

The effect of Mentimeter and Kahoot applications on university students' e-learning

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Abstract

In the digital age, where technology is developing rapidly, there is a need for technology and game-based e-learning environments that students appreciate instead of traditional instruction. Interactive Web 2.0 tools can be utilised to develop e-learning environments. In this study, Kahoot and Mentimeter applications, interactive and game-based Web 2.0 tools, were used. The effect of Kahoot and Mentimeter applications on e-learning was investigated. This study was carried out at a state university in the Western Black Sea Region. It was carried out with prospective teachers studying in the Department of Primary School Education. This experimental study was conducted with 29 prospective teachers in the experimental group and 27 in the control group. Attitude Scale Against e-Learning was applied to prospective teachers before and after the application. Traditional methods were applied to the control group. Kahoot's evaluation feature and the word cloud feature of the Mentimeter program were used in the experimental group.

Keywords: e-Learning, Mentimeter, Kahoot, teaching, teaching technology.

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1. Introduction

Growing in the digital age, where technology is an integral part of life, the new generation is becoming addicted to technology and living a life embedded in technology. It is not reasonable to educate younger generations surrounded by technology away from technology in traditional classrooms using traditional methods (Elmas & Geban, 2012). This transformation started a trend from traditional instruction to electronic learning (e-learning). Equality of opportunity was provided in education through e-learning, and individuals were offered the opportunity to learn regardless of time and place (Isgor & Turan, 2017); e-learning can be achieved in various learning environments, with or without instructors, at different levels of learning, using various technologies, various teaching methods and techniques, special teaching designs, different philosophical and strategic approaches (Gulbahar, 2012). Web environments, where the information was originally taken, began to turn into a Web 2.0 platform where the content was created, shared, reorganised and transferred. This transformation has been described by Downes (2005) as the concept of e-learning 2.0. With the development of Web 2.0, e-learning gains momentum and allows the Internet to turn from an active broadcast into an interactive active broadcast (Jokisalo & Riu, 2009). Gulbahar (2012) describes e-learning as conducting teaching activities in electronic media or transferring knowledge and skills through electronic technologies. Web 2.0 tools, which described as the second generation service, have an essential role in building interactive e-learning environments, which is one of the modern instructional tools that can be used in educational environments in the 21st century (Genç, 2010). In educational environments using Web 2.0 tools that support the education system, students become active groups of students that do not only consume the information given in the classroom but also produce, manipulate, ask their origin and produce new information (Elmas & Geban, 2012). The new generation, born after the 2000s and described as a digital native, is growing with technology, and there are differences in cognitive activities (Prensky, 2001). For this generation, it is necessary to provide learning environments that are technology-based, engaging and motivating. Today's learners, namely, Digital Native, Net Generation, App Generation, need active, collaborative and technology-rich learning environments (Bekebrede, Warmelink & Mayer, 2011; Gardner & Davis, 2013; Prensky, 2001; Tapscott, 2009; El-Adl, & Alkharusi, 2020).

The new generation, which uses technology and computer games more, has various communication and learning methods (Bekebrede et al., 2011). One of the methods that meet the educational needs of this generation is computer games that they enjoy playing and digital game-based learning environments (Prensky, 2001). The game, which is an integral part of human life, has a vital role in learning and personal development. The game not only provides entertainment to the individual but also supports the development of decision making, visual, and spatial abilities (Yang, 2012). It is recognised that playing computer games has various perceptual, cognitive, behavioural, emotional and motivational influences (Hailey, Connolly, Stansfield & Boyle, 2011). Now, digital games have become an essential issue in educational research in the learning of 21st-century learners who use digital media and spend most of their time playing digital games (Yang, 2012). Emphasising the motivating characteristics of digital games, educators believe that this characteristic contributes to learning and can be used for instructional objectives (Hailey et al., 2011). Learners improve their skills of active learning, exploring, questioning and establishing connections between concepts through game-based learning (Yang, 2012). Youth do not only play digital games but also read, talk and dream about these games (Castell & Jenson, 2003). In this sense, while providing learning environments to young learners with different cognitive abilities, it is necessary to create technology and game-based, modern instructional tools that they enjoy in classroom environments. Web 2.0 tools can be utilised as a tool to engage students, make them have fun and motivate them.

Today, one of the most commonly used Web 2.0 tools is the game-based Kahoot application that is suitable for user-centred and behavioural design methods (Plump & LaRosa, 2017). Kahoot is a game-based, free-learning platform, which was first developed in Norway in 2013, has users in 200 countries around the world and is used by nearly half of the students and teachers in the United States. There are two types of logins to the system via Kahoot. One of them is creating a matching test, a multiple-choice

test and a questionnaire by logging in as a manager or teacher at www.kahoot.com. The system generates a numeric pin code when the display is run after any of these applications are created. When the students log in the system using the address www.kahoot.it, the page with the pin code entry and name entry appear. From here, they can log in on the platform by entering the pin code and a name created by the teacher or administrator. The system can be accessed using a pc, tablet, laptop or desktop computer. After the login, the question developed by the instructor is viewed by the learner. The learners are expected to answer the questions within the period determined by the instructor. When the question appears on the screen, the time starts to go backwards with the music. Entering the right answer from the four-choice questions is as important as entering it quickly. The system gives a higher score to the student who enters the correct answer first and ensures that the learning environment turns into a fun-based environment. Kahoot is an online application where quizzes can be produced and presented in a 'game show' type format (Iwamoto, Hargis, Taitano & Vuong, 2017) and ensures that students maintain their motivation.

Another Web 2.0 tool used to create interactive presentations in classroom environments is the Internet-based application, namely, Mentimeter, which has more than 30 million users in more than 120 countries. Mentimeter is a Web 2.0 tool for applications such as designing interactive and entertaining presentations, and adding surveys, quizzes, word cloud, images and graphics. With Mentimeter, entertainment and interaction can be provided in presentation environments with the feature of providing immediate feedback via smartphone, tablet and computer. As soon as the instructor develops and publishes the presentation via www.mentimeter.com, the system generates a pin code for learners to enter. For the learners to enter the system and participate in the application, they must log in with the pin code on www.menti.com. The system is accessed only with a pin code, and no other information of the learner is entered into the system. After the learners log in to the system, the answers they give to the application are immediately reached by the teacher and their friends. As any personal information of the student is not reflected on the system screen, active participation and motivation in the classroom are high by providing the opportunity for the students who have passive, shy and peer shyness in the classroom to participate in the class.

Today, with the development of mobile technologies and a widespread internet connection, e-learning environments are transforming towards mobile technologies. Game-based Web 2.0 tools can be used for learners to use e-learning environments, increase their awareness and attract attention. The word cloud creation feature of the Mentimeter program, which increases the attendance to the lesson and makes the lesson more enjoyable (Skoyles & Bloxsidge, 2017), can be applied at the end of the lesson or the beginning of the next lesson. This practice can contribute to understanding whether keywords remain in students' memories, or which phrase most often remains in their memories. Also, with the game-based Kahoot application in the evaluation of learning environments, it can be ensured that students' interest and motivation towards the course are kept high by building an exciting competition environment for students. In particular, the use of Web 2.0 tools by prospective teachers studying at the faculties of education can contribute to their students' participation, motivation and creating an interactive classroom environment.

Mentimeter and Kahoot applications are Web 2.0 tools with games and entertainment features. Mentimeter and Kahoot are functionally different programs. It can increase motivation by adding competition excitement to Kahoot course environments. Mentimeter, on the other hand, reveals the permanence of the course content in the mind and creates concept maps. When these two Web 2.0 tools are used together, while the motivation of the students increases, the concepts may be more permanent in the mind. They can also develop a positive attitude towards e-learning. Does this study have an impact on preservice teachers' attitudes towards e-learning when these two applications are used? An answer to the question was sought.

2. Method

2.1. Research model

In the study, an experimental model with a pretest–posttest control group was used (Buyukozturk, 2016). This model is namely a mixed model since it has both relational and nonrelational models. It is a relational model since the measurement is made about the dependent variable before and after the experimental process. Comparison of groups (experiment-control) formed by different subjects is a nonrelational model (Buyukozturk, Kilic-Cakmak, Akgun, Karadeniz & Demirel, 2012). The experimental design can be used to decide the effect of an independent approach (Kahoot & Mentimeter applications) on a dependent outcome (e-learning) (Plano & Creswell, 2015). In this study, an experimental design was used to reveal the effect of e-learning in the classrooms where subjects are covered with the traditional method; Web 2.0 supported Kahoot and Mentimeter applications in instructional technology courses.

This study is an experimental study. One of the semiexperimental design types such as 'Randomised Control-Group Posttest Design' was used. Two groups, namely, experimental and control groups were formed, and posttest was implemented to these groups after the instruction process.

Table 1. Experimental process

Groups	Pretest	Implementation	Posttest
Experiment	The Attitude Toward e-Learning Scale	Kahoot and Mentimeter applications	The Attitude Toward e-Learning Scale
Control	The Attitude Toward e-Learning Scale	Common course process	The Attitude Toward e-Learning Scale

2.2. Study group

This study was carried out with undergraduate students studying at the education faculty of a state university in the Western Black Sea Region. Prospective classroom teachers grouped in two separate classes consist of experimental group ($N = 27$) and control group ($N = 29$). These students are equivalent groups because they are placed with university exam scores. The simple random sampling was used because the possibilities of the students studying in these classes to be assigned to both groups (experiment-control) have an equal probability (Buyukozturk et al., 2012).

2.3. Data collection instruments

The Attitude Toward e-Learning Scale developed by Haznedar & Baran (2012) was used to collect the data. The scale, which has two-factor structures, includes 10 items in the e-learning susceptibility subdimension and 10 items in the e-learning avoidance subdimension. Cronbach's α was calculated as 0.87 for e-learning susceptibility items, 0.83 for e-learning avoidance items and 0.62 for scale-wide. The lowest score that can be obtained from the scale is 20, and the highest score is 100. The scale is a 5-point Likert-type structure (definitely disagree = 1, disagree = 2, undecided = 3, agree = 4, strongly agree = 5).

2.4. Procedure

Kahoot and Mentimeter applications were carried out in two separate classes in the instructional technologies course in the education faculty classroom teaching department. The learners in the experimental and control groups about how Kahoot and Mentimeter applications are used were asked. While the number of learners who knew Kahoot application was restricted to 3–4 people for both groups, it was observed that only one student from the experimental and control groups knew the Mentimeter application. Before implementing, both groups were informed about using Google

3. Finding

In this part of the study, the answer to the question of 'Does Web-based tool Kahoot and Mentimeter based instruction have an effect on the attitudes of prospective classroom teachers for e-learning?'. For this purpose, the attitude scale towards e-learning was implemented as a pretest and posttest to the experimental and control groups before and after the application that lasted for 4 weeks.

The scale has a two-factor structure; these are factors that are e-learning susceptibility and e-learning avoidance. The analysis of the data of prospective teachers in the experimental and control groups is presented in subtitles.

3.1. Comparison of experimental and control group pretest scores

The results of the t-test analysis for the independent groups regarding the pretest arithmetic means of the pretest of teachers' e-learning susceptibility and e-learning avoidance are given in Table 2.

Table 2. Dependent sample t-test results of experimental and control group pretest e-learning susceptibility and avoidance scores

Factor	Implementation	Group	N	\bar{X}	Ss	df	t	p
e-learning susceptibility	Pretest	Experiment	27	31.25	7.20	54	-1.37	0.18
		Control	29	34.22	7.56			
e-learning avoidance	Pretest	Experiment	27	26.77	8.20	54	1.38	0.17
		Control	29	24.29	7.27			

When Table 2 is examined, there was no statistically significant difference [$t(54) = -1.37; p > 0.05$] between the pretest arithmetic mean scores of the experimental group ($\bar{X} = 31.25$) and control ($\bar{X} = 34.22$) group. No statistically significant difference [$t(54) = 1.38; p > 0.05$] was found between the experimental ($\bar{X} = 26.77$) and control ($\bar{X} = 24.29$) group teachers' arithmetic mean scores in e-learning avoidance dimension. As a result, it can be said that the experimental and control groups are equal in the dimensions of susceptibility and avoidance towards e-learning.

3.2. Comparison of experimental and control group posttest scores

The results of the t-test analysis for independent groups related to posttest arithmetic means in the e-learning susceptibility and e-learning avoidance are given in Table 3.

Table 3. Dependent sample t-test results of experimental and control group posttest e-learning susceptibility and avoidance scores

Factor	Implementation	Group	N	\bar{X}	Ss	df	t	p
e-learning susceptibility	Posttest	Experiment	27	37.66	7.37	54	1.42	0.16
		Control	29	34.55	9.02			
e-learning avoidance	Posttest	Experiment	27	26.37	7.66	54	1.02	0.31
		Control	29	24.29	7.27			

When Table 3 is investigated, no statistically significant difference [$t(54) = -1.42; p > 0.05$] was found between the posttest arithmetic mean scores of the experimental ($\bar{X} = 37.66$) and control ($\bar{X} = 34.55$) group of teacher candidates.

3.3. Comparison of experimental group pretest-posttest scores

The results of the t-test analysis for the independent groups related to the pretest-posttest arithmetic means of the teachers' tendency towards susceptibility and avoidance towards e-learning are given in Table 4.

Table 4. Dependent sample t-test results of experimental group pretest-posttest e-learning susceptibility and avoidance scores

Factor	Implementation	Group	N	\bar{X}	Ss	df	t	p	η^2
e-learning susceptibility	Pretest	Experiment	29	31.62	7.42	56	-2.72	0.01*	0.99
	Posttest	Experiment	29	37.37	8.16				
e-learning avoidance	Pretest	Experiment	29	26.31	8.52	56	-0.03	0.97	--
	Posttest	Experiment	29	26.37	7.89				

* $p < 0.01$.

When Table 4 is examined, a statistically significant difference [$t(56) = -2.72; p < 0.05$] was found between the pretest ($\bar{X} = 31.62$) and the posttest ($\bar{X} = 37.37$) arithmetic mean scores in the e-learning susceptibility dimension. In other words, it was understood that the instruction carried out with Web 2.0-supported Kahoot and Mentimeter applications positively affected the attitudes of teacher candidates towards e-learning. The degree of effect size (eta square $\eta^2 = 0.99$) was found to have a large effect. There was no statistically significant difference [$t(56) = -0.03; p > 0.05$] between the pretest ($\bar{X} = 26.31$) and posttest ($\bar{X} = 26.37$) arithmetic mean scores of teacher candidates in e-learning avoidance dimension. According to this result, it can be said that Web 2.0-supported Kahoot and Mentimeter applications do not affect the e-learning avoidance of prospective teachers.

3.4. Comparison of control group pretest–posttest scores

The results of the t-test analysis for the independent groups related to the pretest–posttest arithmetic means of the teachers' tendency towards susceptibility and avoidance towards e-learning are given in Table 5.

Table 5. Dependent sample t-test results of the control group pretest–posttest e-learning susceptibility and avoidance scores

Factor	Implementation	Group	N	\bar{X}	Ss	df	t	p
e-learning susceptibility	Pretest	Control	27	34.22	7.56	52	-1.53	0.87
	Posttest	Control	27	34.55	9.02			
e-learning avoidance	Pretest	Control	27	25.70	8.05	52	0.69	0.49
	Posttest	Control	27	24.29	7.27			

When Table 5 is examined, no statistically significant difference [$t(52) = -1.53; p > 0.05$] was found between the pretest ($\bar{X} = 34.22$) and posttest ($\bar{X} = 34.55$) arithmetic mean scores in the e-learning susceptibility dimension. There was no statistically significant difference [$t(52) = 0.69; p > 0.05$] between the pretest ($\bar{X} = 25.70$) and the control group posttest ($\bar{X} = 24.29$) arithmetic mean scores of teacher candidates in the e-learning avoidance dimension. According to this result, it can be said that there is no difference between the pretest–posttest in the control group's susceptibility and avoidance of e-learning.

4. Discussion and conclusion

With the developments in technology, there are changes in learning environments, and it is necessary to design interactive e-learning environments in and out of the classroom. One of the factors that accelerate this transformation is Web 2.0 tools. Kahoot application, which is one of the Web 2.0 tools, is more known by educators, while the Mentimeter application is used less. In this study, the effects of Kahoot and Mentimeter supported learning methods on the e-learning of the preservice teachers who study at the education faculty classroom teaching department. As a result of the study, it was observed that Kahoot and Mentimeter applications have a large effect on the e-learning disposition of prospective teachers studying in the classroom teaching department.

Repetitions carried out through formative assessment activities in Kahoot-supported applications support learning process (Sad & Ozer, 2019), and game features of the application in foreign language instruction allow learners to engage actively and enjoy learning (Yuruk, 2019). In Mentimeter applications, it was seen that students actively engage in classroom activities and enjoy learning as in Kahoot applications (Skoyles & Bloxside, 2017). These game-based applications are considered entertaining not only in classroom applications but also for distance education (Korkmaz & Tetik, 2018).

Studies that Kahoot was used with prospective teachers shown that this application is recognised as developing self-efficacy beliefs, demonstrating ways to integrate technology (Gursoy & Goksun, 2019), being emotionally fun, facilitating the cognitive learning process (Bolat, Simsek & Ulker, 2017) and providing detailed and instant data analysis (Zengin, Bars & Simsek, 2018). It was determined that the Mentimeter application contributes to the development of teachers' digital skills and awareness of technology (Skoyles & Bloxside, 2017).

In most of the studies, the motivation feature of Kahoot is emphasised. It increases motivation in mathematics and Turkish learning (Batibey & Mete, 2019; Zengin et al., 2018), increases the motivation of foreign students learning Turkish (Ayaz, 2019), increases motivation thanks to the sense of competition created by gamification (Sad & Ozer, 2019) and promotes academic achievement by creating an entertaining (Bolat et al., 2017; Polat, 2019) and engaging environment (Iwamoto et al., 2017).

It is possible to apply various evaluations with Kahoot and Mentimeter applications. Students who learn Turkish as a foreign language increase their level of readiness and awareness of the language thanks to the assessment and evaluation activities conducted with the Kahoot application (Ayaz, 2019). It also is perceived to be beneficial instead of evaluations made on the paper (Sahin, 2019). Teachers prefer Kahoot in their evaluations (Topalsan, 2019).

With Mentimeter, students benefit more from digital tools and interact with the content they learn (Skoyles & Bloxside, 2017). With applications, an electronic mind map can be created in Mentimeter (Bielinis, 2018). In Mentimeter applications, the personal information of the student is not reflected on the teacher screen. With this feature, shy and anxious students in the classroom feel more comfortable and their participation in the class increases (Skoyles & Bloxside, 2017).

Interactive classroom environment, student participation, activity, and instructional games, which are features of e-learning, are the factors that define the quality of e-learning. Therefore, Web 2.0 tools can be regarded as essential factors affecting quality e-learning. In this study, it was seen that there was a large effect size against e-learning as a result of Mentimeter- and Kahoot-supported education for prospective classroom teachers. According to this result, Mentimeter and Kahoot can be used as an effective web tool in e-learning environments. The most important limitation of these applications is that they require an internet connection and extra hardware (pc, tablet and smartphone), and the Mentimeter application has word limitation.

This study is limited to Kahoot's evaluation feature and Mentimeter's word cloud feature. In studies to be carried out, studies using other features of these applications can be done. The application was carried out with prospective classroom teachers. Awareness of teachers about Web 2.0 tools can be increased in in-service training courses. Thus, teachers studying in various branches and schools can be provided with interactive lessons in their classrooms using Web 2.0 tools in their classrooms.

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