



AN INVESTIGATION OF THE EFFECTS OF DIGITAL STORYTELLING ACTIVITIES ON ENGAGEMENT AND WRITING SELF-EFFICACY

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Abstract: The purpose of this study is to examine the effects of digital storytelling activities on the student engagement and writing self-efficacy levels of pre-service teachers. The participants of the study are 64 pre-service teachers who are sophomores in the department of Literacy Education in the school of education during the 2015-2016 academic year. A pilot study using 16 junior pre-service teachers was carried out before study. The study was implemented using a pretest posttest quasi-experimental design with control group. “Four Aspects of Student Engagement Questionnaire” and “Writing Self-Efficacy Scale” were used as data collection tools. The results of analysis show that the engagement and writing self-efficacy of the pre-service teachers in the experimental group were higher than the pre-service teachers in the control group.

Key words: Digital storytelling; student engagement; writing self-efficacy; pre-service teacher education

1. Introduction

Digital storytelling is a powerful teaching and learning tool intended for teachers and students that has emerged in recent years as a result of technological developments and the widespread use of digital media (Robin, 2008). Digital storytelling is an effective material tool, also it contributes to the development of 21st century skills (Çocuk & Yanpar Yelken, 2018). Digital storytelling includes technology integration and the use of interactive media (multimedia images, digital audio, video, film, digital comic books) (Ming et al., 2014). Digital storytelling is the electronic presentation of a story on a particular subject (Kobayashi, 2012). There are important elements for digital storytelling. These are; the general purpose of the story, the narrator’s point of view, dramatic question(s), selection of content, clarity of sound, narrator’s speed, meaningful use of sound, quality of images, economy of the story detail, and good use of grammar and language (Robin & Pierson, 2005).

Digital storytelling is a technological application that has a good position as it prepares content with user contributions and helps teachers overcome certain obstacles by using technology efficiently in class (Robin, 2008). Barrett (2006) has stated that, through its use in education, digital storytelling facilitates four student-centered teaching strategies; student engagement, project-based learning, reflection for in-depth learning and technology integration in education. It is important to use digital storytelling in education within certain steps in order to produce more effective products. Cennamo, Ross, and Ertmer (2010) approached digital story creation in five steps: Writing a script, developing a storyboard, locating images, creating a digital story, and sharing it with others.

1.1. Digital storytelling and engagement

One of the aims of this research to investigate the effects of the digital storytelling method on engagement of pre-service teachers with teaching and learning activities. Fredricks, Blumenfeld, and Paris (2004) address three aspects of engagement; behavioral, cognitive, and emotional, while Revee and Tseng (2011) address it in four aspects; behavioral, cognitive, emotional and agentic engagement. Student engagement is a distinctive feature for student-centered universities and is experimentally

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linked to effective training practices for schools to reach the desired outcome (Kuh, 2006). It is also seen as an antidote to student alienation (Fredricks et al., 2004). Kuh (2006), who emphasizes that student engagement is an important factor for success, noted that student engagement represented two components. The first is the amount of time and effort shown through experiences and outcomes in order to build student success. The second is the institutional allocation and management of resources, learning opportunities, and services organized for students to participate in useful activities. Technology-based methods can be used to create learning opportunities and beneficial activities for students. One of the technologies that can be used at this point is digital storytelling, which provides students with the opportunity to use technology for production purposes during the teaching and learning process.

In many existing learning environments, the use of technology is based on the idea that it should support constructivist learning (Liu, 2013). Digital storytelling is seen as an activity based on learning by doing of constructivist learning that helps designers easily plan instructional activities (Yang & Wu, 2012). In this research, it is aimed to investigate how these activities affect the in-class engagement of pre-service teachers. In education systems, there is a need for methods in which students show active participation. This is because engagement is an important factor for success (Kuh, 2006).

Digital storytelling, one of the technologies used to create a classroom environment in which students are active participants (Göçen Kabaran & Aldan Karademir, 2017; Hur & Suh, 2012), enriches the learning experience (Sadik, 2008). Digital storytelling encourages students to participate in class (Condy, Chigona, Gachago, & Ivala, 2012) and makes learning more attractive (Suwardy, Pan, & Seow, 2012). When the literature on engagement during digital storytelling is examined, research shows that digital storytelling increases the engagement of students (Blithe, Carrera, & Medaille, 2015; Dogan, 2007; Ivala, Gachago, Condy, & Chigona, 2013; Niemi & Multisilta, 2015; Sadik, 2008).

1. 2. Digital storytelling and writing self-efficacy

Another topic to be investigated is the writing self-efficacy which is essential for pre-service teachers. Self-efficacy is defined as the self-judgement of individuals on their abilities to organize the necessary practices to show a certain performance and to do so successfully (Bandura, 1986). Educators need to feel self-sufficient to succeed. In addition to the professional self-efficacy of teachers and pre-service teachers, self-efficacy in the language they use is also important (Aydın, İnnalı, Batar, & Çakır, 2013). Although language self-efficacy is important for all educators, it is especially important for language educators.

Technology based methods are used to support language education. Beginning from primary school, it is expected that the use of technology in the development of reading, writing, speaking and listening skills will benefit the mother tongue education (Çocuk & Yanpar Yelken, 2018). The use of technology in teaching and developing basic language skills is becoming increasingly widespread (Başaran, Akar, & Ulu, 2015). Digital storytelling is one of the technologies used for this purpose. The digital storytelling method develops language skills (Yamaç & Ulusoy, 2016). One of the basic language skills is writing (Başaran et al., 2015). While having and being able to develop writing skills is a quality that all teachers should possess, language teachers in particular are responsible for having these qualities and developing these skills (Aydın et al., 2013).

As modern teaching programs are organized according to the constructivist approach, which specify the teachers as role models who are responsible for writing education are supposed to be well educated and should educate their students accordingly (Batar & Aydın, 2014). However, in a study with the senior class pre-service teachers from eight universities, Bağcı (2010) stated that the pre-service teachers, who would be language educators, did not possess the expected level of sufficiency in terms of writing.

Digital storytelling is used in both native and foreign language education and is beneficial in acquiring many skills. One of these skills, writing, is shown to be affected positively by digital storytelling in the

literature (Dogan, 2007; Dollar & Tolu, 2015; Duman & Göcen, 2015; Foley, 2013; Kulla-Abbott & Polman, 2008; Sarica & Usluel, 2016; Seifeddin, Ahmed & Ebrahim, 2015; Yamaç & Ulusoy, 2016).

1. 3. Purpose of the study and research questions

Nowadays, as the importance of technology integration increases, it has become essential to integrate current technologies into different fields of education in an appropriate and correct way. Additionally, it is important that technology integration in a certain field of study should be implemented according to specific teaching and learning activities of this field. It is thought that one of these current technologies, the digital storytelling method, will affect literacy education considering its importance in the language field.

The main aim of this study is to investigate the effects of digital story creation activities on students' engagement and writing self-efficacy levels of pre-service teachers in literacy education. The research questions that lead this study are;

1. Does creating a digital story activity affect student engagement in pre-service teachers studying in literacy education?
2. Does creating a digital story activity affect writing self-efficacy in pre-service teachers studying in literacy education?

2. Material and Method

2. 1. Research model

A pretest posttest quasi-experimental design with control group was implemented in the research. While the independent variable of the research was the applied teaching method, the dependent variables were engagement and writing self-efficacy. The model of the research is shown in Table 1.

Table 1. *Research model (Pretest posttest control group design)*

Groups	Pretest	Experimental Process	Posttest
G ₁	O ₁	X	O ₁
G ₂	O ₂		O ₂

G₁: Group that developed a digital story

G₂: Group that did not develop a digital story

O₁: Pretest O₂: Posttest

X: Digital story creation activities

2. 2. Study group

The convenient sampling method was used in the research. The study group constitutes sophomore pre-service teachers who enrolled in the Instructional Technologies and Material Design course, which was taught during the spring semester of 2015-2016 academic year the second semester in the Literacy Education Department of the school of education at a large state university in Turkey. The pre-service teachers in the experimental group created digital stories as instructional material while the pre-service teachers in the control group created materials based on pen and paper during the Instructional Technologies and Material Design course in a different session. The pre-service teachers' distribution according to gender is shown in Table 2 and their distribution according to general weighted grade average is shown in Table 4.

Table 2. *Distribution of pre-service teachers in the experimental and control group by gender*

Gender	Control Group		Experimental Group		Total	
	N	%	N	%	N	%
Female	19	59.4	22	68.8	41	64.1
Male	13	40.6	10	31.2	23	35.9
Total	32	100	32	100	64	100

When Table 2 is examined, it is seen that the percentage of female participants in the control group (59.4%) and the experimental group (68.8%) were close. Likewise, the percentage of male participants in the control group (40.6%) and the experimental group (32.2%) were close. The majority of the total participants were women (64.1%). A Chi-Square analysis was conducted to examine whether participants' groups differed according to gender.

Table 3. Results of the Chi-Square Analysis conducted to examine whether participants' groups were dependent on gender

Group	Gender				Total		X ²	df	p
	Female		Male		N	%			
	N	%	N	%					
Control	19	29.7	13	20.3	32	50	.61	1	.434
Experimental	22	34.4	10	15.6	32	50			
Total	41	64.1	23	35.9	64	100			

p<.05

When Table 3 was examined, it was concluded that the participant groups did not differ according to gender.

Table 4. Distribution of pre-service teachers in the control and experimental groups according to general weighted grade average

General weighted grade average	Control Group		Experimental Group		Total	
	N	%	N	%	N	%
1.1-2.5	12	37.5	19	59.4	31	48.4
2.6-4.0	20	62.5	13	40.6	33	51.6
Total	32	100	32	100	64	100

When Table 4 is examined, it is seen that the distribution of pre-service teachers' general weighted grade average.

A Chi-square analysis was conducted to examine whether the participant groups varied according to general weighted grade average.

Table 5. Results of the Chi-Square Test conducted to see if the experiment and control groups are dependent on general weighted grade average

Group	General weighted grade average						X ²	df	p
	1.0-2.5		2.6-4.00		Total				
	N	%	N	%	N	%			
Control	12	18.8	20	31.2	32	50	3.07	1	.08
Experimental	19	29.7	13	20.3	32	50			
Total	31	48.4	33	51.6	64	100			

p<.05

When Table 5 was examined, it was concluded that the participant groups did not differ according to general weighted grade average, as p> .05.

Table 6. Comparison of the experimental and control group's writing self-efficacy pretest scores

Group	N	M	SD	df	t	p
Control Group	32	3.53	0.53	62	-1.75	0.08
Experimental Group	32	3.75	0.48			

p<.05

An independent sample t-test was conducted to examine whether the pre-service teachers in the experimental and control groups differed between the pretest scores in terms of writing self-efficacy. As shown in Table 6, it was seen that there was no significant difference ($p > .05$).

2.3. Data collection tools

2.3.1. Four aspects of student engagement questionnaire. Based on the studies found in literature, Fredricks et al. (2004) address engagement as three aspects; behavioral, cognitive, and emotional, while Reeve and Tseng (2011) address it in four factors; behavioral, cognitive, emotional and agentic engagement. This research uses the "Four Aspects of Student Engagement Questionnaire" developed by Reeve and Tseng (2011) and adapted by Eren (2013). Reeve and Tseng (2011) utilized different studies in literature while they developed the scale. They made use of the observational notes in studies by Jang, Reeve, and Deci (2010) and Reeve, Jang, Carrell, Jeon, and Barch (2004) for the agentic engagement factor. Similarly, they made use of the task involvement questionnaire developed by Miserandino (1996), based on Wellborn's (1991) conceptualization of behavioral engagement for the behavioral engagement factor. For the emotional engagement factor, they used items from Wellborn's (1991) conceptualization of the emotional engagement of students. Finally, they used the questionnaire of learning strategies by Wolters (2004), which was derived from Pintrich, Smith, Garcia, and McKeachie's (1993) motivated strategies for learning questionnaire for the cognitive engagement factor.

Reeve and Tseng (2011) conducted exploratory and confirmatory factor analyses by collecting data from 365 undergraduate students in order to determine factor structures for the four aspects of student engagement questionnaire in their research. The scale consists of 22 items and 4 factors. The factors are: Agentic engagement, behavioral engagement, emotional engagement and cognitive engagement. Agentic engagement is 5 items, behavioral engagement is 5 items, emotional engagement is 4 items, and cognitive engagement is 8. It is a scale in the form of "strongly disagree = 1" "strongly agree = 7". Reliability was found as $\alpha = .82$ for agentic engagement, $\alpha = .94$ for behavioral engagement, $\alpha = .78$ for emotional engagement, and $\alpha = .88$ for cognitive engagement.

Eren (2013) conducted a confirmatory factor analysis by collecting data from 521 pre-service teachers while adapting the scale. Reliability was found as $\alpha = .94$ for agentic engagement, $\alpha = .93$ for behavioral engagement, $\alpha = .89$ for emotional engagement and $\alpha = .93$ for cognitive engagement.

Table 7. Reliability findings of the Four Aspects of Student Engagement Questionnaire

Four Aspects of Student Engagement Questionnaire	Group	Number of Items	Reliability Coefficient (α)
Agentic engagement	Control	5	0.862
	Experimental	5	0.821
Behavioral engagement	Control	5	0.875
	Experimental	5	0.878
Emotional engagement	Control	4	0.770
	Experimental	4	0.693
Cognitive engagement	Control	8	0.848
	Experimental	8	0.896
General engagement	Control	22	0.892
	Experimental	22	0.901

In the current study, the reliability scores are shown in Table 7. A reliability coefficient of .70 and higher for test scores is generally seen as sufficient (Fraenkel & Wallen, 2008, p. 157). In Table 7, it is seen that the scale is reliable ($\alpha > .70$).

2.3.2. Writing self-efficacy scale. This study uses the "Writing Self-Efficacy Scale" developed by Aydın et al. (2013). They collected data from 601 pre-service teachers during the development phase and used exploratory factor analysis techniques for component analysis. Item-total correlation was used to test reliability, t-test to calculate the differences between the up and down 27% of groups,

Spearman Brown two half-test correlations and Cronbach's alpha internal consistency coefficient calculations were used. It is a 54-item, 3-factor scale and consists of the writing process (33 items), writing preparation (12 items) and writing evaluation (9 items) factors. The reliability coefficients for the factors are; writing process $\alpha = .96$, writing preparation $\alpha = .88$, writing evaluation $\alpha = .89$ and for the general of the scale $\alpha = .96$. For this research, the reliability results are shown in Table 8. It is seen that the scale is reliable ($\alpha > .70$).

Table 8. Reliability findings of the Writing Self-efficacy Scale

Writing Self-efficacy Scale	Group	Number of Items	Reliability Coefficient (α)
Writing Process	Control	33	0.949
	Experimental	33	0.945
Writing Preparation	Control	12	0.870
	Experimental	12	0.804
Writing Evaluation	Control	9	0.919
	Experimental	9	0.914
General Writing Self-Efficacy	Control	54	0.964
	Experimental	54	0.962

2. 4. Data Analysis

In the analysis of the research data, descriptive statistics were used for the analysis of descriptive findings, Cronbach alpha (α) for calculating the reliability of the scales, Kolmogorov-Smirnov and Shapiro-Wilk for analyzing data distribution, independent sample t-test to see if there is any significant difference in writing self-efficacy between groups. An independent sample t-test was used to answer the first research question, and a two-way ANOVA was used to answer the second research.

Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted in order to examine whether the data shows normal distribution (Greasley, 2008, p. 91). The distribution parameters of the research data is shown in Table 9. If the p value in Kolmogorov-Smirnov and Shapiro-Wilk tests are larger than 0.05, it can be said that the data shows normal distribution (Greasley, 2008, p. 92). When the scales in Table 9 were examined, it was found that the data showed normal distribution as $p > .05$ in tests for both groups.

Table 9. Distribution parameters of research data

Test	Group	Kolmogorov-Smirnov		Shapiro-Wilk	
		N	p	N	p
Writing Self-Efficacy Scale pretest	Control	32	.20	32	.69
	Experimental	32	.20	32	.14
Writing Self-Efficacy Scale posttest	Control	32	.20	32	.74
	Experimental	32	.20	32	.10
Four Aspects of Student Engagement Questionnaire posttest	Control	32	.20	32	.71
	Experimental	32	.11	32	.15

2. 5. Implementation

During the spring semester of the 2015-2016 academic year, a pilot study was conducted with 16 junior pre-service teachers in the Literacy Education Department of the Education Faculty at the university. GoAnimate (its current name is Vyond) web 2.0 tool was used. Considering the learning objectives of the literacy curriculum for elementary school students, the pre-service teachers created a digital story. The digital story was implemented in the five stages specified by Cennamo et al. (2010). After the pilot study, the necessary improvements were made to the study's implementation plan.

The main study took place in Instructional Technologies and Material Design course (8 weeks) in the spring semester of 2015-2016 education year. The necessary permission for implementation was obtained from the school of education's authority. During the implementation, the students in the

experimental group created digital stories, while the pre-service teachers in the control group created materials based on pen and paper. For the experimental group, the researcher gave the pre-service teachers training on creating the digital stories and digital storytelling. The GoAnimate for school tool was used to create digital stories. In order to provide the pre-service teachers with the experience of developing material for students, they were required to create a digital story while taking into account the learning objectives of the curriculum for the classes they would teach. In the beginning, general knowledge was given by the instructor on learning objectives of the curriculum. Opinions were received throughout the process from literacy education instructors.

The digital storytelling was implemented in the five stages specified by Cennamo et al. (2010). A weekly lesson plan was created by the researchers and this plan was used in the process. The Writing Self-Efficacy Scale for the pre-service teachers in the experimental and control group was implemented as pretest and posttest, while the Four Aspects of Student Engagement Questionnaire was implemented as a posttest at the end of the study.

3. Results

The independent sample t-test for the solution of this research problem is shown in Table 10. When Table 10 is examined, it is seen that there is a significant difference in favor of the experimental group in terms of the engagement scores of the pre-service teachers ($p < .05$). Therefore, the result is that the engagement of the pre-service teachers in the experimental group is higher. Additionally, the Cohen's d gives an idea about how important the significant differences between groups. According to the results in Table 10, the sizes of the differences between groups for the measures vary between medium to large.

Table 10. *T-test results according to the group scores of the Four Aspects of Student Engagement Questionnaire*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>Cohen's d</i>
Agentic engagement	Control	32	4.41	0.82	62	-2.37	0.02*	0.59
	Experimental	32	4.88	0.76				
Behavioral engagement	Control	32	4.91	0.80	62	-2.77	0.01*	0.69
	Experimental	32	5.44	0.73				
Emotional engagement	Control	32	5.13	0.74	62	-2.64	0.01*	0.65
	Experimental	32	5.57	0.61				
Cognitive engagement	Control	32	4.98	0.63	62	-2.54	0.01*	0.65
	Experimental	32	5.42	0.73				
General Engagement	Control	32	4.86	0.53	62	-3.51	0.00*	0.89
	Experimental	32	5.33	0.53				

The data of writing self-efficacy were analyzed by repeated measurements two-way ANOVA test. When Table 11 is examined, mean scores of the Writing Self-Efficacy Scale for pre-service teachers can be seen as pretest and posttests.

Table 11. *Average and standard deviation values of the Writing Self-Efficacy Scale*

Writing Self-Efficacy Scale	Group	Pretest			Posttest		
		<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Writing Process	Control	32	3.53	0.52	32	3.57	0.64
	Experimental	32	3.73	0.49	32	4.00	0.53
Writing Preparation	Control	32	3.37	0.60	32	3.47	0.64
	Experimental	32	3.62	0.47	32	3.99	0.55
Writing Evaluation	Control	32	3.74	0.86	32	3.90	0.81
	Experimental	32	4.00	0.70	32	4.17	0.58
Writing Self-Efficacy General	Control	32	3.53	0.53	32	3.61	0.63
	Experimental	32	3.75	0.48	32	4.02	0.50

When Table 12 is examined, it can be seen there was a significant difference in favor of the experimental group, including Writing Self-Efficacy Scale scores $F(1,62)=4.578$, $p=.037$; the "writing

process” factor $F(1,62)=4.642$, $p=.035$; and “writing preparation” factor $F(1,62)=6.736$, $p=.012$ ($p<.05$). However, there was no significant difference in the “writing evaluation” factor $F(1,62)=.006$, $p=.936$ ($p>.05$). There are differences within the group and between the group in terms of writing self-efficacy ($p<.05$). This difference is in favor of the experimental group. In general, the method was found to increase writing self-efficacy in pre-service teachers. According to the results in Table 12, the sizes of the differences between groups for the measures vary between medium to large ($\eta^2_{\text{partial}}=0.07$).

Table 12. ANOVA Results of the Writing Self-Efficacy Scale for pretest-posttest scores

Variable	Source	SS	df	MS	F	p	Partial Eta Squared (η^2)
Writing Process	Group	3.097	1	3.097	6.019*	.017	.09
	Error	31.898	62	.514			
	Scores	.758	1	.758	8.878*	.004	.13
	Group* Score	.396	1	.396	4.642*	.035*	.07
	Error	5.292	62	.085			
	Total	41.441	127				
Writing Preparation	Group	4.753	1	4.753	8.473*	.005	.12
	Error	34.785	62	.561			
	Scores	1.797	1	1.797	22.312*	.000	.27
	Group* Score	.543	1	.543	6.736*	.012*	.10
	Error	4.994	62	.081			
	Total	46.872	127				
Writing Evaluation	Group	2.287	1	2.287	2.620	.111	.04
	Error	54.139	62	.873			
	Scores	.926	1	.926	3.884	.053	.06
	Group* Score	.002	1	.002	.006	.936	.00
	Error	14.788	62	.239			
	Total	72.142	127				
General Writing Self-Efficacy	Group	3.283	1	3.283	6.439*	.014	.09
	Error	31.614	62	.510			
	Scores	.981	1	.981	14.485*	.000	.19
	Group* Score	.308	1	.308	4.548*	.037*	.07
	Error	4.198	62	.068			
	Total	40.384	127				

4. Conclusion and Discussion

One of the results of the research is that after the experimental process, the engagement of the group in which the digital storytelling method was applied is higher than the control group. Digital storytelling provides an opportunity for students to write, present, review, and produce materials using technology, which enables their active participation to their courses. During this digital storytelling material production process, students are involved in activities such as writing stories, using technology to transfer them to digital media, and sharing the digital stories with their classmates. They are also in contact with their classmates and the instructor to solve the problems they experience during these activities. For this reason, activities such as these are thought to influence student engagement in this study. Condy et al. (2012) stated that this method encourages students to engagement in class. Similarly, Yamaç and Ulusoy (2016) stated that this method increased students’ interaction within the classroom. In another study, Özpınar (2017) concluded that this method enabled the pre-service teachers to active engagement in the process.

Blithe et al. (2015) conducted a digital story project on university students in collaboration with campuses and community partners in University of Nevada. A librarian and media expert taught

students how to create and use images, the ethical use of materials, and video editing. Students created digital stories that could be shared with community partners. They came to the conclusion that digital storytelling is a good tool in improving student engagement in the learning process and developing visual and media literacy. In a research conducted at K-12 level with teachers who created digital stories with students in the class, Dogan (2007) found that the creation of digital stories increased students' engagement levels. In addition to these researches, there are researches that have found that digital storytelling increases engagement in K-12 students (Niemi & Multisilta, 2015; Sadik, 2008; Yildiz Durak, 2018) and university students (Ivala et al., 2013).

The second result of the study is that after the experimental process the writing self-efficacy in the group which the digital storytelling method is applied was higher than the other group. In general, it was found that the digital storytelling increases the writing self-efficacy of pre-service teachers. This is an important result for pre-service teachers that digital storytelling activities increase the writing self-efficacy. Writing self-efficacy is an important proficiency for all pre-service teachers, but is a particular pre-requisite for language teachers. Pre-service teachers must have high self-efficacy in order to teach their students this skill. It can be said that the use of the digital storytelling in language education will be beneficial because it increases writing self-efficacy. In their research, Hur and Suh (2012) reached the conclusion that digital storytelling supports language education.

In another line of research, Xu, Park, and Baek (2011) conducted a study with university students comparing digital story creation activities in a virtual environment with off-line software. They arrived at the conclusion that writing self-efficacy is more effective in a virtual environment. In another research, Liu, Wu, Chen, Tsai, and Lin (2014) examined the influence of grammar rules in digital storytelling on the creative self-efficacy. They reached the conclusion that the rule-based group created better products in terms of content but restricted their creative self-efficacy.

Writing process and active engagement are interrelated concepts. In the writing process, students use their own thinking, decision making and organizing processes effectively. In a study, Schmoelz (2018) revealed that a nested action engagement and control emerged in the digital story writing phase. While this method is being applied, students will improve their writing skills and be encouraged to think about how the story will create (Morgan, 2014). Instructors should develop effective instructional strategies and resources facilitating students' engagements in this process (Nam, 2017). When considered from this point of view, pre-service teachers will be able to use this method in their professional lives to engage in interactive and active teaching. Written texts and stories have a particularly important place in the native language education. For this reason, it will be professionally beneficial for pre-service teachers who will be native language educators to know this method. The use of digital storytelling in teacher training programs is thought to be beneficial.

5. Limitations and Future Research

In this study, the effects of digital storytelling on literacy education were investigated. In addition, only one university were studied. The use of digital storytelling in different fields can be studied in depth. Research can be done on what kind of contributions will be made to which field and the obstacles that will be encountered.

In this study, the effect of digital storytelling on writing self-efficacy and engagement was investigated. Future research can be conducted to examine the relationship between participation and writing self-efficacy.

Many different types of software are used when creating a digital story. However, students are more interested in the environment in which they can use characters and mobilize them. Unfortunately, the number of software that allows this is limited, and there is often no support for the desired language. For this reason, software can be developed which prepares digital stories using characters and moving items. In addition, it will benefit from being able to use multiple language support in terms of being able to use more regions.

Once the digital story creation software is decided on, the technological infrastructure in the environment where this activity will take place should be examined and if any problems exist, they

should be solved. When these problems are not solved, they lead to timing difficulties. Digital storytelling is an activity that requires time and good planning. In cases where the time is insufficient, the activity can be done in the form of group work.

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