In the literature, mobile learning is often described with e-learning. Some researchers assert that mobile learning is a part of e-learning. Al-Said (2015) says that mobile learning is one of the e-learning systems. Another study by Bralić, Ćukušić ve Jadrić (2015) suggests that mobile learning is an extension of e-learning. However, considering m-learning and e-learning as complement terms of each other is a better idea (Yokuş, 2016). Mouyabi (2012) likens e-learning to Electronic Revolution of 1980s and m-learning to Wireless Revolution of

twentieth century. Mobility and omnipresent functions are two main terms that differs mobile learning from e-learning (Peng, Su, Chou, Tsai, 2009).

Day by day, there are new definitions put forward on mobile learning. Around that circle of incomprehensibility, there are new misconceptions arose about mobile learning. Parsons (2014) summarizes the misunderstandings about technology in five points: ignoring the learning while focusing on the 'every-time-every-where' term, being under the assumption that mobile learning is happened only when it is needed, assuming it as it happens when the learner is physically moving, supposing it to be an extension of e-learning, and lastly, presuming mobile learning is a part of distance education. (Yokuş, 2016)

Using mobile learning applications turns a blind eye to time and place terms during learning. Hence, it can be regarded as a factor that increases academic success and have a positive effect on learner's motivation. (Kılınç, 2015)

2.2.1 Mobile-Assisted Language Learning

Lately, increasing popularity of mobile devices have made mobile learning a ''hot keyword'' in education (Zhang, 2015). Saran, Seferoglu and Cagiltay (2009) emphasized mobile phones importance to provide supplemental practices. Houser, Thornton and Kluge (2002) explained that there are a lot of projects for mobile assisted learning environments. According to them, mobility, connectivity and low-cost are the unique functions of mobile devices to be educational devices. Kiernan and Aizawa (2004) made a research on usage of mobile phones in language learning. They separated university students from different levels to fulfil the tasks: face to face to face speakers, PC email users and mobile phone email users. The study revealed that the mobile phone email users used less words that the other groups; nevertheless, their way of communication was effective.

There are several platforms that enables mobile assisted vocabulary learning. They commonly use mobile phones and tablets to make students answer the questions or recall the

targeted vocabulary items. One early mobile assisted language learning project to find out mobile phone usage in language learning was created by the Stanford Learning Lab. The results showed that mobile phones are effective for review and practice. (Chinnery, 2006)

Khan Academy is a learning environment that includes free educational materials and statistically shows the students' progresses regarding if they have fulfilled their missions or not (Simões, Redondo, Vilas, 2013). The learners could unlock new avatars and configure them using the points they have been given for attending the activities (Light, Pierson, 2014). A study conducted to study Khan Academy in classroom use indicated that it is beneficial for learning as long as it is provided with close teacher monitoring and extended periods (Murphy, Gallagher, Krumm, Mislevy, & Hafter, 2014).

Figure. 1: Khan Academy (taken from khanacademy.org)

Kahoot is an online learning platform that has similar principles with Quizizz. The platform includes quizzes, surveys and more options that can be engaged by smart phones within classroom. The system also has a score board showing ranks of the students lively (Zhang, 2015). The learners can both play the educative games in groups or individually

(Berg, 2015). Wang (2015) stated that the students who take exam on Kahoot could learn %22 better and be motivated %25 more comparing to the ones have exam on paper. Another study by Bolat, Şimşek, Ülker (2017) shows that Kahoot is beneficial to increase attention, focus on lessons and learning speed; therefore, it facilitates the learning process.

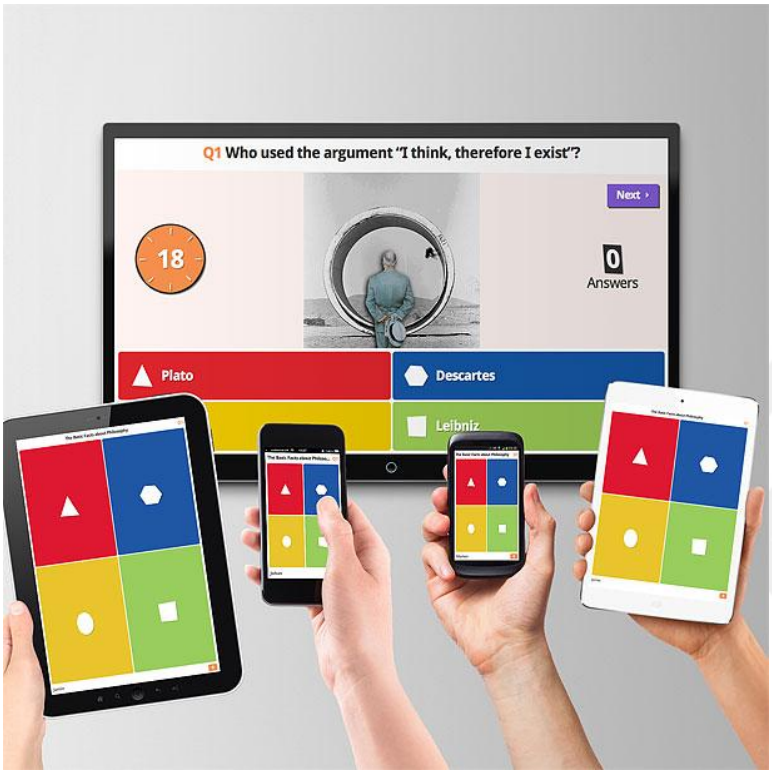


Figure. 2: Kahoot (taken from itmp.fr)

ClassDojo is another tool used by teachers to define a class and to reinforce classroom behaviours via mobile devices or smart board. The tool also has messaging, self-analysing, reporting systems for parents and teacher (Zhang, 2015). Globally, more than 3 million teachers and 35 million children use ClassDojo (Williamson, 2017). Dadakhodjaeva (2017), carried on a study to evaluate the effectiveness and maintenance of the GBG using ClassDojo. The study indicated that ClassDojo has a positive effect on the learners' behaviours. Another study (O'Brien & Aguinaga, 2014) was conducted to find out the behavioural effects of ClassDojo with digital technologies such as whiteboards and iPads. Similar to the study done

by Dadakhodjaeva, the study showed that ClassDojo has a positive effect on classroom behaviours and group dynamics.

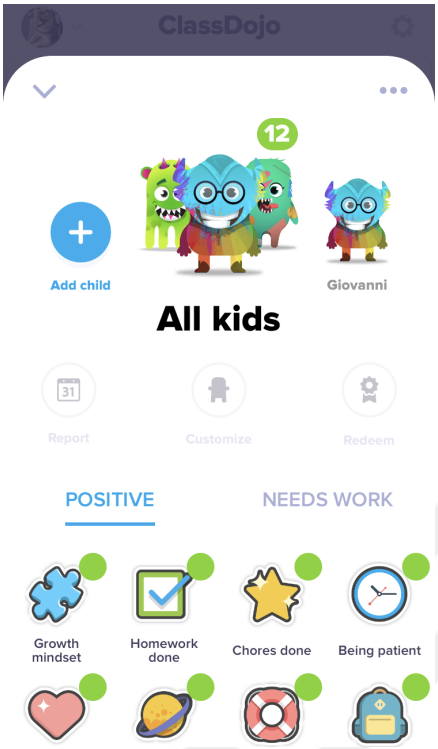
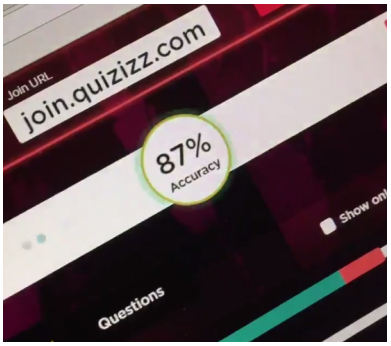


Figure. 3: ClassDojo (taken from classdojo.zendesk.com)

Quizizz is another popular gamification based mobile learning application which is very popular. Teachers can use the tests previously prepared by other teachers or prepare their own tests via this gamified online tool. The teacher announces a code to make students participated in the tasks. The task given by the teacher not only can be solved lively in the classroom but also could be a homework. (https://quizizz.com/). After the test, the teacher gets a detailed report which includes the students' answers. Furthermore, the teacher panel simplifies the learning activity considering the learners (Çeker, Özdamlı, 2017).



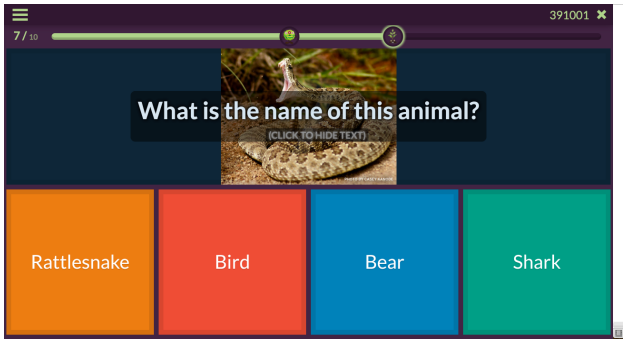


Figure. 4 & Figure. 5: Quizizz (taken from blog.quizizz.com)

The Quizizz application has recently been studied in terms of grammar (Swari, Myartawan & Dewi, 2019; Rahayu, & Purnawarman, 2019) and comprehension skills (Nanda, Abdul & Daddi, 2018). The studies have indicated Quizizz has positive effects on grammar and comprehension; nevertheless, there hasn't been any study done to reveal the effects of Quizizz in vocabulary learning. Considering its increasing popularity in education world, accessibility from both inside and outside of the class and usefulness, Quizizz has been chosen to be applied to the students in this study.

Mobile assisted language learning has some cons for the classroom activities. For instance, Yıldırım (2012) found out that the visuals might draw attention more than the English verbs. Furthermore, rate of the students who have mobile phones in daily life is another important aspect. Bolat, Şimşek and Ülker (2017) stated that duration of the questions and conducting time of the application must be under control. Audio-visual quality was another problem in the early days (Chinnery, 2006); however, quality is being improved day by day thanks to the developing technologies. The screen sizes and limited power and connection problems are other challenges of mobile assisted language learning. (Chinnery, 2006)

2.2.2. Vocabulary Learning

Vocabulary term can be expressed as the words necessary to communicate effectively (Neuman&Dwyer, 2009). Learning vocabulary, which is an essential tool for second language

learners, is an important part of language learning. Vocabulary knowledge helps learners to use the language; more specifically, it has an essential role in all language skills (Alqahtani, 2015). Vocabulary learning, which helps learners to develop word knowledge, enables to learn both intentional and incidental learning of vocabulary knowledge (Schmitt, 2008). Schmitt (2000) emphasizes the necessity of vocabulary knowledge by saying ‘‘lexical knowledge is central to communicative competence and to acquisition of a second language.’’

Vocabulary can be examined in two parts: receptive vocabulary and productive vocabulary. Receptive vocabulary can be defined as the words that is understood when learners see it on a text; however, they cannot use the words in other skills. On the other hand, productive vocabulary is the words used by the learners to express themselves in speaking and writing (Stuart Webb, 2005).

2.2.3. Mobile-Assisted Vocabulary Learning

Mobile devices are popular communication technologies that can be regarded as a tool to facilitate language learning (Mahdi, 2018). Scrutinizing the literature, there are many studies that revealed effectiveness of mobile devices in vocabulary learning. Song and Fox (2008) made a study of vocabulary learning whose results indicated that vocabulary learning performance is improved short message service and the web usage. Suwantarathip and Orawiwatnakul (2015) conducted a study based on the Theory of Behaviourist Learning about the effects of mobile assisted exercises through short message service on vocabulary learning. The results showed that mobile assisted learning increased the learners’ autonomy. The researchers noted that using mobile assisted exercises can improve not only vocabulary knowledge, but also other skills; however, other factors such as the readiness of learning tools and the appropriateness of activities must be taken in consideration. Another study conducted by Thornton and House (2005) indicated that the group of participants who send e-mails from mobile phones developed their vocabulary knowledge better comparing to the groups that

used computers or paper materials. A recent study by Mahdi (2018) investigated effectiveness of mobile devices on vocabulary learning and the influencer variables. The results showed that mobile devices are moderately effective in almost all aspects of vocabulary learning. None of the studies revealed the effect of the mobile devices on word structure; nevertheless, results of the studies support that mobile devices are effective in vocabulary learning.

2.3 Attitude

Attitude is an important point in analysing the individuals' behaviours. Studies on attitude started in 19th century. First time in the history, Thomas and Znaniecki (1918) used attitude term in their ''The Polish Peasant in Europe and America''. Examining the early literature, Allport (1935) described attitude as neural and mental readiness against objects and situations ensue from experiences. Another early description of attitude by Robbins (1994) suggests that attitudes are positive or negative assessing expressions about people, things or events. A description by Kağıtçıbaşı (1999) defines attitude as a tendency that properly constitutes an individual's ideas, feelings and behaviours about a psychological object.

There are four theories used by researchers on studies to find out how attitude originated and changed. They are learning, social provision, consistency or balance and functional theories (Kağıtçıbaşı, 1999).

In the learning theory, the objects related to pleasant experiences are considered positive while the one related to unpleasant experiences are considered negative (Tavşancıl, 2002). According to the social provision theory, a person needs to have an impression to like or dislike something. The theory suggests that a person who strongly supports an attitude is more likely to be tend to reject different views than accept them. The social provision theory can be considered as a frame to understand the attitude change (Kağıtçıbaşı,1999). The consistency theory supports that there is a consistency between attitudes and behaviours. Heider, who developed balance theory, is the pioneer of consistency theory. Balance theory

asserts that there is a tendency to fix the instabilities but never claims that instabilities will be fixed (Kağıtçıbaşı, 1999).

Learning individuals' attitude towards a stimulant helps us to understand their possible behaviour against that stimulant (Üstüner, 2006). Üstüner (2006) stated that students' attitudes towards being a teacher will provide data about the attitudes to be gained in a teacher training program.

A study done by Karagiannopoulou and Christtodoulides (2005) indicated that attitudes towards learning environment is more effective on prediction of students' success than their university admission test scores. Güven (2008) states that positive attitudes towards social sciences course supports comprehension. Merisuo – Storm (2007) claims that attitude towards foreign language course plays an important role on success. Considering the study, while negative attitudes decreased the students' motivation, positive attitudes had a positive effect. The studies show that attitudes towards learning a topic increases the success; therefore, investigating the students' behaviour is an important factor in education (Kara, 2010). Arslan (2006) developed an attitude scale about computer based education. He carried on the study on 151 students in education faculty to find out the students' attitudes towards computer based education. The Cronbach alpha value was .93. Another attitude scale was developed by Kara (2010) to investigate the learners' attitudes toward learning. At the beginning, 77 factors were defined. After the analyses, a scale including 40 factors was developed. Considering the Pearson co-efficient, a reliable scale of learners' attitudes toward learning was developed.

The studies show that attitude plays an important role in education; therefore, there are many studies have been done to examine attitude. Moreover, the attitude scale towards digital technology was developed to emphasize the importance of digital technology in modern world and education (Cabı, 2016). Nevertheless, there isn't any study that examines the role

of attitude towards digital technology in language learning, especially in vocabulary learning. Therefore, this study has been done to reveal the role of attitude towards digital technology in vocabulary learning.

2.3.1. Attitudes Towards Digital Technology

Using overhead projectors was a great technological development. Nonetheless, unstoppably developing technologies made overhead projectors changed with modern projectors called delineascopes. Furthermore, delineascopes have also lost their popularity after smart boards' popularization in classrooms. These developments have started the ball rolling with e-learning usage in classrooms. Recently, smart boards have been increasingly used in many classrooms. These developments have brought a new term: digital technology. Digital technology could be described as the applications that save, forward and electronically monitor the information on a screen. (Cabı, 2016)

Perinsky (2001) separated technology users into two groups: digital native and digital immigrants. Perinsky related this separation with language learning. Digital native represents the group of people who were born and grow up in a world covered with digital technologies. They are used to live with devices of the digital era. On the other hand, digital immigrant term represents the group of people who tries to speak the language they learned afterwards. They weren't born in a technologic world; however, they are to use digital technology in a point of their lives. It is obvious that they are not fluently speak the technology language (Prensky, 2001).

Digital technology is an effective tool as long as it is used properly. Mikelic Preradovic, Lešin, & Šagud (2016). suggest that digital technologies must be used to support the current educational goals instead of replacing them.

Siraj-Blatchford and Whitebread (2003) stated that children's digital technology experiences are related to their parents' use of technology. Some parents have misconceptions

and stereotypes about digital technology. Adult Education and Training in Europe (2005), a report in Croatia, stated that 40% of the Croatian citizens are not used to digital technology. They were also worried about their children's use of digital technology (Preradovic, Lešin, & Šagud (2016).

Considering the importance of digital technology in education, it becomes more and more possible to say that digital technology term should be investigated. With this point of view, this study makes a survey of digital technology in terms of its effects on language learning. In this study, Cabı's Attitude Scale for Digital Technology, which has both positive and negative sub factors, was used to reveal the effects of attitudes for digital technology on students' language learning success. Provided that the study shows a meaningful relationship between attitude towards digital technology and effectiveness of mobile learning in language learning: When a learner group's attitude towards a mobile learning platform is less positive, the learners won't use that mobile learning platform; therefore, waste of time and effort will be prevented.

2.4. Literature Review

Mobile learning is very practical and available for language learning (Chinnery, 2006). It takes attentions of students in the classroom and makes the students be less bored during learning (Yıldırım, 2012). Under this assumption, a number of researches and projects were done.

Saran, Seferoglu and Cagiltay (2009) made a study on students in Turkey to reveal effectiveness of mobile phones in foreign language learning. The quantitative components included pre-study, pre-test, 4 weeks of treatment phase and post-test. The results indicated that using mobile phones were helpful for students' foreign language pronunciation. Additionally, all of the learners participated in the study gave positive feedback about the application.

Levy and Kennedy (2005) developed a project in which the participant learners were required to send messages including words and idioms, definitions and some sentences. Then, the feedback was given by answering questions.

The ministry of education in Turkey established Fatih Project and distributed tablet computers to the students which was a considerable step taken into development of mobile learning around the country. According to a research made on primary school students, the students attended in survey supported the fact that mobile learning applications are beneficial in English vocabulary learning as a foreign language. Furthermore, the research put forward that students' both reading-writing and listening skills were developed in the same rate thanks to the mobile learning applications. (Yıldırım, 2012)

Demir and Akpınar (2016) developed an attitude scale to understand the students' attitude towards mobile learning. The pilot study was done on 326 students from three different universities in two different cities in 2013-2014. The scale includes 4 factors and 45 items. The scale seemed reliable due to its Cronbach's Alpha internal consistency co-efficient was calculated as .950. The results showed that students' digital device usage while studying depends on their attitude towards digital technology. This study was found helpful to the other studies that aim to reveal the usage of different technological devices in education.

There are some difficult points of mobile learning in foreign language learning that are required to be developed and updated yet. As an instance, the 'I am Learning English with Sponge Bunny' application used by Yıldırım (2012) during her research caused students have difficulties using the navigation. What is more, the graphs in application took attention of students more than the English words. On another problem during the research was that some of the students weren't familiar with mobile phones during their daily life; therefore, they had difficulties using the mobile application (Yıldırım, 2012).

Considering the above-mentioned studies, there are lots of studies to reveal the effects of mobile learning in education. The positive sides of mobile device usage in education was proved by many studies; nonetheless, there aren't enough researches done to reveal the factors affecting productiveness of mobile learning in language learning, particularly in vocabulary learning. It is believed that findings of this study will have these benefits:

1. This study will reveal the relation between students' attitude towards digital technology
2. The potential success of technology in education will be emphasized; thus, investments on education and technology areas might be increased.
3. Considering the findings, projects will be developed to let the individuals become familiar with technology.
4. Effect of Quizizz mobile learning platform on vocabulary learning will be understood
5. Provided that the study shows a meaningful relationship between attitude towards digital technology and effectiveness of mobile learning in language learning, the sub factors will be investigated.

3. METHOD

3.1. Design

In this study, one group quasi-experimental design has been used. Simply, the quasi experimental design is a research design that tests casual hypotheses without a random assignment. (White & Sabarwal, 2014). There are four prototypical types of quasi experimental design: one-group design, the interrupted time series design, the nonequivalent-group design and the regression discontinuity design. During the application of one group quasi-experimental design, an observation is done to one or more individuals before a treatment phase. (Reichardt, 2009)

3.2. Research Questions

To investigate the effect of high school students' attitudes towards digital technology on their foreign language vocabulary knowledge development through mobile learning technologies, and reach the probable findings, this study aims to find answers to the following questions:

1.Is there any significant correlation between English vocabulary learning success via mobile applications and students' attitudes towards digital technology and sub dimensions?

2. What is the students' attitude towards digital technology?

3.3. Participants

Criterion Sampling was used in this research. The targeted universe was students who have English language proficiency level of A2, B1 and B1+ between the ages of 15-17 at the high school level in the 2017-2018 academic year in Istanbul. The study could have done in more schools; however, there were some disadvantages and difficulties in doing the research

in more schools. First of all, the teachers from different schools use different books. This could affect the students background knowledge. Moreover, because of the patron pressure, school administrations were not thinking positive about a study in their schools. Consequently, the research was done on the students with English language proficiency levels of A2, B1, B1+ who study in a private school in Maltepe province of Istanbul. The students were already members of the levelled English classes of their schools.

3.4. Instruments

In this study, two data collection tools were used: attitude scale for digital technology which was prepared by Emine CABI (2016) and a performance test. The attitude scale consists 39 scale items and 8 sub-factors. The attitude scale's construct validity was examined with Kaiser-Meyer-Olkin co-efficiency which accepts 0.90 value as a perfect result. The co-efficiency value of the scale is 0.906. During the learning phase, which lasted for 6 weeks, the students were taken into Quizizz vocabulary learning classes in similar numbers of student groups. A performance test was applied after the learning phase to indicate the students' vocabulary knowledge before and after the process of vocabulary learning mobile learning devices. During the performance test, students were required to solve English vocabulary questions. The questions were taken from the Close Up Workbook in A2, B1 and B1+ CEFR levelled course books by National Geography Publishing. The tests include 30 randomly selected questions.

3.4.1. Attitude Scale for Digital Technology

The attitude scale for digital technology prepared by Emine Cabı (2016) was used in this study. The scale created by Cabı (2016) consists 39 scale items in 8 factors: "competence", "social network", "technology use in lesson", "interest towards technology", "technology for me", technology's negative aspects", "technology for entertainment", and "conscious use". For each unit, the points were calculated from 1 to 5: Definitely Disagree=1,

Disagree=2, Neutral=3, Agree=4, Definitely Agree=5 The total point was calculated by addition of each point given to the units. Therefore, the minimum point is 39 while the maximum point is 195.

During that Likert type scale, according to their opinions about the items, the participants will be expected to choose one of the options: Completely Disagree, Disagree, Neutral, Agree, Completely Agree. Each unit is calculated from one to five according to their positive and negative representation structure.

Validity and reliability research was done on 689 students from five different schools in 2013-2014 academic year. The age group was between 14 and 18. Construct validity demonstrates a test's success in correct measurement of an abstract term within the context of the manner to be measured (Büyüköztürk, 2006). The attitude scale's construct validity was examined with Kaiser-Meyer-Olkin co-efficiency which accepts 0.90 value as a perfect result. The co-efficiency value of the scale is 0.906, which is a very close to the perfect value. Consequently, the data collected was found appropriate for factor analysis.

In this study, Cronbach Alpha:

Table 1. *Reliability Statistics of the Attitude Scale for Digital Technology*

	Cronbach's Alpha	**Number of Items**
Competence	,844	10
Social Network	,794	4
Technology Use in Lesson	,784	4
Interest towards Technology	,734	5

Technology for Me	,405	4
Technology's Negative Aspects	,607	5
Technology for Entertainment	,609	4
Conscious Use	327	3
Total	,873	39

3.4.2. Performance Test

The performance test was prepared to indicate the students' vocabulary knowledge after the process of vocabulary learning mobile learning devices. There are totally 30 multiple-choice vocabulary questions. The questions were taken from the Close Up Workbook in A2, B1 and B1+ CEFR levelled course books by National Geography Publishing. The book has widely been used in English as a foreign language education in both Turkey and other countries; furthermore, expert opinions about the questions were taken. Therefore, it is possible to say that the content validity requirements of the questions are met. Levels of the books were selected according to the proficiency level groups of the participants. The questions were randomly chosen from the review parts of the last six units of each book. To make a random selection, each question was numbered and the numbered papers were thrown into a box. Afterwards, 10 papers were taken from the box. The process was repeated three times in order to select 10 questions from each level. Consequently, 30 questions were gathered.

Before the performance test was done, there was a mobile learning process for 6 weeks. After the mobile learning process, the performance test was applied to the students for a second time.

3.5. Implementation Process

The implementation process lasted 8 weeks in total. The summary of the process has been given at Table 1. Firstly, the attitude scale for digital technology was applied to the participants. Afterwards, the students were taken into Quizizz vocabulary learning classes in similar numbers of student groups. The study lasted for 6 weeks. Each week, the students had 2 hours of application lessons. Each Quizizz study included between 15 and 20 questions that are from different levels. The students were asked to solve vocabulary questions on the Quizizz application on mobile phones. Extra mobile phones were provided for the students who don't have mobile phones. Therefore, each student was tried to be educated in similar conditions. After finishing the Quizizz tests, the teacher answered all of the questions with the students.

Figure 1. A screenshot of test questions from Quizizz application

During the post-test, students were required to solve a 30-questions-vocabulary-test. The test questions were taken from National Geography Publishing Close Up A2, B1 and B1+ levelled school workbooks' unit vocabulary review parts. From each level, 10 questions were gathered.

Implementation Process of the Data Collection:

Table 2. *Visualization of the research*

Implementing the Attitude Scale towards Digital Technology	Week 1
Treatment Phase: Learning process via mobile application	Week 2-7 (Total 6 weeks)
Performance Test	Week 8

At the 7th week, students were required to solve the performance test.

In this study, two different data collection tools were used: Attitude Scale for Digital Technology and Performance Test.

3.6. Data Analysis

The data tool Statistical Package for Social Science (SPSS) 25.0 was used in statistical analysing of the research data collected. The extreme values were extracted from the survey analyse. While not all combinations of variables are not able to be tested, normality related to univariates can be analysed with co-efficient of skewness and kurtosis (Büyüköztürk, 2009).

Pearson Correlation was applied to find out if there is a significant correlation between attitudes towards digital technology and success in the post-test results.

To answer the first research question, the variance gathered from the attitude scale was considered.

To find an answer to the second research question, defining statistics were investigated to study each sub-dimension.

3.7. Assumptions:

Participants are believed to be sincere about their opinions. So, the attitude scale and tests are assumed to show the students' ideas truly. Each participant of this research has the sufficient level of technological knowledge and computer skills. Technological devices that are used during the learning activity are similar to each other in order to prevent differentiation. Therefore, factors such as internet connection speed, screen sizes, ease of use wouldn't affect the reliability of the results. Furthermore, it is assumed that the 6-weeks period between the attitude scale application and the performance test will prevent student's memorizing the questions.

3.8. Limitations:

The subject of this research is limited to the determination of the impact of high school students' attitudes towards digital technology on learning English vocabulary knowledge via Quizizz which is a mobile learning based application. In addition to that, participants of the study are limited to the students at the high school level from a school located in the vicinity of Anatolian side of Istanbul city. Because of the legal issues and attitude of the school authorities toward academic researches on their students, the study was able to be done in only one school. Findings of the study are completely the results of obtained data by the scale. Getting more detailed data from the students' parents were not allowed by the school administration. Therefore, the students were told to give sincere answers to the attitude scale; nonetheless, there might be some contradictoriness in the students' answers. English proficiency levels of participant groups are at A2, B1, B1+ levels.

4. RESULTS

The 1st research question investigates whether there is a significant correlation between English vocabulary learning success via mobile applications and students' attitudes towards digital technology.

The descriptive statistics are presented in Table 3.

Table 3. Descriptive Statistics of the Attitude Scale towards digital technology

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Performance Test	76	6	29	1352	17,79	5,367

Pearson Correlation was applied to find out if there is a significant correlation between attitudes towards digital technology and success in the performance test that was applied after 6 weeks of implementation of treatment phase. The results are presented in Table 4.

Table 4. Pearson Correlation results of the Attitude Scale and the Performance Test

Correlations

		Performance Test	Competence	Social Network	Technology Use in Lesson	Technology for Me	Technology for Me	Technology for Me	Technology for Me	Technology for Me
Performance Test	Pearson Correlation	1	,233*	,048	,067	,069	,243*	,028	,086	,063
	Sig. (2-tailed)		,043	,684	,568	,554	,034	,814	,459	,588
	N	76	76	76	76	76	76	73	76	76
Competence	Pearson Correlation	,233*	1	,141	,318**	,632**	,654**	,326**	,558**	,613**
	Sig. (2-tailed)	,043		,223	,005	,000	,000	,005	,000	,000
	N	76	76	76	76	76	76	73	76	76
Social Network	Pearson Correlation	,048	,141	1	,469**	,419**	,355**	,298*	,239*	,175
	Sig. (2-tailed)	,684	,223		,000	,000	,002	,011	,037	,130
	N	76	76	76	76	76	76	73	76	76
	Pearson Correlation	,067	,318**	,469**	1	,433**	,473**	,219	,417**	,523**

Technology Use in Lesson	Sig. (2-tailed)	,568	,005	,000		,000	,000	,062	,000	,000
	N	76	76	76	76	76	76	73	76	76
Interest Towards Technology	Pearson Correlation	,069	,632**	,419**	,433**	1	,633**	,387**	,451**	,507**
	Sig. (2-tailed)	,554	,000	,000	,000		,000	,001	,000	,000
	N	76	76	76	76	76	76	73	76	76
Technology for Me	Pearson Correlation	,243*	,654**	,355**	,473**	,633**	1	,190	,447**	,623**
	Sig. (2-tailed)	,034	,000	,002	,000	,000		,107	,000	,000
	N	76	76	76	76	76	76	73	76	76
Technology's Negative Aspects	Pearson Correlation	,028	,326**	,298*	,219	,387**	,190	1	,415**	-,024
	Sig. (2-tailed)	,814	,005	,011	,062	,001	,107		,000	,841
	N	73	73	73	73	73	73	73	73	73
Technology for Entertainment	Pearson Correlation	,086	,558**	,239*	,417**	,451**	,447**	,415**	1	,489**
	Sig. (2-tailed)	,459	,000	,037	,000	,000	,000	,000		,000
	N	76	76	76	76	76	76	73	76	76
Conscious Me	Pearson Correlation	,063	,613**	,175	,523**	,507**	,623**	-,024	,489**	1
	Sig. (2-tailed)	,588	,000	,130	,000	,000	,000	,841	,000	
	N	76	76	76	76	76	76	73	76	76

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

When examined the Pearson Correlation, it was found out that there is a positive correlation correlation between attitudes towards digital technology and English vocabulary learning success via mobile applications.

Investigating the sub factors, competence (.233) and technology for me (.243) factors has low significant correlations with the performance test whereas there is no significant correlation between the other factors. Furthermore, there are significant correlations between the factors. The highest significant correlation has been found between competence and technology for me factors (Pearson Correlation=,654).

The 2nd question investigates the students' attitude towards digital technology. To evaluate the results, the significance level was accepted as 0,05. There are 39 items and each item has 1 as the minimum point while 5 as the maximum point. Mean of the points gathered from 39 items has been calculated and for each unit, the points were calculated from 1 to 5:

Definitely Disagree=1, Disagree=2, Neutral=3, Agree=4, Definitely Agree=5. Therefore, the means higher than 3 was considered as positive. The results have been revealed at *Table5.*

Table 5. Descriptive Statistics of the Attitude Scale towards digital technology

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Performance Test	76	6	29	1352	17,79	5,367
Competency	76	0	49	2685	35,33	8,009
Social Network	76	0	20	997	13,12	3,864
Technology Use in Lesson	76	0	20	1132	14,89	3,894
Interest towards Technology	76	0	25	1338	17,61	3,919
Technology for Me	76	0	20	1245	16,38	2,747
Technology's Negative Aspects	73	9	25	1266	17,34	3,297
Technology for Entertainment	76	0	20	994	13,08	3,494
Conscious Me	76	0	15	914	12,03	2,104
Total	76	0	181	10571	139,09	23,771

5. CONCLUSION AND RECOMMENDATIONS

Digital technologies have widely been used in education. Therefore, detecting the students' attitude towards digital technology will be beneficial so that the education facilities can be improved. (Cabı, 2015)

The attitude towards digital technology is a significant factor in maintaining of the future. Using digital technologies in an effective way, countries will have improvements in several areas such as politics and education. Today, when we live the digital age, the young people has got a positive attitude towards digital technology. Therefore, using the digital technologies in a conscious way will be useful in education. (Erten, 2019)

The study has revealed that there is a significant correlation between attitude towards digital technology and success in English vocabulary learning via mobile applications. In other words, the results of the study show that students attitude towards digital technology affects their vocabulary learning success via mobile applications.

During the treatment phase, almost all of the students enjoyed using Quizizz as a lesson material. Therefore, it is possible to say that such mobile applications make education more motivating and enjoyable.

The developing technologies affect the education as well as other aspects of life. Therefore, technological devices such as projectors, tablets, mobile phones and smart boards has been widely used in education. The studies have revealed that the technological devices not only make the lessons more enjoyable, but also they make the lessons more understandable thanks to the visualization tools. (Yıldırım, 2012) If the educators use digital technologies correctly and carefully, the rising generation who are interested in technology will have much more enjoyable and beneficial lessons.

APPENDIX

APPENDIX A : Units of Attitude Scale for Digital Technology (Cabı, 2016)

No	Madde ve Faktörler	Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
1	Herhangi bir dijital teknolojiyi kolaylıkla kullanırım.					
2	Çevreme yararlı işlerde teknolojiyi etkin kullanabilmeyi isterim.					
3	Yeni karşılaştığım dijital teknolojiyi bir defa kullanmam öğrenmem için yeterlidir.					
4	Dijital teknolojilerin beni geliştirdiğine inanıyorum.					
5	Dijital bir teknolojiyi kullanmak için bilginin yanında yeterli becerinin olması gerekir.					
6	Okulda teknoloji ile ilgili çok daha fazla dersin olmasını isterim					
7	Anlaşılması en zor dijital bir teknolojiyi bile kullanacağımdan eminim.					
8	Yeni karşılaştığım dijital bir teknolojiyi öğrenmek için istekliyimdir.					
9	Dijital teknolojiyi günlük yaşantımda kullanmak hoşuma gider.					
10	Vaktimin çoğunu dijital teknoloji kullanarak geçirmekten hoşlanırım.					
11	Dijital teknoloji alanında yeni bilgiler öğrenmek hoşuma gider.					
12	Dijital ürün satışı yapan mağazalarda yeni ürünleri inceleme merakım vardır.					
13	Dijital teknoloji alanında uzman olarak çalışmak sıkıcıdır.					
14	Dijital teknoloji ile ilgili haberler dikkatimi çeker.					
15	Derslerimde dijital teknolojinin kullanılması derse olan ilgimi artırır.					
16	Sosyal ağları (facebook, twitter vb.) kullanmak dijital teknolojinin en iyi avantajlarından biridir.					
17	Daha çok sosyal ağları (facebook.twitter vb.) kullanmak için dijital teknolojilerden yararlanırım.					
18	Sosyal ağları (facebook.twitter vb.) etkin olarak kullanırım.					
19	Sosyal ağlarda(facebook.twitter vb.) kendimi daha rahat ifade ederim.					
20	Dijital teknolojileri kullanmak sıkıcıdır.					
21	Yeni bir dijital teknoloji kullanırken karşılaştığım problemin çözümü konusunda kendime güvenirim.					
22	Dijital ortamda fazla zaman harcamak beni yorar.					
23	Daha çok oyun oynamak için dijital teknolojilerden yararlanırım					
24	Internetten hazır kaynaklara ulaşmak yaratıcılığımı engeller.					
25	Bilgisayar oyunları oynarken sokak oyunlarına göre daha çok eğlenirim.					
26	Derslerimde dijital teknolojilerden yararlanmak başarılı olmamı sağlar.					
27	Dijital teknoloji ortamında geçirilen zaman boşa harcanır.					
28	Bilgisayar destekli ortamlarda dijital materyaller ile ders çalışmak derse olan ilgimi artırır.					
29	Dijital teknolojileri kullanmak için yeterli beceriye sahibim.					
30	Dijital teknolojileri kullanırken hızlı ve pratik işlem yapabilirim					
31	Çevremde dijital teknolojiyi etkin kullanma konusunda liderim.					
32	Internet aracılığı ile her türlü bilgiye ulaşabilirim.					
33	Teknolojiyi insanların nasıl kullanmaları gerektiğine dair konularda fikir üretebilirim.					
34	Dijital teknolojiler faydalı amaç için kullanılmalıdır.					
35	Dijital teknolojiyi yaşamımı kolaylaştırmak için etkin olarak kullanırım.					
36	Internet ortamında benim için hangi bilginin yararlı olduğunu ayırt edebilirim.					
37	Dijital teknolojileri kullanırken yaratıcı düşünürüm.					
38	Bildiğim bir uygulamayı farklı dijital teknolojilerde kullanırım.					
39	Dijital teknolojiyi daha çok eğlence aracı olarak kullanırım.					

APPENIX B: Units and Factors of Attitude Scale for Digital Technology (Cabı, 2016)

No	Madde ve Faktörler
	Faktör 1: Yetkinlik
M3	Yeni karşılaştığım dijital teknolojiyi bir defa kullanmam öğrenmem için yeterlidir.
M7	Anlaşılması en zor dijital bir teknolojiyi bile kullanacağımdan eminim.
M21	Yeni bir dijital teknoloji kullanırken karşılaştığım problemin çözümü konusunda kendime güvenirim.
M29	Dijital teknolojileri kullanmak için yeterli beceriye sahibim.
M30	Dijital teknolojileri kullanırken hızlı ve pratik işlem yapabilirim
M31	Çevremde dijital teknolojiyi etkin kullanma konusunda liderim.
M32	Internet aracılığı ile her türlü bilgiye ulaşabilirim.
M33	Teknolojiyi insanların nasıl kullanmaları gerektiğine dair konularda fikir üretebilirim.
M37	Dijital teknolojileri kullanırken yaratıcı düşünürüm.
M38	Bildiğim bir uygulamayı farklı dijital teknolojilerde kullanırım.
	Faktör 2: Sosyal Ağlar
M16	Sosyal ağları (facebook, twitter vb.) kullanmak dijital teknolojinin en iyi avantajlarından biridir.
M17	Daha çok sosyal ağları (facebook.twitter vb.) kullanmak için dijital teknolojilerden yararlanırım.
M18	Sosyal ağları (facebook.twitter vb.) etkin olarak kullanırım.
M19	Sosyal ağlarda(facebook.twitter vb.) kendimi daha rahat ifade ederim.
	Faktör 3: Derste Teknoloji Kullanımı
M6	Okulda teknoloji ile ilgili çok daha fazla dersin olmasını isterim
M15	Derslerimde dijital teknolojinin kullanılması derse olan ilgimi artırır.
M26	Derslerimde dijital teknolojilerden yararlanmak başarılı olmamı sağlar.
M28	Bilgisayar destekli ortamlarda dijital materyaller ile ders çalışmak derse olan ilgimi artırır.
	Faktör 4: İlgi
M8	Yeni karşılaştığım dijital bir teknolojiyi öğrenmek için istekliyimdir.
M9	Dijital teknolojiyi günlük yaşantımda kullanmak hoşuma gider.
M11	Dijital teknoloji alanında yeni bilgiler öğrenmek hoşuma gider.
M12	Dijital ürün satışı yapan mağazalarda yeni ürünleri inceleme merakım vardır.
M14	Dijital teknoloji ile ilgili haberler dikkatimi çeker.
	Faktör 5: Benim için Teknoloji
M1	Herhangi bir dijital teknolojiyi kolaylıkla kullanırım.
M2	Çevreme yararlı işlerde teknolojiyi etkin kullanabilmeyi isterim.
M4	Dijital teknolojilerin beni geliştirdiğine inanıyorum.
M5	Dijital bir teknolojiyi kullanmak için bilginin yanında yeterli becerinin olması gerekir.
	Faktör 6: Olumsuz Yönler
M20	Dijital teknolojileri kullanmak sıkıcıdır.
M22	Dijital ortamda fazla zaman harcamak beni yorar.
M13	Dijital teknoloji alanında uzman olarak çalışmak sıkıcıdır.
M27	Dijital teknoloji ortamında geçirilen zaman boşa harcanır.
M24	Internetten hazır kaynaklara ulaşmak yaratıcılığımı engeller.
	Faktör 7: Eğlence Amaçlı Kullanım
M10	Vaktimin çoğunu dijital teknoloji kullanarak geçirmekten hoşlanırım.
M23	Daha çok oyun oynamak için dijital teknolojilerden yararlanırım
M25	Bilgisayar oyunları oynarken sokak oyunlarına göre daha çok eğlenirim.
M39	Dijital teknolojiyi daha çok eğlence aracı olarak kullanırım.
	Faktör 8: Bilinçli Kullanım
M34	Dijital teknolojiler faydalı amaç için kullanılmalıdır.
M35	Dijital teknolojiyi yaşamımı kolaylaştırmak için etkin olarak kullanırım.
M36	Internet ortamında benim için hangi bilginin yararlı olduğunu ayırt edebilirim.

[1]N=689

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