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Online and blended learning approach on instructional multimedia development courses in teacher education

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In this study, an e-learning environment was designed for teacher candidates. Teacher candidates developed multimedia-based projects by means of multimedia tools. This research aims to determine the effects of online and blended learning approaches on the success level of multimedia projects and the teacher candidates' attitudes, opinions and perceptions on e-learning. This study used a combination of qualitative and quantitative methods. There were two different groups in the study: online and blended groups. The online and the blended groups consisted of 30 and 32 teacher candidates, respectively. Teacher candidates in the blended group developed multimedia-based projects and shared information communicating in a WiziQ and Facebook environment with their peers and instructors when they were not at school. On the other hand, the teacher candidates in the online group communicated with their instructors and peers only in a WiziQ and Facebook environment. The results showed that the blended learning approach was more effective than the online learning approach. The usability of online learning and blended learning in higher education is addressed in recommendations for future research and practice.

Keywords: online learning; blended learning; Web 2.0; WiziQ; Facebook; multimedia design

Introduction

In recent years, the popularity of Internet usage and Internet communication tools has become more important than ever (Tezer & Bicen, 2008; Uzunboylu & Ozdamli, 2011). This is also reflected in popular education. Consequently, the use of Internet tools in education is rapidly growing. With the use of Internet, online education tools are providing various advantages for 'distant learning', which has taken an important position in our lives (Cavus, Uzunboylu, & Ibrahim, 2008). Teacher candidates are presented with Internet technologies in various new learning services. Through Internet tools, a wide range of resources and content can be shared easily. Therefore, the Internet is playing a crucial role in delivery of higher education lectures. Differences have been observed in the way teachers manage the use of the Internet in education. According to Kember, McNaught, Chong, Lam, and Cheng (2010), there are a number of available websites, which teachers use in their lectures.

Nussbaum and Sinatra's (2003) study stated that educators were receiving good use from various websites' tools. The term Web 2.0 showed itself with different tools

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on the Internet. As an example, recently used beneficial education tools are the product of Web 2.0. Communication and sharing is becoming easier with Web 2.0 (Cabada et al., 2009; Ito, 2008). Web 2.0 tools allow learners to read information whilst, networking with their friends. Moreover, the learners can share knowledge with each other. Hence, the web pages have acquired a dynamic dimension on sites such as Facebook, Twitter. Social network sites have attracted millions of users; many of them have integrated their daily practices with these sites. The effects of development are mostly seen in informatics and technology fields. The learners can learn anytime and anywhere in an online learning context. However, it is not possible for instructors to always be online in order to assist learners engaging in reflective practice (Uzunboylu, Bicen, & Cavus, 2011). The most important advantage of online learning is that the learners are able to access the educational materials, whenever needed. However, all education-based online learning environments are not suitable for teaching principles (Chen, Wei, Wu, & Uden, 2008). If there was a considerable amount of interaction, the student perspectives towards such environments would show a growth (Donnelly, 2010a,b; Woltering, Herrler, Spitzer, & Spreckelsen, 2009).

Online learning, through courses delivered completely online or through blended learning models, which combine classroom-based activities with an online component, and constitutes a part of many teacher candidates' experiences.

According to Penuel, Korbak, Cole, and Jump, (1999) one of the key reasons why multimedia projects may be so successful is that the teacher candidates feel themselves more comfortable in an online environment and as a result participation to the courses increases. Multimedia environments can be used for two purposes: the first one is for supporting teacher candidates studying with multimedia environments and the second is for making the teacher candidates learn while they are creating new multimedia environments (Ozdamli & Uzunboylu, 2009). As Thomas, Fernandez, and Manjon (2009) emphasized, it is not enough to present the teacher candidates only the technical information in the courses of software development and multimedia environment development.

Leading them to gain software development skills in real life is also required. Hence, in order to develop an effective multimedia environment, well coordinated teams are needed.

In addition, traditional teaching roles become less clear; and some educators may focus on the technology and disregard the learning goals (Twomey, 2004). Some studies compare blended learning approach, face-to-face learning approach and e-learning approach (Garrison & Kanuka, 2004; Graham, 2006; Lapsley, Kulik, Moody, & Arbaugh, 2008; Macdonald, 2008; Ocak, 2010; Severino & Messina, 2010). However, there is no research that compares blended and online learning on instructional multimedia courses. In this study, multimedia environment was used for both purposes; supporting teacher candidates studying with multimedia and making teacher candidates learn while they are creating instructional multimedia environments. Consequently, this research compares the effects of blended and online learning approach on instructional multimedia development course.

Technical difficulties are one of the most commonly reported obstacles of online education (Hara and Kling, 2000; Smyth, Houghton, Cooney, & Casey, 2011; Welker and Berardino, 2005). Information technology (IT) ability and access may affect students' ability to engage in the online environment (King, 2002). For this reason, the tools that can be accessed easily by the student must be chosen. The

research carried out in this field reveals that Facebook and Web 2.0 tools are commonly used by the students (Hew, 2011; Uzunboylu et al., 2011). In addition, traditional teaching roles become less clear; and some educators may focus on the technology and disregard the learning goals (Twomey, 2004).

Some studies compare blended learning approach, face-to-face learning approach and e-learning approach (Garrison & Kanuka, 2004; Graham, 2006; Lapsley et al., 2008; Macdonald, 2008; Ocak, 2010; Severino & Messina, 2010). However, there is no research that compares blended and online learning on instructional multimedia courses. In this study, multimedia environment was used for both purposes; supporting teacher candidates studying with multimedia and making teacher candidates learn while they are creating instructional multimedia environments. Consequently, this research compares the effects of blended and online learning approach on instructional multimedia development course.

Theoretical background

Constructivist theories popularity was increased in learning in the early 1990s. According to constructivist theory, there is no one known meaning in the world. Instead, there exists many ways to obtain information. Accordingly, as there exists various significant ways of obtaining information, there are different perspectives for any given situation and term (Duffy & Jonassen, 1992). The main Constructivist models aim to make exercises which support teacher candidates on obtaining information via developing their experiences and being objective by transferring their aims as 'knowledge objects' (Säljö, 2000). Therefore, constructivist theories are composed of active student models with knowledge objects. As Hrastinski (2009) states, information is not learned only in the classroom. Experiences gained from external sources are significant (Rovai, Wighting, & Lucking, 2004). An example to this, in higher education, learning happens with external experiences (Uzunboylu et al., 2011). As indicated by a number of researchers, the online learning strategies are being used for learning and teaching in higher education. However, teacher candidates' educational experiences are also supported by other learning materials (Michlitsch & Sidle, 2002).

The attributes of the e-learning environments have some similarities with the constructivist theory. According to Chuang and Tsai (2005) Internet-based instruction is an openly distributed system; therefore, learners can actively enroll in any given curriculum content or participate learning activities at any time and at any place, where only has to be equipped with a computer and the Internet connection. In addition, in the learner-centred e-learning environments, learners could help the contents to be organized and learned. E-learning environments enable and provide synchronous and asynchronous communication. Thus, learners can create social interactions. This is similar to constructivist theory features. Learners can share experiences with others through disucssion, argumentation and negotitation in constructivist theory.

Online and blended learning

When the historical development of distant learning is considered, primarily there was one-way communication (radio, television, etc.) and then the advances in technology brought about computer and web-based education (Tino, 2002).

Tapanes, Smith, and White (2009) stated that online distance learning technologies have the potential of enhancing opportunities for interaction between learners and instructors from a vast diversity of countries.

Chuang and Tsai (2005) indicated that Internet-based instruction has been widely spread on the Internet in recent years. In the Internet-based learning environments, teacher candidates could have a variety of new learning opportunities. For example, with the use of the Internet, distance education has switched from the objectivist approach to the constructivist environments (Passerini & Granger, 2000).

The popularity of distant and blended learning is increasing (So & Brush, 2008). Blended learning, which combines classroom instruction with e-learning, can maximize the benefits of both face-to-face and online methods (Bonk & Graham, 2006; Garrison & Kanuka, 2004; Graham, 2006; Macdonald, 2008; Macdonald, 2008; Osguthorpe & Graham, 2003).

A blended learning model combines the different advantages of face-to-face education and e-learning to ensure an effective learning environment is provided to the teacher candidates (Kose, 2010). A variety of researches support the blended learning strategy for educating and teaching activities (Perez, Ruiz, & Gayo, 2006; Smet, Keer, & Valcke, 2008; Soekartawi, 2006). Shachar and Neumann (2010) provided evidence that teacher candidates in a distance learning setting outperform their counterparts in 'traditional' learning environments.

Dziuban, Hartman, and Moskal (2004) described the blended learning characteristics as (1) a shift from teacher-centred to student-centred instruction in which teacher candidates become active and interactive learners; (2) increased student–instructor, student–student, student–content and student–outside resources interactions and (3) integrated formative and summative assessment mechanisms for teacher candidates and instructors. These characteristics make blended learning very effective.

Literature review

In the last decade, many studies have been done comparing online and face-to-face learning approaches (Arbaugh et al., 2009). Some studies demonstrated that these two delivery mediums do not create any differences on examination performance (Abraham, 2002; Piccoli, Ahmad, & Ives, 2001). Some studies showed meaningful differences in attitudes towards the delivery medium of the Internet. In addition, teacher candidates received high marks in a short time with spending less effort and this result can be revelation of effective learning. Various studies were done examining ease of use and usefulness of the environments for e-learning and blended learning (Liaw, 2008; Locatis, Vega, Bhagwat, Liu, & Conde, 2008; Sun, Tsai, Finger, Chen, & Yeh, 2008). These studies show that there had been positive results on student successes when online materials were integrated into traditional learning (Boyle, Bradley, Chalk, Jones, & Pickard, 2003; Lim & Morris, 2009; O'Toole & Absalom, 2003). The research, performed by Lopez-Perez, Perez-Lopez and Rodriguez-Ariza (2011), demonstrated that blended learning activities had positive effects on increasing the students' results. However, Kirschner and Karpinski (2010)'s study, which compared, the effects of an online approach, using Facebook, with classroom-based learning approaches on teacher candidates' success, illustrated that Facebook users had lower general point averages (GPAs) and studied fewer hours per week than non-users.

Using an equivalency theory, Lapsley et al. (2008) investigated the online and classroom-based sections of an undergraduate course in human resources. They found that when equal experiences were provided in both learning approaches, learners using the online approach performed better than the classroom-based learners. The University of Granada carried out a study of the blended learning amongst 1431 registered teacher candidates in the 2009–2010 academic years. This study showed that blended learning had a positive effect in reducing dropout rates and in improving exam marks. Moreover, the teacher candidates' perceptions of blended learning were interrelated with their final marks depending on the blended learning activities (Lopez-Perez et al., 2011).

The aim of the study

This research's aim is to determine the effects of online and blended learning approaches on multimedia projects, based on the opinions and perceptions of the higher education teacher candidates. In order to achieve this objective, the authors sought answers to the following questions:

(1) What is the difference in the success rate of teacher candidates studying in online and blended learning groups?
(2) Is there a significant difference between the pre-test and post-test scores of teacher candidates' attitudes towards e-learning in online and blended groups?
(3) Is there a significant difference between teacher candidates' perceptions of online and blended learning groups depending on whether or not they are studying in an e-learning environment?
(4) What are the teacher candidates' opinions of an e-learning environment?

Method

This study used a combination of qualitative and quantitative methods. The qualitative method consisted of interviews whereas the quantitative method consisted of surveys and exams.

Setting

This experimental study, using Web 2.0 tools such as WiziQ and Facebook, was carried out at Near East University (NEU), Department of Computer Education and Instructional Technologies (CEIT). Teacher candidates in the online group attended synchronous and asynchronous online courses and shared information by communicating with their peers and instructors. Teacher candidates in the blended learning group attended synchronous and asynchronous courses online and laboratory courses face-to-face.

Participants

General point average of the teacher candidates was calculated and sorted in a descending list. Of the 69 teacher candidates, 62 volunteered to participate in the study. This study comprised two different groups: online and blended groups. A random

method was applied when assigning teacher candidates to the online and blended groups. The online group consisted of 30 teacher candidates. Fifty-three per cent and 47% of the teacher candidates were males and females, respectively. Twenty-one years was both the mean age and the median age. The blended group was composed of 32 teacher candidates, 40% females and 60% males, whose median age was also 21. According to Fraenkel and Wallen (2006), there are no specific rules for determining the size of a group in experimental research, therefore minor difference in the sizes of two groups were neglected. It was known that the teacher candidates in the study groups had sufficient knowledge and skills to use the environment. In order to determine whether or not the GPA of teacher candidates in each group affected the results of the study, and, if it was necessary to form new groups, the GPA of teacher candidates in each group was tested using *t*-test. The results were as follows.

A total of 62 final year undergraduate teacher candidates in the CEIT department participated in this study. All teacher candidates were studying Multimedia development in the field of Instructional Technology and Material Development. The GPA of the teacher candidates was calculated and sorted in a descending list. Of the 69 teacher candidates, 62 volunteered to participate in the study. This study comprised two different groups: online and blended groups. A random method was applied when assigning teacher candidates to the online and blended groups. The online group consisted of 30 teacher candidates. Fifty-three per cent and 47% of the teacher candidates were males and females, respectively. Twenty-one years was both the mean age and the median age. The blended group was composed of 32 teacher candidates, 40% females and 60% males, whose median age was also 21. According to Fraenkel and Wallen (2006), there are no specific rules for determining the size of a group in experimental research, therefore minor difference in the sizes of two groups were neglected. It was known that the teacher candidates in the study groups had sufficient knowledge and skills to use the environment. In order to determine whether or not the GPA of teacher candidates in each group affected the results of the study, and, if it was necessary to form new groups, the GPA of teacher candidates in each group was tested using *t*-test. The results were as follows.

As can be seen from Table 1, there was no significant difference ($t = -0.79$, $p > 0.05$) between the GPA scores of the teacher candidates in both groups. Based on the above findings, it can be claimed that groups were appropriate and homogeneous for an experimental study.

Materials and procedure

The multimedia development course

e-Learning was not a key feature of the department but the named multimedia development course was taught using online tools. The course required teacher

Table 1. GPA grades of online group and blended group.

Groups	*N*	*M*	SD	*t*	*P*
Online	30	2.72	0.40	−0.79	0.43
Blended	32	2.79	0.41		

Note: *Significant at the 0.05 level of confidence.

candidates to work synchronously and asynchronously to develop a multimedia-based project. The multimedia development course was a final year course in the department.

The preparation of the educational environment

The principles of constructivist approach were used in developing the educational environment and the activities carried out during the study. At the beginning of the study, the researchers created the http://www.WiziQ.com/ceit address in signing up to WiziQ. An interactive virtual classroom environment was created thanks to the many features of WiziQ profile tools. The advantages of WiziQ profile tools are that they allow the adding of a chat tool, which enables a student to have a chat with instructors and peers synchronously. In addition, from WiziQ, instructors and teacher candidates can send messages to each other. WiziQ, as a technology supported collaborative learning environment model, allows teacher candidates to learn, share, discuss, chat or construct knowledge by submitting projects and to receive feedback from their friends and instructors to improve their projects.

In this environment, instructors and teacher candidates could share videos from the content library and Youtube. Lesson-related materials, which feature word documents, pdf documents, excel documents, Power Point documents, video files, audio files and flash files could be added to the library users' computers. Such materials could include different sites such as Youtube, Authorstream, scribd, slideshare, etc.

WiziQ enables anyone to teach or learn about anything that they want without geographic boundaries. It is an easy tool to use, which works on any operating system, and requires no installation or changes in the user's system. No technical expertise is needed and, with little or no training, anyone can learn in minutes how to benefit from WiziQ. Instructors could schedule a class with a title, date, time and duration. Instructors could record courses and share in WiziQ and Facebook. Consequently, teacher candidates are able to follow missed classes and upload and download files. In addition, the instructor could sets up who attends the courses and invite teacher candidates via e-mail and Facebook to do so. In the educational environment, WiziQ and Facebook, which include the communication tools such as whiteboard, screen sharing, media player, video and audio conference, chat, and content library, could be used together. Instructors and teacher candidates could use whiteboard for writing course notes, drawing graphs, sharing course materials, sharing screen, giving feedback with emotion icons, and drawing highlights. In this environment, instructors and teacher candidates could share videos from the content library and Youtube. Lesson-related materials, which feature word documents, pdf documents, excel documents, Power Point documents, video files, audio files and flash files could be added to the library users' computers. Such materials could include different sites such as Youtube, Authorstream, scribd, slideshare, etc.

The course materials were prepared interactively to Sharable Content Object Reference Model (SCORM) standards. Course materials, embedded in the WiziQ, were reviewed by experts in the field and the links about the course were added, also. Moreover, at the beginning of the study on the environment, an explanation was given of the instructors' expectations of the multimedia-based projects, which teacher candidates would develop throughout the term.

Application

Blended and online groups

At the beginning of the study, the researchers applied an '*e-learning attitude*' scale to the teacher candidates in order to determine e-learning attitudes before the study. Later on, teacher candidates were given detailed information about the WiziQ with Web 2.0 tools, which would be used in the study. This study was carried out in one academic semester (14 weeks) according to the blended learning approach. The teacher candidates enrolled in the multimedia development course and the instructor communicated for two hours per week in a computer lab, two hours per week synchronously on the Internet, and, for the rest of the week, they communicated asynchronously on the Internet.

As in the blended group, early in the study, the researchers applied '*e-learning attitude*' scale to the teacher candidates to determine e-learning attitudes before the study. Later on the first day of the course, teacher candidates were given detailed information about the WiziQ and Web 2.0 tools, which would be used in the study. This study was carried out in one academic semester (14 weeks) according to the online learning approach. The teacher candidates enrolled in the multimedia development course and the instructor communicated for four hours a week synchronously on the Internet and, for the rest of the week and throughout the semester, they communicated asynchronously on the Internet.

The teacher candidates' tasks in both groups, throughout the study, were to research, discuss the given topics with their peers and develop Multimedia-based projects about these topics. The teacher candidates discussed online the projects, which they developed, after publishing them on Facebook and WiziQ. The instructor was attentive and helped the teacher candidates, whenever help was needed, and provided the help, using WiziQ and Facebook. Besides, the instructor managed the learning environment, organized the activities, followed the synchronous and asynchronous activities of the teacher candidates' and analysed them. The cooperative learning style studies were prepared, also by using WiziQ. Teacher candidates uploaded their works to the environment and presented comments to their friends. Feedbacks on these studies were provided both in WiziQ and class environments. At the end of the 14-week period, pre-service teacher groups presented the Multimedia-based projects, which they had developed. On completion of the presentations and evaluations, the scale '*E- Learning attitudes & perception*' was applied to the teacher candidates. Moreover, 15 teacher candidates from each group were interviewed face-to-face by the researches, each for 10–15 minutes.

Data collection and analysis

Assessment of multimedia-based projects

The validity and reliability of the assessment educational software were confirmed by three experts in the field of educational technologies and by one curriculum expert and one instruction expert. The multimedia-based projects were modified based on the feedback received from these experts and, then, evaluated by three experts in the field of educational technologies, who did not know the identity of teacher candidates as their names were hidden during the evaluation process. Evaluations were carried out on a forum with 100 being the top mark and the results were analysed based on the average grades.

The '*E-Learning attitudes & perception*' scale ($\alpha = 0.920$), prepared by the researchers, was used to determine the attitudes and perceptions of the teacher candidates in the study. The scale was applied to both blended and online groups. The survey was offered online in order to improve the response rate. The scoring ranged from 5 '*Certainly Agree*' to 1 '*Certainly Disagree*'. Validity has been established by the use of factor analysis and the scale by a review of six experts in educational technology. Selected items were revised based upon their comments and recommendations. For determining the factor structure, paraphrasing and verifying factor analysis were done and it was observed that in the analysis, the items of the scale were added in two factors. Afterwards, the items were examined and regarding the features that have been assessed, these factors were defined as, 'e-learning attitudes' and 'e-learning perceptions' The scale had two dimensions and was composed of 47 items. The first dimension included 28 items ($\alpha = 0.928$) and the second dimension included 19 items ($\alpha = 0.910$). For the whole scale, Cronbach alpha (α) value was 0.920 and half-split reliability of the scale was 0.902. Thus, the internal consistency reliability of the measures used in this study can be considered as good. According to the researchers (Hung & Yuen, 2010; Sekaran, 2003), the closer the reliability coefficient value gets to 1.0, the better the reliability of the forum becomes. In general, reliability score which is less than 0.60, is considered poor; those between 0.60 and 0.70 are acceptable, and those over 0.80 are good. A reliable instrument is the one that gives consistent results (Fraenkel & Wallen, 2006).

Interview

As for the qualitative part of the study, an interview form, which was semi-structured and did not include leading questions, was constructed for the teacher candidates' experiences obtained during the study. The interview form consisted of four questions. In order to maintain the validity of the interview's content the questions were prepared by the researchers; six field experts were consulted and the necessary modifications were made to the interview form in the light of their recommendations. An appropriate environment was prepared for the teacher candidates to give accurate and sincere answers to the questions during the interviews. In order to create a secure environment, the interview questions were asked using day to day language. The interviews with the teacher candidates were held after the submission of the grades. A voice recorder was used during the interviews, each of which lasted approximately 10 minutes.

In the analysis of the data, independent *t*-test, repeated – measures ANOVA, mean and percentage were used.

Results

The four research questions, used to organize the presentation of the study results, were as follows.

Findings about the success rates of teacher candidates studying in online learning and blended learning environment

The results given in this section are based on the teacher candidates' grades obtained in assessment of multimedia-based projects.

In order to find out whether or not there was a statistically significant difference between teacher candidates studying in either an online learning and or a blended learning environment, an independent sample *t*-test was carried out. The results are shown in Table 2.

Teacher candidates could reach the instructor both in school and from their own places of study at any time. They were face to face with their instructor for 2 hours each week and had the chance to ask them questions. Teacher candidates were able to express themselves when they were face to face. Based on these results, it could be claimed that a blended learning environment could be used for the successful learning of multimedia-based projects.

The results clearly indicated that the teacher candidates studying in the blended learning environment ($M = 81.28$, $SD = 5.65$) had higher success rates than those studying in the online learning environment ($M = 70.43$, $SD = 6.34$). An independent sample *t*-test, based on assessment results, indicated a significant difference between the two groups ($t = -7.118$, $p < 0.05$).

The reason for the significant difference in the assessment between the two groups could be that the teacher candidates, studying in the blended learning environment, could reach the instructor both in school and from their own places of study at any time. They were face-to-face with their instructor for two hours each week and had the chance to ask them questions. Teacher candidates were able to express themselves when they were face-to-face.

Based on these results, it could be claimed that a blended learning environment could be used for the successful learning of multimedia-based projects.

e-Learning attitudes of teacher candidates in the online group and blended group

In order to find out whether or not there was a statistical difference before and after studying in this environment, repeated – measures ANOVA were carried out. From pre-test to post-test, the repeated-measures ANOVA results revealed a significant gain in e-learning attitudes ($F_{1,\ 60} = 16.729$, $p < 0.001$) for both online and blended groups (Figure 1). Overall, the teacher candidates' e-learning attitudes post-test score ($M = 3.82$, $SD = 0.47$) was significantly higher than the teacher candidates' e-learning attitudes pre-test score ($M = 3.53$, $SD = 0.49$).

This result demonstrates that online and blended learning approaches both affected teacher candidates' work towards e-learning positively.

In addition, the results of the repeated measures ANOVA, based on groups, revealed a significant interaction for the e-learning attitudes score difference from pre-test to post-test. The blended learners gained significantly more positive attitudes ($F_{1,\ 60} = 5270.94$, $p < 0.05$) from pre-test to post-test than the online learners (Figure 2).

Table 2. Success rates of teacher candidates studying in online learning and blended learning environment.

Group	*N*	*X*	SD	df	*t*	*P*
Online	30	70.43	6.34	60	−7.118	0.000
Blended	32	81.28	5.65			

*The mean difference is significant at the 0.05 level. Interaction for e-learning attitudes pre-test and post-test scores ($p < 0.05$).

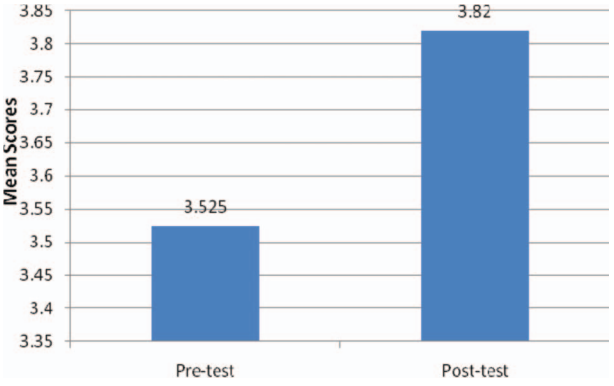

Figure 1. E-learning attitudes pre-test and post-test scores ($p < 0.001$).

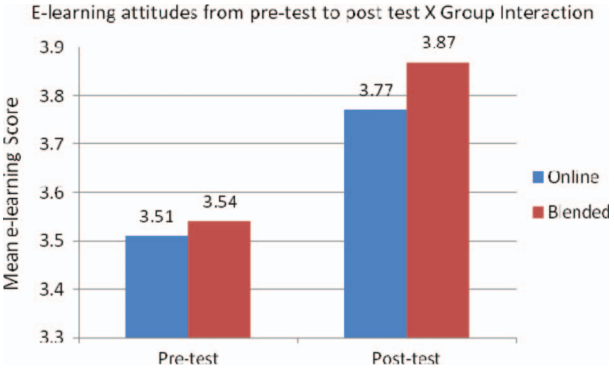

Figure 2. Pre-test to post-test by group interaction.

Post hoc results indicated that teacher candidates in the blended group scored significantly higher on their e-learning attitudes post-test score ($M = 3.87$, SD = 0.42) than the online teacher candidates ($M = 3.77$, SD = 0.52).This research, illustrating those teacher candidates' works and perceptions on e-learning, were affected variously by online and blended approaches. It is understood that the blended group's perceptions, who gained a greater acquisition of e-learning before the experiment, had more effects on increasing teacher candidates' perceptions towards e-learning compared to the online group.

Online and blended learning groups: teacher candidates' perceptions towards the state of their studying in e-learning environment

In order to find out whether or not there was a statistically significant difference between teacher candidates' perceptions studying in the online and blended learning groups; *t*-test was carried out. The mean and standard deviation values of teacher candidates' perceptions in the online and blended groups are presented in Table 3.

The results clearly indicated that teacher candidates, studying using the online approach ($M = 3.70$, SD = 0.75), had approximately similar perception scores as

Table 3. Teacher candidates' perceptions towards environment.

Group	*N*	*X*	SD	df	*t*	*P*
Online	30	3.70	0.75	60	−1.275	0.207
Blended	32	3.90	0.43			

Note: *Significant at the .05 level of confidence.

those studying using the blended learning approach ($M = 3.90$, SD = 0.43). As can be seen in Table 3, there was no significant difference ($t = -1.27$, $p > 0.05$) between the perceptions of the teacher candidates in both groups. Based on the above findings, it can be claimed that both groups indicated positive perceptions for studying in an e-learning environment. However, the teacher candidates, in blended group, showed more positive perceptions compared to the teacher candidates in the online group. This proved that following pre-done lectures in required time eased learning and whiteboard applications in the traditional class environment eased lecturing. According to these results, one could argue that teaching approach (online/blended) learning approach (blended/online) is not affected with the exception of some teacher candidates' perceptions on working in an e-learning environment.

The opinions of teacher candidates towards using e-learning environment

After completing the study, the researchers asked the teacher candidates several questions through face-to-face interviews in order to find out their opinions on the study. The teacher candidate interview analyses were used to capture the general views of teacher candidates towards using e-learning environment. The responses of teacher candidates' were regarded and listed; subsequently the responses were grouped according to their subjects.

In response to the question 'What is the most important advantage of using WiziQ and Facebook environment in lectures?'

Online group opinions

One of the most important advantages declared by the online group teacher candidates' is the possibility of repeating lectures as much as they wanted. Fatma remarked: '*I think most important advantage is that we could repeat the course videos when we needed*' and Cigdem said: '*Most important advantage is repeated feature of videos*'.

Besides, another commonly stated advantage is the guaranteed access to friends and instructors and the information sharing provision when they want.

Canan remarked one of the most interesting results: 'I feel that I have learned so much from my peers. They have the knowledge and ability that I do not have' and another student, Osman's said: 'I like contacting to my peers and instructors via Facebook and WiziQ as I can get quick replies from them'.

Most of the teacher candidates stated that this environment makes good use of both visual and audio. Pembe stated: '*The most important advantage is the visual and auditory presentation of the courses*'.

Some teacher candidates indicated that the projects ran on faster. Kenan said 'Projects progressed more quickly with the use of WiziQ and Facebook environment'. Also some students stated 'The use of environment is easy because we are using facebook in our daily life'.

Blended group opinions

As for the most of the Blended group of teacher candidates, they had flexible time for studying. Dervis responded as '*Wiziq and Facebook allowed us flexibility in our project development progress'* and Orkun said: '*The most important advantage is independence feature from time and place*'.

Teacher candidates indicated that they had repeating, and making good use of synchronous and asynchronous communication features. One answer from Muge: '*With asynchronous feature of Wiziq and Facebook, I repeated course videos more than once*'. Also Nihan remarked: '*It was entertaining to communicate with instructor anytime and anywhere*'.

Most teacher candidates in the blended group mentioned that this study was attractive and entertaining and thus increasing their motivation. An interesting response was made by Kemal as he said '*It was very fun and easy using features*'. Besides, teacher candidates in both groups agreed that integration of lectures with popular social websites such as Facebook always took their interest. Another student, Dilem said 'I use Facebook in my daily life so it is interesting to also use it in my lectures'.

Teacher candidates answers to the question; 'What are the disadvantages of using WiziQ and Facebook?'

Online group opinions

The responses demonstrated that most teacher candidates had Internet connection problems. Canan said '*Due to my slow internet connection, it takes time to access the video materials*'.

Ahmet's opinion was one of the most interesting results. He said: 'Sometimes, the status updates made by my friends takes my attention away' In contrast to that, Mehmet underlined that 'There is no disadvantage of using Facebook or WiziQ, on the contrary, its educational use increased my attention towards the lectures'. Also one of the teacher candidates mentioned that he had to go to an internet café as he did not own a computer. Emre responded as 'As I did not have computer, I needed to go to internet cafe to follow the lectures'.

Blended group opinions

Some of the teacher candidates from the Blended group also stated that they had connection problems when the Internet was slow. Tuba remarked '*When the internet connection was slow In Simultaneous audio video course, the biggest problem was the asynchronous arrival of video and audio*' and Ezgi said '*Due to the slow connection, a few times the simultaneous lectures took longer than usual*'. On the other hand, some of the teacher candidates claimed that the application did not have any negative effects. Nihan said that '*I think there is not any disadvantage of the system and it was very fun*'.

The answers of teacher candidates to the question; 'Would you prefer your lectures to be only on the internet environment or both in class and internet environment?'

Online group opinions

The responses demonstrated that most of the teacher candidates preferred using the blended approach.

The teacher candidates in the online group recommended processing the basic subjects in class and the rest in the Internet environment. Kemal remarked one of the most interesting result: '*I think first meeting should be in the class environment and the rest in online environment*' and Emre said '*The basic topics should be presented in class and other activities should carry online*'. Exceptionally, only one of the teacher candidates suggested that the lectures should take place only in the class environment. Tuba said '*I don't like participating in online courses; I want to see my instructor and my peers face to face*'.

Blended group opinions

Most of the teacher candidates in Blended group had the same opinion. Dervis remarked that '*I prefer consolidating the lectures on the internet that have been processed in the class environment*'. In addition, it is strange that one of the teacher candidates preferred that lectures should carry only in online environment. Muge said that '*I have not enough time for classes as I am also working at internet cafe so it is perfect to participate online courses*'.

The teacher candidates' answers to the question 'Was Facebook or WiziQ more useful when used in the lectures?'

Online group opinions

Answers of the students showed that WiziQ's use in practical and the computer lectures could be more successful. On the other hand, they mentioned that Facebook could be used for all the lectures. Ahmet said '*The use of WiziQ for practical and computer courses is better, as interactive whiteboard environment and screen sharing eases lecturing of these lectures. Also Facebook could be used in all of the lectures with the aim of increasing the attention to the lectures*'.

Blended group opinions

Most of the teacher candidates in Blended group stated that it could be used perfectly for all the lectures as there was an interactive environment. Dilem said that 'I think all lectures can be carried out from WiziQ and Facebook environment'. On the other hand one teacher candidate indicated that 'Computer courses should take on online environment.'

Discussion

An important result from the experimental study, which was carried out with the teacher candidates studying using a blended learning approach, was the statistically significant higher success rates than those studying using the online learning approach. Similarly, Lopez-Perez et al.'s (2011) study implied that the teacher

candidates, who attend blended learning activities, have positive effects at raising their marks for the exams. Kose (2010) indicated that a combination of face-to-face education and e-learning provided better teaching and learning experiences. Therefore, it can be claimed that the blended learning approach was more effective in higher education.

Overall, the teacher candidates' (blended and online group) attitude towards e-learning increased at the end of the study. Another important result revealed by the study was that the teacher candidates studying in the blended learning environment, scored higher in their attitudes towards e-learning than those studying in the online learning environment. As in Lopez et al. (2011) study, the teacher candidates, studying in blended learning environments, were found to be more successful in many studies in literature (Boyle et al., 2003; Lim & Morris, 2009; O'Toole & Absalom, 2003). It could be claimed that the blended learning approach was more effective than the online learning approach.

The other result of the research is that teacher candidates, who study using online and blended approaches, have more positive perceptions of learning. The approach, used in the study, did not change their perceptions of the e-learning environment. However, the perceptions of the teacher candidates, who study with a blended approach on 'Used e-learning environment eases learning' are more positive compared to those of online group teacher candidates. Similarly Lopez-Perez et al. (2011) identified that teacher candidates, who study with a blended learning approach have more positive perceptions.

The results of the teacher candidates' interviews confirmed that the teacher candidates, studying with a blended learning approach, have an advantage of receiving feedback just in time from the instructors in the class environment compared to teacher candidates using the online learning approach as the online group teacher candidates were faced with Internet problems creating difficulties and disrupting their learning.

The results of the teacher candidates' interviews confirm that the teacher candidates, studying with a blended learning approach, have an advantage of receiving feedback just in time from the instructors in the class environment compared to teacher candidates using the online learning approach as the online group teacher candidates were faced with Internet problems creating difficulties and disrupting their learning.

Bicen and Cavus (2010) stated that speed and type of the Internet is very important. In addition, the teacher candidates in the online group kept losing their motivation due to the problems occurred during the lectures. However, the blended learning teacher candidates were able to resolve these problems in the class environment with the instructors. The mutual vision of both groups demonstrated that it could be more effective when blended learning was used in experimental lectures. The interactivity of the environment was the main reason for their success. Consequently, this shows the inescapable benefits of blended learning.

Clearly, it was seen that blended and online learning approaches increased teacher candidates' perceptions towards e-learning and that the blended learning approach was more effective than the online learning approach in increasing success rates and e-learning attitudes. Additionally, this study's results indicated that sharing and learning information using Web 2.0 tools such as WiziQ and Facebook encouraged teacher candidates to develop multimedia-based projects. Similarly,

Hung and Yuen (2010)'s studies pointed out that use of Facebook and other social websites had positive effects on learning.

Conclusion and recommendations

The scientific researchers are proving that integration of e-learning activities into the education system has become a must. Some of the studies mentioned the positive effects, which e-learning produces whereas some demonstrated the negative effects. In order to overcome the negative effects, a blended learning approach could be useful. However, Deghaidy and Nouby (2008) stated that blended learning approach would require particular pedagogic skills from the teachers. Martyn (2003) implied that, composing a successful learning environment could start primarily with the face-to-face environment, then continue simultaneously with an unsynchronized environment and end again with a face-to-face conversation. However, it is obvious that web tools can create rich environments and the educational environments of the future should be created by means of technological tools. The blended learning environment, used in this study, can be used, also, in many other classes. In order to create a blended learning environment, each teacher should implement one or several Web 2.0 tools such as WiziQ, Facebook, Twitter, etc. These are available, free of charge, on the Internet and the teacher could choose the ones appropriate to his own context.

As in every study, there were a number of limitations attached to this research. The first limitation was the fact that only computer education instructional technology teacher candidates were surveyed. Nevertheless, it is our suggestion that any further research in this area should strive to include different departments in higher education so that more elaborate analyses can be performed and the studies can be longitudinal.

It can be concluded that the blended learning approach is useful for anyone interested in choosing an e-learning environment for learning. The individuals, who might be interested in using these environments, are teachers, teacher candidates, universities, schools, institutions or anyone, who may be looking for a blended approach, which will satisfy the required criteria.

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Fezile Ozdamli began her career in higher education at the Near East University in Computer Information Systems department. After a one-year preparatory education, she completed her undergraduate degree in 2004. During her undergraduate education, she has worked at 'Kibris Newspaper'. In 2005, at Near East University, she began her master's degree after getting into the Department of Computer Education and Instructional Technology and she graduated in 2007. She got into doctorate programme on the same program and completed it in January 2011. In June 2011, after the reviews of jury, she had the designation (title) of Assist. Prof. Dr. in Computer Education and Instructional Technology department and accordingly appointed to the relevant list. In 2008, at the Near East University, Ataturk Faculty of Education, in Computer Education and Instructional Technologies department, as an instructor she began lecturing computer and educational technologies related courses. Since the year of 2011, in the Department of Computer Education and Instructional Technology she has been serving as the Vice President at the Deputy Head of Master Program and Vice President at the Department of Science Teaching. She has one international and one national academic content books published by reputable publishing houses. Three of her articles at Social Sciences Index (SSCI) and 12 at the Educational field indexes (British Education Index, ERIC, Science Direct, Scopus, etc.) had been indexed and there are eight reports that had been presented and published at the international conferences by her. Also she is the editor of World Journal on Educational Technology journal.

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