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Digital Story-telling to Improve 21st Century Skills: Pre-service Science Teachers' Reflections

SECKIN-KAPUCU Munise (1), YURTSEVEN-AVCI Zeynep (2)

Eskisehir Osmangazi University, Turkey (1)
Eskisehir Osmangazi University, Turkey (2)

Abstract

In recent years, new methods and techniques have been widely used in education in order to increase the effectiveness of learning in various countries. The use of digital technologies in implementing these methods is also an important approach in terms of developing 21st century skills and adapting to technological developments. In this context, science education is one of the main areas where the use of technology is crucial. It is important that pre-service teachers who will be educate future generations to have 21st century skills. It is also important that they gain experience to synthesize these technology skills with their field knowledge. For this study, third-year pre-service science teachers developed digital stories on the striking scenes of scientists' lives, which allowed them using their field knowledge and apply their technology skills that they gained throughout undergraduate education. The aim of this study is to examine the experiences of science pre-service teachers in terms of 21st century skills. This study is designed as a phenomenology research. The criterion sampling was used from the purposeful sampling methods to determine the participants. The research was carried out with forty 3-year pre-service teachers from Science Teaching Department of a public university in Turkey during the fall semester of 2018-2019 academic years. Digital stories have been prepared in relation to a striking part of the life stories of scientists who had research on subjects from the secondary school science curriculum. The study was completed in a period of approximately 3 months. In this study, digital dairies were used as the data collection tool. Dairies were analyzed using content analysis technique. Reflections of pre-service teachers that they were provided in dairies were examined in terms of 21st century skills. Three main categories given by P21 (2008) were used as themes: learning and innovation skills, information, media, and technology skills, and life and career skills. The preliminary analysis revealed that digital story-telling process contributed all three main categories under the following sub-categories: critical thinking and problem-solving, collaboration, information-media-ICT literacy, flexibility, productivity.

Keywords: *Digital story-telling, science pre-service teachers, digital dairies*

1. Introduction

Skills that are expected and desirable from today's generation are generally called as 21st century skills.

The P21 (2008) lists these skills under three main categories: learning and innovation skills (creativity and innovation, critical thinking and problem solving, communication and collaboration), information, media, and technology skills (information literacy, media literacy and ICT- information and communications technology literacy) and life and career skills (flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility) [10, p.13]. These skills are also emphasized in today's educational environments and are required by the learners. The digital story approach is a current practice in developing most of the mentioned skills [8].

Nowadays, with the increase in the access to technology and the development of Web 2.0 tools, educators who do not have programming or advanced technology skills can also produce their own educational contents by using these tools [4]. Use of digital story-telling, which is created by bringing video, picture, written or oral narratives or dialogues, and music together in a story-building framework, has accelerated as a means of expression in different areas with the emergence of Web 2.0 technologies [12].

What distinguishes the digital story method from traditional storytelling is that it is supported by digital media, visual and audio materials. Digital story use in teaching is an educational technology that promotes several 21st century skills such as technology literacy, creative thinking, effective communication and productivity [6].

The process of creating a digital story includes creative skills such as determining a topic, researching the subject and creating scripts [7]. Those who prepare a digital story, not only have a unique experience, it is also revealed that this experience contributes to the person's various skills such as research, organization, expression, communication, technology, presentation, cooperation, creativity and imagination [5, 11, 14]. The usability of digital storytelling in schools has been supported in various studies [e.g., 1]. Furthermore, the method of preparing digital stories is seen as an effective pedagogical approach that has been used for a long time in different countries [13].

Like different areas, the use of digital technologies in education has become a necessity. New methods and techniques have been widely used in education in order to increase the effectiveness of learning. One of the new methods that is widely used in education is the digital story-telling. In many studies on digital storytelling, it is emphasized that this approach is a powerful and effective tool that can be used in educational environments [2, 9].

Studies investigating the effect of digital storytelling on educational outcomes present that this method supports students' creative thinking and imagination skills, increases academic achievement and motivation [3, 7, 16]. In addition, digital storytelling contributes to digital literacy skills [7]. Digital storytelling offers opportunities such as providing diversity in classroom practices, personalizing the learning experience, supporting student-centered teaching, helping to explain complex issues, and creating easy and inexpensive learning environments [17, 18]. For this reason, it is important to use digital storytelling in classroom applications. However, when the studies in science education are examined, there are not many studies available about digital story-telling [15]. It is believed that this research will contribute to the field in terms of using this method for science teaching, since it is a relatively new application for science education.

In this research, pre-service science teachers created digital stories on the striking scenes of scientists' lives. This method was used to support pre-service teachers better conceptualizing scientific concepts and understand the nature of science better. Participants` reflections about the process of preparing digital stories were analyzed to determine which 21st century skills of pre-service teachers are supported by this method.

2. Methods

2.1 Study Design

Phenomenology provides an in-depth understanding of the meaning and nature of our daily experiences (Patton, 2014). This method was preferred, since in depth investigation of pre-service teachers' digital story creation experiences is aimed.

2.2 Participants

The research was carried out with forty third year pre-service teachers from Science Teaching Department of a public university in Turkey during the fall semester of 2018-2019 academic years. The criterion sampling was used from the purposeful sampling methods to determine the participants. The primary criterion is that pre-service teachers have taken the Computer II course and are taking Special Teaching Methods I course.

2.3 Process

Digital stories have been prepared in relation to a striking part of the life stories of scientists who had research on subjects from the secondary school science curriculum. Initial training has been provided about nature of science, the properties of scientific knowledge, technology and preparing digital stories by two experts and feedback was provided throughout the process. The study was completed in a period of approximately 3 months.

2.4 Data Collection Tool

In this study, digital dairies were used as the data collection tool. Nine probes regarding research process about the scientists` life, writing scenarios, creating the digital story, problems encountered in this process and their suggestions to improve this process of preparing the digital story were given in the dairies for participants to fill. Dairies were collected after their experience of preparing a digital story.

2.5 Data Analysis

Dairies were analyzed by content analysis technique. Reflections of pre-service teacher that they provided in dairies were examined in terms of 21st century skills. First, one of the researchers read through participants` responses and coded under the pre-determined themes, which are the three main categories provided by P21 (2008). Then, two researchers worked on participant quotes to decide sub-categories and finalized codes based on participants` explanations.

3. Findings

Three main categories given by P21 (2008) were used as themes: learning and innovation skills, information, media, and technology skills, and life and career skills. The preliminary analysis revealed that digital story-telling process contributed all three main categories under the following sub-categories: critical thinking and problem-solving, collaboration, information-media-ICT literacy, flexibility, productivity. Some of exemplar codes and quotes from participants are given in Table …

Themes (categories)	Sub-categories	Exemplar Codes	Quotes
learning and innovation skills	collaboration	support	After finishing the pitching and voice-over, I asked my classmates for the suitability for the grade level. *Participant 1*
information, media, and technology skills	media literacy	visuals	Since our script was starting with the time the scientist was born, we uploaded photographs of that period and tried to create scenes reflecting that period. Since the subject is more related to space, sky and solar system, we used photographs and gifts related to these concepts. *Participant 3*
life and career skills	productivity	Video creation	I have both learned working with different technologies and created an educational digital story. In my teaching life, I would like to give more space to these types of materials. *Participant 12*

4. Discussion and Future Directions

The findings of this study align with the existing literature in terms of supporting development of 21st century skills [7, 11, 14]. Future studies can be conducted on using digital stories produced by pre-service teacher in actual classroom settings and student outcomes could be investigated.

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