CHANGING ATTITUDES TOWARDS EDUCATIONAL TECHNOLOGY USAGE IN CLASSROOM: WEB 2.0 TOOLS

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ABSTRACT

The purpose of this study is to investigate the effects of using Web 2.0 tools in teaching on teacher candidates' attitudes towards using technology and instructional materials in the classroom environment, within the context of Technology Acceptance Model (TAM). To this end, a training program was given to 46 teacher candidates in various departments. This study employs an interrupted time series model which is a quasi-experimental research design. "Technological Attitude Scale" developed by Erdemir, Bakırcı and Eyduran (2009), "Attitude Scale for Material Use in Classroom Environment" developed by İpek Akbulut and Haliloğlu Tatlı (2013) and semi-structured interviews were used as data collection tools. The quantitative data obtained were analyzed using a paired sample t-test with SPSS 15.00, while the qualitative data were subjected to content analysis. The attitudes of the teacher candidates towards the use of technology (t(45) = 3.58, p<.01) and the use of instructional materials (t(45) = 10.28, p<.01) in the classroom environment showed a statistically significant difference before and after the training course. Additionally, at the end of the training program, all the participant teacher candidates pointed out that the use of technology in the classroom environment is a necessity.

| **Keywords:** | *Technology acceptance model, teacher training, material development, web 2.0 tools* |

INTRODUCTION

Today's generation of learners have grown up in a world surrounded by technology, they are enthusiastic and highly capable of using it (Prensky, 2010; Derbel, 2017). The learning demands and needs of this generation that is deeply intertwined with technology have changed considerably over time (Cameron, 2005 Lai & Hong, 2015). This change necessitates teachers who are the key component of the teaching-learning process, acquire and develop professional competences that can respond to the changing learning characteristics (Turkmen, Pedersen & McCarty, 2007; Ertmer & Ottenbreit- Leftwich, 2010; Koh, Chai & Lim, 2017). The technological competence that teachers have in order to prepare the materials that this generation needs, is beginning to be questioned. This is because there is a direct relationship between teachers' technology competencies and presentation of course content to the students in a proper and qualified manner (Lai & Hong, 2015; Almerich, Orellana, Suárez-Rodríguez & Díaz-García, 2016). At the present time, teachers are required to present their field knowledge in a pedagogical way with technological support and it is demanded that each teacher can develop qualified instructional materials in their field quickly and easily (Kaya, 2006; Basssani & Barbosa, 2018).

Instructional materials should be tailor-made and the person who can best develop this material is the

teacher of that course. It is known that the use of materials in the teaching process positively affects the academic achievement of the students (Kablan, Topan & Erkan, 2013), makes learning permanent (Capar, 2012), increases the positive attitude towards the lesson and decreases the level of anxiety (Ersen, 2014). However studies suggest that most of the teachers do not give enough room for technology-supported content in their lessons (Ciftci, 2013), are not sufficiently ready to utilize internet and computer for teaching purposes (Erdemir, Bakirci & Eyduran, 2009; Hsu, 2016), believe in the importance of technology in education but feel incompetent to use it in their fields (Duhaney, 2012; Hırça & Simsek, 2013), pedagogical beliefs as a barrier in technology integration (Tondeur, van Braak, Ertmer & Ottenbreit-Leftwich, 2017) and for these and similar reasons many teachers do not use technology in education (Can & Kaymakci, 2016).

When we look at the root of the above mentioned problems, we see that prospective teachers graduate without acquiring the capability to use technology and to integrate technology into instructional material development (Lai & Hong, 2015; Hsu, 2016; Tondeur, Pareja Roblin, van Braak, Voogt & Prestridge, 2017). It is known that, the responsibilities of teacher candidates in classes related to instructional technologies within the scope of their syllabus is based more on preparing materials, listening to courses, taking notes and preparing presentations (Yilmaz & Ayaydin, 2015) and that the education provided in the courses is not supported with practice (Mete, 2008). That is why they cannot obtain satisfactory knowledge and experience in regard to technology (Chai, Koh & Tsai, 2010). It is advised to focus on building skills in technology literacy and on learning the effective utilization of current technology in teaching and learning processes in the "technology utilization" courses provided to teacher candidates (Gunduz & Odabasi, 2004). In order to use technology effectively in the classroom, teachers should have continuous and sufficient training in this area, technology should be related to the course content and learning theories and technological infrastructure should be completed (Brooks, 2003). Additionally, teachers should have positive attitudes towards technology (Topaloglu, 2008). A new model called TAM has emerged in the research environment, including many variables such as behavioral intentions for using technology, percieved use of technology, ease of use of technology, attitudes towards technology, self efficacy for use in technology (Schepers & Wetzels, 2007). TAM is a powerful tool that defines the adoption of teachers' to technology then the other models (Scherer, Siddiq & Tondeur, 2019).

Technology Acceptance Model (TAM) developed by Davis (1989) is one of the models based on the idea asserting that using technology is affected by the individual's attitude towards technology, is utilized to analyze individual's acceptance of information technology and using behavior (Venkatesh, Morris, Davis & Davis, 2003; Turan, 2008). As demonstrated in a schematic way in Figure 1, the TAM model is known as one of the robust and valid models which have potentially wide applicability (King & He, 2006).
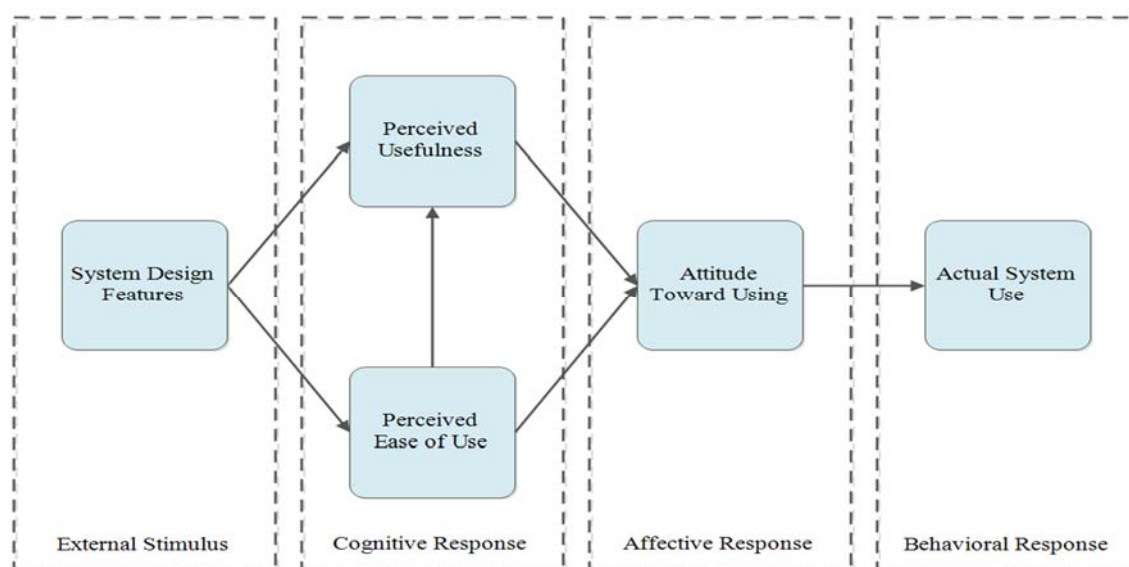

Figure 1. **Technology acceptance model (TAM) (Davis, 1993)**

According to the TAM, ease of learning, ease use of new technologies and users' beliefs that they will

benefit from using new technologies, increase adopting and probability of acceptance and use of the technology (Turan & Colakoglu, 2008). It has been found that perceived utility has direct effect on technology use (Teo, 2009), the perceived ease of use have a positive effect on perceived benefit, and perceived benefit on the attitude towards usage (Ma, Andersson & Streith, 2005). In addition Sert and Usluel (2009) determined that increasing teachers' decisions about using technology is beneficial will increase their technology usage. By using web 2.0 tools, users can create the content they wanted with powerful visials without a technical problem (Elmas and Geban, 2012).

In this context, web 2.0 tools have been introduced to prospective teachers in the context of the study so that they can easily use the technology in the material development process. The benefits that web 2.0 tools provide to users are listed in Table 1.

Table 1. Benefits of web 2.0 tools

Benefits of web 2.0 tools	
Easily integrated into classroom environment	Konstantinids, Theodosiadou & Pappos, 2013
Reduction of the costs, the low level of complexity needed for use	Grosseck, 2009
Easy usage oppurtunity with the interfaces it has	Adcock & Bolick, 2011
Quick and easy access to all kinds of information and content	Liu & diğ., 2016;
Create a blended learning environment	Majid, 2014
Increasing the level of learning	Ajjan & Harsthone, 2008
Increasing students' active participation into the learning environment	Huang, Jeng & Huang, 2009
Gives oppurtunity to learners to create and edit the content	Grosseck, 2009
Effective in creating collaborative and interactive learning environment	Kam & Katerattanankul, 2014
The learning environment gives possibility to reach a wide range of the masses	Lu, Lai & Law, 2010
Increasing TPAB self-confidence levels of prospective teachers	Tatlı, Ipek Akbulut & Altınışık, 2016
Supporting prospective teachers' critical thinking skills	Sendag, Erol, Sezgin & Dulkadir, 2015

In the scope of the study, a course content considering the benefits and ease of use provided by Web 2.0 tools was prepared for prospective teachers. From this point of view, it is considered that in the scope of this study, providing course content to the teacher candidates through technology support and adoption of technology in the use of lessons of the teacher candidates will support improving positive attitudes towards the use of technology. In this study, it is aimed to examine the effect of technology supported education, within the framework of TAM, on the attitudes of teacher candidates towards use of instructional materials in the classroom environment and to find out their opinions about the technology course content.

RESEARCH METHOD

Research Model

The aim of this study is to investigate the effects of using Web 2.0 tools in teaching within the context of Technology Acceptance Model (TAM), on teacher candidates' attitudes towards using instructional materials and technology in the classroom environment. The research is planned in the framework of mixed method. It is a research approach in which both quantitative and qualitative data are collected to explain research problems, two data sets are integrated with each other, and the results are extracted using the advantages of this integration (Creswell, 2015In view of Creswell's classification made, the explanatory sequential design is used in this study. The purpose of this design is that the work begins with quantitative phase (data collection and analysis) and to explain quantitative results, qualitative phase is intended to

process (Creswell & Plano Clark, 2011; Creswell, 2015).

Web 2.0 tools which will be included in the "Developing Instructional Materials with Web 2.0. Tool" program are determined before the program is prepared for prospective teachers. The content of the weekly class schedule is shown in Table 2.

Table 2. The content of the training program

Weeks	The content of the training program
1	TAS and Attitude scale towards material usage was applied to teacher candidates
2	Concept cartoon with Bitstrips
3	Concept cartoon with Powtoon
4	Fishbone with Creately
5	Concept map with Smartdraw
6-7	Concept map, mind map, flowchart, concept network with Inspiration
8-9	Concept map, mind map, flowchart, concept network with Edraw Max
10	Game, test, flash card with Quizlet
11	Crossword, word search with Quiz Maker
12	Story board with Storyboard
13-14	Animation with Powtoon
15	TAS and Attitude scale towards material usage was reapplied to teacher candidates
16	Intervies with teacher candidates

In this study, Web 2.0 tools were used as external stimuli in the context of TAM because of the following features: being easy to use, not requiring high level computer skills and complying with the needs of today's students. During the lessons; Web 2.0 tools were introduced to teacher candidates and they were asked to develop instructional materials with their group mates in their field of study using these tools. While introducing Web 2.0 tools; it is underlined what purpose these tools can be used for and what kind of instructional materials they enable to develop. The functions of the interface and the buttons on the inside of each Web 2.0 tool have been introduced with the aid of the host computer and projector. Throughout the training program, the instructors helped teacher candidates when they were experiencing problems. In this way, a cognitive response was aimed to be created. At the end of the process, it was investigated whether the external stimulus and the cognitive response turned into an affective behavior

Participants

A sample of 46 teacher candidates from various departments of Karadeniz Technical University, Fatih Faculty of Education, participated in the study during the 2015-2016 fall semester.

Data Collection Tool

Technological Attitude Scale developed by Erdemir, Bakirci & Eyduran (2009), Attitude Scale for Material Use in Classroom Environment developed by Ipek Akbulut & Haliloglu Tatli (2013) and semi-structured interviews were used as data collection tools in this study.

Collection of Data

Technology attitude scale (TAS)

A 29 item 5 point Likert-type (with 1 being "strongly disagree" and 5 "being strongly agree") Technological Attitudes Scale (TAS) developed by Erdemir, Bakirci & Eyduran (2009) was administered to participant teacher candidates twice, before and after the training program. The calculated reliability coefficient value of the scale obtained from the study belonging to Erdemir, Bakırcı and Erduran (2009) is 0.93 The Cronbach's alpha value of the scale calculated in this research is 0.92.

Attitude scale towards instructional material use in the classroom environment

The second data collection tool employed in this study was the attitude scale towards instructional material use in the classroom environment which was developed by Ipek Akbulut & Haliloglu Tatli (2013). This scale has 20 items and two sub-dimensions: attitidues towars material use and attitudes towards material use in the classroom environment. The items were rated on a 5 point Likert scale (1=Strongly Disagree, 2 =Disagree, 3 =Neutral, 4 =Agree, 5 =Strongly Agree). This scale was also administered to participant teacher candidates twice, before and after the training program. The alpha internal consistence coefficient that was calculated for the reliability of the scale was 0.89.

Semi-structured interview form

A six-item interview form was developed by two field experts in order to determine the opinions of teacher candidates on "Web 2.0 tools" and "Instructional Material Development with Web 2.0 Tools". This interview form was assessed by Turkish language field experts in terms of grammar and meaning validity. Then the final semi-structured interview forms were administered by the researchers to the participant teacher candidates.

Data Analysis

The data obtained from the scales administered in the study were analyzed with paired samples t-test in SPSS 15.00. The level of significance (p value) was assumed as 0.01. The qualitative interview data were subjected to content analysis. Data were analyzed separately by the two researches and were classified into the following categories: code, category and theme. The Kappa coefficient of con-cordance between the researchers' coding was calculated as 0.87. The coefficient obtained indicates that there is almost a perfect conformity between the encoded data (Landis & Koch, 1977). Non-common codes were reshaped, structured and presented in tables.

FINDINGS

3. 1. Findings Regarding The Attitude Towards Technology

The findings regarding the attitude towards technology were examined under two headings: those obtained from Technology Attitude Scale (TAS) and from semi-structured interviews.

TAS was administered twice, before and after the training program of "Developing Instructional Materials with Web 2.0. Tools". Pre-test and post-test descriptive statistics are presented in Table 3.

Table 3. Pre-test and post-test mean and standard deviation values

No	Technology Attitude Scale	Pre-test		Post-test	
		$\overline{X}$	Sd	$\overline{X}$	Sd
1	Preparing simple, specific and affordable instructional materials by using available facilities and environmental conditions.	4.08	0.63	4.30	0.55
2	Preparing concept, mind and knowledge maps.	3.80	0.69	4.37	0.80
3	Preparing written materials by using computer softwares (writing softwares, graphic softwares etc.).	3.80	0.75	4.17	0.77
4	Preparing two-dimensional visual materials like such as banners, puzzles and work sheets.	3.91	0.94	4.50	0.69
5	Preparing programmed teaching materials.	3.67	0.84	3.96	0.79
6	Being able to use online search engines (Google, altavista etc).	4.50	0.59	4.65	0.74
7	Using educational softwares in the classroom that're fit for the purpose.	4.02	0.77	4.30	0.66
8	Using graphic materials in the classroom that're fit for the purpose.	3.76	1.06	4.10	0.82
9	Using banners, puzzles, work sheets etc in the classroom that are	4.06	0.83	4.41	0.62

	fit for the purpose.				
10	Using diascope in the lesson in a way that's fit for the pupose.	4.17	0.61	4.48	0.59
11	Using tv/video in the lesson in a way that's fit for the pupose.	4.04	0.70	4.43	0.65
12	Using overhead projector in the lesson in a way that's fit for the purpose.	3.67	0.49	3.89	1.06
13	Using computer in the lesson in a way that's fit for the purpose.	4.39	0.50	4.41	0.75
14	Using internet in the lesson in a way that's fit for the purpose.	4.33	0.60	4.50	0.59
15	Using information technologies in the lesson in a way that's fit for the pupose.	4.04	0.94	4.41	0.58
16	Assessing an educational software in terms of its suitability for the purpose of the class.	3.93	0.88	4.00	0.73
17	Assessing instructional materials in terms of their suitability for the purpose of the class.	3.83	0.88	4.06	0.68
18	Assessing instructional materials and tools in terms of their suitability for the purpose of the design principles.	3.65	0.90	3.93	0.80
19	Planning how to assess an instructional material.	3.63	0.88	3.85	0.84
20	Planing fundamental stages of teaching (introductional activities, content presentation, practices, feedback, evaluation).	3.91	0.76	4.30	0.63
21	Making purpose analysis for the subject.	3.89	0.74	3.87	0.88
22	Offering distance learning courses over the internet.	2.61	1.12	3.06	1.21
23	Choosing an appropriate computer program in order to develop the desired instructional material.	3.26	1.08	3.59	0.98
24	Choosing the right instructional materials and tools that're fit to the purpose of the class.	3.85	0.70	4.19	0.58
25	Segmenting subjects in a class that was analyzed regarding purpose, aim and behavior.	3.83	0.93	4.13	0.62
26	Making physical arrangements in the classroom environment that fit the purpose of the lesson.	3.93	0.83	4.24	0.60
27	Creating multimedia softwares by using a computer technology or computer program.	3.13	1.17	3.46	0.81
28	Developing assessment and evaluation tools in multimedia in order to measure students' performance.	3.43	0.96	3.52	0.91
29	Collecting information about the students by using appropriate data collection tools in order to improve the quality of the class.	3.80	0.83	4.04	0.21
Total		**3.83**	**0.47**	**4.11**	**0.43**

It is seen from Table 3 that the teacher candidates' average scores regarding their attitude towards technology lie within the range of ($\overline{X}$ =2.61-4.50) for the pre-test and ($\overline{X}$ =3.06-4.65) for the post-test. The following three items drew a large percentage of undecided responses (neutral) and got average scores between 2.60 and 3.39 in the pre-test: "Item 22", "Item 23" and "Item 27". In the post-test, "Item 22" remained to be responded as undecided but with a statistically significant higher average, and the other two items' average answer shifted to the "agree" side. For all items of the scale, except for one: "Item 21", the average scores increased in the post-test. When the pre-test and the post-test scores are compared, the biggest increase in average scores were seen in the items of "Item 4", "Item 2" and "Item 22". It was determined that the smallest increase was realized in the average scores of the following three items: "Item 13", "Item 16" and "Item 28". The t-test results for the significance of the difference of the average scores in TAS pre-test and post-test are shown on Table 4.

Table 4. t-test results of the average values of TAS pre-test and post-test.

TAS	n	$\overline{X}$	Sd	Se	t	p
Pre-test	46	3.83	0.47	45	3.584	0.001
Post-test	46	4.11	0.43			

As shown in Table 4, teacher candidates' scores regarding their attitude towards technology was recorded as $\overline{X}$ = 3.83 on average in the pre-test and as $\overline{X}$ = 4.11 in the post-test. Therefore it can be stated that, after the training program teacher candidates' attitude towards using technology has changed significantly in a positive way ($t_{(45)=}$ 3.58, p<.01).

All the participant teacher candidates gave positive answers to the question regarding the necessity of technology use in education (Table 5).

Table 5. The opinions of teacher candidates on why technology is a necessity in education.

Theme	Code	Quotation	f*
Learning Environment (f=89)	Getting attention	"Technology is attention getting." (TC21)	24
	Facilitating learning	"facilitates learning." (TC12)	20
	Enabling permanent learning	"enables permanent learning" (TC40)	15
	Supporting individual learning	"educational technologies, tend to individualise the lesson"(TC11)	8
	Being entertaining	"Lessons could become more entertaining by using technology." (TC33)	8
	Active student involvement	"…effective in activating students" (TC15)	6
	Making lesson more productive	"makes lesson more productive" (TC18)	3
	Affordable (time etc.)	"using technology saves time and effort." (TC20)	2
	Reinforcing the subject	"reinforces the teaching subject"(TC10)	2
	Creating a positive learning Environment	"creates a positive learning environment both for the teacher and students." (TC3)	1
Teacher (f=20)	Lessening the burden on the teacher	"it lessons the burden on the teacher" (TC29)	7
	Easing the teaching process	"eases the teaching process." (TC27)	5
	Enhanching teaching	"ideal for enhancing teaching" (TC36)	3
	Suitable for the new generation	"has becomed so intertwined with our lives, is essential in education." (TC18)	2
	Activating teacher	"Educational technologies activates teachers, not passivize them." (TC33)	1
	Supporting educational Attainments	"thanks to technology, it is easier to take students attention and give educational attainments" (TC28)	1
	Suitable for crowded classes	"it could be suitable and beneficial to use technology in crowded classes" (TC20)	1
Course Content (f=12)	Rich content	"by using technology teaching subject can be supported by many examples" (TC7)	6
	Embodying abstract concepts	"technology enables embodying abstract concepts, especially in the field of life sciences ." (TC32)	3
	Enabling preparing material by one's own	"increases freedom in classroom and with various applications, enables preparing materials by our own." (TC10)	2
	Encouraging making research	"encourages making research in order to develop effective materials." (TC28)	1
Total			**121***

* Teacher candidates were allowed to state more than one opinion. (TC: teacher candidate)

As can be seen from Table 5, opinions of teacher candidates on why technology is a necessity in

education are classified under the following headings: learning environment, teacher and course content. The learning environment theme mostly coded with getting attention (f=24), facilitating learning (f=20), enabling permanent learning (f=15), supporting individual learning (f=8) and being entertaining (f=8). The teacher theme was mostly associated with the codes of lessening the burden on the teacher (f=7), easing the teaching process (f=5) and enhancing teaching (3). When it comes to the course content, the most frequent codes mentioned were providing rich content (f=6) and embodying abstract concepts (f=3).

All teacher candidates stated positive opinions on use of technology in education. However 6 of them stated that they might face some challenges when using technology in courses. Table 6 presents those challeges mentioned by the participant teacher candidates.

Table 6. Teacher candidates' opinions on the possible challenges regarding use of technology in courses

Potential challenges	Quotation	f
Time limitation	"Class time is not enough. Problems may arise with keeping up with the syllabus." (TC5)	4
Infrastructure problems	"… may face problems in class regarding computer and internet connection" (TC1)	2
Struggling with classroom management	"….it might be difficult for unexperienced/new teachers to control the classroom." (TC21)	2
Not complying with technology	…it is difficult to use some computer programs" (TC20)	1
Not being suitable for every course	"technology migt not be suitable for the content of every course"(TC22)	1
Total		**10***

* Teacher candidates were allowed to state more than one opinion. (TC: teacher candidate)

As shown in Table 6, teacher candidates mentioned time limitation (f=4), infrastructure problems (f=2), classroom mangement problems (f=2), lack of technological competence (f=1) and course problems (f=1) as potential challenges that might be faced when using thecnology in content classroom.

3. 2. Findings Regarding Use of Instructional Materials in Classroom Environment

Findings regarding use of instructional materials in classroom environment are examined under two main categories: those obtained from use of instructional materials in classroom environment attitude scale and those obtained from semi-structured interviews.

The pre-test and post-test mean and standard deviation of the items on the use of instructional materials in classroom environment attitude scale attitude scale are shown in Table 7.

Table 7. Pre-test and post-test mean and standard deviation of the items on the attitude scale.

No	Use of Instructional Materials in Classroom Environment Attitude Scale	Pre-test		Post-test	
		$\bar{X}$	Sd	$\bar{X}$	Sd
	Items regarding Instructional Material Use				
1	I like using materials in lessons	4.46	0.69	4.46	0.75
2	I believe that using instructional materials during lecture is essential.	4.52	0.72	4.56	0.72
3	I believe that students' success will increase with use of materials.	4.59	0.69	4.63	0.68
4	I believe that using materials in the lessons will increase permanent (persistent) learning.	4.63	0.61	4.63	0.68
5	I believe that using materials in lessons facilitates teaching.	4.63	0.61	4.48	0.75
6	I think that it is necessary to search from different sources for	4.54	0.69	4.63	0.53

	developing materials.					
7	I think that I organize the lesson better when I use materials.	4.30	0.78	4.24	0.79	
8	I think that using material in the classroom drives students' attention.	4.83	0.38	4.59	0.65	
9	I believe using materials helps students reach their goals	4.39	0.77	4.52	0.69	
10	I think that it is easier to remember subjects/concepts/lessons which is taught by using materials.	4.67	0.56	4.63	0.68	
11	I think that use of materials reinforces subjects learnt in the lesson.	4.65	0.53	4.41	0.72	
12	I believe that use of materials provides presenting the knowledge in different ways.	4.70	0.47	4.39	0.88	
Total		**4,58**	**0,43**	**4,51**	**0,57**	
Attitude Towards Material Use in the Classroom						
13	I feel uncomfortable while teaching/lecturing with materials.	3.80	1.07	2.37	1.22	
14	I believe that developing materials is a waste of time.	4.24	1.08	1.61	0.77	
15	I believe that it is difficult to control classroom in the material used lectures.	3.72	1.11	2.15	1.01	
16	I think that using materials misleads real target by keeping student busy.	4.37	1.02	1.50	0.72	
17	I have difficulty in taking attention of students' in the lessons which I use materials.	4.28	0.91	1.67	0.79	
18	I think that lecture hour is not enough for using materials.	3.74	1.22	2.24	1.06	
19	I think that use of materials in the lecture limits lecturer.	4.24	0.97	1.74	0.95	
20	I am afraid of misusing materials.	3.85	1.09	2.00	0.00	
Total		**4,03**	**0,74**	**2,16**	**0,57**	
Scale Total		**4,36**	**0,47**	**3,57**	**0,23**	

As can be seen in Table 7, pre-test and post-test average scores of the items "Item 1" and "Item 4" have not changed. The post-test average scores of the following items decreased: "Item 5", "Item 7", "Item 8", "Item 10", "Item 11" and "Item 12". On the other hand, the following items' average scores increased in the post-test: "Item 2", "Item 3", "Item 6" and "Item 9". At the end of the training program, it is determined that averages of all negative items of the scale regarding material use in the classroom environment fell in the post-test. The t-test was performed to determine whether the difference in pre-test and post-test scores is statistically significant. The results of the t-test are shown in Table 8.

Table 8. The test results of the scale

Attitude Scale Towards Material Use in the Classroom Environment	Measurements	n	$\overline{\text{X}}$	Sd	Se	t	p
Dimension of the Scale regarding Material Use	Pre-test	46	4.58	0.43	45	0.84	0.40
	Post-test	46	4.51	0.57			
Dimension of the Scale regarding Material Use in the Classroom Environment	Pre-test	46	4.03	0.74	45	1.41	0.00
	Post-test	46	2.16	0.57			
Scale in General	Pre-test	46	4.36	0.47	45	1.28	0.00
	Post-test	46	3.57	0.23			

It is determined that, the average score regarding material use dimension of the scale decreased from $\overline{\text{X}}$= 4.58 (pre-test) to $\overline{\text{X}}$ = 4.51 (post-test) however this decline was not statistically significant ($t_{(45)}$= 0.84, p>.01). On the other hand, average score regarding material use in the classroom environment dimension of the scale decreased from $\overline{\text{X}}$=4.03 (pre-test) to $\overline{\text{X}}$= 2.16 (post-test) and the difference is found to be statistically significant ($t_{(45)}$= 11.41, p<.01). Considering the scale as a whole, the difference between pre-test and post-test scores is found to be statistically significant ($t_{(45)}$= 10.28, p<.01).

Teacher candidates were asked to evaluate the instructional materials that they developed during the training program and their comments are listed in Table 9.

Table 9. Teacher candidates' evaluations/comments regarding the materials developed in the training program

Pros of material usage	f	Cons of material usage	f
Makes classes entertaining	12	Leads to virtual addiction and abandonment of concrete materials	1
Enables permanent learning	6		
Facilitates teaching	5		
Can be used again and again	2		
Increases interaction	1		
Individualizes learning	1		
Total	**27**	**Total**	**1**

As presented in Table 9, teacher candidates expressed advantages of material usage as follows: making classes entertaining (f=12), enabling permanent learning (f=6) and facilitating teaching (f=5). Only one teacher candidate mentioned a disadvantage of material use as stating virtual instructional materials lead to virtual (computer/internet etc) addiction in students and as a result students do not want to use concrete materials. In this part of the study, findings regarding teacher candidates' evaluations on "Developing Instructional Materials with Web 2.0 Tools Course" and their comments on Web 2.0 tools are presented. Their answers are categorized as pros and cons of the course and presented in Table 10.

Table 10. Teacher candidates' course evaluations

Pros	f	Cons	f
Improves imagination	5	Intense course content	4
Give opportunity for practice	5	Crowded class	1
Gaining technology knowledge	3	Would be more useful if it was given before	1
Learning new applications	3	Computer strains eyes	1
Enables revising field knowledge	1		
Total	**17**	**Total**	**7**

Graph 1, presents an analysis of the teacher candidates' evaluations on Web 2.0 tools.
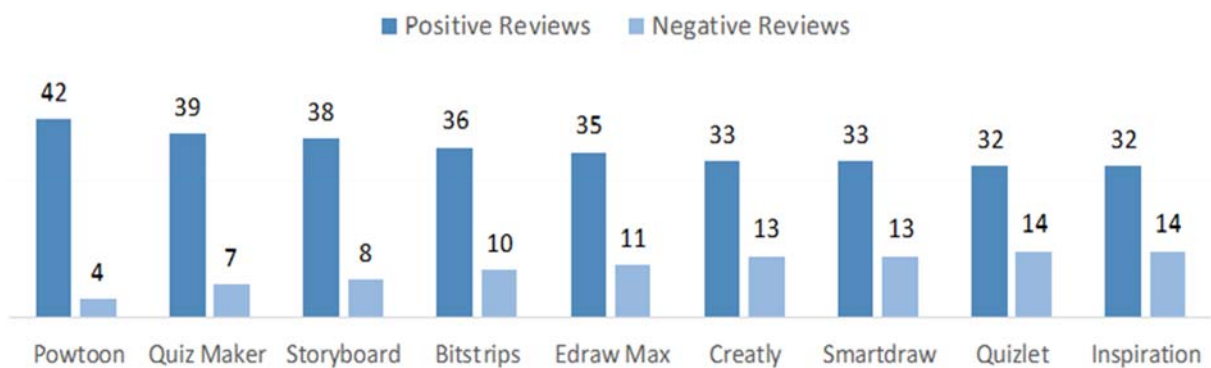
Graph 1. Teacher candidates' evaluations on each Web 2.0 tool

As shown in the graph above, the most liked Web 2.0 tools were Powtoon (f=42), Quiz Maker (f=39)

and Storyboard (f=38) and the least liked/unliked were Inspiration (f=14), Quizlet (f=14), Smartdraw (f=13) and Creatly (f=13) applications. Answers of the teacher candidates regarding liked and disliked features of these applications are presented in Table 11.

Table 11. Liked & disliked features of web 2.0 tools

	Web 2.0 tools Features	Powtoon	Quiz Maker	Storyboard	Bitstrips	Edraw Max	Creatly	Smartdraw	Quizlet	Inspiration	Total
Liked features	Ease of use	14	16	7	14	17	15	21	11	14	129
	Helps develop effective behaviour	12	15	12	9	8	6	10	16	12	100
	Rich content	12	2	15	9	8	9	4	1	8	68
	Entertaining	13	3	-	10	1	-	-	7	-	34
	High quality animation program	8	-	-	-	-	-	-	-	-	8
	Presents ready templates	-	1	-	1	6	-	-	-	-	8
	Turns classes into games	-	3	-	-	-	-	-	4	-	7
	Affordable/economic	1	1	-	-	1	-	1	-	-	4
	Comprehensible	1	1	-	-	-	1	1	-	-	4
	Enables creating selfresembling characters	-	-	-	2	-	-	-	-	-	2
	Most used application	-	-	-	-	-	-	-	-	2	2
	Total	**61**	**42**	**34**	**45**	**41**	**31**	**37**	**9**	**36**	**366***
Disliked Features	Complex usage	6	2	6	1	6	7	3	3	10	44
	Poor content	-	1	1	5	-	1	3	-	-	11
	Not practicle/suitable for my department (preschool teacher candidates)	-	-	-	-	-	-	-	2	-	2
	Incompatibility of Turkish characters	-	1	-	-	-	-	-	-	-	1
	Total	**6**	**4**	**7**	**6**	**6**	**8**	**6**	**5**	**10**	**58***

*Teacher candidates were allowed to state more than one opinion.

When Table 11 is examined, it is seen that the general features of Web 2.0 tools that are liked by the candidate teachers are ease of use (f=129), helping develop effective materials (f=100) and presenting rich content (f=68) being entertaining (f=34) feature was mostly stated for Powtoon, Bitstrips and Quizlet. The main disliked features were stated as complex usage (f=44) and poor content (f=11).

All teacher candidates gave positive responses regarding the necessity of the course. Table 11 shows the suggestions of the teacher candidates on "in what grade should the course be offered and why?".

Teacher candidates' recommendations regarding the content of the training program "Developing Instructional Materials with Web 2.0 Tools" are presented in Table 12.

Table 12. Teacher candidates's recommendations regarding the content of the training program
   "Developing Instructional Materials with Web 2.0 Tools"

Recommendations	f
Nothing needs to be changed	29

Number of applications used in the course should be increased (Photoshop, Prezi etc.)	7
The intensity of the course content should be leşsen	4
Class size should be reduced	2
Course hours should be increased	1
The program should include making practices in schools	1
Language of the applications used in the course should be Turkish	1
There should be more details regarding the content	1
Total	**46**

More than half of the teacher candidates thought there shouldn't be any changes regarding the content of the training program (f=29). Some of them recommended that number of applications used in the course should be increased (f=7), the intensity of the course content should be lessen (f=4) and the class size should be reduced (f=2).

DISCUSSION AND CONCLUSION

Prospective teachers stated that use of technology in education is beneficial in terms of learning environment, teacher and course content. Similarly, they point out that use of Web 2.0 tools is easy and helps the material preparation process. Together these two situations create the cognitive reactions of prospective teachers to web 2.0 tools. Increasing attitudes of prospective teachers positively towards technology and use of materials in the classroom environment constitutes their affective response. It is thought that the cognitive and affective reactions occurring in prospective teachers will support the formation of learning environments with Web 2.0 tools in their professional lives by transforming into behavioral responses. Cakar (2018) reported that the perceived benefits and attitudes were influential on the intentions of users. He also stated that this intention is decisive on the behavior to be achieved. Pazvant (2017) found a strong relationship between attitude and intention; said that this relationship affected positively the perceived benefit. The high perceived ease of use increases the behavioral intention (Khati, 2016).

"TAM" is a process that users' attitude towards technology ultimately turn into behavior in the real system where the perceived usefulness and perceived ease of use affect cognitive responses to using technology (Davis, 1993). From this point of view, use of Web 2.0. tools in education as an external stimuli in the context of this study, has some perceived usefulness such as attracting attention, ensuring permanent learning, facilitating learning and teaching process and providing rich content. In this study, an appropriate setting was created for a cognitive response since teacher candidates find the use of web 2.0 applications easy and have the perception that it is useful. It is thought that will enable teacher candidates to develop positive attitudes toward the use of technology in education. The body of literature includes all studies indicating that the perceived usefulness is important in technology acceptance (Usluel & Mazman, 2010; Lee & Coughlin, 2015), the perceived usefulness and perceived ease of use positively affect technology acceptance (Ozer, Ozcan & Aktas, 2010) and affect behaviour in the real system (Celik & Ipcioglu, 2006); perceived usefullness and ease of use effects teachers intention in using technology (Jeung, 2014).

Data obtained from the "Technology Attitude Scale" that was applied to teacher candidates were examined and it was determined that the attitude scores regarding instructional technologies in creased in the post-test. This indicates that the teacher candidates believe that they can use technology without encountering any problems in the educational environment (Eyup, 2012). The teacher candidates who participated in the research stated that it is necessary to use technology in education because technology brings benefits to the learning environment, to teachers and also helps prepare instructional materials. Their opinions about the advantages/benefits of technology in this regard were compatible with the findings in the literature such as appealing the attention of the students (Derbel, 2017), facilitating learning (Pasa, Bolat & Karatas, 2015), ensuring permanent learning (Prensky, 2009), supporting individual learning (Grant & Mims, 2009) and increasing students' active participation in the class (Horzum, 2007). It is also known that use of technology in teaching makes teaching more understandable, lasting, useful and fun (Simsek & Yildirim, 2016). Self-confidence of the participants towards using technology increased when they were allowed to

use the technology practically in the classroom and adopted it as a habit (Tondeur, Pareja Roblin, van Braak, Voogt & Prestridge, 2017). As a result of this study, it was determined that the average scores regarding instructional material preparation obtained from the "Technology Attitude Scale" showed the highest amount of increase in the post-test. It is known that the attitude towards technology and towards self-confidence is important in terms of technology usage in education but is alone not enough (Koseoglu, 2012). The increase in the knowledge of instructional material has a positive effect on attitude towards technology (Tekin, Inci, Aslan & Yagız, 2013).

Within the scope of the study, teacher candidates' were informed about the instructional material and as a result of this information process their attitudes towards technology use were affected positively. All participant teacher candidates stated that "the use of technology in education is a necessity". Which variables effect the technology integration is frequently asked in literature. Teacher candidates mentioned some problems that they face (time constraints, infrastructure problems and classroom management challanges) while using technology in the classroom. TAM is one of the models used for measuring the user's technology acceptance, is a way of determining the teacher's intentions to use new technologies in educational practices. In recent years using educational technologies in teacher education increased but using technology and technology acceptance is still a problem for educational institutions (Berrett, Murphy, & Sullivan, 2012). Although teacher candidates knows the importance of technology in teaching, learning process and wants to integrate technology to the process, they are unable to integrate it into lessons effectively (Tondeur, Pareja Roblin, van Braak, Voogt & Prestridge, 2017).

In the study conducted by Pelgrum (2001) in 26 countries, in relation to technology integration, some obstacles were mentioned such as sufficient number of computers, inadequacy of teachers, difficulties in integrating technology, lack of computer-assisted training time, inadequate hardware, lack of proper software, insufficient time for the teacher, inadequate simultaneous access, lack of specialists and lack of technical support. Despite the elapsed fifteen years, the teacher candidates mentioned the same problems regarding technology use in education which indicated that the shortcomings of the integration point have not been overcome.

Likewise, in the study of Çakır & Yıldırım (2009) which was conducted to determine the opinions of the computer teachers and teacher candidates on the factors affecting successful technology integraclasses, limited access to technology, and inadequate knowledge of teachers negatively influence technology integration in schools. However, the TAM model argues that using technology is not only based on technical and managerial characteristics, but also on the personal characteristics, expectations and perceptions of technology users, and that user perception can also affect this success (Akca & Ozer, 2012; 2013). From this point of view, it is understood that the inadequacy of the technological infrastructure influences the use of technology to a certain extent, but that the teachers who have a positive perception of using technology are able to provide technology integration to their courses in all conditions (Venkatesh, Rabah, Fusaro, Couture, Varela & Alexander, 2016).

When the data obtained from the "Attitude Scale for Material Use in the Classroom Environment" were examined, it was found that there was a significant difference in favor of the post-test. Before the training that was given in the context of this study, teacher candidates' had a high level of positive attitude toward using instructional materials but they also believed that use of material in the classroom is a waste of time, it distracts students and/or restricts their imagination. After the training program these negative opinions diminished significantly. This can be seen as an indicator that the participant teacher candidates are more likely to use web 2.0 tools in their future professional lives. Web 2.0 tools are user-friendly and easy-to-use applications and it is believed that they will make the lessons entertaining and increase the students' technological literacy (Sadaf, Newby & Ertmer, 2012).

In line with the literature which guided the aims of this study, the instructional materials that teacher candidates have developed within the context of this study were expected to make the lesson fun (Basarmak & Mahiroglu, 2015), enable permanent learning (Tatar, Zengin & Kagizmanlı, 2013) and facilitate the teaching process (Coklar & Tercan, 2014). It is aimed that students know where and how to use these tools, make appropriate tool selection for the purpose of the activity to be done, and develop materials by supporting their field knowledge with web 2.0 tools (Elmas & Geban, 2012).

The teacher candidates evaluated the content of the training program as positive concerning that it helped them develop their imagination and gave the opportunity for application. On the other hand they criticized the course content for being too intense. At the present time there are many Web 2.0 applications and a growing number of applications are being developed. Criticisms about the intensity of the course content should come under review but should not undercome the benefits that Web 2.0. applications provide which are mentioned in the literature as getting students adopt group study habits, providing effective learning, developing high level thinking abilities, enhancing individual development and fostering taking responsibility (Horzum, 2010; Liu, Wang & Tai, 2016).

Teacher candidates stated that they liked Powtoon, Quiz Maker and Storyboard applications more than Inspiration, Quizlet, Smartdraw and Creatly applications. Main reasons most teacher candidates like the applications introduced in the training program were mentioned as being easy to use, helping to prepare effective material and offering rich content. In a study on Web 2.0 applications, it is stated that applications with similar content and interfaces are more prominent (Konstantinids, Theodosiadou & Pappos, 2013). Some of the teacher candidates evaluated a number of applications as being complex and the content as being insufficient. It is thought that some part of this criticism direction is due to teacher candidates' incompetency in handling technology. Causes of negative attitudes of teachers towards technology were mentioned as academic studies regarding educational technology were not persuasive for teachers, they can not give up the old and dominant educational culture, they have not yet fully understood the benefits of the technology assisted content and they are not encouraged to use technology in the classroom environment, were not aware of in what degree they could integrate technology to their teaching and learning activities (OECD, 2009; Scherer, Siddiq, & Tondeur, 2019).

The lack of perfect versions of Web 2.0 tools (the applications are in the developmental stage), the short life span of some tools, a large number of different applications (users have to examine dozens of applications and select the appropriate technology), the need for extra mental load and time could be shown as some of these limitations (Yukselturk & Top, 2016). It is also stated in the literature that teacher candidates do not have enough training on how to develop instructional materials and prepare samples for these materials using the technology therefore they want to participate in a training program in this regard. (Inel, Evrekli & Balim, 2011). In the light of these opinions, it is recommended that web 2.0 applications be integrated into the related course contents and be included in the curriculum of the first years of undergraduate study.

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Appendix

1. Why do you think technology is a necessity in education? Please explain.

2. What are possible challenges regarding the use of technology in courses? Please explain.

3. What are your evaluations /comments regarding the materials developed in the training program? Please explain.

4. What are your evaluations about the course developed according to Web 2.0 ? Please explain.

5. What are your evaluations on each Web 2.0 tool? Please explain.

6. What do you recommend regarding the content of the training program "Developing Instructional Materials with Web 2.0 Tools"? Please explain.