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Research Article

Participatory Design Based Digital Storytelling and Creativity Indicators in Elementary School

Suzan Duygu Bedir Erişti[1]

Abstract

The present research study aims at determining how the participatory design approach within the framework of digital storytelling would reflect onto the process in which students reveal their creativity on design based application process. The participants of the study were chosen elementary school. The students are in the city of Eskişehir, Turkey. While determining the participants, the criterion-sampling method was used. In the study, the criterion for determining the participants taking the "Digital Storytelling" course incorporated in the Education Program for Talented Students (EPTS). 58 elementary school 6th-, 7th- or 8th-grade students taking the course of "Digital Storytelling" in EPTS participated in the study. The elementary school 6th-, 7th- and 8th-grade students actively participated in the phases of creating their own digital stories, heroes and characters. The students indicated their visual explanations and views throughout the design process. The data obtained at the end of the design process in the study were analyzed according to the visual research metholoyg with focusing on image analysis and content analysis. The application process affected students' creativity in an efficiant manner depending on the students' and field experts' views.

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Introduction

Digital storytelling is a process that includes learning, creating and sharing using technology. In this process, students interpret their thoughts by using active participating approaches such as illustrating, photographing, audio recording, writing, drawing and so on (Robin, 2008; Tendero, 2006). The digital storytelling system is a short digital media production includes individual narratives, experiences, historical sharing, autobiographical interpretations in a form of a visual explanation (Gils, 2005).

Participatory digital storytelling involves participants acting and learning basic storytelling skills with professionals (Mazzone, 2007; Barret, 2006; Dorner et. al., 2002). The process makes students work together to create a story based on their creativity potentials and empower students to enable to take action and decision-making for solving their creativity problems. Participants uses participatory approaches to analyses and synthesis the stories through creativity potentials (Morajevi et. al., 2007). By the way of using participatory digital storytelling students reflect their thoughts, imaginations, experiences and emotions to find their creative way. Additionally, the participatory digital storytelling build technology skills, communication skills and visual explanation skills with the help of professionals.

The interaction and collaboration is one of the biggest challenge of participatory digital storytelling process. Participatory storytelling is an effective application of pardicipatory design approach. The participatory design approach appeared in 1960s and was mostly used effectively in design processes and in studies conducted regarding adults (Druin, 1996). As children have become effective users of technology, projects and studies in which children are design partners are now considered to be a necessity (Druin, 1999; Muller & Kuhn, 1993). It encourages students to open their creative potential to share and to build ongoing links through their creativity (Eristi, 2014; Clark & Percy-Smith, 2006; Meadows, 2003). So the students participate actively to the process by taking responsibility, deal with organization and putting forward experimenting and developing unique suggestions for solution (Skivenes and Strandu, 2006).

As a result of the participatory design approach, students enable characteristics of being creative individuals such as creative thinking, flexibility, fluency, originality, critical thinking ability, sufficiency of analyze, synthesize, organize and evaluate of a process, connecting relationships

(Skivenes & Strandu, 2006; Lubart & Guignard, 2004). The participatory digital storytelling process includes an individual transformation of a student by encourage them to find their way of producing their creativity. So the process is more important than the product during the storytelling applications. Creative approaches, creative stories, creative thoughts and creative explanations such as drawing, designing and writing are totally the way of being creative and way of something new to be creative in a playful and funny process.

There is a close interaction between crativity and the participatory digital storytelling approach to prepare the conditions that help creativity occur. Depending on the points mentioned above, the present study aims at determining how the participatory design/digital storytelling approach within the framework of digital storytelling would reflect onto the process in which students reveal their creativity.

Taking into subject to this purpose, the following research questions were proposed:

1. How does the participatory design approach based on the digital storytelling application reflect onto the process of revealing elementary school students' creativity depending onfield experts' views?

2. What are students' views about the application in the context of the participatory design approach within the digital storytelling application?

Method

The study was conducted in two phases subject to the visual research method on the basis of the use of the digital storytelling approach in the processes of revealing elementary school students' creativity. The purpose of the first phase was to determine the reflections of the participatory design approach within the scope of the digital storytelling application onto the process of revealing the students' creative behavior based on the views of the field experts and of the researcher. The data obtained the views of the field experts and of the researcher were analyzed according to the visual research method with focusing on image analysis and content analysis. The second phase, where the students' views were determined, included the analysis of the data within the framework of content analysis. Visual research methods offers researchers a reality of which they are unaware. This reality is the visual reality which is investigated through meanings based on researchers and participants' symbolic and image based meanings.

Visual reality can be used as a means of gathering data as well as being a tool for analysis and explanation. Visuality contributes new dimensions to research processes different from actually existing ones and focuses on generate knowledge rather than reveal it. (Cahnmann, Taylor & Siegesmund, 2008; Kress & Van Leeuwen, 2006). Visual research approach can be suggested to broaden researchers' perspectives, perceptions and knowledge (Barone, 2008).

Participants

While determining the research sample, the criterion-sampling method, one of the purposeful sampling methods, was applied. The criterion used for determining the participants in the study included not only the technological facilities of the school which the students attended but also its capacity to execute a course with digital storytelling content in its curriculum. In the context of the criteria determined, the research sample was made up of 58 elementary school 6th, 7th and 8th grade students taking the optional course of "Digital Storytelling" in EPTS (Education Program for Talented Students), and it is an optional course given by the researcher at EPTS for four weeks (6 hours a week) in the Education Faculty of Anadolu University Eskisehir, Turkey, in the Spring Term of academic year of 2009-2010 (between 15th of March and 15th of April for four weeks). EPTS (Education Programs for Talented Students) is an after school program for talented students in elementary and secondary schools constructed at Anadolu University in the weekends and summers. The program includes identification, curriculum, instruction, assessment, program, and teacher training models of talented students (Sak, 2013; Sak, 2011). The instruction process of digital storytelling application was consturcted at EPTS program by researcher through the sequential components of EPTS program related a lecture and learning activities given and guided by an academician.

Application Process

Within the scope of the study, the digital storytelling application was introduced to the students. At the first week of the process the steps of digital storytelling was discussed with the participants' of the study. The steps were presented to the students through focusing an idea, investigating and exploring focus idea, create a scenario, design storyboard, gather visuals, images, animation, audio and video, combine the whole component and represent the digital story. After the introduction lesson a task analysis process was constructed based on the participated student skills. The researcher encourage the participating students to determine the
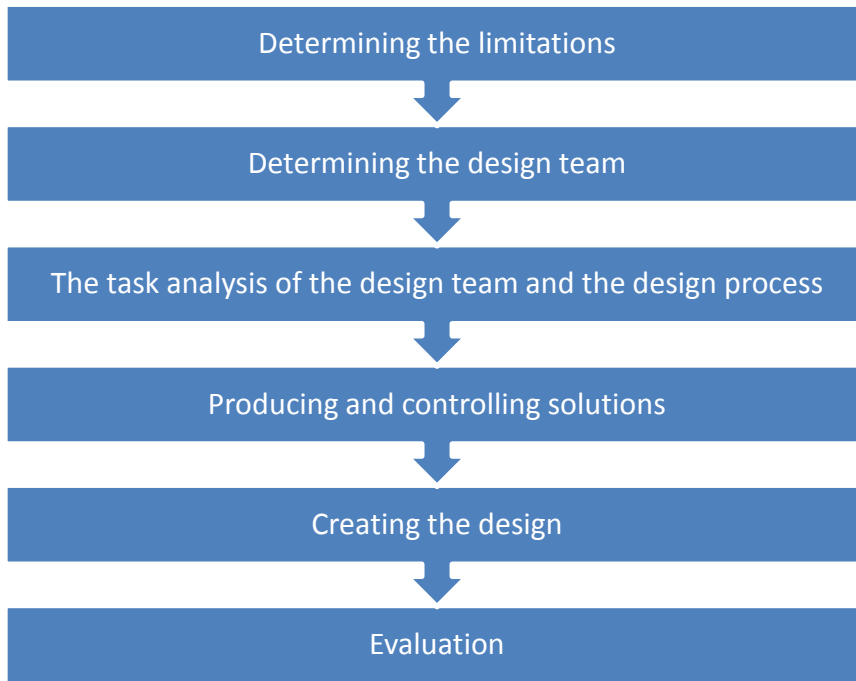
working groups conducted with their interests, sufficiencies and creative approaches. The working groups included scenario, illustration, design, sound and music and story. design programs (Adobe Flash CS 5, Adobe Photoshop CS 5, Sound Recorder and Office) related digital storytelling were taught to the students the during the application process. The content was presented to the students in a structure including the participatory design approach that could be considered as a design process in which students were active participants. In this respect, the students became designers of their own creativity.

The participatory design approach within the scope of the digital storytelling application was applied in creating content in the context of the response to the question of "Do the design elements used in the interactive environment design include meaningful metaphors for the target audience?" The students taking part in the study within the scope of the participatory design approach participated in the design development processes with a critical perspective. Among the design techniques in the participatory design/storytelling approach, the content inquiry and illustration (Preece et. al., 2002; Holtzblatt et. al., 2005; Muller & Kuhn, 1993) displayed for students' participation in the design process.

The phases of the research application process were planned as follows:
(1) design process
(2) student-technology-creativity interaction
(3) evaluation

The first phase included a digital storytelling study conducted via the participatory design approach with a sample group of elementary school 6th, 7th and 8th grade students. Depending on the culture-themed subjects determined within the scope of the application, this process aimed at helping students to display their imaginations, thoughts and creativity and to use the visual explanation they created in the design process. The second phase of the study included the development of an interactive environment design in which the participants in the design team would make use of their creativity. The third phase of the study included evaluation of the process based on the students' views. In this respect, a systematic way was followed in the study as illustrated in Figure 1:

Determining the limitations
Determining the design team
The task analysis of the design team and the design process
Producing and controlling solutions
Creating the design
Evaluation

Figure 1. Design Process

Prior to the application process, the students were not only told that they were involved in the design process of an interactive environment design in which they could tell their cultural values to their peers but also informed about the digital storytelling approach, its components and types. Following this, interviews were held with the students based on the content inquiry method in the context of the participatory design approach regarding the subjects to be taught within the scope of the digital storytelling approach. In this respect, the subject was determined as being of cultural values, significant aspects of these cultural values, significant people, characters and events. Following the content inquiry study, the digital story telling study was conducted with the idea of combining the heroes - based on the independent cultural themes and events - in a new and original story. In the digital storytelling study, five different characters in Anatolian culture were gathered in a new story independent of their own individual traits. These characters were Keloglan (one of the heroes in folktales in Anatolian culture), Dede Korkut (a story narrator in Dede Korkut Stories in Anatolian culture), Deli Dumrul and Tepegoz (the main characters in Dede Korkut Stories) and Sahmeran (one of the characters prominent in mythological stories in Anatolian culture).

The research sample was divided into three groups with respect to the participants' interest within the scope of the digital storytelling study, scenario, sound recording and illustration in the context of their efficacies and creativity (Prosser & Schwart, 1998; Rose, 1996; Muller &

Kuhn, 1993). Preliminary studies were conducted with the groups regarding the application process, storytelling approaches, sound recording methods and certain design programs that they were likely to need prior to the application. These studies were carried out in the first two weeks of the research process. These groups gathered the determined themes within the framework of a few original scenarios based on their own narrative languages in the context of digital storytelling, created the characters and personalities prominent in cultural values, sound-recorded the stories they created and decided on how to form the design elements in the design. In this process, the participating students re-interpreted the characters in the context of creative approaches within the scope of the study, re-wrote the stories originally and decided collectively not only on which characters and stories to use in what way in the design process and but also on what to include in the interactive environment design. The students also decided to include a button in the design to allow the characters to introduce themselves. When these buttons were clicked on, the characters appeared with their images and sound recordings on the screen. In addition, the students decided to have sections under the headings of the stories and drawings and to include pictures regarding the stories. Eventually, the students started the design process with the help of the researcher and the teachers. The researcher and the teachers directed the process in a way to make the designs available for use in digital environments with technical support when the students required it. Regarding the content of the interactive environment design within the scope of the study, a total of four original stories, ten background illustrations created with a computer-supported design program, twelve original characters created with the help of the design researchers and twenty six original character drawings and sound recordings were all prepared by the students. The metaphors in the stories and the characters created in the design process were used to evaluate the students' creative approaches.

Collection of the Data

The research data were collected via analysis of the digital stories designed by the students and its components (which the students put forward in the application process); via interpretation in the framework of the focus group interviews based on the expert views; via observation of the process; interviews held with the students regarding the process; and via the participatory diaries of the students. The purpose of the interviews held with the students was to determine not only their views about the process of the digital storytelling application via open-ended questions and but also their views about the reflections of the process onto the reflection of their creativity based on image analysis. The purpose of the participatory diaries of the students was

to reveal what phases they experienced in the research process, how they expressed themselves in the process and how they reflected their creative potentials to the design process. The observations in the research process and the interviews were recorded with audio and video recorder devices. In this way, the data collected were enriched, and the validity of the data was increased.

Analysis and Interpretation of the Data

A two-phase method was applied in the interpretation of the findings in the study. In the first phase, the findings obtained via the focus group interviews based on the expert views in the context of reflections of the digital storytelling approach onto the reflection of the participating students' creativity in the process were interpreted. Two focus group interview was designed with field experts. One of the focus group was about determining the creativity indicators of storytelling products and the other focus group was constructed to evaluate the students' storytelling products based on creativity indicators. In the study, the reflections of the participatory design approach onto the students' participatory approaches within the framework of the digital storytelling process were determined. Focus group interviews held with the participation of 6 field experts and the researcher (two art educators, an expert linguist, an educational scientist, the researcher and a doctorate student from the field of educational technology) on the basis of the product subject to the digital storytelling application that occurred.

The first focus grouping interviews included field experts opinions regarded the creativity based on storytelling. The second focus grouping interview was conducted with the students' participation to the design process. So the focus grouping interview questions were prepared to evaluate the students' participation to reflect creativity, skills, technology use and originality. The main themes of the focus group interview questions were the students' aim with the story, the students' thoughts that they want to tell with the story, originality of students' choices related the storytelling steps, the students' creation reflecting to the process, the students' organizing skills on the story in a significant manner, effectiveness of story reflection and connection of story with the main theme, the effective use of storytelling components to improve the story such as music, sound, illustration, animation, video recording, meaning of storytelling for the students based on reflecting idea, creativity, skills, thoughts and feelings.

In the first phase, in the evaluation process of the digital storytelling application, the design created by the students, the visual explanation regarding the design, the subjects related to the visual explanation, effectiveness of the visual explanation, the quality of storytelling, characteristics of the characters and the structure of the design as a whole were evaluated. Visual coding was done depending on the field experts' views about the designs and the metaphors created by the students on the basis of the characters were determined (Finley, 2005; McNiff, 2000; Eisner, 1985). In addition, the field experts evaluated the stories, the structure of the design as a whole and the visuals in the interactive environment design in the context of the students' creativity approaches and also determined certain indicators regarding the evaluation of the creative approaches in the framework of the digital storytelling application. While determining these indicators, the criteria in McDrury & Alterio's Model of Reflective Storytelling (McDrury & Alterio, 2003) regarding the evaluation of the digital storytelling process was taken into consideration. These criteria included determining the story, designing the story, expanding the story, building the story in the process and reconstructing the story (Sanders, 2009). The evaluating criteria of storytelling was designed through the five steps of Reflective Storytelling and these five steps was connected with the storytelling components (Figure 2). The evaluation criteria of storytelling process related cretativity was deeply expanded by the fielt experts based on focus group interviews.
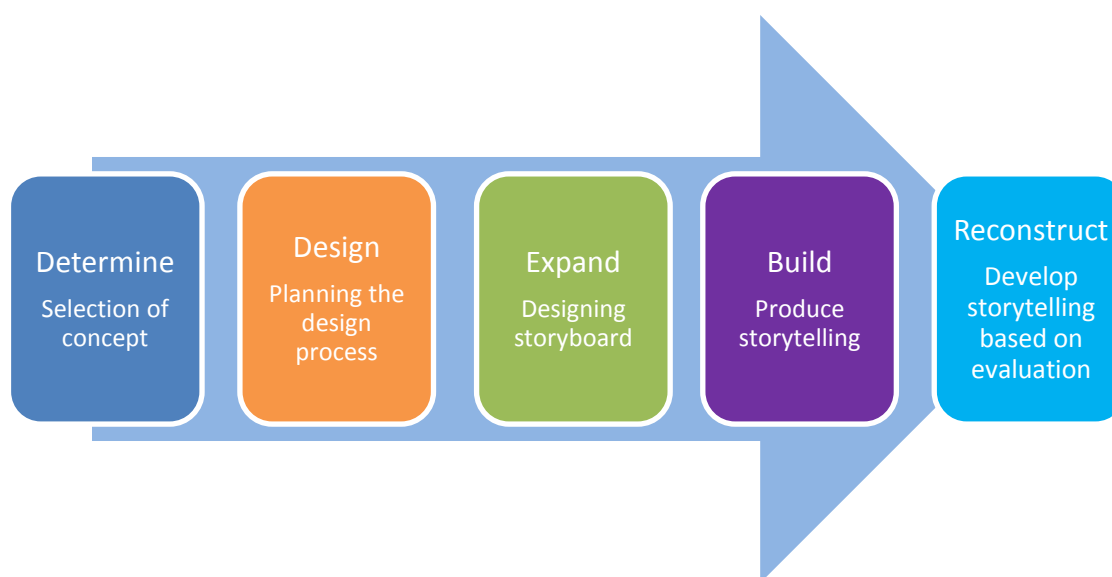

Figure 2. Evaluating Criteria of Digital Storytelling

In the second phase, the findings for determining the participating students' views about the digital storytelling approach were interpreted within the framework of content analysis based on the qualitative research method (Yıldırım & Şimşek, 2006). In addition, in order to increase the internal reliability and validity of the research findings, the students' views were frequently quoted. Content analysis is a process that allows researchers to reveal the themes based on the data obtained. The researcher tries to explain the participants' views depending on the themes obtained from the participants in the process (Glaser & Strauss, 1967). The concepts and the themes obtained via the data collected from the interviews, from the participants' diaries and from observations in the study within the framework of content analysis were associated, interpreted and explained (Nevitt & Hancock, 2004). Consequently, meaningful explanations were provided regarding the focus of the study with the concepts and themes obtained, and the themes were interpreted (Yıldırım & Şimşek, 2006).

In the phase of data analysis, two different forms were developed to examine the participants' views. In addition, the parts of descriptive index and researcher's comments were included in the forms, and these parts were filled in by the researchers. For the reliability of the study, the researchers and field experts (one educational science specialist and one art education specialist) examined the forms and determined the items they agreed on and those they disagreed on. In order to calculate the reliability of the study, the formula suggested by Miles and Huberman (1994) was used. As a result of the calculations, the reliability of the study was found as 97%.

Findings and Discussion

Findings Regarding the Evaluation of the Students' Creative Approaches in the Process of the Digital Storytelling Approach

Although creative individual characteristics differ in determining creativity, it is possible to make certain generalizations. According to Runco (2003) and Florida (2003) creativity requires individual flexibility and fluency. Bristol & Viskontas (2006) emphasize that creative students are successful in transferring and associating information. According to Souza Fleith (2000), creative students are generally ambitious entrepreneurs. Aljughaiman and Mowrer-Reynolds (2005) believe that creative individuals are curious, humoristic, spirited and artistic individuals

who put forward original thoughts, who take risks and who have a wide range of vocabulary knowledge (Runco, 2008). According to Treffinger and his colleagues (2013), creativity varies depending on individuals and disciplines. However, basically, creative individual characteristics indicate producing new and original ideas, examining and explaining the ideas in depth, being open to discovering new ideas and being courageous and sensitive. From a present perspective accepted indicators of the creativity potential are not limited to one ability field. Cognitive factors, personal traits, emotional factors and environmental interactions occurs during the creativity process (Eristi, 2014; Besancon & Lubart, 2008). In this respect, occurrence of creativity varies depending on different disciplines and on the tasks and environment (Eristi, 2014; Lubart & Zenasni, 2010). Thus, instructional activities that allow revealing students' creativity behavior are significant for them. The fact that the digital storytelling approach includes different components and that it provides students with opportunities to express different statements within the framework of their creativity potentials helped determine the creativity indicators in the study (see Figure 3).

Figure 3. Digital Storytelling Study Interface

In this respect, in the study, the components of the digital storytelling process and their reflections on the occurrence of creativity were evaluated individually and as a whole by field experts to answer the research question related the digital storytelling application reflectin onto the process of revealing elementary school students' creativity depending on field experts'

views. The experts interpreted the creativity approaches in the digital storytelling process in a framework that takes different creativity fields into consideration. In the first phase of the study, it was emphasized that the students demonstrated a substantial creative approach in such dimensions as the effectiveness of the characters, the quality of sound recordings, the association of the stories with visuals and the way of their presentation in the interactive environment design examined based on the expert views. The experts examined such features of the interactive environment design separately as visuals, content, sound recordings and color use, which are all design elements, and evaluated the students' creativity in the context of these features. In addition, the experts evaluated the digital stories created in the development process of the interactive environment design within the scope of the digital storytelling project in the context of their degree of originality, their narrative features, enrichment and structuring of concepts and putting forward contributions (McDrury & Alterio, 2003). In this respect, the indicators that the field experts took into consideration while interpreting the creative approaches are presented in Table 1.

Table 1

Creativity Indicators of Digital Storytelling Based o Expert Views

Characteristics of Illustrations
Originality of the characters
Drawing-related features of the characters
Effective use of metaphors reflecting the personality traits of the characters in the drawings
Color features of the characters
Description of the Characters
Originality of the descriptions of the characters
Harmony of the visual representations and character descriptions
Capability of character descriptions to reflect the personality traits of the characters
Design and Storytelling
Association of storytellings with visuals
Degree of originality of the storytellings
The narrative features of the storytelling and its features in the context of enrichment of concepts
Restructuring of storytelling in the context of design
Sound Recording
Harmony of the sound recordings with the personality traits of the characters

In the digital storytelling application, it was found to be creative that the students placed five different Anatolian-culture heroes in new stories by characterizing them again. In addition, the character designs put forward by the students in the process of restructuring the characters were considered by experts as a significant application that made the digital storytelling study effective. The sound recordings constituted another area of application that required the students to behave according to the personality traits of the characters. When the design elements of the digital storytelling study were examined separately, especially the storytelling study applications related to developing character design, creating original stories and gathering character designs effectively were found effective. The findings based on the experts' views regarding the features of the stories and the characters that occurred as a result of reinterpretation of the Anatolian-culture characters in the design are presented below (Figure 4):

Figure 4. The Character of Deli Dumrul

In the application process, Deli Dumrul, one of the characters in the students' drawings, was one of the characters prominent in Dede Korkut Stories in Anatolian culture. The Deli Dumrul characters of the students in their pictorial representations include power, horse-riding, combat, dominance and self-confidence. Based on the experts' views, it could be stated that these metaphors were creatively reflected in the character drawings. The creativity indicators expressed based on the experts' views show not only the originality of the character drawings but also successful visualization and concretization of the personality traits that the character owns in the original story. In addition, descriptions such as horse-riding, carrying a sword and shooting arrows, which are all the traits that the character has, could be said to be the reflections of the influence of Anatolian culture onto the pictorial representations. When the Deli Dumrul character projected by the students was examined, it was seen that similar to the pictorial

representations, the character was described as one with power and authority (Figure 4). In the stories, the effects of the Anatolian culture on the Deli Dumrul character were observed, yet it was also considered striking that the characters were reflected with such certain utopic creative thoughts as time-travel. In this respect, it could be stated that within the student group, the students put forward a valid original and creative approaches in line with their creative potentials.
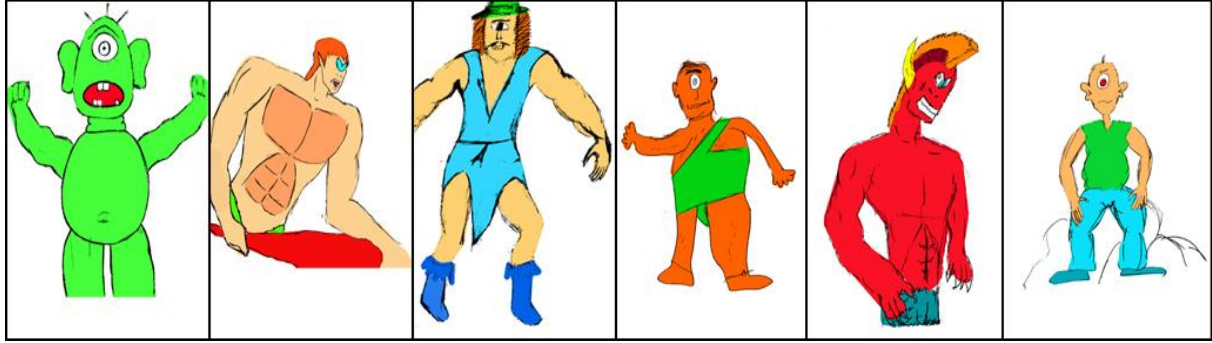

Figure 5. Tepegoz Character

Another character, Tepegoz, reflected by the students was one of the characters found in Dede Korkut Stories in Anatolian culture. The metaphors prominent in characters such as Tepegoz included being supernatural and powerful. These metaphors in the characters were described successfully. Based on the experts' views, it could be stated that these metaphors reflected the creativity of the students as well as their abilities in drawing. According to the experts' views, the stylistic features, effective use of colors and original perspective could be considered as indicators of the creative approaches of the students in terms of reflecting the character (Figure 5). Similarly narrated in stories as a supernatural character representing the evil, Tepegoz was punished in different ways at the end of each story. In addition, in the storytellings, the approaches to the Tepegoz character were successful in the framework of the criteria determined by the experts' views depending on the occurrence of creativity. The reason was that the descriptions regarding the Tepegoz character in the storytellings were original and fluent as well as effective in terms of imagination of the students.

Figure 6. Keloglan Character

The Keloglan character was one of the heroes in folktales in Anatolian culture. The metaphors prominent in the Keloglan character created by the students demonstrate well-mannered, cheerful and traveller personality traits (Figure 6). According to the experts' views, the metaphors in the Keloglan character were found to be in harmony with the original Keloglan stories. Successful reflection of the characteristic features was another indicator observed in the drawings. Depending on the experts' views, it could be stated that the Keloglan characters were created with creative approaches and that they carried the traces of the Anatolian culture. In addition, the descriptions regarding the Keloglan character in the storytellings were found to be effective by the experts with respect to such creativity indicators in their originality, fluency and extraordinariness.

Figure 7. Sahmeran Character

"Sahmeran", one of the characters prominent in mythological stories in Anatolian culture, was a surreal therapeutic character with a snake-like body and a human-like head. Sahmeran, one of the characters that interested the students most in the process of digital storytelling study, was represented effectively in the drawings. Although each character demonstrated different

traits, they generally carried metaphors regarding a powerful and well-mannered, though startling, character (Figure 7). These traits matching the personality traits of the character in Anatolian culture powerful were clearly seen as well-mannered and therapeutic Sahmeran in the stories put forward by the students. In addition, the Sahmeran character was one of the characters that pushed the limits of the students' imagination most because the students were interested in this character due to its superhuman as well as human-specific features.
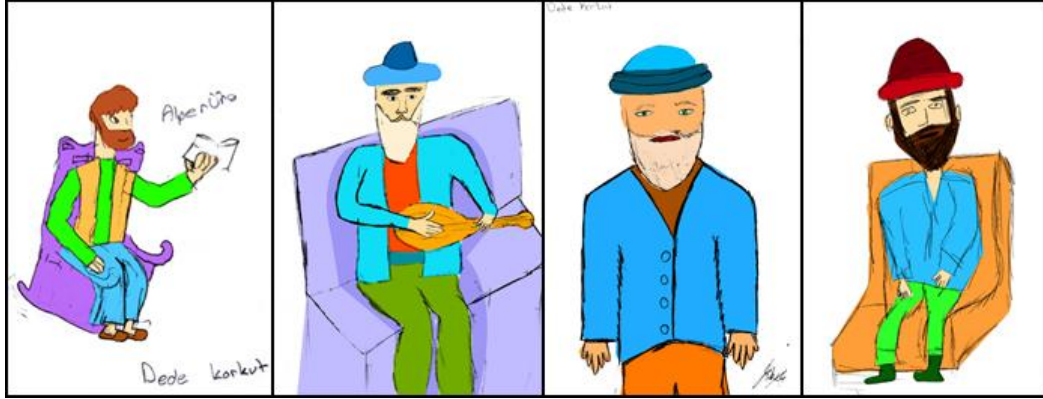

Figure 8. Dede Korkut Character

Dede Korkut, the main hero in Dede Korkut stories in Anatolian culture, was a respected and advice-giving character that narrated these stories and had great influence on humans. The most striking feature of this character was that the character narrated the stories by playing a lute-like instrument (a traditional instrument in Anatolian culture). Metaphors based on such certain characteristic features as wisdom, narration and powerfulness were prominent in the students' drawings, and these features corresponded to Dede Korkut stories in Anatolian culture (Figure 8). The character in the stories created by the students was described as a helpful, leading and advice-giving story-narrator.

Depending on the experts' views, it could be stated that besides the whole study put forward as a result of the digital storytelling study, such applications as character development, storytelling and sound recording were the fields in which the students demonstrated creative behavior effectively. In this respect, in the focus-group interviews held regarding the reflections of the participatory design approach - within the framework of the digital storytelling application - onto the students' creativity were as follows:

- The digital storytelling application could lead to an instructional process with active participation,

- The digital storytelling application can help students gain organizational efficacy regarding the design process and can allow them to discover their creative potentials.

- It can provide more effective permanency regarding the instructional content.

- Students can direct their creative approaches effectively with respect to their interests and efficacies in the process.

- Technical efficacies regarding the effective use of technology can prepare an environment which allows students to demonstrate their different creativity potentials.

- Effective use of team work can help students to discover each other's creative approaches and to encourage one another.

- It can contribute to the development of students' creativity skills as they have the opportunity to express themselves.

Findings Based on the Students' Views Regarding the Process of the Digital Storytelling Application

The research question related the students' views about the application in the context of the participatory design approach within the digital storytelling application was constructed through the Table 2 below presents the findings based on the students' views regarding the digital storytelling application:

Table 2.
Students' Views about the Digital Storytelling Application

Themes
Reflections of the digital storytelling application on revealing students' creativity
Reflections onto students' demonstration of creative behavior
Reflections onto students' discovery of their different efficacies
Reflections onto students' self-expression in a specific manner
Effectiveness of the participatory design approach and its reflections on creativity
Reflections of participation in the design process as an active participant onto the development of creative approaches
Reflections of participation in the design process as an active participant onto students' self-confidence
Provoking curiosity regarding the application process of the participatory design approach

Themes
Reflections of group work onto creativity
Reflections of group work onto development of creative behavior
Reflections of the group work application on increasing motivation
Technology use efficacy and its reflections on creativity
Reflections of technology as an active participant on creativity
Reflections on effective use of technology
Cultural awareness
Reflections on raising cultural awareness
Reflections on provoking interest and curiosity regarding cultural identity and values

One of the students, A14, reported his/her views regarding the sub-theme of "*reflections onto students' demonstration of creative behavior*" within the scope of the main theme of "*revealing students' creativity*" by stating;

> "*It helped me learn to think creatively, and the lessons were entertaining. I became more interested in the lesson. I was happy because I was able to achieve a study with the help of creative thoughts. I contributed to the digital story by preparing an animation and I was able to show my creativity.*"

Another student, A24, reported his/her views regarding the sub-theme of "*Reflections onto students' discovery of their different efficacies*" within the scope of the main theme of "*revealing students' creativity*" by stating "*...everybody becomes more successful when they do things in line with their own interests.*" Regarding the same theme, another student, A31, reported his/her views as follows:

> "*I had the chance to express my thoughts freely. Also, I animated my drawings via animations. In this respect, I think I developed myself. Thanks to this course, I will be able to prepare cartoon films I have dreamt about by preparing animations. Today, we recorded sounds for the characters. It was very entertaining. Thus, I feel closer to writing and literature.*"

In fact, students' participation in the process lies in line with their own interests and expectations. It helped them recognize the creativity fields that they were interested in, they were unaware. A32, another student who created the theme mentioned, supported this situation remarking that "*the task distribution in class allowed me to discover my abilities and helped*

me gain experience; in this way. I recognized that I was more successful in writing stories because one of the stories belonged to me."

According to the students' overall views constituting the sub-theme of "*Reflections onto students' self-expression in a specific manner*" within the scope of the main theme of "*Revealing students' creativity*", they were able to make use of their efficacies in a way to benefit from their creativity areas more effectively as they became aware of these areas. One of the students, A23, supported this finding recognizing that "*I did drawings; I tried to improve my drawings; by creating these amateur drawings, I saw what my mistakes were. Then I improved my drawings a bit more, and I managed to express myself more effectively in this way*".

Another main theme, "*Effectiveness of the participatory design approach and its reflections on creativity*", was the one on which most of the students agreed. In general, the students reported positive views about taking part in the process, creating designs effectively and having a say in every phase of the process. One of the students, A2, reported effective views about the sub-theme of "*Reflections of participation in the design process as an active participant onto the development of creative approaches*" within the scope of the main theme of "*Effectiveness of the participatory design approach and its reflections on creativity*". A2 emphasized that active participation guided him/her regarding creativity and stated that;

> "*We used my drawings in the digital story. One of the digital stories in the digital story was mine. I was happy that my handicraft products were favored. Thus I was proud of myself. I recognized my willingness to write stories and draw characters, and I became more interested.*"

The sub-theme of "*Reflections of participation in the design process as an active participant onto students' self-confidence*" regarding the main theme of "*Effectiveness of the participatory design approach and its reflections on creativity*" was another theme emphasized by most of the students. One of the students, A4, reported his/her views about the positive reflection of the process onto his/her self-confidence admitting:

> "*I contributed effectively to the digital story, and this made me proud of myself. I contributed both to the character drawings and to the sound recordings. The result was very good. It is a wonderful feeling to see my drawings used in the design. You believe what you have done is a beautiful thing, and you feel happy.*"

The last sub-theme regarding the main theme of "*Effectiveness of the participatory design approach and its reflections on creativity*" was "*Provoking curiosity regarding the application process of the participatory design approach*". Regarding this sub-theme, one of the students, A26, *stated;*

> "*I think I contributed to the lesson in terms of character creation. The character of Dede Korkut that I drew was a part of design. The use of my drawing in the design made me happy. I was glad to be a part of this activity. In this way, I became more interested in the subject.*"

The main theme of "*Reflections of group work onto creativity*" revealed based on the research findings was another main theme that the students reported solid positive views about and found fairly effective. One of the students, A16, who reported views about the sub-theme of "*Reflections of group work onto development of creative behavior*" regarding the main theme of "*Reflections of group work onto creativity*" emphasized the effectiveness of group work admitting "*In the digital storytelling course, we gathered and animated five different heroes in the digital environment. During the group works, we did a better job by discussing on different thoughts with our group mates.*" Another student, A10, reported his/her views about the sub-theme of "*Reflections of the group work application on increasing motivation*" remarking that;

> "*In the digital storytelling course, it was nice to work in groups and to carry out the design cooperatively. As a member of a group, taking part in such an activity honored and pleased me, and I became more interested in the lesson. I liked this course.*"

Regarding the sub-theme of "*Reflections of technology as an active participant on creativity*" revealed based on the findings constituting the main theme of "*Technology use efficacy and its reflections on creativity*" within the scope of the study, one of the students, A57, reported his/her views as follows:

> "*I actively participate and contribute to the digital storytelling design process. I learnt to work in groups and to put forward perfect products. I have also learnt that I can learn unfamiliar things by studying hard and by asking for help when necessary. And, in this course, I learnt that technology is not just a means of playing games. Thus, I learnt technological art. Thanks to technological art, I managed to create a number of background items. I was able to express my thoughts creatively. I contributed to this course by writing a scenario. I helped with the character*"

drawings. In this way, I creatively used my drawing ability as well as my ability to write stories."

One of the students, A40, reported his/her views about the sub-theme of *"Reflections of technology as an active participant on creativity"* indicating:

"Photoshop is a program which is entertaining yet difficult to use, and we tried to use it to obtain a number of images. I have learnt that we can do changes on numerous sounds and images by using technology. I learnt how to create a cartoon film, how to draw with the help of a computer and how to do sound recordings. I first created the Keloglan character. Later, I dubbed Deli Dumrul. I read the text changing my voice. I got very excited doing vocalization, but I became happy when I saw the product. No one could believe it was my voice. As I used technology effectively, I managed to do things I had imagined. There was much creative reflection of mine as well as of my friends."

One of the students, A33, stated his/her views about the sub-theme of "*Reflections on effective use of technology"* indicating:

"In this course, I learnt how to do changes on images. I learnt how to combine two images and how to draw characters. I also learnt how to animate the characters I created and how to do sound recordings. I had much fun during the lessons. Also, I learnt the overall features of Anatolian characters."

The main theme of *"Technology use efficacy and its reflections on creativity"* within the scope of the study was one that the students clearly expressed their views about. In addition, in their design diaries the students emphasized the effectiveness of the process mostly with respect to this theme.

In the study, another finding obtained based on the students' views was the main theme of *"Cultural awareness"*. One of the students, A51, reported his/her views about the sub-theme of "*Reflections on raising cultural awareness"* saying:

"In this course, I learnt that Tepegoz was a very strong character. Because it had only one eye, it was called Tepegoz. This character believed nobody could defeat it. Sahmeran was a snake and knew the formula of therapeutic magic potions. Keloglan was naïve yet very clever. Dede Korkut was a very famous folk hero. Deli Dumrul was against Azrael (the angel of death)."

A39, another student, reported his/her views regarding the sub-theme of *"Reflections on provoking interest and curiosity regarding cultural identity and values"* admitting:

> *"I increased my knowledge about cultural characters. Also, we wrote a story using these characters. In this course, I learnt that Dede Korkut had a lute-like instrument; Tepegoz ate human; Deli Dumrul was willing to fight with Azrael; Sahmeran was a snake; and it lived under the ground. All these drew my attention. I also wondered about other heroes in our culture. In addition, thanks to the story we wrote, I became more interested in the digital story we developed. This made me happy, and I liked the digital story."*

Depending on the students' views about the effectiveness and reflections of the digital storytelling application onto their creativity, it could be stated that actions such as guiding students especially in line with their interests, encouraging them to do group work, involving them in the design process as a participatory designer and providing them with the opportunity to participate effectively in every phase of the design process helped them express themselves, discover and make use of their creativity and develop themselves. In addition, it could also be stated in line with the findings obtained that it allowed learning by discovering the process and made the instructional process more effective and interesting. It is also important to associate such applications with instructional areas and subjects that allow students to discover their creativity (Skivenes & Stranbu, 2006). The reason is that the students' use of interesting stories and characters from the Anatolian culture in the process provided the students with an in-depth application opportunity to discover themselves.

In the participatory design process within the scope of the digital storytelling approach, students test their knowledge regarding a purpose determined and participate in the discussion and decision-making process regarding the design. In addition, students revise their creative potentials, efficacies and needs regarding the purpose determined, associate them with the design process and make, test, evaluate and develop decisions. While creating all these, they benefit from both individual and group interactions. In addition, the fact that students are participatory designers in the participatory design process motivates them more, encourages them to participate, allows them to put forward their needs clearly and helps them discover themselves and one another (Morajevi et. al., 2007). As such, the participatory design approach could be said to be an effective and entertaining process thanks to which students discover themselves as well as their creativity.

The first phase of the participatory design approach based on digital storytelling starts with the definition of students' participation in the process. Simply put a good-quality creative process will be available for students. While defining their participation in the process, students discover their creativity and define, revise and effectively make use of their efficacies and skills based on their creative potentials. Students put forward suggestions regarding solutions to a problem or a certain purpose based on the participatory design approach, and they introduce products cooperatively. In the participatory design process, students, who also constitute the audience of the process, can demonstrate a design approach based on the appearing product which meets their needs better (Skivenes & Stranbu, 2006). With such a design approach, students have the opportunity to use different creativity potentials based on their needs.

Conclusion

Today, with the influence of globalization, it is important to train individuals for future not only in line with national criteria but also according to international standards. As a natural result of this situation, in a number of countries in the world, many educational institutions of different types and at different levels try to provide opportunities to increase students' knowledge with the help of technology-based instructional applications. In this respect, instructional methods, applications and activities that require effective use of technology are important. With the participatory design approach based on the digital storytelling application within the scope of the study, the students were provided with the opportunity of technology use associated with a design process in which they were active participants. As a result, an educational environment in which the students could use their creative behavior effectively was established. The participatory design approach within the framework of digital storytelling in the study could be said to be an application process in which the students could clearly discover their creative potentials because prior to the application, the students had a tendency to discover themselves for the purpose of being involved in the process as active participants and of recognizing themselves within the context of the participatory design approach. The use of participatory digital storytelling includes creativity related to facilitate colloborate digital media in numerous contents in an effective manner based on critical thinking capacity (Gubrium & Harper, 2013; Lambert, 2013; Ohler, 2013). Participatory storytelling is a creative process based on deeply thinking and deeply imagination dealing with storytelling components effectively and reflecting

multiple ideas to construct digital platform on story (Matthews & Sunderland, 2013; Willox, 2012).

As a result of the study, it was revealed that at the end of the application process, the students had positive views about the digital storytelling approach and about their involvement in the digital storytelling process as participatory designers. The students stated that they participated in the design process; that they created the scenario in the design; that they drew the characters; and that they took part in an entertaining training process as they did sound recordings. Most of the students reported that it was pleasing and exciting to take active part in the design process and to see their products displayed. In addition, a majority of the students stated that their excitement in seeing that their own designs were appreciated and used increased both their interest in the instructional process and their self-confidence and helped them discover their creativity. Depending on the students' views, it could be emphasized that especially participation in the process as an active participant motivated the students to become interested in the instructional content. According to the research findings, the digital storytelling approach could be said to be an interactive, effective process which provokes active participation and which allows students to discover themselves.

Consequently, the research findings pointed out that an application in which students actively participate in line with their expectations, efficacies and interests not only help them to reveal their creativity and to find pleasure in learning but also increase their motivation in the course. In addition, effective use of the digital storytelling approach motivated the students' educational experiences to become more effective. Also, the digital storytelling approach, which places students in the center of learning, leads to more effective instructional experiences.

Additionally, the project gave students the opportinities to tell stories of their creative approaches based on the participatory storytelling method. The digital stories included a powerfull and personal insights of creativity, participation, self confidence and communication.

Participatory storytelling methods included the creative forms of self expression such as drawing, designing, drama, music and writing. The colloborative process of participants allowed them to find an effective way of creativity.

Based on the research findings, it could be stated that the digital storytelling approach constitutes an effective learning environment which allows students to use their limited time more effectively and productively.

The participatory design approach also allows putting forward designs that meet students' real needs in the design process. The reason is that the actual users or the audience of a design are the students themselves who are participatory designers in the process. In this respect, studies could be conducted regarding the effectiveness of designs in which students are participatory designers. In the process of the participatory design approach within the scope of the digital storytelling application, students discovered their creativity and the process encourage them to reflect their efficacies. In the process of developing digital storytelling application, students constructed the design environment in line with their interests, expectations and needs.

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