AWARENESS AND COGNITIVE LOAD LEVELS OF TEACHER CANDIDATES TOWARDS STUDENT PRODUCTS MADE BY DIGITAL STORYTELLING

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ABSTRACT

The purpose of this research is to assess the student products created by digital storytelling, and to determine the awareness towards learning the topic and the cognitive loads of students during the process. Research was performed with a total of 52 teacher candidates attending 2nd class at "Classroom Teacher" department of Mersin University Faculty of Education in 2012-2013 education years. General scanning model was used to determine the cognitive loads and awareness of student products, created by teacher candidates through digital storytelling, for learning the topic.

As a result of the Research, we reached the conclusion that the awareness related to basic concepts and program created by digital storytelling increased, and there was not a cognitive overload. Also, students' opinions were taken on the process and according to acquired data, it was concluded that the students were pleased with the process, their awareness increased, and they made plans to improve what they learned and use them in the future. In line with acquired findings, it was suggested that experimental studies should be made on this topic.

Keywords: Digital storytelling, cognitive load, awareness.

INTRODUCTION

With the advance of information and technology today, learning-teaching environments, methods and approaches have begun to change. Technology removed the limitations of access to knowledge and facilitated access to knowledge in learning. Learning the ways of reaching information instead of learning the information, effective and efficient use of technology, internationalization and lifelong learning have become important concepts.

Rapid change in information and technology cause individuals to feel the need for lifelong learning, and to meet such needs, they need to have certain knowledge, skills and attitudes within "lifelong learning" skills. "Basic competences in science and technology", "digital competence" and "learning to learn" are some these knowledge and skills (European Commission, 2007).

Especially; digital competence, effective use of information-communication technologies, effective use of computers in the acquisition, production, utilization presentation, and sharing of information, internet communication, learning to learn competences are essential for individuals to assume their learning responsibilities and perform their own learning (Wain, 2000; Walters and Walters, 2001).

Today, many information communication technologies and multimedia tools are being used. One of them is digital storytelling. Digital storytelling is a program used in information-communication technologies today. It consists of a document or story and visuals that contain multimedia texts. It is possible to draw the attention of students by using multimedia approach in classroom environment.

Anstey and Bull (2006) state that this can be managed through stories created by the voice, pictures and identities of students to have them reach information and improve a series of social behaviors. Digital storytelling covers the process of creating a new product through various multimedia tools such as videos in short film form of an original story given by usually author's own voice, music and narrations (Hull and Nelson, 2005). When viewed from this point, it is essential to learn and use digital storytelling in terms of lifelong learning skills. However, if we look at the literature, we can see that multimedia tools sometimes can cause cognitive loads (Anglin, Vaez and Cunningham, 2004). Because multimedia learning mostly happens in the working memory. Because working memory capacity is limited, loading these limits with undesired cognitive loads can cause negative effects on learning, remembering and transferring. Therefore, cognitive load is an important point for education designers (Mayer, 2001).

Although there are many points to be careful during the design, educational design principles must be taken into account, especially in multimedia learning environments, to keep the cognitive load in the working memory at an optimum level. Within such intensity of information; a student's deciding on choosing the information to be used, preferring the options, deciding on which connections to follow often cause cognitive overloads. Hesitation in the process of deciding which road to follow is pretty distracting and can cause many cognitive problems.

Especially, the cognitive overload we face in multimedia is an important problem and occurs when students are bombarded with much information at once. Especially, students facing cognitive overloads among information intensity and various options in multimedia often used in recent years cannot know where they are, where they are coming from and where they are going to at such situations; in other words, they get lost.

In this situation, it becomes hard to construct knowledge and create a meaningful learning. One of the most important problems in the education system is the problems when facing cognitive overloads in the process of creating meaningful information. In other words, preventing cognitive overloads will help decrease loss levels of students. In such environments, students, who are over loaded with cognitive loads and thus get lost, will have low performances and they will have to spend more time and effort to reach the information they seek. If we look from this point of view; the purpose of education is to bring up individuals, who can use multimedia, who are familiar with technology, who know how to reach information. At the same time, cognitive overloads must be avoided in multimedia learnings. Information preferences, evaluation, decision-making processes of students working in multimedia have an effect of their awareness.

This process, also defined as cognitive awareness in the literature, includes the skills of motivating, focusing, and developing an attitude on the topic. Concept of cognitive awareness covers an individual's being aware of his/her own learnings and learning processes and being able to give himself/herself relevant feedback. Briefly, cognitive awareness is a way of learning how to learning (Bransford, Brown, and Cocking, 2000; Dunlosky and Metcalfe, 2008). Cognitive awareness helps bringing up individuals who can control their knowledge and thoughts about themselves, who assesses what they know and what they should know, who knows where they are and what they would do next (Gelen, 2004).

So, in today's age of technology, while bringing up the teachers who would bring up the students of the future, it seems very important to have teacher candidates brought up as individuals that can use information communication technologies, and who are aware of their learnings. Based on the defined requirements, this study researched the effect of student products made by classroom teacher candidates through digital storytelling, on learning awareness and cognitive loads.

PURPOSE OT THE STUDY

The purpose of this research is to assess the student products created by digital storytelling, and to determine the awareness towards learning the topic and the cognitive loads of students during the process. For this purpose, answers were sought for the following questions:

- **How is the awareness of classroom-teaching students regarding the concepts they learn and the education application?**
- **How are the cognitive load points of classroom-teaching students in the process of the application performed through digital storytelling?**
- **What are the opinions of classroom-teaching students on the performed application?**

SAMPLE OT THE STUDY

Study is performed with 2nd class students of "Classroom Teacher" department of Faculty of Education. The reason of choosing the Classroom-Teaching department is that primary school level is the basis of education process and that classroom teachers are appointed to these posts. Research required students to create products related to "education, teaching and learning" concepts by way of digital storytelling. Defined concepts are the most basic concepts of the profession of teaching and learned in first class under the lesson "Introduction to Educational Sciences". So, students are familiar with the basic concepts. The reason for having a study group of 2nd class students is that the students know the basic concepts and that the lesson "Teaching Technologies and Material Design" is a 2nd grade lesson. The study of preparing teaching materials through "digital storytelling" was applied in this lesson. Study group of the Research was a total of 52 teacher candidates attending 2nd class at "Classroom Teacher" department of Mersin University Faculty of Education in 2012-2013 education year. Among the teacher candidates attended to the research, 38 (73.07%) were females, and 14 (26.92%) were males. Gender-related frequency and percent values of teacher candidates, who comprised the research study group, are given in Table: 1.

Table: 1
Distribution of Teacher Candidates According to Genders

Variable	Gender			
	Female	f	Male	f
N	38	73.07	14	26.92
Total	52			

METHOD

Research Design

In this research; general scanning model was used to determine the cognitive loads and awareness of student products, created by teacher candidates through digital storytelling, for learning the topic (Karasar, 2008). Scanning model is a research approach that aims to depict a past or current situation as the way it existed (Karasar, 2008).

Data Collecting Tools and Application

In the study, in order to determine the awareness of students on learning the basic concepts of digital storytelling and education, and to measure the cognitive load instilled on students while making K-W-L charts and operations, cognitive loads scale was used. Also, to receive students' opinions related to performed applications, semi-constructed interview questions were prepared.

Measurement Tools

K-W-L graph: **These are regulatory graphics that help learning, developed by Donna Ogle in 1998. This graphics use three columns to depict what students know about the topic what they want to know about the topic, and what they learned about the topic. It is used to reveal Students' previous knowledge, determine their experience and knowledge about the topic and to ensure that they are aware of their ideas on the topic. It helps visually synthesizing the information as well as, having the student monitor his/her own improvement (Ogle, 1998).**

In the study, students were required to answer questions "what did I know about this topic?", "what do I want to learn?" and "what did I learn" related to "education, teaching and learning" concepts, through K-W-L graph.

Cognitive Load Scale

In the study, 9-grading scale (Subjective Rating Scale), developed by Paas and Van Merrienboer (1993), was used to measure total cognitive loads. The scale consists of one item and measures the effort spent by students for performing a task. The scale is graded as "very very little", "very little", "a little", "partially little", "neither little nor much", "partially much", "much", "very much" and "very very much". The scale was adapted to Turkish by Kılıç and Karadeniz (2004). TO calculate Cronbach Alfa internal consistency coefficient of the single-item original scale, Kılıç and Karadeniz assigned more than one duties for students and her after each duty, a "cognitive loads scale" was applied. With this method, Cronbach Alfa internal consistency coefficient of the original scale was calculated as .90 for reliability analysis. In grading the cognitive loads scale; 1-4 load points was evaluated as low cognitive load, and 5-9 load points was evaluated as high cognitive load (Paas and Van Merrienboer, 1993).

Semi-Constructed Interview Questions

In semi-constrcuted interview technique, researcher prepares interview questions beforehand; however, he/she provides partial flexibility for people researched during the interview, and allows reorganization and discussion of the prepared questions (Patton, 1987). Researcher created draft questions before preparing the Interview questions and submitted them for the opinions of an expert. Regarding the expert opinion, necessary changes were made and it has taken its final form. Face to face interviews with participants took 30 minutes as an average and they were recorded under their approval.

Application of Measurement Tools

Research was made in 2012-2013 spring educational terms, with classroom teaching 2nd Class students. In the lesson "Teaching Technologies and Material Design", students were given a K-W-L graph and asked to fill-in columns 1 and 2 (what do I know, and what do I want to know about basic concepts and digital storytelling?). In later weeks, "Digital Storytelling" program was told for 1 week (4 hours) and exemplary applications were performed. After the Topic was told, students were asked to create a product by making a detailed research related to "education, teaching and learning" concepts, and preparing these concepts through digital storytelling. Created product went through the stages of;

- **Gathering detailed information on "education, teaching and learning" concepts,**
- **Product design planning,**
- **Positioning the concepts by using digital storytelling,**
- **Adding pictures, videos, sound,**
- **Adjustment of timing**
- **Product completion**

Students were applied the cognitive load scale at each stage. Points gathered from the cognitive load scale, which was applied for a total of 6 times, were converted to a table as average cognitive load points and cognitive load status. After all applications were completed, students were given the K-W-L graph for the last time and they were asked to fill-in the 3rd column (what do I know about the topic and digital storytelling right now?). At the end of the application, 6 random students, from those with high and low cognitive loads, were chosen to have their views on the applications, and their opinions were assessed by semi-constructed interview questions. Acquired findings were presented by students' direct quotes.

Data Analysis

Information gathered by K-W-L graph was evaluated by 2 specialists, one being the researcher, and acquired findings are stated in percentages (%) and frequency (f). Data gathered from cognitive load scale are tabulated as average cognitive load points and cognitive load status. Qualitative data are presented with direct quotes.

FINDINGS AND DISCUSSION

In order to answer the 1st sub-problem of the research, students were asked to fill-in K-W-L graph's Columns 1 and 2 at the beginning of the application, and Column 3 at the end of the application; acquired data were analyzed by 2 experts in their fields.

Students were required to answer questions "what did I know about digital storytelling?", "what do I want to learn?" and "what did I learn" related to "education, teaching and learning" concepts and digital storytelling, through K-W-L graph. Gathered data were evaluated, then, acquired findings are shown in Table: 2.

Table: 2
Frequency (f) Values of Answers Given to K-W-L Graph

K What Do I Know?		W What Do I Want to Learn?		L What Did I Learn?	
"on education, teaching and learning concepts	f	"on education, teaching and learning concepts	f	"on education, teaching and learning concepts	f
-I know what these concepts mean	52	-I want to learn how to perform an effective education and teaching.	47	-I learned the relations of the concepts with each other.	38
-I know why these concepts are important for my job	36	-I want to find more examples on the Concepts.	14	-I've seen many examples on the concepts and I can easily distinguish them from each other.	37
- I know the differences between the Concepts	27	-I know everything on this topic and I do not think I can learn more.	7	- I can create new stories related to the concepts.	41
-I know which concept the applications are perform in the class define	13			-I learned how to express the concepts, which are abstract for me, in a concrete manner.	9
on Digital storytelling	f	on Digital storytelling	f	on Digital storytelling	f
-I do not have any information, I have never heard of it.	44	-I want to learn how to use it.	47	-I learned how to use the Program.	48
-I know how to add a program, picture and writing that I previously used.	5	-I want to transfer PPT presentations to digital storytelling.	5	-I realized that it is a teaching technique and effective in lecturing.	32
-Telling a topic by stories.	3	-I want to learn how to add voice-over and pictures.	5	-I learned how to adjust my voice.	4
		-I want to learn how to use Digital storytelling in my job.	24	-I learned to use the Program well enough to teach to another.	2
				-As well as digital storytelling, I also learned how to prepare PPT and use Paint programs.	6
				- I've learned that the pictures used must not become distant to the topic.	3
				- I've learned that it is a creative process.	7
				- I've learned that a topic can be taught without being boring.	2

Table: 2 reveals that all students know the f(52) concepts in description, regarding basic education concepts. At the same time, more than half of the students f(27) can differentiate the concepts and a great majority f(36) explains what the concepts are important for their jobs. Regarding the basic concepts under this lesson, it has been concluded that they wanted to learn how to use the concepts in classroom applications, that they needed examples to materialize the concepts, and that a few students f(7) did not want to learn more on the topic.

At the end of the application; almost all students f(41) stated that they can create new stories on the concepts, a majority f(38) stated that they can see the relation of the concepts with each other and that they f(37) can distinguish the concepts better with new examples. A few of the students f(9) told they can easily materialize the concepts.

Answers for digital storytelling reveal that majority of the students f(44) do not have any information on the subject. Very few students f(5) told that they knew about the subject but they did not know some of its applications and again very few students f(3) knew that digital storytelling is teaching with stories.

Under this lesson, majority of the students f(47) told that they wanted to use the program, that they planned to use this program during their careers and that they wanted to improve themselves on some applications related to digital storytelling. At the end of the application, majority of students f(48) stated that they learned to use the program, that the program is a teaching technique, that they also learned PPT preparation and Paint programs through digital storytelling, while very few students f(2) told that they could teach the program to another, that the process is very creative, it improved creativity, that they learned to select appropriate pictures and that a topic can be taught without being boring.

According to the findings, in learning the basic concepts, students usually knew the concepts on descriptive dimensions, and told that they needed more examples to distinguish and materialize them.

At the end of the application, they saw "education, teaching and learning" concepts more clearly in the concept schematics to explore their relations, showed more than one new examples and were able to explain it within one example. If we examine the situation in terms of concept teaching, we can say that they went through many stages of full and permanent concept learning, in the application process. Merrill (1994) states that while a concept is being taught, the process must include content elements such as a concept scheme, example, non-example, distinguisher, non-distinguisher features.

While defining a concept, actually, it is stated that the content of such concept can include the objects and situations that have the listed features. One of the content elements used while teaching the concepts is the concept scheme. Concepts display a hierarchical structure; concept scheme shows the position of the taught concept within the hierarchy, in other words, within the whole. Distinguisher features the features that distinguish an object, situation, stimulus from others (Merrill, 1994; Marzano et al., 2011).

From this point of view, students reached the bottom and top concepts of the concept while attempting to define the concepts by digital storytelling method, created stories to show their relations with each other while defining the concepts and enriched the text with examples. So, it can be said that they attempted to explain the concepts thoroughly by getting involved in more research during preparation, story designing and creating the transition between the topics. Similar findings have been encountered in the process of learning digital storytelling. At the beginning of the process, almost all students stated that they knew nothing about the subject, that they even hadn't heard of it but at the end of the application, it was found that they expressed that they learned the subject.

For learning the concepts and digital storytelling method, each student, it can be said that an awareness has developed for their own learning, with the statements they wrote before and after the application on K-W-L graph. This finding is in parallel with Ogle's statement (1998) "it helps visually synthesizing the information as well as, having the student monitor his/her own improvement". To answer the 2nd sub-problem of the research; a cognitive load scale was applied in 6 stages of the application in order to determine students' cognitive loads in the process, arithmetic average of the acquired points were taken, to find the average cognitive load points and cognitive load status. Findings are shown in Table: 3.

Table: 3
Cognitive Load Points and Cognitive Load Status of Students

	Command 1	Command 2	Command 3	Command 4	Command 5	Command 6	Average Cognitive Load Point	Cognitive Load Status
1st Student	4	5	4	4	2	3	3.66	Low Cognitive Load
2nd Student	5	3	4	5	3	2	3.67	Low Cognitive Load
3rd Student	4	3	4	6	1	6	4.00	Low Cognitive Load
4th Student	4	3	3	2	3	4	3.16	Low Cognitive Load
5th Student	3	3	1	4	4	4	4.16	Low Cognitive Load
6th Student	5	4	3	8	3	5	4.66	High Cognitive Load
7th Student	4	4	5	5	3	7	4.67	High Cognitive Load
8th Student	4	3	4	4	3	2	3.33	Low Cognitive Load
9th Student	4	8	5	6	4	7	5.66	High Cognitive Load
10th Student	3	5	4	4	2	1	3.16	Low Cognitive Load
11th Student	4	4	3	3	2	4	3.33	Low Cognitive Load
12th Student	5	4	3	3	3	2	3.33	Low Cognitive Load
13th Student	3	5	4	4	2	1	3.16	Low Cognitive Load
14th Student	4	9	5	5	4	2	4.83	High Cognitive Load
15th Student	3	4	4	6	3	6	4.33	High Cognitive Load
16th Student	4	5	4	3	3	4	3.83	Low Cognitive Load
17th Student	5	6	3	5	3	4	4.33	High Cognitive Load
18th Student	8	3	3	5	4	5	4.66	High Cognitive Load
19th Student	5	3	3	2	2	2	2.83	Low Cognitive Load
20th Student	5	1	4	3	4	3	3.33	Low Cognitive Load
21st Student	3	6	5	3	1	8	4.33	High Cognitive Load
22nd Student	5	4	3	5	2	4	3.83	Low Cognitive Load
23rd Student	5	5	4	5	2	8	4.83	High Cognitive Load

24th Student	6	5	3	5	4	5	4.16	High Cognitive Load
25th Student	1	5	4	3	3	4	3.33	Low Cognitive Load
26th Student	3	5	4	6	4	5	4.50	High Cognitive Load
27th Student	6	6	5	4	4	6	5.16	High Cognitive Load
28th Student	5	4	3	5	2	4	3.83	Low Cognitive Load

29th Student	3	2	4	5	2	7	3.83	Low Cognitive Load
30th Student	5	5	3	3	1	5	3.66	Low Cognitive Load
31st Student	5	5	4	4	3	4	4.16	High Cognitive Load
32nd Student	1	3	5	3	4	4	3.33	Low Cognitive Load
33rd Student	4	7	6	4	3	5	4.83	High Cognitive Load
34th Student	5	6	2	4	1	5	3.83	Low Cognitive Load
35th Student	5	5	4	7	4	5	5.00	High Cognitive Load
36th Student	1	5	4	3	3	4	3.33	Low Cognitive Load
37th Student	5	3	4	5	4	6	4.50	High Cognitive Load
38th Student	6	4	3	3	2	3	3.50	Low Cognitive Load
39th Student	3	6	5	3	1	2	3.33	Low Cognitive Load
40th Student	5	6	5	4	3	6	4.83	High Cognitive Load
41st Student	5	5	8	3	4	4	4.83	High Cognitive Load
42nd Student	7	5	4	4	2	4	4.33	High Cognitive Load
43rd Student	5	6	2	4	1	5	3.83	Low Cognitive Load
44th Student	3	5	4	5	1	1	3.16	Low Cognitive Load
45th Student	5	3	4	3	2	5	3.66	Low Cognitive Load
46th Student	7	6	4	4	3	1	4.16	High Cognitive Load
47th Student	4	4	6	5	3	3	4.16	High Cognitive Load
48th Student	6	3	2	3	3	3	3.33	Low Cognitive Load
49th Student	5	3	4	1	5	1	3.16	Low Cognitive Load
50th Student	4	7	9	4	4	5	5.50	High Cognitive Load
51st Student	7	9	3	3	5	4	5.16	High Cognitive Load
52nd Student	6	4	4	5	1	4	4.00	Low Cognitive Load

Table: 3 reveals that 29 students had a low cognitive load and 23 students had a high cognitive load. When we examine the cognitive loads of students with high cognitive loads in each stage, we see that they usually had difficulties in "product design" stage, and then, in gathering detailed information related to the concepts. However, if look at in in general, more than half of the students have low cognitive loads. Mausavi et al (1995) state that the working memory has a limited capacity and if it is overloaded, learning, remembering and transferring would be adversely affected. Consequently, we can say that a cognitive overload did not occur while students were creating a product through digital storytelling. Externa cognitive load is the most important variable that influences the total cognitive load that the teaching designer can control during design stage. Here, finding examples in "education concepts" topic is the internal cognitive load while providing directives beforehand and keeping them in mind is the external cognitive load. An effective cognitive load is the learning tasks that comprise selection, sequence, inference etc. processes in design (Mann, 2005).

In terms of findings, we can say that mentioned cognitive loads were not overloaded in the process. We can also say that this is positive in terms of learning. 6 students were interviewed to answer sub-problem 3 of the Research. 3 of the interviewed students had 3 high cognitive loads, and 3 had low cognitive loads.

Findings acquired as a result of the interview with students are presented as direct quotes.

Students with Low Cognitive Load;

S.1. "I had great fun in this lesson. I learned a new program and I also prepared a presentation in the program I learned. First I was afraid but now, I believe I learned these topics well enough to tell to another. I will also use these things I learned when I become a teacher. I think that students would never be bored of this. I'm already interested in computers and I'm happy to learn a new thing. We just learned the education concepts last year. This year, it was a bit hard to create an appropriate story while using these concepts again but now I can write many more stories."

S.2. "I learned a program I knew nothing about. Indeed I hadn't heard its name before. first time I heard it, I thought of it as something like an example event. However, we find very different pictures, and sometimes we draw them ourselves. The most fun part is the voice-over. I felt like a film producer. Also, concepts such as education and teaching are actually very easy but only making definitions is not enough. We need to find many examples. I really worked hard on it. It is quite hard making-up stories just by knowing the definition. Of course, I do not know if I can carry out this application in every topic but it would be fun to use in primary school. Students would be much interested. Also, I have even created an album at home from my own pictures. I told the story of the places I traveled to. From now on, I think I can use it in many different areas."

S.3. "It is great to learn new things but it takes too much time. I'm a bit bored but I learned something new. It is not hard to learn and use the program. The hard thing is to create a story with the given concepts; believe me, I even asked my friends in the apartment building how I could create a story. But, there were many interesting ideas..... I've been using flash program before this, so I'm used to using such programs."

Students with High Cognitive Load;

S.4. "I learned to use the program very well. Adding videos, making voice-overs are fun but concepts were very boring for me. We had already learned these last year. It would be much fun if we told about historical places or read poems. I do not like such topics much. I could not know how to create the story; actually, I came to you and asked about it, as you know. The concepts seemed to intertwine. I know it has to be this way but I think if the topic was free, I would enjoy it much more."

S.5. "I had a bit of a hard time using the program because I did not know how to use a computer well. I also had a hard time in computer lesson.

I do not have a pc, perhaps that's why it was difficult for me…….. I already knew the education concepts but they were reinforced when repeated this year. I created examples from my life. I had a nice presentation. But it took a long time. Indeed, I even had to ignore some of my other lessons. "

S.6. "This program is fun and pretty easy to learn but designing took some time. It is hard to transfer the things in my mind to a computer. In other words, thoughts and actions cannot be in harmony all the time. I had some problems. I could not find a video. I created all stories myself. Therefore, it was a bit hard but I think I learned very well. You cannot learn unless you are desperate. I was a bit bored but the result was beautiful. I will teach this way when I become a teacher. Even little children can use this program very easily."

When we review students' opinions, we see that they did not have a hard time learning the digital storytelling program but they did while performing an application about a topic. We can say that this is more about designing and finding examples. According to the opinions of students with low cognitive loads, we can say that their previous intensive computer usage helped them learn the program. According to the students, students are happy with learning the program and creating a product, and they stated that they would like to use it in their career. Based on this finding, we can say that the application has an effect of increasing students' motivation. At the same time, it can be said that it is effective in transferring the information.

CONCLUSION AND SUGGESTIONS

Based on the data acquired at the end of the research, it is found that the products created by digital storytelling helped students see their own improvements and performed applications did not increase students' cognitive loads too much. At the same time, students were pleased with the applications and stated that they increased their motivations. Digital storytelling is pretty effective for students to learn by using their visual, audio and kinesthetic abilities. While creating their stories, students also use their high level thinking skills (www.tech4learning.com, 2007). Digital storytelling is an application where students work in cooperation and is effective in learning through group interaction. Consequently, we can say that research findings are in parallel with the literature.

At the same time, the research found that students had low cognitive loads. Having more than half students with low cognitive loads can show that the students did not have a hard time during the operations. When we look at the Literature, we can say that there is a consistency with the findings of the research that found "cognitive load is low in students who especially use computers more in multimedia" (Kılıç and Karadeniz, 2004). In the research, part of the high cognitive load students is students who rarely use computers. Majority of the low cognitive load students are students who were previously familiar with computers, using various programs comfortably. Interviews with the students also support this finding. We see that multimedia applications decrease cognitive loads and support learning (Kablan, 2005; Mayer et al., 1999).

In other words, if we consider digital storytelling as a multimedia, we can say that it could affect students' cognitive loads. To come up with such a judgment, experimental studies are needed. However, simultaneous visual and audio applications are believed to be effective. As a result of interviews with students, it is concluded that students enjoyed the applications very much and they were motivated. The Literature states that multimedia prepared in line with cognitive theory principles increase teaching efficiency in learning (Mayer et al, 1999; Sezgin, 2009; Kılıç, 2006).

As a result, we can say that the products created by digital storytelling increase students' awareness on the topics they learn, do not increase cognitive loads much, and applications leave a positive effect.

In line with these findings, it is recommended that experimental studies are made to research the effect of digital storytelling on cognitive loads, and researches are made for student awareness or cognitive awareness with different scales.

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