Primary School Teacher Candidates and 21st Century Skills

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Abstract

In this study, the aim is to determine the effect of digital storytelling on the primary school teacher candidates' 21st century skills. Since digital storytelling contains many skills like information, media and technology skills, communication and collaboration skills, group works, etc within itself, it can be defined as a good way for individuals to gain and develop 21st century skills. A digital storyteller, during the process of making his/her digital stories, is to research and access information, analyze, evaluate and give decision on what s/he has researched, solve problems, use his/her creativity, be capable of using technology, applications and/or programs and have digital, technology, visual and information literacy . In order to collect data, *21st Century Skills and Competences Scale Directed at Teaching Candidates*, digital storytelling rubric and structured interviews were used. According to results of the study, posttest scores of the candidate teachers' on 21st Century Skills and Competences Scale were higher than those of on the pretest. There was a meaningful difference between digital storytelling rubric scores the teacher candidates got from the three digital stories and the scores got higher on every following digital story, which can be said to support the result that the posttest scores of the candidate teachers' on 21st Century Skills and Competences Scale were higher than those of on the pretest. This situation is also supported by the fact that the scores obtained from the digital stories explain the variability of the scores on 21st Century Skills and Competences Scale by about 40% and that the scores obtained from the digital stories are the predictor of 21st century skills and competences of the teacher candidates. The participants also mentioned at the interviews that digital storytelling contributed to their 21st century skills development.

Keywords: Learning and Innovation Skills, ICT Skills, Life and Career Skills, Digital Storytelling, Teacher Candidates

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INTRODUCTION

The constant changes and progresses in science and technology have necessitated new expectations and requirements in many fields. While it was acceptable and sufficient for the individuals to have certain knowledge on any subject in the previous century, the 21st century has required individuals to go beyond having knowledge on a certain subject or subjects and gain new skills, called 21st century skills, to be able to keep up with the dazzling changes and progresses and adapt those skills to their daily lives.

Various institutions and organizations have defined and identified what the 21st century skills (EnGauge 21st century skills, OECD competencies, The ISTE Educational Technology Standards, World Economic Forum, National Research Council, Partnership for 21st Century Skills -P21-, the European Union, Assessment & Teaching of 21st Century Skills -ATCS-, Technological Literacy Framework for the 2012 National Assessment of Educational Progress (NAEP)). The reports by such institutions and organizations show that 21st century skills are outlined as cognitive skills, socio-cultural skills, self-efficacy skills and technology skills. While such skills as creativity, innovation, critical thinking, problem solving are outlined under the cognitive skills, being aware of the sub-skills under cognitive skills and having intrinsic motivation to use such skills are listed under self-efficacy skills. Besides, socio-cultural skills are composed of such sub-skills as collaboration, communication, working with diverse groups and technology skills are composed of information, media and technology literacy. Though these skills are explained in different headings, they are interconnected and interacted and all these skills develop dependently. In Table 1, the similarities and differences of the frameworks by Voogt and Pareja Roblin (2010) are given.

Table 1 Comparison of six frameworks in terms of 21st century skills.

Mentioned in all frameworks	Mentioned in most frameworks (i.e., P21, EnGauge, ATCS and NETS/ISTE)	Mentioned in a few framework	Mentioned only in one framework
- Collaboration - Communication - ICT literacy - Social and/or cultural skills; citizenship	- Creativity - Critical thinking - Problem solving - Develop quality products / Productivity (except in ATCS)	- Learning to learn (ATCS, EU) - Self-direction (P21, En Gauge, OECD) - Planning (En Gauge, OECD) -Flexibility and adaptability (P21, EnGauge) Core Subjects: - Mathematics; communication in mother tongue; science (EU, P21, ATCS); - History and arts(P21 and ATCS)	- Risk taking (En Gauge) - Manage and solve conflicts (OECD) - Sense of initiative and entrepreneurship (EU) - Interdisciplinary themes (P21) - Core Subjects: economics; geography; government and civics (P21)

In order to educate citizens who are qualified and equipped with various skills, many countries have updated their education programs and integrate 21st century skills in their education systems. As one of these countries, Turkey has been making necessary adjustments and updates in teaching programs and has published 2023 Education Vision. It can be seen in the 2023 Education Vision and teaching programs by the Turkish Ministry of National Education that the development of 21st century skills is an indispensable global norm and that all the expectations in teaching programs at all levels are to be consistent with 21st century skills. In the 2023 education vision report, 21st century sills are listed in various headings within the context of the Turkish Qualifications Framework (https://www.myk.gov.tr//TRR/File6.pdf).

In order for countries to adapt themselves to the changing world and emerging new skill areas and to educate citizens equipped with 21st century skills, they have to have educators and teachers who have developed their skills and can raise students to be capable of having and using their skills. Therefore, the education and teaching programs for both pre-service and in-service training of teachers and teacher candidates should be in accord with 21st century and its requirements, by which they can gain and develop their skills. According to the report by OECD (2018), the pressure on the governments to provide their citizens with right skills through high-quality education has been increasing. At this point, teachers have a crucial role to build more successful education systems. However, it is also mentioned in the report that rapid changes in the world challenges the nature of teaching itself and that teachers in the information and technology age are expected to go beyond traditional development of content knowledge and cognitive skills. They are expected to develop strategies to meet the demands and requirements of 21st century skills. Being aware of the rapid and constant technological advancement, teachers are to keep up with such changes and update skills to use their technology in their classroom. In the new age, teachers should be able to inspire their students to innovate, be creative, think critically and work collaboratively with diverse groups.

Digital Storytelling and 21st Century Skills

Digital storytelling is a new way of traditional storytelling by using multimedia or technical tools such as images, videos, music, sound effects, voice and narrative (Digital Storytelling Association, 2012; McGeoch, 2010; Porter, 2004; Robin, 2008). The digital stories can be in the form of personal narratives, narratives on historical figures or events, and content area stories (Robin, 2006).

There are seven elements to produce such multimedia stories which are all dynamic and interconnected to each other (Bull & Kajder, 2004, Fields & Diaz, 2008, Lambert, 2010, Jakes & Brennan, 2005, Robin, 2006, Satterfield, 2007):

- Point of view: the main point and the message of the story.

- Dramatic question: a key question to attract the attention of the audience.

- Emotional content: the emotion to be conveyed to the audience

- The gift of the voice: the effect of voice on conveying the feelings, the message and the emotional content of the story.

- Economy: the numbers and the length of the music, effects, images, pictures etc. and the length of the story itself which is generally limited to 2-5 minutes.

- The soundtrack: the use of music and other sounds.

- Pacing: the rhythm of the story.

As Yılmaz and Ciğerci (2018) define, there are five stages of producing digital stories. The first step is writing the story. The storyteller, at this stage, decides on what to tell in the story. The second step is voice recording. The storyteller should perform voice recording in a silent place like a studio. The third step is collecting visuals like photographs, pictures, videos etc. to be used in digital story. The fourth step is making the digital story, during which all the components (the story, visuals, voice recording) are gathered using programs such as Photo Story, iMovie, Movie Maker, etc. The last step is exporting and sharing the digital story. At this step, the digital story created by using any kind of programs are saved and then shared on a platform like YouTube.

Since digital storytelling contains many skills like information, media and technology skills, communication and collaboration skills, group works, etc within itself, it can be defined as a good way

for individuals to gain and develop 21st century skills. A digital storyteller, during the process of making his/her digital stories, is to research and access information, analyze, evaluate and give decision on what s/he has researched, solve problems, use his/her creativity, be capable of using technology, applications and/or programs and have digital, technology, visual and information literacy (Dogan, 2012; Duman and Göçen, 2015; Göçen, 2014; Green, 2011; Gregory and Steelman, 2008; Karakoyun, 2014).

Digital storytelling can be used in teaching and learning environment effectively as it provides an opportunity to integrate technology into the education (Educause Learning Initiative, 2007). Robin (2006) states that digital storytelling develops many of the students' skills like research, writing, organization, technology, presentation, problem solving, evaluation and communication.

Robin (2008) and North Central Regional Educational Laboratory (NCREL) draw attention on the fact that digital storytelling can develop such 21st century skills as digital, global, technology, visual and information literacy. Besides these skills, NCREL also states that digital storytelling is an effective tool for students to progress their creative thinking and creativity, meta-cognitive skills, communication, collaboration and group work skills. Moreover, Kajder (2004) mentions that digital storyteller not only use their technology literacy but also act as a listener, interpreter, reader, writer, artist, and thinker.

When the researches, the samplings of which are teacher candidates are examined, there are the ones which conclude that digital storytelling is an effective method to develop creativity, technology and all language skill areas (Erten, Özdemir, Güllü Egin and Palabıyık, 2018; Brenner, 2014), other studies show that teacher candidates find digital storytelling joyful, educative, an artistic and reflective tool to develop their creativity (Uslu Pehlivan, Kurtoğlu Erden and Cebesoy, 2017; Erten, Özdemir, Güllü Egin and Palabıyık, 2018; Brenner, 2014).

The aim of this research is to determine the effects of digital storytelling on the development of 21st century skills of teacher candidates. The following questions will be answered in the study:

1- Is there a meaningful difference between the pre and post test scores of the teacher candidates in *21st Century Skills and Competences Scale Directed at Teaching Candidates*?

2- Is there a meaningful difference in the rubric scores of the teacher candidates for the three digital stories they created?

3-Are the digital storytelling rubric scores of the teacher candidates predictor of the scores of *21st Century Skills and Competences Scale Directed at Teaching Candidates?*

4- How do the teacher candidates view the effects of digital storytelling on 21st century skills?

METHOD

Explanatory sequential design, one of the mixed methods, was used in the study. The first step of the design is to collect and analyze quantitative data and it is followed by the collection of and analysis of qualitative data. The aim in the second stage, qualitative data collection and analysis, is to follow the results of the first stage. In this mixed design, the aim is to interpret how the qualitative results explains quantitative results (Creswell, 2014).

The first quantitative phase of the study was designed on one group pre and post test design. The reason to use this design in this research is that the study was done with 42 teacher candidates in Turkish Language Teaching lesson who were all in one section. In the qualitative phase of the study, structured interviews were held with 15 participants individually.

In this study, the 42 teacher candidates were requested to create 3 digital stories within the context of Turkish Language Teaching lesson. Two of the digital stories were prepared on the themes (art, national culture, health and sport, nature and universe, science and technology, emotions, time and space, the world of children, etc.) listed in 3rd and 4th grade primary education Turkish teaching program and one digital story was in the form personal narrative. Two different themes were given to each of the participants. Before the study, the lecturer of the lesson, who is also the researcher, took necessary research permission from the administration of Education Faculty in Harran University. Then, the researcher gave the participants detailed information about the research and the participants fill up a voluntary participation form. The 12-week research consisted of 4 stages.

At the first stage, the researcher and teacher candidates made lessons, designed workshops on digital storytelling and wrote literature review. At the end of the third week, *21st Century Skills and Competences Scale Directed at Teaching Candidates* was conducted to the group.

The second stage of the study lasted 8 weeks, during which the participants prepared their digital stories. This stage was held with both in and out of classroom activities. The participants attended a virtual classroom opened on Edmodo by the researcher and shared their stories, storyboards, visuals, sound recordings and finally their digital stories in the virtual classroom. The digital stories were scored by using a digital storytelling rubric (www.educatorstechnology.com). The scores of the participants are given in Table 2.

Table 2 The rubric scores of the participants on three digital stories (DS)

Participants	DS1	DS2	DS3	Participants	DS1	DS2	DS3
1	11	13	14	22	10	12	13
2	10	11	11	23	10	10	12
3	11	13	15	24	12	14	15
4	10	12	14	25	12	13	15
5	9	11	12	26	12	14	15
6	8	9	10	27	9	10	11
7	10	12	14	28	11	12	13
8	12	14	15	29	11	13	14
9	9	10	11	30	11	11	13
10	10	12	13	31	12	14	15
11	10	11	12	32	12	14	15
12	11	13	14	33	8	10	11
13	9	10	10	34	11	12	13
14	10	11	12	35	10	11	12
15	12	14	15	36	11	13	14
16	10	11	13	37	9	11	12
17	9	11	11	38	9	11	12
18	11	13	14	39	11	13	14
19	11	13	14	40	10	12	12
20	10	12	12	41	11	13	14
21	11	13	14	42	11	12	13

At the third stage of the research, week 12, *21st Century Skills and Competences Scale Directed at Teaching Candidates* were conducted as post-test and then interviews were held with 15 voluntary participants. At the final stage, the researcher analyzed quantitative and qualitative data and wrote the report.

Participants

As mentioned above, all the 3rd grade students attend Turkish Teaching lesson in just one section. The number of the students taking the lesson was 42 and all participated in the study. 29 of the participants were female, while 13 of them were male. All the participants filled an consent form to participate in the study.

Data collection instruments

The following data collection instruments were used to collect qualitative and quantitative data for this study.

21st Century Skills and Competences Scale Directed at Teaching Candidates

In this study, 21st century skills and competences scale, which was developed by Anagün, Atalay, Kılıç and Yaşar (2016), was used to measure 21st century skills of the teacher candidates after taking the consent of the researchers. In order to confirm the scale structure and validity, an Exploratory Factor Analysis (EFA) followed by a Confirmatory Factor Analysis (CFA) was performed. The EFA results suggested 42-item and three-factor structure, in which factors were called: Learning and Renewal Skills, Life and Career Skills, and Information Media and Technology Skills by using CFA results. Also, reliability analysis showed that Cronbach's α value for the whole scale was .889, which was highly acceptable. Similarly, Cronbach's α values were .845, .826, and .810 for single factor base for factor 1, factor 2, and factor 3 respectively.

Further, in order to evaluate the digital stories created by the teacher candidates, "an analytic rubric for digital stories" was used.

Structured Interviews

In order to get the opinions of the participants about the effects of digital storytelling on the development of 21st century skills, the researcher developed a structured interview form consisting of 3 questions aiming to determine the effects of digital storytelling on teacher candidates' life and career skills, learning and innovation skills, information, media and technology skills. These skills were adopted from the ones in P21 (Figure 2). The answers of the participants to the questions were recorded. The following interview questions were asked to the participants:

1) What do you think about the effects of digital storytelling on your learning and innovation skills?

2) What do you think about the effects of digital storytelling on your information media and technology skills?

3) What do you think about the effects of digital storytelling on your life and career skills?

Fig. 2 The Framework of 21st century skills (source: www.p21.org)

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Data Analysis

The analysis of the quantitative data started with a normality test. The data showed normal distribution, so the assumptions were set for the first three related research questions. In this respect, related measurements for first research question was analyzed by using t-test results. Following, single-factor ANOVA used for related measurements of second research question. Last, the third research question was interpreted by using simple linear regression analysis for related measurements.

As to the qualitative data analysis, a descriptive analysis was used for the interviews after the recordings were transcribed into computer files and checked independently by the researcher and an expert in the department of primary education. 21st century skills listed in P21 were accepted as the themes and sub-themes. Besides, the characteristics listed in *P21 Framework Definitions* (2009) were adopted as the codes. Therefore, a descriptive analysis was applied for the analysis of the qualitative data in the study. For presenting the findings obtained from the descriptive analysis, the researcher decided on the selection of illustrative quotations to be included in the research report. The quotations were translated into English by the researcher and rather than using names or nicknames for the students while taking quotations, giving numbers to each of the 15 participants in the interview like P1(Participant 1), P2 (Participant 2), P3(Participant 3) was preferred.

FINDINGS

In this part, the findings of the study were presented depending on research questions respectively.

1- Findings on the experimental group

In the first part of the results, the 21st century skills competence perceptions of the teacher candidates were investigated. Teacher candidates' perceptions at beginning of the study versus at the end of the study was examined by the pre-and post-test differences in the experimental group. The data was analyzed using independent samples t-test, and the results were given in Table 3.

Table 3 Results on 21st century skills and competences

Scale	Measure	N	$\bar{X}$	S	df	t	p
Whole scale	Pre-test	42	172.976	12.996	41	5.361	.000*
	Post-test	42	184.786	16.400			
Learning & innovation skills	Pre-test	42	71.381	7.381	41	4.311	.000*
	Post-test	42	76.405	8.603			
Information, Media and Technology Literacy	Pre-test	42	31.857	4.448	41	7.406	.000*
	Post-test	42	36.810	2.787			
Life & career skills	Pre-test	42	69.738	4.516	41	1.534	.133
	Post-test	42	71.571	7.899			

*p<.05

Table 3 shows the pre-and post-test comparisons of teacher candidates' on 21st century skills competence perceptions. According to the results, there was a significant difference between pre-and and post-test scores overall ($\bar{X}pre$= 172.976, $\bar{X}post$ = 184.786; t = -5.361; p <. 05). Further, the scale was examined on three-factor basis. The first factor; (a) learning and innovation skills, shows significantly different scores ($\bar{X}pre$=71.381, $\bar{X}post$=76.405; t=-4.311; p<.05) between the teacher candidates' perceptions through time. Similarly, the second factor; (b) information, media and technology literacy scores significantly differ between pre-and post-test as well ($\bar{X}$=31.857, $\bar{X}$=36.810; t=-7.406; p<.05). On the other hand, in the third factor; (c) life and career skills, there was no significant score differences ($\bar{X}$=69.738, $\bar{X}$=71.571) through the time period.

2- Findings on rubric scores of digital storytelling activities

In the second part of the analysis three digital stories, created by the candidates, were examined by using rubric scale scores. Descriptive statistics of digital stories depending on the rubric scores were given in Table 4 below.

Table 4 Descriptive statistics on digital story rubric scores

Rubric scales	N	$\overline{X}$	S
Digital story-1	42	10.404	1.106
Digital story-2	42	12.000	1.343
Digital story-3	42	13.142	1.555

According to the results in Table 4, the mean scores of the teacher candidates on digital stories rubric scale increased gradually with the values of $\overline{X}1$= 10.404; $\overline{X}2$ = 12,000; and $\overline{X}3$ = 13.142 for each digital stories respectively. Further, Table 5 presents single-factor ANOVA results for three measurements, to determine whether the rubric scores of the digital stories differ significantly.

Table 5 ANOVA results on digital story rubric scores

Source of variance	Sum of squares	df	Mean of squares	F	p	Bonferonni test
Between the groups	189.468	41	4.621			
Within the groups	158.873	2	79.437	192.752	.000*	3>1;3>2;2>1
Error	33.794	82	.412			
Total	382.125	125				

*p<.05

Further, the mean score differences on three digital stories created by teacher candidates' state that the differences were significant (F $_{(2-41)}$ = 192.752; p <.05). Moreover, the group differences precisely show that teacher candidates' digital story scores were highest on the 3rd, also the 2nd digital story score was higher than the 1st one significantly. Thus, the digital story scores of teacher candidates progressively increased through the three activities. Consequently, we could state that teacher candidates developed throughout the process.

3- Prediction of 21st century skills competence perceptions by digital storytelling activity scores

In order to find out if the teacher candidates' digital story scores were a significant predictor of the 21st century skills competence perceptions, simple linear regression analysis was conducted. The results were presented in Table 6.

Table 6 Regression analysis for digital story rubric and 21st century skills competence perception

Model	B	Standard error	β	t	p
Constant	96.460	17.005		5.672	.000*
Rubrics	6.720	1.285	.637	5.230	.000*

R=0.637   R^2=0.406   F$_{(1-40)}$=27.348   p=.000*

According to Table 6, we could state that digital story scores, that were obtained from the last digital story created by the candidates, were a significant predictor of the 21st century skills competence perceptions, that were obtained from the post-test results of teacher candidates (F $_{(1-40)}$ =

27.348; p <.05). Further, we could conclude that the digital story scores of teacher candidates explain 40.6% of the variability in 21st century skills competence perception scores.

4- Opinions of The Teacher Candidates about The Effect of Digital Storytelling on 21st Century Skills

The opinions of the teacher candidates about the effects of digital storytelling on 21st century skills were obtained from the structured interviews and the findings were outlined as *"learning and innovation skills"*, *"information, media and technology skills"* and *"life and career skills"*

The Effects of Digital Storytelling on Learning and Innovation Skills

The opinions of the teacher candidates about the effects of digital storytelling on learning and innovation skills include "creativity and innovation", "critical thinking and problem solving", "communication and collaboration" sub-themes. In the following table themes, sub-themes, codes and quotations from the interviews are given (Table 7).

Table 7 Themes, Sub-themes, Codes and Quotations on Learning and Innovation Skills

1st Theme: Learning and innovation skills			
Sub-theme	Codes	f	Sample quotations
Creativity and innovation	Think creatively	15	Writing the story is new and unfamiliar product form me. While writing a story, we reveal our creativity, analyze and evaluate our own thoughts (P8)
	Work creatively with others	12	When you face a problem during the process, you prefer to have a collaboration with friends and family members, you see people having diverse thoughts and you get different point of views (P3).
	Implement innovations	11	Making digital stories in itself prompts you to productivity and this gives you the sense "Yes, I did it, I,hmm I can succeed and can do more from now on" (P1).
Critical thinking and problem solving	Reason effectively	3	I believe that digital storytelling develops inductive and deductive thinking skills on a subject. By this way, you can, oh you can make predictions about the results and we can criticize and interrogate (P 13).
	Use systems thinking	9	We shared every, each one of the steps one by one: our stories, the storyboards, digital stories. Therefore, everything we did was seen by our friends and we were criticized about negative and positive things we did... We made revisions on what we were criticized. And this, how can I say, this developed our creative thinking. I mean problems occurred and we directly tried to produce solutions (P 9).
	Make judgments and decisions	15	We got the opportunity on hmm on looking at the things from the point of views of others and we learnt to be open to new thoughts (P 10).
	Solve problems	15	Our teacher and friends helped us to solve problems. Sometimes, I, rather than asking to somebody, preferred to find solutions on the Internet (P 15).
Communication and collaboration	Communicate clearly	15	We shared our stories, storyboards, visuals, sounds and effects; we shared everything; we shared our digital stories with our teacher and friends on Edmodo. We communicated with each other face-to-face, on WhatsApp and Edmodo at any time. This was very good for communication and collaboration skills (P 7).
	Collaborate with others	12	I can say that I am not very good at using technology tools like some of my friends. So sometimes I had some difficulties. But I want to thank to my friends and my teacher because we had a very good collaboration. (P 11).

Creativity and Innovation

During the interviews, all the participants were of the opinion that writing their own stories was the main sign of the creativity and that while writing the stories, they had a chance of creating their own ideas and analyzing and evaluating those ideas. They also focused on the fact that by sharing all the stages of their work on Edmodo, they made recommendations, gave feedback on each other's works, shared their experiences with each other and they were open and responsive to new and diverse perspectives of their classmates, which meant that all the participants worked creatively with each other. As for implementing innovations, 11 of the participants stated that they had not had such an experience before. As they stated, creating digital stories gave them a sense of success.

Critical Thinking and Problem Solving

At the interviews, only 3 participants mentioned explicitly about their using different types of reasoning. Especially, one of the participant told that she used both inductive and deductive reasoning while writing her stories. 9 of the participants mentioned that they analyzed how parts of a whole story interact with each other by making comments on the stages of the digital storytelling (story writing, storyboard, using media, etc) face to face or/and on Edmodo, which they believed to have contributed to their critical thinking. All the participants thought that they only analyzed and evaluated not their own work but also the works of the others, which helped them make judgments and decisions on the whole process of digital storytelling, and tried to solve all kinds of problems they faced.

Communication and Collaboration

At the interview, all the participants were of the opinion that they did not have any communication problems with their friends and the researcher, as well. By attending the virtual group and class, they did not have to wait for the weekly lessons to get the opinions of their teacher (the researcher) and friends. While only 3 participants stated that they did not have to make too much collaboration with the others as they regarded themselves as capable of using technology and producing media easily, the rest of the participants expressed that they helped each other, they learnt from each other and solved the problems easily by creating a collaborative environment. Some of the participants underlined a fact that before this study they, as a whole class, had not had that much sharing and communication and thanks to this study, they established good relationships with each other.

The Effects of Digital Storytelling on Information, Media and Technology Skills

The opinions of the teacher candidates about the effects of digital storytelling on information, media and technology skills include "information literacy", "technology literacy" and "media literacy" sub-themes. In the following table themes, sub-themes, codes and quotations from the interviews are given (Table 8).

Table 8 Themes, Sub-themes, Codes and Quotations on Information, Media and Technology Skills

2nd Theme: Information, media and technology skills			
Sub-theme	Codes	f	Sample quotations
Information literacy	Access and evaluate information	15	While making our digital stories, you try to reach access the right information. You question the sources of the information. You question whether the information and sources are trustworthy (P 4).
	Use and manage information	13	The information we will give in our digital stories are very important. We cannot use every information. We must critically handle the information and its source. Besides, we must be careful about the copy right issues. About the use of information, we also care about the economic, social, political, legal and cultural issues all (P 12).

Media literacy	Analyze media	5	With digital storytelling activities, We can analyze media and can be aware of harmful and helpful sides of them. We can learn how to use media for the sake of our students (P 2).
	Create media products	10	While preparing our digital stories, we create our own media. Doing this is new thing for us. Doing this means using our creativity. Since we produce photos, sounds recordings, sound effects, music via media. This develops our media literacy (P 15).
Technology literacy	Apply technology effectively	15	We learn to use new programs and applications and we use various technology tools. This expands our horizon on technology use. Of course, we face some problems while using technology, but we overcome this problem by again making use of technology (P 7).

Information Literacy

All of the participants mentioned that while they were creating their digital stories, they searched for information for almost every stage of digital storytelling. During this information access process, they tried to reach appropriate and right sources and examine and evaluate the information critically. They were also of the opinion that the information to be given in a digital story to the audience had a crucial importance; therefore, they had to be so careful and use their critical thinking to reach a decision on the use of any kind of information in their digital stories. Besides, some of the participants added that while using information, they had to be careful about the copyright, legal, social, political and cultural issues, which meant that they were aware of the ethical and legal issues while accessing and using information.

Media Literacy

About the media literacy, 5 participants mentioned about analyzing the media. They stated that during the digital storytelling process, they reached different media and they tried to figure out how media can influence the beliefs and thoughts of others, how prejudicial and unfavorable or helpful, beneficial and educatory messages can be given via media and how they could critically analyze the message they took from different media sources. 10 participants, on the other hand, expressed their thoughts on how they managed to create media products. They emphasized that while creating their own media products, they made use of various technology tools ranging from voice recording to internet, applications and video making programs. They were of the opinion that digital storytelling process contributed to their media literacy and that they used various source to create their media creation tools.

Technology Literacy

Digital storytelling process by nature requires effective use of information, communications and technology. A digital storyteller examines and uses various technology tools to research, organize, evaluate and communicate information. The participants believed that by searching for information on various media resources, creating their own media, using digital storytelling experience contributed to development of their technology skills. Some of the participants also emphasized that when they faced technology problems, they managed to overcome them by again using technology. They also mentioned that as future teachers, they should have information, communications and technology literacy and that they should use and teach their students how to use them in their teaching career.

The Effects of Digital Storytelling on Life and Career Skills

The opinions of the teacher candidates about the effects of digital storytelling life and career skills include flexibility and adaptability", "initiative and self-direction" and "social and cross-cultural skills" and "productivity and accountability" sub-themes. In the following table themes, sub-themes, codes and quotations from the interviews are given (Table 9).

Table 9 Themes, Sub-themes, Codes and Quotations on Life and Career Skills

3rd Theme: Life and career skills			
Sub-theme	Codes	Z	Sample quotation
Flexibility and adaptability	Adapt to change	10	When we needed collaboration, we took parts in various and diverse groups. We tried to adapt to this (P 6).
	Be flexible	13	Digital storytelling provides us with working diverse groups and develop empathy with them (P 4).
Initiative and self direction	Manage goals and time	15	The stress and anxiety and the fear that I will not be able to do the things on time put my skills into background (P 5). While working on making our digital stories, our teacher gave us deadlines for each stage, so we personally had to manage our goals and set times. We prepared our own schedules to do the things in an order (P 1).
	Work independently	15	We tried to manage self-direction and set goals to put concrete products forth. We all did this by ourselves (P14).
	Be self-directed learners	15	Thanks to such kinds of activities, we had a chance to show our initiative skills. All the control during all the stages were in our hand, so our self-direction skills developed and we found a chance to know ourselves (P 9).
Social and Cross-Cultural Skills	Interact effectively with others	14	For our digital stories, all of us got the opinions and comments of the others. By this way, we gave a shape to our work and our stories. By caring about the others' comment and feedback, we did a good job. We produced our own digital stories (P 2).
	Work effectively in diverse teams	13	I found an environment in which I were able to work with friends from different cultures. We learnt to respect to each other (P 10).
Productivity and accountability	Manage projects	15	Making our digital stories in itself is a project. As the goal of this project is to put our digital stories forth, this developed our creativity and productivity (P 12).
	Produce results	15	We got an opportunity to make our own digital stories and to manage the process by ourselves. It also provided me with a sense of responsibility to produce unique stories (P 9).
Leadership and responsibility	Guide and lead others	5	During this process, I tried to show and guide some of my friends how to use moviemaking programs easily. Helping them was also very important form me (P 11).
	Be responsible to others	12	There were two important factors in the digital stories we prepared. The first one was that these stories should be suitable for the level and interest of primary school students. The second one that as we shared our digital stories on the Internet, we should take value judgment of the audience from different cultures into account (P 1).

Flexibility and Adaptability

At the interviews all of the participants expressed that digital storytelling process led them to have a sense of responsibility, make schedules to do the jobs on time, react positively and respect diverse feedback, recommendations of their classmates and lecturer on their digital stories, adopt themselves to work effectively and collaboratively in multi-cultural environments, be decisive in finding solutions to any problems rather than giving up in any failure and develop empathy to understand others' views or opinions.

Initiative and Self-direction

According to the participants, one of the most important gains of digital storytelling process to develop their skills in managing goals and time, working independently and being self-directed learners. They stated that they made their own schedules, put deadlines, tried to complete the tasks in a given time, expanded their learning and obtained new opportunities to express themselves, had a sense of commitment to creating digital stories and planning to use digital storytelling in their future teaching careers. However, one of the important findings is that one participant stated she felt stress and anxiety to perform scheduled job responsibilities on time like writing the story, forming the story

board, accessing and making media, combining all they had in hand to create a digital story, which she believed kept her initiative and self-direction skills in background.

Social and Cross-cultural Skills

The participants stated that they had a remarkable chance of interacting with each other and working in diverse teams in virtual environments and in classroom. As they pointed out, the classroom consisted of students from various socio-cultural backgrounds and from different cities, which they believed was a great chance to work with friends from different cultures. This situation also led them to respect each other's social and cultural differences while interacting and working in group work.

Productivity and accountability

The participants stated that digital storytelling adventure in itself was a great project during which they had to use and develop their productivity and accountability skills effectively while working both independently and with diverse groups. They stated that thanks to this project, they developed a sense of responsibility first and then they tried to manage the stages of making digital stories. As they pointed out they had deadliness on every stage and they had to make and manage their own schedules to fulfill their responsibilities and reach the final result. However, some of the participants thought that they sometimes got stressed and nervous and had a fear about not being able to keep up with the deadlines.

Leadership and responsibility skills

During the interviews, some of the participants stated that they were capable of using information, communications and technology tools and of using various applications and programs before this study began. The recommendations and feedbacks given on Edmodo by such participants was a sign of the fact some of the participants already had well-developed ICT skills. During the process, it was clearly observed that these participants felt a responsibility to help their friends, guide and lead them. At the interviews while these participants stated that they helped their friends for any kinds of problems or difficulties that the others experienced and they felt themselves responsible for this and that they were very happy to guide and lead their friends whenever necessary. Some of the students, on the other hand, pointed out that they were responsible to the primary school students and those who would watch their digital stories on the Internet..

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

This research examined the effect of digital storytelling on the development of 21st century skills of teacher candidates.

It was concluded in the study that the posttest scores of the candidate teachers' on 21st Century Skills and Competences Scale were higher than those of on the pretest. There was a meaningful difference between digital storytelling rubric scores the teacher candidates got from the three digital stories and the scores got higher on every following digital story, which can be said to support the result that the posttest scores of the candidate teachers' on 21st Century Skills and Competences Scale were higher than those of on the pretest. This situation is also supported by the fact that the scores obtained from the digital stories explain the variability of the scores on 21st Century Skills and Competences Scale by about 40% and that the scores obtained from the digital stories are the predictor of 21st century skills and competences of the teacher candidates.

Another result obtained in the study on learning and innovation factor is that the posttest scores the teacher candidates got on the scale were meaningfully higher than the scores in pretest. This result is also supported by the statements of the participants at the interviews. They thought that writing their own stories, sharing their products on Edmodo and giving feedbacks and recommendations on each others' work, working with their classmates developed their creativity and

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innovation skills. Daigle (2008) pointed out that digital storytelling requires technology use, writing skill and creativity, while Jenkins and Lonsdale (2007) stated that digital storytelling helps students to develop their problem solving and creativity skills. Likewise, Karakoyun (2014) and Anılan, Berber and Anılan (2018) found out that digital storytelling process developed teacher candidates' creativity. Besides, similar results can be seen in other studies (Dupain and Maguire, 2005; Jakes, 2006; Ohler, 2008; Yuksel, Robin and McNeil, 2011).

The participants also stated that digital storytelling affected their critical and problem solving skills and communication and collaboration skills, as well. P21 (2009) uses the term "learning and innovation skills" in order to "separate students who are prepared for a more complex life and work environment in the 21st century, and those who are not." According to P21 (2015), these skills necessitates looking at any problem in a new and different way, linking learning across subjects and disciplines, thinking creatively, working creatively with others and implementing innovations. During the application process, they used different types of reasoning while writing their stories, analyzed, evaluated, made judgments and decisions on not only their works but also on the other participants', The participants also mentioned that they had not had that much sharing and communication and thanks to this study , they established good relationships with each other. Karakoyun (2014) mentioned that as the participants made comments on the scenarios of the digital stories and they helped each other while making digital stories, the communication and collaboration skills of the participants developed. Sadık (2008) also stated that long-term digital storytelling projects, like in the current study, is believed to develop students' communication and collaboration skills. Robin (2006) stated that when digital stories are shared on the Internet, students have a chance to criticize and make comments on both their own and their peers' digital stories, by which they can develop their social learning. Besides, Behmer (2005), Foley (2013), Ohler (2008), Yang and Wu (2012) stated that participants need to use their critical thinking and problem solving skills, communication and collaboration skills at almost every stage of digital storytelling.

The posttest scores the teacher candidates got on the second factor of the scale (information, media and technology skills) were meaningfully higher than the scores in pretest. At the interviews, all the participants expressed that that they searched for information and media from different types of sources and either individually or collaboratively, examined and evaluated the information critically in terms of the audience, copyright, ethical and legal issues. They also produced their own media by making use of various technology tools ranging from voice recording, camera, to internet, applications and video making programs. Finally, as to technology literacy, the participants used various technology tools and though some of the participants drew attention on the difficulties while using technology, they overcame them by again applying to technology. They also stated that they are expected not only to use technology in their future career as teachers but also to teach their students how to use them. Similar to these findings, Karakoyun (2014), Koltuk and Kocakaya (2015) in their studies found out that digital storytelling helped teacher candidates and students to develop their information, media and technology skills. Likewise, Dogan (2007) believed that digital storytelling especially develops media and technology skills. Also, Robin (2008) stated that if an individual is directed to participate actively in digital storytelling, his/her information, visual and technology skills will certainly develop. Other researchers like Czarnecki (2009), Gakhar (2007), Yuksel, Robin and Mcneil (2011) underlined the fact that digital storytelling is an effective way to develop technology skills.

When it comes to the last factor of the scale, which is life and career skills, it can be seen that there is not a statistically meaningful difference between the posttest and pretest scores the participants obtained on the third factor. This can be due to the fact that life and career skills need longer time to develop. However, there are some certain findings from the interviews that 12-week digital storytelling project supported the life and career skills of the teacher candidates. Most of the participants were of the opinion that they took responsibility and made schedules to do the jobs till deadlines. During the process, they believed that they reacted positively and respected diverse opinions and feedbacks of their friends and the lecturer and that they adapted themselves to work in a self-directed way and collaboratively in multi-cultural environments, and had sense of commitment to

what they were doing. Most of them also thought that they found a chance to develop and show their productivity. But some of the participants mentioned that they sometimes got nervous and afraid of not being able to keep up with the deadlines. On the other hand, some of the participants were seen to have a leadership responsibility. Such participants helped to overcome any problems that their classmates were experiencing. Finally, most of the participants thought that they were responsible to the audience and that they tried to take the needs, levels and interests of the audience into consideration. The findings of this research on the development of life and career skills correspond to the findings of Karakoyun (2014) and Koltuk and Kocakaya (2015), who concluded that digital storytelling develops students and teacher candidates life and career skills. Likewise, Robin (2008) stated that as the students are actively engaged in digital storytelling, they take responsibility and produce a product, while Yuksel, Robin and Mcneil (2011) concluded that the students developed such life skills as having sense of community, establishing empathy, having collaboration and social interaction and communication via digital storytelling. Zhao (2004) also mentioned that the use of technology in digital storytelling is a way to develop problem solving, meta-cognitive and research skills.

Considering the above discussion points and the importance of digital storytelling on the development of 21st century skills derived from the relevant literature, some suggestions for future are as follows:

- This study was limited to the candidate teachers in primary education department. Researchers can make studies with teacher candidates studying at other departments in faculty of education.

- The digital stories to be prepared by teacher candidates can be applied in classroom environments in schools and the effects of digital stories on learners' skill development can be analyzed.

- Future studies can focus on in-service teachers. Researchers can design studies using digital storytelling as method to develop 21st century skills of in-service teachers.

- Apart from the studies to be held with candidate teachers and in-service teachers, students at primary, secondary, high and university students can be given workshops on digital storytelling and 21st century skills and they can be encouraged to create their own digital stories. Then, the effects of digital storytelling on skill development of students can be studied by researchers.

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