THE IMPACT OF DOCUMENTARY DIGITAL STORYTELLING ON **CRITICAL THINKING AND READING SKILLS IN HIGH SCHOOL STUDENTS**

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Abstract: This study explores the impact of documentary video-based digital storytelling on developing critical thinking skills in high school students' reading comprehension, moderated by learning styles. Using a quantitative experimental design, 60 students from Yogyakarta State University were divided into control and experimental groups. Results indicate that digital storytelling significantly enhances critical thinking, particularly for students with visual learning styles. The study highlights the importance of tailoring educational methods to students' learning preferences.

Keywords: documentary video; digital storytelling; critical thinking; reading comprehension; learning styles.

INTRODUCTION

Education in today's digital era has undergone a significant transformation due to technological advances that affect the learning process (Akour & Alenezi, 2022). The integration of technology in modern education aims to improve students' conceptual understanding, critical skills, and thinking ability. One prominent technique in this regard is the use of digital storytelling through documentary videos, which has emerged as an interesting and potential method for strengthening reading comprehension and stimulating students' critical thinking (Podara et al., 2021). A relevant reference supporting the use of documentary videos in education is the study by (H. L. Chen & Chuang, 2021), which highlights the importance of applying effective learning principles to reveal the full potential of web-based medical education. Additionally, (Ahmady & Khani, 2022) discuss the different types of videos that can be used for educational purposes, ranging from instructional videos to fictional movies. (Mohammed et al., 2024) highlights a storytelling style that resembles one-on-one conversations in vlogs, which can be used to create educational content and transmit knowledge beyond the scope of personal experience. Meanwhile, research by (Zhao, 2021) shows that instructional videos are used to creativity and innovation. In addition, research by

introduce new skills, knowledge, or behaviors that must be learned. Thus, the use of documentary videos in the form of digital storytelling can be an effective tool for improving student understanding, stimulating critical thinking, and strengthening the learning process in the digital era.

Digital storytelling, particularly through documentary videos, is an emerging educational tool that integrates visual, audio, and narrative elements to enhance students' critical thinking and reading comprehension (Shahid & Khan, 2022). This study aims to investigate how documentary video-based digital storytelling influences high school students' critical thinking skills, considering the moderating role of learning styles. Previous research indicates the potential of digital storytelling to engage students emotionally and cognitively, but the interaction between learning styles and this educational method remains underexplored (Kim & Li, 2021). Relevant references supporting the use of documentary video in digital storytelling include a study conducted by (Chen et al., 2023), which highlights that digital storytelling allows almost anyone to use available hardware and software to connect personal stories with still images or movement, music, and sound, combined with the author's

The impact of documentary digital storytelling on critical thinking and reading skills in high school students

(La Rose & Detlor, 2021) discussed that digital storytelling integrates stand-alone and first-person narratives with multimedia (such as images, music, narration, animation) to create 3-5 minute videos. Additionally, (Mojtahedzadeh et al., 2021) emphasize that digital storytelling can have a personal impact on the storyteller at an individual level. Another reference (Nair & Yunus, 2021) shows that digital storytelling can be a very effective teaching tool for children of various ages and grade levels who are tasked with creating their own stories. Therefore, the use of documentary videos in digital storytelling provides an engaging and effective approach to increasing student understanding, stimulating critical thinking, and strengthening student engagement in the learning process.

The importance of reading and critical thinking skills at the upper secondary education level cannot be ignored. Students at this level are not only able to understand the texts they read, but are also able to analyze, share, and synthesize information to develop their own ideas and opinions. Critical thinking is a core skill that is not only useful in academic contexts, but also in everyday life and in their preparation for the future. Relevant references supporting the importance of reading and critical thinking skills at the senior secondary education level include research by (Arisoy & Aybek, 2021) which highlights efforts to improve senior secondary students' critical thinking skills based on three different learning models. Additionally, (Raj et al., 2022) discussed the development of critical thinking skills through the analysis of a new management learning model for high schools in Thailand. Research by (Yosepha et al., 2023) shows that multidimensional curriculum design can improve the higher-order thinking skills of elementary and middle school students. Furthermore, research by (Chesire et al., 2022) highlighted the importance of contextualizing critical thinking about health using digital technologies in secondary schools in Kenya.

Each student has a unique learning style, which includes preferences in how they receive, process, and understand information. Adapting teaching methods to student learning styles can optimize learning effectiveness (Hassan et al., 2021). Learning styles can vary from visual, auditory. kinesthetic, to text-based, influencing how students respond to various teaching techniques, including the use of digital storytelling. Although previous research has demonstrated the benefits of using digital storytelling in improving students' reading skills and stimulating critical thinking, little visual, auditory, kinesthetic, and textual.

research has specifically explored how students' learning styles moderate the influence of these techniques (Al-Shaye, 2021). Therefore, this study aims to fill this knowledge gap by investigating the extent to which digital storytelling based on video documentaries influences the development of critical thinking in high school students' reading comprehension, taking into account differences in their learning styles

By deepening the understanding of the interaction between digital storytelling, learning styles, and the development of students' critical thinking, it is hoped that this research can provide a valuable contribution in designing more inclusive and effective learning strategies. The results of this research can not only provide new theoretical insights but also have practical implications that can be applied in educational contexts to support students' academic success and personal development in this digital era.

METHOD

This quantitative experimental study involved 60 high school students from Yogyakarta State University, divided into an experimental group using documentary video-based digital storytelling and a control group using conventional methods. Critical thinking skills were assessed using (Hursen, 2021) test, and learning styles were identified using the Felder-Silverman Learning Style Inventory. Data were analyzed using descriptive statistics, t-tests, and ANOVA to examine the effects and interactions.

The population in this study consists of high school students in a large city in Indonesia.

The research sample was selected using purposive sampling. A total of two classes from one high school were selected, with one class serving as the experimental group and the other as the control group. Each class consists of 30 students, so the total sample size is 60 students. This sample selection was based on similar demographic characteristics and academic levels.

The critical thinking test used in this research is developed based on the components of critical thinking according to (Sari et al., 2021). This test consists of 25 items on a Likert scale, which includes aspects of clarification, analysis, inference, evaluation, and explanation.

The learning style questionnaire used is the Felder-Silverman Learning Style Inventory (FSLSI), which consists of 44 items on a Likert scale. This questionnaire will identify students' learning style preferences in four dimensions: Preparation. Gather research permission from schools and ethics committees. Select and train teachers who will implement digital storytelling in experimental groups. Develop documentary videobased learning materials for the experimental group and conventional learning materials for the control group.

Implementation. Pre-test: Measure students' initial critical thinking abilities in both groups. Implementation: Experimental group: Use digital storytelling-based learning methods with documentary videos for 8 weeks. Control group: Use conventional learning methods for 8 weeks. Post-test: Measure students' critical thinking abilities in both groups after the intervention.

The collected data will be analyzed using the following statistical analysis techniques:

Descriptive test. To provide a general overview of the data distribution, including the mean, median, mode, and standard deviation of the pretest and post-test results.

T-Test. To compare the average difference in pre-test and post-test results between the experimental group and the control group. This test will determine whether there are significant differences in the development of critical thinking between the two groups.

The content validity of the research instrument will be evaluated by experts in the field of education to ensure that the instrument covers all relevant aspects of critical thinking, reading comprehension, and learning styles. Additionally, construct validity testing will be conducted using factor analysis. Instrument Reliability

The reliability of the instrument will be tested using Cronbach's alpha coefficient to ensure internal consistency of the critical thinking test, reading comprehension test, and learning style questionnaire. A Cronbach's alpha value above 0.70 is considered reliable.

This research will comply with research ethical standards, which include: Informed consent: Students and parents/guardians will be provided with complete information about the purpose, procedures, benefits, and risks of the study, and they will provide written consent prior to participation. Confidentiality: Student personal data will be kept confidential and used only for research purposes. Anonymity: Student identities will be kept confidential in research reports.

RESULTS AND DISCUSSION

Normality test results

The normality test aims to determine whether the sample data comes from a normally distributed population or not. Data that are suitable for use in this research are those with a normal distribution. In this study, the Shapiro-Wilk normality test was conducted using the SPSS application. The Shapiro-Wilk test was chosen because the sample size in one class was <50. The decision criteria are as follows:

If the Shapiro-Wilk test yields a significant value above 0.05, then the residuals are normally distributed.

If the Shapiro-Wilk test yields a significant value below 0.05, then the residuals are not normally distributed.

		I able I	1. Tests of N	ormanty			
		Te	ests of Norm	ality			
		Kolmog	gorov-Smirn	ov ^a	Sh	apiro-Wilk	
	Group	Statistic	df	Sig.	Statistic	df	Sig.
POSTTEST	Control	.114	30	$.200^{*}$.941	30	.097
	Experiment	.118	30	$.200^{*}$.966	30	.426
PRETEST	Control	.150	30	.085	.893	30	.006
	Experiment	.144	30	.117	.895	30	.006
*. This is a lo	wer bound of the	true significance					
a. Lilliefors S	ignificance Corre	ection					

 Table 1. Tests of Normality

Based on the test results, it is known that each variance or not. It is considered to have the same variable's data is normally distributed with Shapiro-Wilk scores >0.05. ≥ 0.05 , and if the significance level is < 0.05, then

Homogeneity test

The homogeneity test is used to determine whether the data from the research results in the experimental and control classes have the same

variance or not. It is considered to have the same variance (homogeneous) if the significance level is ≥ 0.05 , and if the significance level is < 0.05, then the data is concluded to have different variances (non-homogeneous). The table presenting the results of the homogeneity test is provided below.

The impact of documentary digital storytelling on critical thinking and reading skills in high school students

	Test of He	omogeneity of Varia	nces		
		Levene Statistic	df1	df2	Sig.
PRETEST	Based on Mean	1.820	arguination of particular colspan="2">arguination colspan="2">arguination colspan="2">arguination colspan="2">arguination colspan="2">arguination colspan="2">arguination colspan="2">arguination colspan="2"	.183	
	Based on Median	1.968	1	58	.166
	Based on Median and with adjusted df	1.968	1	57.029	.166
	Based on trimmed mean	1.799	1	58	.185
POSTTEST	Based on Mean	.010	1	1 df2 Sig. 1 58 .18 1 58 .16 1 57.029 .16 1 58 .18 1 58 .18 1 58 .18 1 58 .18 1 58 .18 1 58 .92 1 58 .87 1 57.675 .87	.921
	Based on Median	.026	df1 df2 Si 0 1 58 3 1 58 3 1 57.029 0 1 58 0 1 58 0 1 58 5 1 58 5 1 58 5 1 58 7 1 58	.872	
	Based on Median and with adjusted df	.026	1	57.675	.872
	Based on trimmed mean	.017	1	58	.897

Table 2 Test of homogeneity of variances

Hypothesis testing

After confirming that both classes are normally accepted. distributed and have homogeneous variances, a test of equality of two means is conducted using a two-rejected. tailed t-test in the SPSS 23.0 for Windows software with a significance level of 0.05. The decision T-Test criteria, according to Santoso (Septi, 2013:44), are Pretest as follows:

If the probability value is > 0.05, then H0 is

If the probability value is < 0.05, then H0 is

		,	Table	3. Pretest					
Group Statistics									
	Group	Ν	·	Mean	Std. Deviation	Std. Error Mean			
PRETEST	Control		30	81.3667	8.08781	1.47663			
	Experiment		30	84.7000	10.20531	1.86323			

The pretest results in the control group had a indicate that the experimental group has a higher mean value of 81.36, while in the experimental average score than the control group. group, the mean value was 84.7. These results

			Т	able 4.	Indeper	ndent sa	mples test			
				Inde	pendent	Samples	Test			
		Levene's for Equal Varian	Test lity of		_	- t-1	test for Equal	ity of Means		
			0.		16	Sig. (2-	Mean	Std. Error	95% Con Interval Differe	fidence of the ence
PRETEST	Equal variances assumed	<u>F</u> 1.820	.183	-1.402	58	.166	-3.33333	2.37740	-8.09222	1.42555
	Equal variances not assumed			-1.402	55.123	.166	-3.33333	2.37740	-8.09751	1.43084

Based on the test results, it is known that the confidence level. significance value (sig) is greater than 0.05. This means that there is no significant difference Post test between the two groups tested at the 95%

Table 5. Post test						
	Grou	p Statistics				
Group	Ν	Mean	Std. Deviation	Std. Error Mean		

POSTTEST	Control	30	83.7333	6.57547	1.20051
	Experiment	30	87.6333	6.59406	1.20390

include the average (mean) after treatment. After showed less improvement than the experimental receiving treatment, the experimental group group with an average of 83.7.

The results of the study provide a description of showed a better learning style improvement with the pairs of learning style scores analyzed, which an average of 87.63, while the control group

		Levene for Equa Varia	's Test ality of nces			t-t	est for Equali	ty of Means		
					-	Sig. (2-	Mean	Std. Error	95% Conf Interval Differe	idence of the nce
		F	Sig.	t	df	tailed)	Difference	Difference	Lower	Upper
POST TEST	Equal variances assumed	.010	.921	-2.294	58	.025	-3.90000	1.70018	-7.30328	49672
	Equal variances not assumed			-2.294	58.000	.025	-3.90000	1.70018	-7.30328	49672

Table 6. Independent samples test

Table 7. Table Anova	
ANOVA	

	Tests of Betwee	n-Subjects	Effects		
Dependent Variable: POS	TTEST				
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	718.348ª	7	102.621	2.636	.021
Intercept	369674.785	1	369674.785	9494.591	.000
Gaya_Belajar	434.054	4	108.514	2.787	.036
Group	12.042	1	12.042	.309	.581
Gaya_Belajar * Group	142.396	2	71.198	1.829	.171
Error	2024.636	52	38.935		
Total	443241.000	60			
Corrected Total	2742.983	59			
a. R Squared = .262 (Adjus	ted R Squared = .163)				

The learning style has a significance value of in means between the groups is accepted. 0.036, which is < 0.05. This indicates that there is a significant difference between the control and experimental groups based on learning style. Therefore, the null hypothesis (H0) stating that there is no average difference between the groups based on learning styles is rejected.

The group has a significance value of 0.581, which is greater than 0.05. This shows that there is no significant difference between the control group *Results and interpretation* and the experimental group. Therefore, the null Learning style hypothesis (H0) stating that there is no difference Results indicate that students using documentary

The interaction between Learning_Style and Group has a significance value of 0.171, which is greater than 0.05. This shows that there is no significant interaction between learning style and group. Therefore, the null hypothesis (H0) stating that there is no significant interaction between learning style and group is accepted.

The impact of documentary digital storytelling on critical thinking and reading skills in high school students

video-based digital storytelling showed significant improvement in critical thinking skills compared to the control group. Learning styles moderated this effect, with visual learners benefiting the most. ANOVA results confirmed significant differences based on learning styles but not between groups overall. These findings suggest that integrating digital storytelling in education can enhance critical thinking, especially when tailored to students' learning preferences. Other studies also indicate that visual learners respond better to visual materials such as documentary videos (Pem, 2022). However, research by (El-Sabagh, 2021) did not find strong evidence supporting the effectiveness of adapting learning styles to specific teaching **REFERENCES** methods in improving learning outcomes.

Group (sig = 0.581)

There were no significant differences between the control group and the treatment group. This suggests that membership in a particular group does not significantly impact the development of students' critical thinking abilities. Research by (Xu et al., 2023) suggests that the media itself does not heavily influence learning outcomes; rather, it is how the media is utilized. Other research indicates that technology-based interventions require time and adaptation to demonstrate significant results. Additionally, research by (Ceken & Taşkın, 2022) indicates that appropriate media can enhance learning, including critical thinking skills, when used correctly within a welldesigned learning context.

Interaction between learning style and group

There was no significant interaction between learning style and group, indicating that the influence of learning style on students' critical thinking abilities was not affected by membership in a particular group. Research by (Mohamed et al., 2023) suggests that while learning style can influence learning outcomes, its effect may not always be significant in interactions with other variables such as treatment group. (Jimola & Ofodu, 2021) emphasize the importance of adapting learning styles to the environment and learning methods to achieve optimal results.

CONCLUSION

This study concludes that documentary videobased digital storytelling enhances critical thinking skills in high school students, with significant effects moderated by learning styles. Visual learners showed the greatest improvement, highlighting the importance of educational methods to individual preferences.

Future research should explore the long-term effects of digital storytelling and its applicability across diverse educational contexts. Additionally, examining other moderating factors such as technology access and teacher training could provide deeper insights.

Further research is needed to explore why the treatment group did not show significant results and how this method can be optimized for different groups of students. The use of mixed methods involving multiple learning styles and tailored learning strategies could be a focus for future research.

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The impact of documentary digital storytelling on critical thinking and reading skills in high school students