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Digital Applications in Education and Its Effects Meta Analysis Study

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SUMMARY

There are many academic studies in the literature examining educational digital applications. These studies documented the positive effects of practices on attitudes and academic achievement. Information technologies which have become a part of our lives have taken their place in our education system and contributed to education system in many ways. Modern educational environments have benefited from information technology devices in terms of raising human profile in accordance with 21st century skills and many academic studies have been carried out covering different courses, different levels and different purposes in line with the effectiveness of these devices. This situation brought out the need to create a perspective by gathering the works under common themes. In our study, 33 study that took place between the years 2013 to 2019 in different regions from Turkey in this direction has been selected. These studies were evaluated in 8 different themes and 20 sub-concepts. The effects of educational digital applications on academic achievement, scientific process skills and attitudes of students are positive. From time to time, the effect of gender was observed on perceptions and attitudes. In-school and out-of-school activities are effective in acquiring 21st century skills. In some studies, limitations such as physical space, time and cost hindered the realization of activities and sometimes it was a negative situation that the trainers did not have the necessary training formation and felt inadequate for these activities. Existing curricula, which are shaped within the framework of knowledge-based examination system, were also seen as another limiting factor. At the end of the research, suggestions were made for the effective use of educational digital applications in the education system.

Keywords: Educational Digital Games, Computer Assisted Instruction, Educational Mobile Game, Innovative Applications

INTRODUCTION

Today, information technology products become an important part of lifetime experiences (Balkı & Saban, 2009). Information technology products usage are in many important points in lifetime such as transportation, communication, health and security. Furthermore, it provides many conveniences and creates attracted areas for learning. With this speciality information technology has become an indispensable part of education (Ross, Morrison, & Lowther, 2010). That upsurge in information technology products usage shows that individuals should have technology usage ability and adaptation abilities (Yılmaz, Üredi, & Akbaşlı, 2015).

Jones (2001) emphasizes that playing is an execution that develops the imagination of children in every aspect of childhood, which provides a learning environment by living, contributes to the development of social, mental and physical aspects, and ensures experiences in various aspects. It is possible to make the child learn in a way that makes it less difficult by gamiying any matter that he / she should learn (Aral, Baran, Bulut, & Çimen, 2000). In this aspect, gamifying can be used as an influential educational tool in education system in which individuals who are approved of as a child are educated until the last year of secondary education.

According to multipleintelligencetheory, individuals have different level of intelligence and this theory shows that each person's learning styles, tendencies and abilities have differences (Gardner, 1999). As an example of English, a story, a music, animation or drama technique that is told within the scope of the lesson can activate children who have various intelligence and make learning more fun (Yang, 2019). Gardner mentions that the games played in childhood generally have one or more different types of intelligence.

In his study, Mattar (2018) emphasized the importance of active learning and emphasized that student's activity in the learning process is important for the efficiency of the process in learning. Likewise, in constructivist theory based understanding, the learner is required to have in high-level thinking skills such as understanding, using, organizing, criticizing, interpreting and problem solving rather than receiving information as a simple message, and the outcomes of the educational system should require to include these specialities (Yurdakul, 2005). For achieving the skills of 21st century, games are important in learning as educational tools and make students more active while they are learning.

When we look at the digitalizing games with information technology, it first emerged in the 1950's and the effect of technological development, it became to its present version.

Nowadays, with the spread of mobile devices and the spread of digital games, teachers have to be creative and innovative in order to use and develop technology as a tool (Sari, Anjani, Farida, & Ramdhani, 2017). Although criticized in various ways, digital games have taken their own place in the education system and their effects on concepts such as attention, spatial concentration, problem solving, decision making, collaborative work and creativity that have an important role in the comprise of this situation (Aguilera & Mendiz, 2003).

Korucu, Usta and Yavuzaslan (2016) in their meta-analysis study on the usege of augmented reality technologies in education, which in this context, executions are seen more frequently in education sector than the other sectors. The reason for increasing in academic research carried out within this direction is verbalized as supporting technological developments and increasing in opportunities to access information in many countries.

Purpose of the Research

In this study, it is aimed to investigate the effects of various applications such as computer assisted teaching applications, mobile applications and digital games on various variables such as motivation, attitude, cognitive process skills and academic achievement in education. The answers to the following questions were looked for:

1. What are the different educational digital game applications applied in the educational process?
2. Do educational digital game applications have an impact on academic achievement, attitude, perception and cognitive process skills?

Importance of Research

Meta-synthesis method has emerged due to the necessity of gathering studies carried out in different places for different purposes but in similar areas under one common roof (Polat & Ay, 2016). Meta-analysis studies can be used to reach generalizable results by analyzing and synthesizing the research results included in the study content (Hunter & Schmidt, 2004).

In terms of examining educational digital applications, this meta-analysis study, which generally covers the scientific studies conducted in our country, is important in terms of gathering these applications that address different courses and different variables under the same title by applying different varieties. Besides, it aims to transpose the difficulties fighted during the process of integrating these practices into the education system, negative evaluations, the findings of the education stakeholders and the system itself.

In the light of information from 24 different provinces in 7 regions of our country in the last 6 years of study findings, it is wanted to offer a small contribution to the literature on digital educational practices for Turkey's educational system.

Limitations

The limitations of the research process are:

- The researches conducted in the last 6 years (2013-2019) were included in our study.
- In our study, the data to be obtained from the studies to be included in the meta-analysis study is limited to the variables in the "meta-analysis data generation tool".
- The sample of our study is limited to the master theses and doctorate theses that can be accessed from the Thesis Center of Higher Education Council.
- Meta-analysis is limited to the general limitations of the screening method.
- Work is usually realized in Turkey were included in the study countries.

METHOD

In our study, "meta-synthesis method", which is a qualitative research design, was used. Through the agency of this method, many studies can be interpreted by inserting them into a single mode of operation. The effect sizes of individual studies can be combined under certain themes and a general result can be obtained also comparisons can be made (Dinçer, 2014).

Polat and Ay (2016) mentioned the concepts of validity and reliability in his study on meta-synthesis. He stated that these concepts are preliminary plan in qualitative research. In the same way, it pointed out the necessity of taking certain steps in order to ensure validity and reliability in meta-synthesis studies. When the past studies with the meta-analysis method were examined, the steps were generally followed as shown in Table 1. Our current study has been realized within the framework of these steps.

Table 1. Process Steps of Meta-Analysis Research

Steps	Explanation
1	Determination of research problem.
2	Determining appropriate keywords for the subject of the study and reviewing the literature.
3	Supply, review, identification and evaluation of resources.
4	Determining the inclusion and exclusion criteria of the research and selecting the studies to be evaluated.
5	Analysis of the selected studies, creating common themes and sub-themes of these themes, introducing similar and different aspects.
6	Synthesizing the findings obtained from the themes and making inferences.
7	Detailed reporting of the process and findings.

Data Collection

The database of the Thesis Center of Higher Education Council was used to reach the academic studies that will help to our research. In the Thesis Center of the Council of Higher Education, within the framework of educational digital game applications, the studies between 2013-2019 were tried to be achieved by using keywords such as computer assisted education and mobile application.

59 studies including one or more keywords such as educational digital game, digital game, mobile game, computer assisted instruction were collected. 33 studies were included in the research in accordance with the following principles:

- Examining the effects of educational digital applications on various variables (academic achievement, scientific process skills, perception, attitude, etc.).
- The research design of the studies and the data collection methods that are used should be clearly stated.
- Specifying the sample group and it should be significant size.
- Specifying the research design.
- Specify the data collection tool that was used.

Coding Method

The themes, quantitative and qualitative findings of the academic research included in the study were coded as shown in Table 2.

Table 2. Meta-Analysis Coding Method

Themes	Themes Coding
Opinions of Current Curriculum	OCC
Classroom Activities	CA
Out of School Applications	OSA
Academic Success	AS
Perceptions of Education	PE
Attitudes Towards Education	ATE
Scientific Process Skills	BSB
Opinions on Education	OE

Researches Included in Meta-Analysis

Information on the year, type of publication, author, research model, sample group and research theme of the studies included in the study is presented in Table 3.

Table 3. Researches Included in Meta-Analysis Studies and Codes

Work Code	Year	Post Type	Author	Research Model[a] Sample Group[b]	Theme[1]
C_1	2019	Master Thesis	Derya ZENGİN	[a]Mixed method research [b]72 Students(Middle School)	OCC, OE, AS
C_2	2018	Master Thesis	Tuğba PAMUK	[a]Mixed method research [b]60 Student(Middle School)	AS, ATE
C_3	2018	Master Thesis	Meltem ÖZMUTLU	[a]Qualitative Method research [b]10 Student(Primary, Secondary)	OE, PE, ATE
C_4	2018	PhD Thesis	Nurullah TAŞ	[a]Mixed method research [b]22 Student(Highly Talented)	CA, SPS, OE
C_5	2018	Master Thesis	Akram Faraj Ali Al-ZANGANA	[a]Quantitative method research [b]32 Student(Pre-school)	OSA, AS
C_6	2018	Master Thesis	Umut Ali ERGÜZELOĞLU	[a]Quantitative method research [b]81Student(Secondary school)	AS
C_7	2018	Master Thesis	Ali Ceyhun MÜFTÜOĞLU	[a]Mixed Method Research [b]88 Student(Licience)	ATE
C_8	2018	Master Thesis	Levent KARABULUTLU	[a]Qualitative method research [b]28 Student(Pre-School)	SPS, OE, AS
C_9	2018	Master Thesis	Buket TECEN	[a]Quantitative method research [b]40 Student (Pre-School)	AS
C_{10}	2018	Master Thesis	Senem KÖLEMEN	[a]Quantitative method research [b]90 Student(Middle-School)	OE
C_{11}	2018	Master Thesis	Mehmet Fatih YAPICIOĞLU	[a]Quantitative method research [b]60 Student (Middle-School)	AS
C_{12}	2017	Master Thesis	Elif ALKAR	[a]Quantitative method research [b]131 Student(Middle-School)	AS
C_{13}	2017	Master Thesis	Emrah DOĞAN	[a]Quantitative method research [b]108 Student(Middle-School)	AS
C_{14}	2017	PhD Thesis	Günsu Yılma ŞAKALAR	[a]Mixed Method Research [b]6 Student(Special Education)	OCC, PE, SPS,
C_{15}	2017	Master Thesis	Davut ALAN	[a]Mixed Method Research [b]122 Student(High School, Associate)	CA, ATE, OE
C_{16}	2017	Master Thesis	Sibel DEMİRKAN	[a]Qualitative Method	AS

				Research [b]50 Student(Middle-School)	
C_{17}	2017	PhD Thesis	Gülşah ULUAY	[a]Mixed – Method Research [b]30 Student(Middle-School), 36 Student	SPS, AS, ATE
C_{18}	2016	Master Thesis	Yasemin ÖZKOYUNCU	[a]Quantitative method research [b]66 Student(High School)	AS
C_{19}	2016	Master Thesis	İlyas AKKUŞ	[a]Mixed-Method Research [b]28 Student(Licence)	PE, SPS, OE
C_{20}	2016	Master Thesis	Melih ÇATTIK	[a]Mixed-Method Research [b]4 Student(Special Education)	SPS, OE
C_{21}	2016	Master Thesis	Regaip ŞAHİN	[a]Mixed-Method Research [b]40 Student(Middle-School)	AS
C_{22}	2016	Master Thesis	Sedat MOR	[a]Mixed- method research [b]34 Student(Mid-School)	PE, ATE, OE
C_{23}	2016	PhD Thesis	Mira Elif Demirhan SAYIN	[a]Mixed method research [b]43 Student(High School)	ATE, SPS
C_{24}	2016	Master Thesis	Belkız OKUMUŞ	[a]Quantitative method research [b]32 Student(High School)	AS, OE
C_{25}	2016	Master Thesis	Tuğba KAPUCU	[a]Mixed- method research [b]74 Student(Middle School)	AS
C_{26}	2015	Master Thesis	Mehmet Enis ŞENLEN	[a]Mixed- method research [b]32 Student(High School), teacher	OE, AYA, AS
C_{27}	2015	Master Thesis	MURAT AKBAY	[a]Mixed- method research [b]91 Student(High Student)	SPS, OE, CA
C_{28}	2015	Master Thesis	Cengiz GÜNDÜZALP	[a] Quantitative method research [b]90 Student(Middle Student)	SPS, ATE, AS
C_{29}	2015	Master Thesis	Fatih KÜSLÜ	[a] Quantitative method research [b]54 Student(Middle School)	AS
C_{30}	2015	Master Thesis	Burcu İNAN	[a] Quantitative method research [b]66 Student(Middle School)	ATE, CA, AS
C_{31}	2015	Master Thesis	Münevver Gülbin KOÇER	[a] Mixed method research [b]15 Student(High School), 20 Teacher	OE, ATE, CA
C_{32}	2014	PhD Thesis	Nuri Can AKSOY	[a] Mixed method research [b]40 Student(Middle School)	CA, AS, ATE
C_{33}	2013	Master Thesis	Burcu YURDAARMAĞAN	[a] Quantitative method research [b]152 Student(High School)	CA, AS, PE

[1] *Descriptions of the codes are shown in Table 2.*

When Table 3 is investigated, it is seen that 5 are (15,15%) doctoral theses and 28 are (84,85%) master theses.

The distribution of the studies by years is shown in Table 4.

Table 4. Distribution of the studies included in the research by years

Yıl	Frequency	Percent
2013	1	3,0
2014	1	3,0
2015	6	18,2
2016	8	24,2
2017	6	18,2
2018	10	30,3
2019	1	3,0

Our study was carried out in the following steps by following the process steps of the meta-analysis study indicated in Table 1.

Step 1: Identifying the research problem

Educational digital game education activities were determined as the study area. In this context, the effects of the materials developed on different situations such as academic achievement, attitude, perception and cognitive process skills were examined.

Step 2: Identify the appropriate keywords and search for the literature

In the scope of the study, while searching the literature, keywords such as computer aided education applications, mobile applications, digital educational materials were used and 59 studies registered to the Thesis Center database of the Higher Education Council were archived by using various words within the framework of these keywords.

Step 3: Provision, review, identification and evaluation of resources

As a result of the literature review, 59 archived studies were grouped in terms of various variables such as location, year, research method and research subject. Themes and explanatory conceptions of the themes were determined by using meta-analysis identification tool.

Step 4: Determining the inclusion and exclusion criteria of the research and selecting the studies to be evaluated

Considering the fact that the studies represent different regions in Turkey, the number of participants, research methods, data collection tools used, the suitability of the keywords of meta-analysis, the clarity and clarity of the expressions in the results phase. 33 were included in the study

Step 5: Analyzing the selected studies, creating common themes and sub-themes of these themes, revealing similar and different aspects.

33 studies selected within the scope of the research were made ready to be transferred to categorized tables in terms of information such as author, year, type of publication, data collection tools used, sample group and sample selection method.

Step 6: Synthesizing the findings of the themes and making inferences

Within the framework of educational digital applications, it was determined which themes (views on the current curriculum, academic achievement, scientific process skills, views on education, perceptions on education, etc.) were selected and sub-concepts and explanations related to these themes were selected and grouped from the researches.

Step 7: Detailed reporting of the process and findings.

The data obtained from the studies were determined separately in the themes of the researches grouped according to various variables, and the findings were interpreted after being transferred to the tables.

RESULTS

Research, Turkey has been included in a study conducted across 24 different cities in the Land of the study and Iraq. The distribution of the studies by provinces is given in the table below.

Table 5. Distribution of Provinces where research is carried out

Country	Frequency
Adana	1
Ankara	3
Bayburt	1
Burdur	1
Edirne	1
Erzurum	1
Eskişehir	1
Isparta	1
İstanbul	6
İzmir	1
Kars	3
Kastamonu	1
Kırşehir	1
Konya	1
Malatya	1
Mardin	1
Niğde	1
Ordu	1
Osmaniye	1
Sakarya	1
Siirt	1
Sivas ve Tokat	1
Süleymaniye(Iraq)	1
Şırnak	1

When table 5 is examined, it is seen that the study covers all regions of Turkey and that the most studied with 6 studies was selected from the province of Istanbul.

The research models of the studies are shown in Table 6.

Table 6. Research Model Distribution

Research Model	Frequency	Percent
Quantitative Research	13	39,4
Qualitative Research	3	9,0
Mixed Method	17	51,5

As a research model, quantitative and mixed model studies are indicated in the data in Table 6, where the studies are frequently.

The data collection tools used by the quantitative and qualitative models in the researches are shown in Table 7.

Table 7. Data Collection Tools Used in Research

Model	Data Collection Tool	Frequency	Percent
Qualitative Model	Open-ended Questions	4	5,5
	Semi-Structured Interviews	7	9,7
	Interview Form	5	6,9
	Observation	4	5,5
	Audio Recordings	1	1,3
Quantitative Model	Scale	15	20,8
	Survey	3	4,1
	Academic Achievement Test	26	36,1
	Scientific Process Skill Test	7	9,7

When Table 7 is analyzed, it is seen that interview form, observation, open-ended questions and semi-structured interviews are used to collect data in the researches using qualitative model as research model. While academic achievement tests and scales are used extensively in quantitative model researches, scientific process skills tests are preferred in this process.

Sample selection methods of the studies are shown in Table 8.

Table 8. Sample Selection Method

Sample Selection Method	Frequency	Percent
Random	4	12,1
Easily Accessible Sampling	17	51,5
Purposeful Sampling	8	24,2

When Table 8 is examined, it is seen that most of the studies (51.5%) prefer easy-access sampling. The reason for this is the limitation of time variation in studies conducted on students.

The values representing the sample groups in the studies are given in Table 9.

Table 9. Sample Groups in the Studies

Sample Groups	Frequency	Percent
Pre-School	3	8,1
Elementary School	1	2,7
Secondary School	16	43,2
High School	8	21,6
Associate	1	2,7
License	2	5,4
Teachers	3	8,1

Highly Gifted	1	2,7
Special Education	2	5,4

When the study groups in Table 9 are examined, 16 students (43.2%) were the most preferred secondary school students. This group is followed by high school (21.6%) with 8 studies and teachers with 3 studies (8.1%) respectively. In some studies, there were more than one sample preferences such as the selection of teachers and students as sample groups or the selection of high school and secondary school students as student levels.

As a result of step 5 of Table 1, "Analysis of selected studies, creating common themes and sub-themes related to these themes, revealing similar and different aspects", all selected articles were examined and common themes and sub-concepts related to these themes were formed. are shown as shown.

Table 10. Key Phrases and Concepts

Themes	Key Phrases and Concepts	Frequency	Percent
Current Curriculum Opinions	In the current educational curriculum, digital educational games do not have enough space.	2	2,0
	Anxiety in the current curriculum limits practices.	1	1,0
Out-of-School Applications	Educational digital games are effective on learning outside school time	1	1,0
	Educational digital games outside school time have an impact on 21st century skills.	1	1,0
Classroom Activities	Educational digital games in the classroom increase student interest in the lesson.	11	10,8
	Educational digital games in the classroom are effective on scientific creativity and problem solving processes.	1	1,0
Academic success	Educational digital games positively affect academic achievement.	25	24,5
	Educational digital games have no significant impact on academic achievement.	1	1,0
Perceptions of Activities	Gender influences students' perceptions of educational digital games	1	1,0
	Students' perceptions of educational digital games are positive.	8	7,8
Attitudes Towards Activities	Educational digital games have a positive effect on student attitudes.	15	14,7
	Gender is effective on students' attitudes towards educational digital games.	2	2,0
Scientific Process Skills	Educational digital games affect students' scientific process skills.	9	8,8
Opinions on Education	It is effective on educational digital games (problem solving, motivation, interest, etc.).	13	12,8
	Computer Aided Teaching Practices are effective on the permanence of the information learned.	1	1,0
	Intensive use of technological devices can cause a variety of health problems (headaches, tears, etc.).	2	2,0
	The reason for not applying educational digital games is time, cost and physical conditions.	2	2,0

	Teachers do not have sufficient prior knowledge of the way educational digital games are applied in education.	1	1,0
	Teachers can design their own educational digital game.	1	1,0
	Teachers' attitude towards educational digital games is positive.	4	3,9

As shown in Table 10, the themes of the studies are determined. In addition, common concepts have been formed within the framework of these themes.

When the studies of C_1 and C_{17} are examined, it is stated that the applications carried out within the course should be supported with the current curriculum. This may enable the applications to be performed more effectively and in accordance with their purpose.

When C_6 is examined, it can indirectly contribute to education when outside-class activities are organized in a planned manner as in classroom activities.

When C_{11} is examined, in this context, it is stated that educational digital games can contribute to the achievement of 21st century skills in addition to increasing academic success and also affect scientific creativity and problem solving skills.

When the perceptions of educational digital games are examined, it is seen that in C_{17}, perceptions change according to gender, although positive results are observed in 8 studies.

In the 11 studies examined, it was seen that educational digital game applications in the classroom increased the students' interest in the lesson.

When the attitudes were examined, it was seen that positive attitudes were observed in the students in 15 studies related to the practices carried out within this framework, and that these values differed according to gender factor when examining C_{17} and C_{19}.

It was stated that the effects of educational digital games on academic achievement were positive in 25 studies in different courses and applications in different levels. In C_{15}, a significant effect of the application on academic achievement could not be seen.

When the studies were examined in terms of impact on scientific process skills, positive results were observed in 9 studies and in 13 studies positive effects of applications on problem solving, motivation and interest were observed.

In the study, situations that prevent the implementation of the applications efficiently are also mentioned. For example, when examining C_{27} and C_{32}, it is stated that intensive use of technological devices can cause headaches and tears.

In addition, the obstacles to the efficient implementation of the applications were also mentioned in C_1 and C_{17}. When the C_1 is examined, it can be seen that the trainers' anxiety to raise the current curriculum subjects in time can come to the forefront and this situation may adversely affect the efficiency of the implementations to be performed. When C_{17} is examined, it is seen that time and cost are also important factors.

In 4 studies where observations were made on teachers who are important stakeholders of education, it was stated that teachers' attitudes towards educational digital applications were positive. However, it is stated that teachers do not have sufficient prior knowledge in order to realize the applications efficiently and in accordance with their purpose. It is stated that the trainings that can be given will increase the preliminary knowledge of the teachers and even the ability to design their own games will have a positive effect on the process.

DISCUSSION AND CONCLUSION

In our study, in the last 6 years (2013-2019), it took place in various provinces of Turkey's Higher Education in the National Thesis Center, a total of 33 studies examining educational digital applications are combined in a meta-analysis inside. Care was taken to include the studies in different provinces. Thus, it was aimed to see the different applications made in all regions in a small frame.

When the studies are examined in general, it is seen that academic success anxiety comes to the forefront. This situation sometimes restricts the practices by emphasizing the lack of time in terms of raising the subjects in the curriculum and sometimes decreases the importance of the practices due to the anxiety of raising students suitable for the examination system.

As a result of the practices carried out in the researches examined, both academic achievement and scientific process skills, positive perceptions and attitudes are remarkable. From time to time, it has been observed that various factors have an impact on the results as identified in C_{17} and C_{19}, and from time to time it has been seen that cost and curriculum raising concerns have negative effects.

Kwon, Lee, and Shin (2015), in their study of the pros on the exam-based education system in the Korean country, emphasized the high concern of society for the examinations of a good school placement and emphasized the destructive effects of these concerns.

As a matter of fact, in terms of career, exams are a gateway to a good school. Students are classified as successful and unsuccessful within the framework of certain criteria. Educational systems also aim to educate students in the profile that these exams are successful. Therefore, the examination systems should be shaped in this direction in order for the features such as creative thinking, problem solving, cooperation and communication to emerge willingly with the contributions of all stakeholders of the education, which are under the title of 21st century skills that are required to be brought to the output of the education system. In this way, as in educational digital materials, all innovative applications can be efficiently and suitably integrated into the training system.

In a research conducted by Al-Azawi, Al-Faliti and Al-Blushi (2016) within the framework of game-based learning, the positive effects of game-based learning on motivation, academic achievement and other variables were mentioned rather than the traditional method. It is emphasized that the content to be realized in this direction should be designed in a way that will attract the attention of the students in an age-appropriate manner. From this point of view, the content to be designed is of the kind that can be supported both by hardware and software by modern technologies and should be designed in terms of content.

It should be noted that the use of such content is not an aim. As a result, these contents are also an educational tool in an effective educational environment.

In Turkey, Opportunities Enhancement Technology Improvement Act (Fatih) Project infrastructure, equipment, teacher training, Education Information Network (EBA) has signed several important sub-projects such as a major reform movement. In our country, important steps have been taken especially for the improvement of hardware infrastructure. However, the use of information technology products in education requires a planned process from start to finish. In order to use the products in a timely and appropriate manner, it is important that all training stakeholders are conscious. In his study, Dursun, Kırbaş and Yüksel (2015) attributed the lack of desired effectiveness of the FATİH Project to the reasons that the technological tools could not be distributed to all schools, the project could not be promoted well and the inadequacy of in-service trainings. He also mentioned that the EBA is not sufficient to provide material.

Educational Digital Applications have taken place in the education system within the scope of the human profile that is intended to be raised in line with the infrastructure improvement movements, academic studies, revised movements and national policies and will continue to develop and receive. At this point, it is important to ensure that all the stakeholders are ready for these practices by conducting the practices to be carried out in accordance with a specific purpose both regionally and nationally in a planned way in advance and to ensure willing participation. In this way, the outputs of the process can be increased, and with all the stakeholders, efficient learning environments can be created with more determined participation by getting rid of various concerns such as time, cost and curriculum.

SUGGESTIONS

In spite of various obstacles such as cost, duration, and curriculum anxiety, it is seen that academic digital applications have positive results in terms of both achievement and attitude and perception.

It is important that EBA, which is an educational content environment within the Fatih Project, provides up-to-date content support in line with the current curriculum.

Local education with Turkey should in all regions of electives as well as a compulsory course in the EBA's current content of teachers in all fields continuously steps towards the realization of training practical service in order to contribute disposable face is the face of this training can be supported by distance learning. Participation of educators who are willing and technologically pedagogically competent in the content creation process can positively affect the quality of the materials.

Career is the situation that all stakeholders of education take into account. It has become a center of education system today. It is possible that unsuccessful and unhappy individuals will emerge as a result of the fact that the students are guided by the professions that the society considers successful, not according to their abilities. In world countries, the importance of concepts such as creative thinking, problem solving, cooperation and communication, which should be developed in order to be successful in the age of knowledge within the scope of

21st century skills, emerges by societies, educators, business representatives and government institutions and educational reforms are implemented in this direction.

Gumaelius and Nymark (2017) conducted a study on Teknikåttan, a science, math and technology tournament for 15-year-old students in the Swedish country. It provided ideas that this test, which measures students' abilities under various headings, can be used as a national assessment tool. Considering the education systems that are focused on the examination systems of countries around the world, it can be said that the examination is a keystone of the educational structure. Therefore, the education system of the country, which has a test system developed to measure 21st century skills, can be shaped accordingly.

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