African Educational Research Journal
Vol. 7(3), pp. 143-152, August 2019
DOI: 10.30918/AERJ.73.19.024
ISSN: 2354-2160
Full Length Research Paper

The effect of educational technologies on manners and sustainability of teacher candidates

Okan Sarigöz

Faculty of Education, Mustafa Kemal University, Serinyol, Hatay, Turkey.

Accepted 24 July, 2019

ABSTRACT

The practices of education and teaching are of paramount importance for the representatives of our future, children. Therefore, every nation is constantly seeking for more sustainable and more efficient education practices for its own future. Knowing that digital technology world is being frequently used by students, applying the use of this technology to the educational field would be desirable by all countries. The nations are in a permanent search for an education system that is self-refreshing, success raising, supportive of easier learning, motivation rising and capable of making classes more fun. This type of educational system seems only possible nowadays with the support of classes by digital technologies by teachers. The purpose of this study is to determine knowledge fund, competency, and manners of teacher candidates' on digital educational technologies and obtain their views on sustainability of digital technologies on education. The results of the research showed that digital educational technologies affected learning of teacher candidates positively, made classes more enjoyable, raised the attention levels, diminished the forgetfulness and reinforced the communication in between them.

Keywords: Educational technology, digital technology, 4DX educational technology, curriculum, sustainability in education.

*Corresponding author. E-mail: okan.sarigoz@gmail.com. Tel: +905531662382.

INTRODUCTION

In a post-modern knowledge based society on a century where preparations are continuing to apply artificial intelligence components on education; the expectations of societies towards education are rapidly changing and it is aimed to raise individuals with the abilities of solving complex problems, having cognitive flexibility, having high perceptional skills, constructing causation relations, creative and cooperative skills with the help of education (Keleşoğlu and Kalaycı, 2017; Söylemez, 2004; Xu et al., 2018; Gökmen et al., 2018).

The world of computational digital technology is improving in a mind blowing pace in terms of both self-development and producing, sharing and using the information (Orhan and Genç, 2018: 265). Thanks to cyber world, now you can carry out many functions such as shopping online and communicating with friends and reaching any desired information without having to get up from your couch. This cyber world that makes life much easier was considered by many countries to be applied in the educational environments and efforts were spent to make education more durable and meaningful by using number of digital materials ranging from augmented reality to virtual reality. However, in order to benefit from the advantages of this mysterious world, both conformity with the tools of developed and developing technologies and digital literacy are required.

To be able to organize symposiums, panels, seminars through cyber world, and teach by distance learning; a set of technologic gadgets, experts of the subjects and teachers that are digitally literate are needed. Today, with the globalization and improvement of technological tools, the importance of teachers' knowledge, skills and experience on digital reading, writing and presentation issues is rapidly rising (Şahen-Erkan and Balaban-Dağal, 2018: 133). The interaction offered by the world of technology preserves both distance learning and its

positive effects while presenting face-to-face interaction of traditional and modern education in cyber world.

With the impact of digital technology in the last century, the printed publications began losing their former importance and reading from a printed or written source is now being gradually replaced by e-technology and digital reading. Especially in the information society that we are a part of; digital technology became more preferable due to the factors of enlarging and reducing the text to make it in the desired size, storage, preservation and recording of the information, editing the data as one wishes, reducing the use of papers, the lightness and portability of equipment's, storage capacity, usage for multiple times, sharing the information remotely, raising the motivation, access to information from everywhere that has internet connection (Rose, 2011; Dyson and Haselgrove, 2001; Atal and Koçak-Usluel, 2011; Garland and Noyes, 2004; Gibson and Gibb, 2011; Spencer, 2006).

Particularly in meeting the demands of society on changing educational and societal needs, the schools are expected to raise students with the abilities of digital literacy, cooperation and communication in addition to high level thinking skills as critical thinking, creative thinking, problem solving, taking initiatives, rational and reflective thinking (Finegold and Notabartolo, 2010; Karataş et al., 2016; Ahonen and Kinnunen, 2015).

While technological products are actively used in many areas of education, digital technologies have been gradually utilized for game and exhibition purposes in education. The most favored one of those is the technology known as 4DX. The technology of 4DX was first introduced to the audience in 2009. 4DX is a game based digital technology that consists of seats capable of moving in three dimensions and providing vibration, equipment's that spray water into the air and release smells to the environment, light and sound effects, virtual glasses and augmented reality. The digital games and halls developed with 4DX technologies are still accepted as the most developed games and halls to the day.

Digital games have been mentioned in the field of education in time and some research was made over them. In one of the researchers on digital education, teacher candidates express themselves as sufficient in terms of using educational digital games on classes (Bağcı and Çoklar, 2014). A study by Göldağ (2018) revealed that digital game addiction level varies with respect to gender, internet connection, computer and mobile phone, educational status of parents and monthly income of the family whereas a study by Donmuş and Gürol (2015) showed that the settings of learning foreign languages supported by educational computer games contributes positively to students' all kind of access levels. Another study conducted by Tüzün et al. (2009) revealed that educational computer games raised the academicals success and motivation rates of students in learning the class of geography significantly while a research by Kablan (2010) concluded that educational computer games that were designated according to the objective of learning increases the learning levels of students and their academicals achievement and make the classes less boring (Kahyaoğlu and Elçiçek, 2016: 353).

In studies on the effects of lecturing with digital stories over the students, it was found that digital story-telling supports creative thinking skills, imagination and motivation; facilitates the individualization of learning and description of complicated subjects, constructing comfortable and non-wasteful educational environments; and supports student-based learning by helping students take more active roles compared to teachers (İnceelli, 2005; Xu et al., 2011; Kapp, 2012; Duveskog et al., 2012; Zichermann and Cunningham, 2011; Yang and Wu, 2012; Fiş-Erümit and Karakuş, 2015; Suwardy et al., 2013; Vu and Feinstein, 2017; Wang et al., 2013).

In educational environment, digital stories have a wide range of application including history, mathematics, ethical concepts, universal ethical principles, literature works, education of teachers, creative writing and thinking, health education, social and cultural studies, and language education (Abramovich et al., 2013; Kocaman-Karoğlu, 2015; Hebebci and Usta, 2018; McLellan, 2006; Lindgren and McDaniel, 2012; Oppermann, 2008; Robin, 2008; Kocaman-Karoğlu, 2016).

According to Conole and Alevizou (2010), educational digital technologies provide the student with the chance of moving beyond educational programmer and textbooks, and changing the content related to objectives, learning experiences and content creation. This can help boost their self-confidence considerably. Having higher self-confidence due to educational digital games; students can meet others outside the classroom, raise their pace of learning, have more relations, become more socialized, gain better sense of responsibility, express themselves better in social environments (Özerbaş and Akın-Mart, 2017; Aycan, 2008; Usluel and Mazman, 2009).

Digital games that have increasingly more impact on students are considered to be used in education effectively in a sustainable manner by developed countries. However the most important issue here is that these quality increasing (Aktaş, 2014) digital technologies should sufficiently know by teachers (Seferoğlu, 2006) and effectively used and teachers should constantly refresh their knowledge on digital games as the technologies develop.

The changes or plans that are designated on educational programme for educational technologies can only be possible with determining the current level of information of teachers or teacher candidates on educational digital technology, their manners towards technology, and their opinions on sustainability of digital educational game usage on education.

Research objective

The purpose of this research is to determine information level, competency, manners and opinions on sustainability of digital technologies on education of teacher candidates. For these purposes, answers were sought for the following questions:

1. Is there any statistically significant difference between *experimental group* pre-test and *control group* post-test results?
2. Is there any statistically significant difference between *experimental group* pre-test and *experimental group* post test results?
3. Is there any statistically significant difference between *control group* pre-test and *control group* post test results?
4. Is there any statistically significant difference between *experimental group* posttest and *control group* post test results?
5. What is the analysis of the responses of teacher candidates to research questions prepared?

Limitations of the research

This research has the restrictions below:

1. It is limited by 80 students studying in Hatay Mustafa Kemal University, Education Faculty, 2nd grade volunteering in the study.
2. The study is limited by teaching and education technologies (4DX technology) used as an educational material.

Model of the research

The research is of the experimental design type and is based on the views of teacher candidates. Pretest-posttest pattern model was utilized in the research. The working group of the study was randomly formed from teacher candidates of Education Faculty in 2nd grade, chosen candidates were randomly distributed to have 2 classes with 40 people in each class. In the research, experimental group is formed by the teachers lecturing with using digital technology and control group is formed by the teacher candidates lecturing with traditional methods.

Working group of the research

The working group of the research includes 80 teacher candidates in sophomore year on Hatay Mustafa Kemal University at 2018-2019 education period. Required permission was granted from related authorities for both research and application and teacher candidates.

Frequency distribution of working groups of participating candidates is shown in Table 1 while gender frequency distribution is provided in Table 2.

Based on Table 1, voluntarily participating teacher candidates consist of N=40 (%=50.0) people in experimental group and N=40 (%=50.0) people in control group. N=80 (%=100) teacher candidate took part in the study.

Based on Table 2, N=46 (%=57.5) female and N=34 (%=42.75) male teacher candidates voluntarily partake in the study. In total, N=80 (%=100) teacher candidates were worked with.

Table 1. Frequency values of working group.

Groups	N	%
Experimental group	40	50.0
Control group	40	50.0
Total	80	100

Table 2. Gender frequency values of the working group.

Gender	N	%
Female	46	57.5
Male	34	42.5
Total	80	100

METHODOLOGY

The section includes information on preparation stage of the research, preparation of data collection tools, and application of the research.

Preparation of the research

Firstly, a major course taught in sophomore year in Education Faculty named “Educational Technologies and Material Design” and its curriculum was examined for the research. One of the subjects of the course called “ Learning Theories and New Programmers” and its topics were chosen to be studied. Subjects were prepared in accordance with 4DX technology in order to be watched with virtual glasses and augmented reality, by taking help from Computer and Instructional Technologies department faculty. Afterwards, an arrangement was set up with a cinema hall that has 4DX technology section. 4DX technology section of the cinema hall consists of virtual glasses that raise the feeling of reality on participant, technologies with augmented reality, machines that have leverage below and can move up

and down, seats rotating sideways that have seatbelts, machines with capability of releasing smell, ventilators blowing wind to spectators, and equipment's that spray water inside the place.

Data collection tool

In order to collect the data of the research, "Manners Scale for Digital Technology" that was developed by Cabı (2016) and was not used in any research before was utilized by granting permission from the developer. The scale that consists of 39 items and has Kaiser-Mayer-Olkin value of 0.906, Cronbach Alpha coefficient that is the coefficient for validity and reliability of scale of 0.806 and factor analysis of scale items range between 0.32 and 0.82. Results of Confirmatory factor analysis of the scale are X_2=2045, N=689, Sd=674, p=0.000 implying that confirmatory factor analysis of the scales are in meaningful levels.

Application of the research

Before the beginning of the research, an essay writing task was offered to the teacher candidates on 'usage of digital technology on education, its effects on teacher and student', and based on the writings of candidates, 10 questions were prepared to be asked to teacher candidates related to the research at the end of the study. Further, before the research, "Manners Scale for Digital Technology" was applied to both experimental and control groups and results were analyzed with SPSS 20 statistical package programmer. After finding no statistically significant difference between Experimental group and Control group, the research proceeded. Lastly, the scale that was answered by teacher candidates at the beginning of the research was applied once more to the Experimental and Control groups at the end of the research. The application of the scale at first and last stage of the research is out of the 5 weeks period that is set for the research.

RESULTS

Analysis results of the responses to manners scale

On the basis of data on Table 3 and analysis of responses of teacher candidates to scale items, it has been concluded that there was no significantly meaningful difference of approaches between *Experimental Group* pre-test and *Control Group* pre-test data. Therefore, it is possible to say that both groups have similar approaches on technology at the beginning of the research.

On the basis of data on Table 4 and analysis of teacher candidates' responses to scale items, a statistically meaningful difference was observed in between *Experimental Group* pre-test and *Experimental Group* post-test data in favor of *Experimental group* post-test. Therefore, it is possible to state that lectures with digital technologies can affect the manners of students positively.

On the basis of data on Table 5 and analysis of responses of teacher candidates to items in scale, a significant manner change was spotted in between *Control group* pretest and *Control Group* post test data in favor of *Control group* post test results. Therefore, it is possible to state that student manners changed positively for the lectures with traditional fashion, as well.

On the basis of data on Table 6 and analysis of responses of teacher candidates to scale items, a statistically meaningful manner change was spotted in between *Experimental Group* posttest and *Control Group* post test data in favor of *Experimental Group* posttest. Therefore, it is possible to state that manners of students on lectures with digital technologies were more positive than those with traditional education methods.

Responses of teacher candidates on experimental group to developed questions

Question 1. "How did digital 4DX technology affect your opinions?" The answers to the 1st question are laid in Table 7.

34 participant stated that educational technologies were more impressive than they expected, 27 of them mentioned that they know had more experience and knowledge on Educational Technologies, 21 people articulated that they have raised awareness on 4DX technology, 18 of them mentioned about increased awareness, 16 participant realized it was very entertaining, 13 persons thought it would be effective in teaching, 9 of them argued it would raise motivation, 5 of them imagined students would enjoy having lectures with technology more and 3 of participants agreed lectures taught with the help of technology would be understood better.

Question 2. "What kind of experiences did you gain during the applications of 4DX Digital Technology?" Table 8 shows the responses of teacher candidates to this question.

27 participant teacher candidate stated having more positive approach towards teaching technologies, 14 of them mentioned increased awareness, 9 of them articulated having gained more knowledge, 7 people told about learning how to use and 4 candidates mentioned their quest on how to teach lectures more effectivity with 4DX educational technologies.

Table 3. T-test analysis results of the responses of teacher candidates to scale items for Experimental group pre-test and Control Group pre-test.

Groups	N	$\bar{X}$	Ss	Sd	-t	p
Experimental group pre test	40	129.750	6.698	78	.573	.568
Control group pre test	40	130.650	7.326			
Total	80					p>0.05

Table 4. T-test analysis results of the responses of teacher candidates to scale items for Experimental group pretest and Experimental Group post-test.

Groups	N	$\bar{X}$	Ss	Sd	-t	p
Experimental group pre test	40	129.750	6.698	78	26.859	.000
Experimental group post test	40	170.350	6.822			
Total	80					p<0.05

Table 5. T-test analysis results of responses of teacher candidates for Control Group pre-test and Control group pre-test.

Groups	N	$\bar{X}$	Ss	Sd	-t	p
Control group pre test	40	130.650	7.326	78	5.902	.000
Control group pre test	40	143.325	11.439			
Total	80					p<0.05

Table 6. T-test analysis results of responses of teacher candidates to scale items for Experimental Group post-test and Control Group post-test.

Groups	N	$\bar{X}$	Ss	Sd	-t	p
Experimental group post test	40	170.350	6.822	78	12.833	.000
Control group post test	40	143.325	11.439			
Total	80					p<0.05

Table 7. Analysis of answers of teacher candidates to Question 1.

F	Responses
34	I was impressed beyond my expectations
27	I gained experience and knowledge on educational technologies.
21	It raised my awareness on utilizing technology within the lectures.
18	It raised my awareness on technology-assisted education.
16	I did not know it could be so much fun. It was entertaining.
13	I began to think that teaching lessons with technology would be more effective.
9	I think it will increase students' motivation for lectures.
5	I think students would enjoy lectures taught with these technologies more.
3	I think lectures taught in assistance with technology will be comprehended better.

N=40.

Question 3. "What do you think about the inclination of digital 4DX technologies to reality?"

Responses of teacher candidates to this question are shown in Table 9.

Table 8. Analysis results of teacher candidates' responses to Question 2.

F	Responses
27	My approach towards educational technology grew positively with 4DX technology.
14	4DX technology raised my awareness on educational technologies.
9	I gained more knowledge on 4DX educational technology.
7	I learned about the usage of 4DX educational technology.
4	I began searching about how to teach my lectures more effectively with educational technologies.

N=40.

Table 9. Analysis results of the responses of teacher candidates to Question 3.

F	Responses
31	There was no difference from reality.
23	It was realistic and very persuasive.
17	It was well designed.
8	It was exciting due to its similarities to reality.
5	I felt like a part of the game.

N=40.

31 of the participant teacher candidates stated noticing no difference of educational technology from reality, 23 of them mentioned about them as being very persuasive and realistic, 17 of them stated that it was well designed, 8 people expressed that it was exciting and 5 candidates argued feeling like a part of the game.

Question 4. "What do you think about the materials used in Digital 4DX technology?" Responses of teacher candidates to this question are provided in Table 10.

27 of participant teacher candidates stated observing modernization in the field 4DX education technology and material development, 11 of them mentioned that educational materials were very well designed, 7 of them stated that virtual world was not much different than the real world, and 3 of them expressed that educational technologies were designed so as to grab the attention of students.

Question 5. "How did digital 4DX technology impact your relations with your friends and faculty?" The answers of teacher candidates to this question are shown in Table 11.

33 of participating teacher candidates stated increased relation with their friends by communicating about the application just after leaving the application, 18 of them expressed improved communication with faculty, 13 of them mentioned having closer relations with faculty, 7 of them stated having increased communication with the staff of application and 2 participant told about having better communications with friends who did not participate in the application as they talked about it.

Question 6. "What do you think about the usage of digital 4DX technology on education?". Answers of teacher candidates to this question are presented in Table 12.

32 of participating teacher candidates stated using educational technologies would increase the attention of students towards classes, 29 of them stated it would raise students' motivation, 25 of them argued it would improve academicals success, 17 of them mentioned it would help for the better comprehension of lecture content, 13 of them agreed it would reinforce communication, 10 of them articulated lectures would be more enjoyable, 8 participant stated it would support creative thinking, 5 of them told it would decrease forgetfulness, 4 of them argued it would lead to equality of opportunities and 3 participant stated that it would save the lectures from being boring.

Question 7. "What are your opinions on suitability of digital 4DX technology to educational programmers?" The answers of teacher candidates to this question are provided in Table 13.

30 of participating teacher candidates stated that themes should be made appropriate for educational programmers and educational technologies about the suitability of using educational technologies on lectures, 25 of them argued it would bring a novel approach to teaching programmers, 18 of them agreed that teaching programmers should be rearranged by considering the recent educational technologies attained, and 9 of them expressed that the important point is that subjects of teaching programmers should be understandable with the help of 4DX educational technology.

Question 8. "At which level of education in schools can Digital 4DX technology be utilized?" The responses of teacher candidates to this question are shown in Table 14.

37 of participating teacher candidates stated that educational technologies could be used in all levels of education while 33 of them stated that primary schools, 19 of them stated secondary schools, 13 of them stated

Table 10. Analysis results of teacher candidates' responses to Question 4.

F	Responses
27	I was not aware of such modernized and developed technologies.
11	They are very well designed.
7	They make you feel in the real world even though it is a virtual world.
3	They are designed to attract the attention of students.

N=40.

Table 11. Analysis results of teacher candidates' responses to Question 5.

F	Responses
33	After the application, I have talked about it with my friends in excitement and my communication got stronger at that time.
18	Our communication with faculty improved as we talked about the application.
13	We became closer with faculty while talking about the application.
7	Our relation with the members and staff of the application improved.
2	Our relation with the friends that did not participate in application improved as we were telling them about it.

N=40.

Table 12. Analysis results of teacher candidates' responses to Question 6.

F	Responses
32	It will increase the attention of students towards lectures.
29	It will boost students' motivation.
25	It will improve students' academicals success.
17	It will help students comprehend the lectures better.
13	It will improve the communication among students.
10	It will make lessons more entertaining.
8	It will help improve creative thinking skills of students.
7	It will improve perception of students.
5	It will decrease forgetfulness.
4	It will provide equality of opportunity.
3	It will help diminish boringness of the lectures.

N=40.

Table 13. Analysis of responses of teacher candidates to Question 7.

F	Responses
30	Themes can be prepared in accordance with teaching programmer.
25	It can offer a new and novel approach to educational programmers.
18	Teaching programmers should be rearranged based on 4DX technology.
9	What matter is the comprehension of content of educational programmers by students.

N=40.

high schools and 6 of them stated universities for best level of application and 4 participant stated in-service, informal and distant education.

Question 9. "What is your opinion on the sustainability of 4DX digital technology on education and teaching?" The answers to this question are shown in Table 15.

32 of participating teacher candidates stated that educational technologies should always be present in the

Table 14. Analysis of responses of teacher candidates to Question 8.

F	Responses
37	It can be used in all levels.
33	It can be used in primary schools.
19	It can be used in secondary schools.
13	It can be used in high schools.
6	It can be used in universities.
4	It can be used in in-service, informal and distance education.

N=40.

Table 15. Analysis results of the responses of teacher candidates to Question 9.

F	Responses
32	4DX educational technology should continuously be present in the education.
18	The sustainability of education depends on educational technologies.
7	Teaching methods should be refreshed as educational technologies consistently develop.
4	There is sustainability in both teaching and educational technologies.

N = 40.

teaching, 18 of them mentioned that sustainability of teaching depends on educational technologies, 7 of them agreed that teaching should be refreshed with respect to education technologies and 4 people expressed that teaching and educational technologies are sustainable.

DISCUSSION

It is a fact that with all the lectures taught to teacher candidates, their academicals success and knowledge fund improved. However, not all the methods raise the success as much as aimed. The purpose on education programmers is to make student understand the subjects better, provide better comprehension and make them learn in joy without getting bored. This is possible only with the materials used in lectures and the colorfulness brought to educational environment with those materials. Thus, classes and educational environments should be equipped with materials with the most recent and most developed technologies of the time.

It is obviously important to equip classes with educational technologies. However, the more important factor is teacher that will use these technologies effectively. Therefore, for both teacher candidates studying in education faculties and teachers that are actively working, in-service educations should be provided by related institutions and authorities on educational technologies so that all teacher get informed about the utilization of currently used or to-be used educational technologies.

Another significant issue on educational technologies is the state of knowledge, awareness and consciousness of teachers for effective usage of educational technologies on lectures. Teachers should definitely have adequate knowledge on educational technologies and have high awareness as well as high consciousness. To complete these skills of teachers, all teacher candidates on universities should be offered the course “educational technologies and material design” efficiently. In case the teaching programmer of the course does not meet the current needs of the time, it should be rearranged based on latest technologies.

It was found that manners of teacher candidates towards educational technologies were below the expected level for both the experimental and control groups before the research. After the research, it was observed that the manner level of experimental group considerably improved due to the application while that of control group did not improve as much as expected. Therefore, to improve the manners of both teacher candidates and teachers sufficiently, all the instructors that are interested in education could be taken to 4DX halls to practically show them what educational technologies can change for an individual and manner levels of all educators should be raised above the desired level.

In lectures taught with educational technologies, as students mostly talk to each other about educational technologies and visuals, their communication abilities and addressing skills also develop. Also, since they share opinions in this process, high level critical thinking skills such as reasoning and creativity also develop.

In education, depending on teaching classes that address as many sense organs as possible, forgetfulness decreases and comprehension increases. Educational technologies are developed such that they address to multiple senses such as visual, tactual, and smelling

senses. Therefore in classes with educational technologies, students can both understand the subjects more effectively and have less forgetfulness.

Educational technologies can be designated for all levels of education. The important thing is to learn about the level of students and making the necessary changes. Thus, educational technologies can be arranged based on lecture subjects and learning materials and used all fields and levels of education both at schools and informally on seminars, symposiums, congresses, and conferences.

Education is not merely a face-to-face process. Nowadays, thanks to education technologies, distance education and teleconference methods are used in schools to communicate information. Further, by way of educational technologies, people involve in synchronous sharing of information by participating in events such as seminars, symposiums, and conferences. Everybody should be aware of these educational technologies and should be capable of using them in order to benefit from all these facilities and take advantage of the blessings. Those who find their knowledge or skills insufficient should develop themselves by attending various courses offered by both governmental institutions and private sector foundations.

Education requires sustainability as it is a life-long process. Then, all nations must constantly refresh their educational system to keep up with the modern world. All of these developments and improvements necessitate educational technologies. Educational technologies are needed everywhere due to its effects on discovering, sharing and distributing knowledge and teaching, reinforcing and analyzing knowledge in educational environments. Therefore, as long as education is present and takes place in schools, educational technologies will be a necessary component for educational activities.

Conclusion

In this study, the manners of teacher candidates towards digital educational technology as well as their knowledge and competency on the subject and their opinions on the sustainability of digital technology on education were investigated. From the responses of the participant teacher candidates to the scale items and the interviews made with teacher candidates, related to educational technology and usage of digital technology on education, it was found out that it raises information level, provides experience, upgrades awareness level, increases the attention to the lectures, could make the classes more fun, would improve academicals success, would improve motivation, would make the lessons more lovely, would offer better comprehension of subjects, would lead students to research and study, could support communication and relationships, could reinforce creativity and high level thinking skills, would decrease forgetfulness, would remove the boringness of the lectures, and will improve the awareness. Based on the interviews with teacher candidates, it was stated that educational technologies should definitely be present in teaching practices starting from primary school to universities. Especially in science classes in primary schools, thanks to this technology, students can travel to all the organs within the human body and can recognize every part by having a journey through veins. Teaching all lectures with this technology, students can comprehend the subjects better and follow the content without getting bored and with undivided attention. Also, as students talk to each other and discuss about educational technologies, their communication grow stronger. Educational technologies or digital technologies may be efficiently used in all fields of education. The troubling part is that arranging educational technologies, digital software's and lectures to teach classes based on this technology could have a tremendous cost. Therefore, this technology is easier to apply on economically developed countries. Furthermore, as the world gets modernized and technology keeps improving, these technologies will require rearrangements and larger economical resources will be needed. Another problem that is awaiting the nations that prefer to utilize modern educational technologies is the educational programmers of these nations. Because, in most countries, educational programmers are not designated based on these technologies but based on simple tools and gadgets that has simple mechanical structures. Therefore, the countries that wish to modernize their educational technologies in accordance with latest technologies should begin by making changes in their educational programmers. It should be remembered that continuity is present both in education and tasks related to education. The world of education is always included in this continuity. Therefore, all educational programmers, educational technologies, digital technologies, and all the other concepts related to education should be regulated so as to exhibit sustainability.

REFERENCES

Abramovich, S., Schunn, C., and Higashi, R. M. (**2013**). Are badges useful in education?: Itdepends upon the type of badge and expertise of learner. Educational Technology Research and Development, 61(2): 217-232.

Ahonen, A. K., and **Kinnunen**, P. (**2015**). How do students value the importance of twenty-first century skills? Scandinavian Journal of Educational Research, 59(4): 395-412.

Aktaş, C. (**2014**). QR kodlar ve iletişim teknolojilerinin hibritleşmesi. İstanbul: Kalkeden Yayıncılık.

Atal, D., and **Koçak-Usluel**, Y. (**2011**). İlköğretim öğrencilerinin okul içinde ve dışında teknoloji kullanımları. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 41: 24-35.

Aycan, Y. S. (**2008**). Coğrafya öğretiminde bilgisayar destekli öğretim yönteminin öğrenci başarısına etkisi. Yayımlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi, Ankara.

Bağcı, H., and **Çoklar**, A. N. (**2014**). Bilgisayar oyunları, eğitsel kullanımları ve tasarım yeterlikleri açısından BÖTE öğretmen adaylarının değerlendirilmesi. Kuramsal Eğitimbilim Dergisi, 7(2): 195-211.

Cabı, E. (**2016**). Dijital teknolojiye yönelik tutum ölçeği. Kastamonu Eğitim Dergisi, 24(3): 1229-1244.
Conole, G., and **Alevizou**, P. (**2010**). A literature review of the use of Web 2.0 tools in higher education. The Open University Walton Hall, Milton Keynes, UK.
Donmuş, V., and **Gürol**, M. (**2015**). İngilizce öğrenmede eğitsel bilgisayar oyunu kullanmanın erişiye ve kalıcılığa etkisi. Turkish Studies, 10(15): 313-332.
Duveskog, M., Tedre, M., Sedano, C. I., and Sutinen, E. (**2012**). Life planning by digital storytelling in a primary school in rural Tanzania. Educational Technology and Society, 15(4): 225-237.
Dyson, M. C., and **Haselgrove**, M. (**2001**). The influence of reading speed and line length on the effectiveness of reading from screen. International Journal of Human-Computer Studies, 54: 585-612.
Finegold, D., and **Notabartolo**, A. S. (**2010**). 21st-century competencies and their impact: an interdisciplinary literature review. Transforming the US Workforce Development System. Finegold D, Gatta M, Salzman H, Schurman SJ, eds. Champaign, IL: Labor and Employment Relations Association, 19-56.
Fiş-Erümit, S., and **Karakuş**, T. (**2015**). Eğitim teknolojileri okumaları. B. Akkoyunlu, A. İşman, ve F. Odabaşı (Ed.), Eğitim ortamlarında yeni bir yaklaşım: Oyunlaştırma içinde (395-414). Sakarya: TOJET.
Garland, K. J., and **Noyes**, J. M. (**2004**). CRT Monitors: Do they interfere with learning? Behaviour & Information Technology, 23(1): 43-52.
Gibson, C., and **Gibb**, F. (**2011**). An evaluation of second generation e-book readers. The Electronic Library, 29(3): 303-319.
Gökmen, A., Taflı, T., and Atıcı, T. (**2018**). Biology preservice teachers' views on digital experimental tools. Karaelmas Journal of Educational Sciences, 6: 291-302.
Göldağ, B. (**2018**). Lise öğrencilerinin dijital oyun bağımlılık düzeylerinin demografik özelliklerine göre incelenmesi. Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi, 15(1): 1287-1315.
Hebebci, M. T., and **Usta**, E. (**2018**). Eğitim ortamlarında dijital rozet kullanımına ilişkin öğretmen görüşleri. Türk Bilgisayar ve Matematik Eğitimi Dergisi, 9(2): 192-210.
İnceelli, A. (**2005**). Dijital hikâye anlatımının bileşenleri. The Turkish Online Journal of Educational Technology, 4(3): 132-142.
Kablan, Z. (**2010**). Öğretim sürecinde bilgisayara dayalı alıştırma amaçlı oyun kullanılmasının eğitim fakültesi öğrencilerinin akademik başarısına etkisi. Kuram ve Uygulamada Eğitim Bilimleri, 10(1): 335-364.
Kahyaoğlu, M., and **Elçiçek**, M. (**2016**). Eğitsel bilgisayar oyunlar ile desteklenen fen bilimleri öğretiminin öğrencilerin motivasyon ve yansıtıcı düşünme becerileri üzerine etkisi. Turkish Studies International Periodical for he Languages, Lİterature and History of Turkish or Turkic, 11(14): 349-360.
Kapp, K. M. (**2012**). The gamification of learning and instruction: Game-based methods and strategies for training and education. San Francisco, CA: Pfeiffer.
Karataş, S., Bozkurt, Ş. B., and Hava, K. (**2016**). Tarih öğretmeni adaylarının öğretim ortamlarında dijital hikâye anlatımı etkinliğinin kullanımına yönelik görüşleri. International Journal of Human Sciences, 13(1): 500-509.
Keleşoğlu, S., and **Kalaycı**, N. (**2017**). Dördüncü sanayi devriminin eşiğinde yaratıcılık, inovasyon ve eğitim ilişkisi. Yaratıcı Drama Dergisi, 12(1): 69-86.
Kocaman-Karoğlu, A. (**2015**). Öğretim sürecinde hikâye anlatmanın teknolojiyle değişen doğası: Dijital hikâye anlatımı. Eğitim Teknolojisi Kuram ve Uygulama, 5(2): 89-106.
Lindgren, R., and **McDaniel**, R. (**2012**). Transforming online learning through narrative and student agency. Educational Technology & Society, 15(4): 344–355.
McLellan, H. (**2006**). Digital storytelling in higher education. Journal of Computing in Higher Education, 19(1): 65-79.
Oppermann, M. (**2008**). Digital storytelling and American studies: Critical trajectories from the emotional to the epistemological. Arts and Humanities in Higher Education, 7(2): 171- 187.
Orhan, A., and **Genç**, S. M. (**2018**). Bilişim teknolojisindeki gelişmenin sosyoekonomik etkileri. Yönetim ve Ekonomi Araştırmaları Dergisi, 16: 264-275.
Özerbaş, M. A., and **Akın-Mart**, Ö. (**2017**). İngilizce öğretmen adaylarının Web 2.0 kullanımına ilişkin görüş ve kullanım düzeyleri. Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi, 18(3): 1152-1167.
Robin, B. (**2008**). Digital storytelling: A powerful technology tool for the 21st century classroom. Theory into Practice, 47(3): 220-228.
Rose, E. (**2011**). The phenomenology of on-screen reading: University students' lived experience of digitized text. British Journal of Educational Technology, 42(3): 515-526.
Şahen-Erkan, S. S., and Balaban-Dağal, A. (**2018**). Öğretmen adaylarının dijital okuma, yazma ve sunum hazırlama becerileri hakkındaki görüşlerinin değerlendirilmesi. Uluslararası Bilimsel Araştırmalar Dergisi, 3(1): 131-144.
Seferoğlu, S. S. (**2006**). İlköğretim bilgisayar programlarının değerlendirilmesi. Bilişim Teknolojileri Işığında Eğitim Konferansı ve Sergisi (BTIE-2006), 7-10 Kasım, Sheraton Oteli, Ankara.
Söylemez, S. A. (**2004**). Türkiye'de teknoloji ve eğitim yatırımları: Karşılaştırmalı bir bakış açısı. Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 1: 63-80.
Spencer, C. (**2006**). Research on learners' prefer-ences for reading from a printed text or from a com- puter screen. Journal of Distance Education Revue De L'éducation À Distance Spring/ Printemps, 21(1): 33-50.
Suwardy, T., Pan, G., and Seow, P. S. (**2013**). Using digitalstorytelling to engage student learning. Accounting Education, 22(2): 109-124.
Usluel, Y. K., and **Mazman**, S. G. (**2009**). Sosyal ağların benimsenmesi ölçeği. Eğitim Bilimleri ve Uygulama Dergisi, 8(15): 137- 157.
Vu, P. and **Feinstein**, S. (**2017**). An exploratory multiple case study about using game-based learning in STEM classrooms. International Journal of Research in Education and Science, 3(2): 582-588.
Wang, D., He, L. and Dou, K. (**2013**). StoryCube: supporting children's storytelling with a tangible tool. The Journal of Supercomputing, 70: 269–283.
Xu, M., David, J. M. & Kim, S. H. (**2018**). The fourth industrial revolution: opportunities and challenges. International Journal of Financial Research, 9(2): 1-6.
Xu, Y., Park, H., and Baek, Y. (**2011**). A new approach toward digital storytelling: An activity focused on writing self-efficacy in virtual learning environment. Educational Tecnology & Society, 14(4): 181-191.
Yang, Y., and **Wu**, W. (**2012**). Digital storytelling for enhancing student academic. Computers & Education, 59(2): 339-352.
Zichermann, G., and **Cunningham**, C. (**2011**). Gamification by design: Implementing game mechanics in web and mobile apps. Canada: O'Reilly Media, Inc.

Citation: Sarigöz, O. (2019). The effect of educational technologies on manners and sustainability of teacher candidates. African Educational Research Journal, 7(3): 143-152.