

The Effect of Thematic Curriculum and Multimedia Use on Learning Interest and Critical Thinking Skills of High School Students in Central Java

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ABSTRACT

This study examines the effect of thematic curriculum and multimedia use on the learning interest and critical thinking skills of high school students in Central Java. A quantitative analysis was conducted using a sample of 160 students, with data collected through a Likert scale questionnaire. The data was analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3). The results indicate that all hypothesized relationships are positive and significant. Specifically, multimedia use positively impacts both critical thinking skills and learning interest, while the thematic curriculum also positively influences critical thinking skills and learning interest. These findings suggest that integrating a thematic curriculum and multimedia tools can effectively enhance students' engagement and critical thinking abilities. The implications for educational practices and future research are discussed.

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1. INTRODUCTION

Education stands as a cornerstone for individual and societal progress, with a growing emphasis on improving its quality through innovative approaches. The evolution of education into a global movement underscores its pivotal role in fostering prosperity and well-being [1]. Rapid population growth poses challenges to achieving inclusive and equitable education, necessitating increased funding and gender parity efforts, especially in low-income

countries [2]. Historical transitions in educational systems highlight the transformative power of education in society [3]. Recent advancements, spurred by technological progress, have revolutionized teaching methods, leading to the rise of virtual learning environments and e-learning platforms, particularly accentuated during the COVID-19 pandemic [4]. These changes reflect a shift towards smarter and technovative education, integrating multimedia tools and thematic curricula to enhance learning outcomes and engage

students effectively in a modern, interconnected world.

Thematic learning, as described in the provided research papers [5]–[9], integrates various subjects under overarching themes, fostering a comprehensive understanding and enabling students to establish connections across different fields of knowledge. This approach emphasizes practical, student-centered learning experiences that are hands-on, flexible, and conceptually rich. However, challenges in implementing thematic learning include limited teacher knowledge and inadequate school infrastructure [6]. To enhance this educational model, incorporating multimedia tools like videos, animations, and interactive content can offer dynamic and engaging learning experiences that boost student comprehension and information retention [9]. By combining thematic curriculum with multimedia resources, educators can create a stimulating learning environment that supports holistic understanding and encourages students to explore interdisciplinary connections effectively.

Despite the potential benefits of these educational innovations, there is limited empirical evidence on their effectiveness in improving critical thinking skills and learning interest among high school students. In Central Java, traditional teaching methods still dominate, and there is a pressing need to explore the impact of modern pedagogical approaches. Understanding the effects of a thematic curriculum and multimedia use on students' learning outcomes can provide valuable insights for educators and policymakers aiming to enhance educational practices.

The primary objective of this study is to investigate the effect of a thematic curriculum and multimedia use on the learning interest and critical thinking skills of high school students in Central Java. Specifically, this study aims to examine the impact of multimedia use on students' critical thinking skills, assess the influence of multimedia use on students' learning interest, evaluate the effect of the thematic curriculum

on students' critical thinking skills, and determine the impact of the thematic curriculum on students' learning interest.

2. LITERATURE REVIEW

2.1 *Thematic Curriculum and Its Impact on Learning*

Thematic curriculum, as highlighted in the provided research papers [5], [8], [10]–[12], is an instructional approach that integrates various subjects around central themes, fostering a comprehensive understanding of interconnected concepts. This approach promotes critical thinking and problem-solving skills by encouraging students to see connections between different areas of knowledge [12]. By providing context and relevance to the material being studied, thematic curriculum enhances students' cognitive development [8]. Additionally, thematic learning has been shown to increase student motivation and engagement by making learning more meaningful and relatable [10]. The implementation of thematic learning has been found to be student-centered, hands-on, and flexible, contributing to a more practical and effective learning experience [5].

2.2 *Multimedia Use in Education*

Multimedia tools, including videos, animations, and interactive content, have indeed gained popularity in educational settings for their ability to create engaging learning experiences that cater to various learning styles [13], [14]. By presenting information in multiple formats, multimedia learning can enhance students' understanding and retention of

content, ultimately improving educational outcomes [14]. Moreover, the interactive and exploratory nature of multimedia tools can boost critical thinking skills by providing opportunities for students to engage actively with the material [14]. Additionally, the visually appealing and interactive nature of multimedia content can increase student motivation and interest in learning, making the educational experience more dynamic and stimulating [14]. Overall, the integration of multimedia tools in education has the potential to transform traditional teaching methods and enhance student engagement and learning outcomes significantly.

2.3 Learning Interest

Learning interest plays a crucial role in students' academic success by influencing their motivation, engagement, and achievement levels. Research by Supriyadi Supriyadi [15] and Fuji Tri Astuti [16] both demonstrate a positive correlation between learning interest and learning outcomes, with findings indicating that interest in learning significantly impacts students' academic performance. Additionally, Fajar Nugraha and Hatma Heris Mahendra [17] highlight various factors affecting students' interest in learning, such as physical and psychological aspects, family support, teaching quality, and the learning environment. Moreover, Komang Surya Adnyana and Gusti Ngurah Arya Yudaparmita [18] emphasize indicators of learning interest, including attention during learning, liking for

subjects, enthusiasm, and active participation. These studies collectively underscore the importance of nurturing and sustaining students' interest in learning to enhance their educational outcomes.

2.4 Critical Thinking Skills

Critical thinking is a fundamental skill that involves reasoning, analyzing, and applying logic to reach informed conclusions [19]. Educational institutions, such as Ottoman schools, historically aimed to enhance critical thinking through courses like philosophy and logic [20]. Introducing critical thinking technologies, such as the lotus flower technique and Edward de Bono's six hats, can significantly improve the quality of education by fostering higher-order thinking and encouraging students to explore various perspectives [21]. Acquiring critical thinking skills involves understanding the standards of rational thinking, recognizing cognitive biases, and learning how to transition from habitual to correct thinking [22]. Active learning approaches like thematic teaching and multimedia usage can further boost critical thinking by challenging students to question assumptions and apply their knowledge in innovative ways [23]. By integrating these methods, educators can effectively cultivate students' critical thinking abilities, enabling them to navigate complex problems and think independently.

Previous Research Findings

Research studies have consistently shown the positive

impact of integrating multimedia and thematic curriculum on students' learning outcomes. An investigation by Anwari et al. highlighted that the use of interactive PowerPoint media in thematic learning improved student understanding and achievement [24]. Similarly, Putri and Alyani found that multimedia-based learning resources significantly enhanced sixth-grade students' motivation and learning outcomes in science subjects, specifically on the solar system topic [25]. Furthermore, Rizqy Ana et al. emphasized the effectiveness of thematic teaching materials in enhancing students' learning experiences and cognitive development [10]. Additionally, Suwardi et al.'s research on integrative thematic textbooks demonstrated their effectiveness in improving students' learning outcomes, as

validated by experts and practitioners [26]. These findings collectively support the notion that innovative teaching methods, such as multimedia integration and thematic instruction, play a crucial role in boosting student achievement, critical thinking skills, motivation, and overall engagement in the learning process.

Based on the research objectives, the following hypotheses are proposed:

H1: Multimedia use positively affects students' critical thinking skills.

H2: Multimedia use positively affects students' learning interest.

H3: The thematic curriculum positively affects students' critical thinking skills.

H4: The thematic curriculum positively affects students' learning interest.

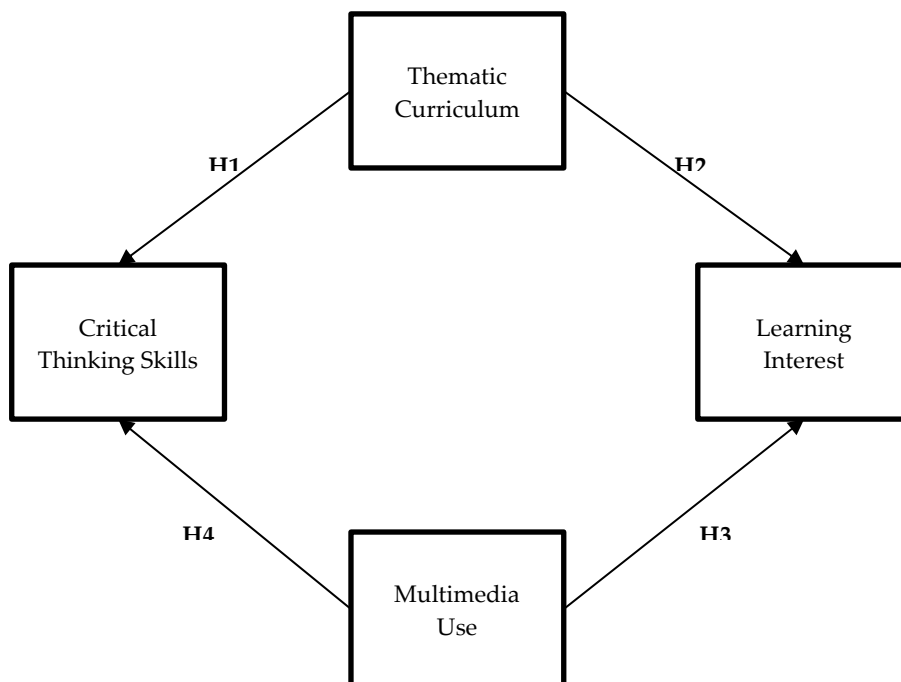


Figure 1. Conceptual Framework

3. METHODS

3.1 Research Design

This study employs a quantitative research design to investigate the effects of thematic curriculum and multimedia use on the learning interest and critical thinking skills of high school students in Central Java. The study utilizes a cross-sectional survey method, which allows for the collection of data at a single point in time to test the hypothesized relationships.

3.2 Population and Sample

The target population for this study comprises high school students in Central Java. A sample of 160 students was selected using a stratified random sampling technique to ensure representation across different schools and grade levels. The sample size was determined based on the requirements for Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis, which typically requires a minimum sample size of 100-200 to achieve reliable results (Hair et al., 2011).

3.3 Data Collection Procedures

The questionnaire was administered to the selected sample of students during regular school hours. Prior to data collection, informed consent was obtained from the students and their parents or guardians. The students were assured of the confidentiality and anonymity of their responses. Trained research assistants were present during the administration of the questionnaire to provide instructions and address any questions.

3.4 Data Analysis

The collected data was analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3), a statistical technique that allows for the testing of complex relationships between variables, and is particularly suitable for this study due to its ability to handle small sample sizes and non-normal data distributions (Hair et al., 2014). Descriptive statistics, including means, standard deviations, and frequencies, were calculated to provide an overview of the sample characteristics and the distribution of responses. The measurement model was evaluated to assess the reliability and validity of the constructs by examining factor loadings, composite reliability, and average variance extracted (AVE) for each construct. The structural model was evaluated to test the hypothesized relationships between the constructs, with path coefficients, t-values, and p-values calculated to determine the significance of the relationships, and the coefficient of determination (R^2) examined to assess the explanatory power of the model.

4. RESULTS AND DISCUSSION

4.1 Demographic Characteristics of the Sample

The demographic characteristics of the sample provide important context for understanding the participants in this study. The sample consists of 160 high school students from Central Java. The demographic information includes age, gender, and grade level. The results are presented in Table 1.

Table 1. Demographic Characteristics of the Sample

Demographic Characteristic	Category	Frequency	Percentage (%)
Age	15 years old	30	18.75
	16 years old	50	31.25
	17 years old	45	28.13
	18 years old	35	21.88
Gender	Male	82	51.25
	Female	78	48.75
Grade Level	10th grade	55	34.38
	11th grade	60	37.50
	12th grade	45	28.13

The ages of the students ranged from 15 to 18 years old, with the following distribution: 15 years old - 30 students (18.75%), 16 years old - 50 students (31.25%), 17 years old - 45 students (28.13%), and 18 years old - 35 students (21.88%). The sample had a nearly equal gender distribution, with 82 male students (51.25%) and 78 female students (48.75%). The grade levels of the students were distributed as follows: 10th grade - 55 students (34.38%), 11th grade - 60 students (37.50%), and 12th grade - 45

students (28.13%). The demographic characteristics are summarized in Table 1.

4.2 Measurement Model Evaluation

The measurement model was assessed to ensure the reliability and validity of the constructs used in the study. This evaluation involved examining the factor loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) for each construct.

Table 2. Measurement Model

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variant Extracted
Thematic Curriculum	TCC.1	0.869	0.874	0.923	0.799
	TCC.2	0.938			
	TCC.3	0.873			
Multimedia Use	MMU.1	0.740	0.811	0.876	0.638
	MMU.2	0.865			
	MMU.3	0.800			
	MMU.4	0.786			
Learning Interest	LIT.1	0.822	0.872	0.907	0.661
	LIT.2	0.835			
	LIT.3	0.841			
	LIT.4	0.816			
	LIT.5	0.750			
Critical Thinking Skills	CTS.1	0.726	0.826	0.884	0.657
	CTS.2	0.874			
	CTS.3	0.818			
	CTS.4	0.818			

Source: Data Processing Results (2024)

The evaluation of the measurement model demonstrates that all constructs have good reliability and validity. The factor loadings for all items are above the threshold of 0.70, indicating strong indicator reliability. The Cronbach's alpha and composite reliability values for all constructs exceed 0.70, confirming good internal consistency. Additionally, the AVE values for all constructs are above 0.50, indicating good convergent validity. These results support the use of these constructs in the structural model evaluation and subsequent hypothesis testing.

4.3 Discriminant Validity

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs by evaluating the degree of difference between overlapping constructs. To establish discriminant validity, the Fornell-Larcker criterion is commonly used, which compares the square root of the Average Variance Extracted (AVE) for each construct with the correlations between the constructs.

Table 3. Discriminant Validity

	Critical Thinking Skills	Learning Interest	Multimedia Use	Thematic Curriculum
Critical Thinking Skills	0.811			
Learning Interest	0.665	0.813		
Multimedia Use	0.565	0.711	0.799	
Thematic Curriculum	0.533	0.677	0.681	0.824

Source: Data Processing Results (2024)

The discriminant validity results enhance the credibility of the study's findings by demonstrating that the measurement model's constructs are well-defined and

distinct from one another. This robust measurement foundation supports the subsequent structural model evaluation and hypothesis testing.

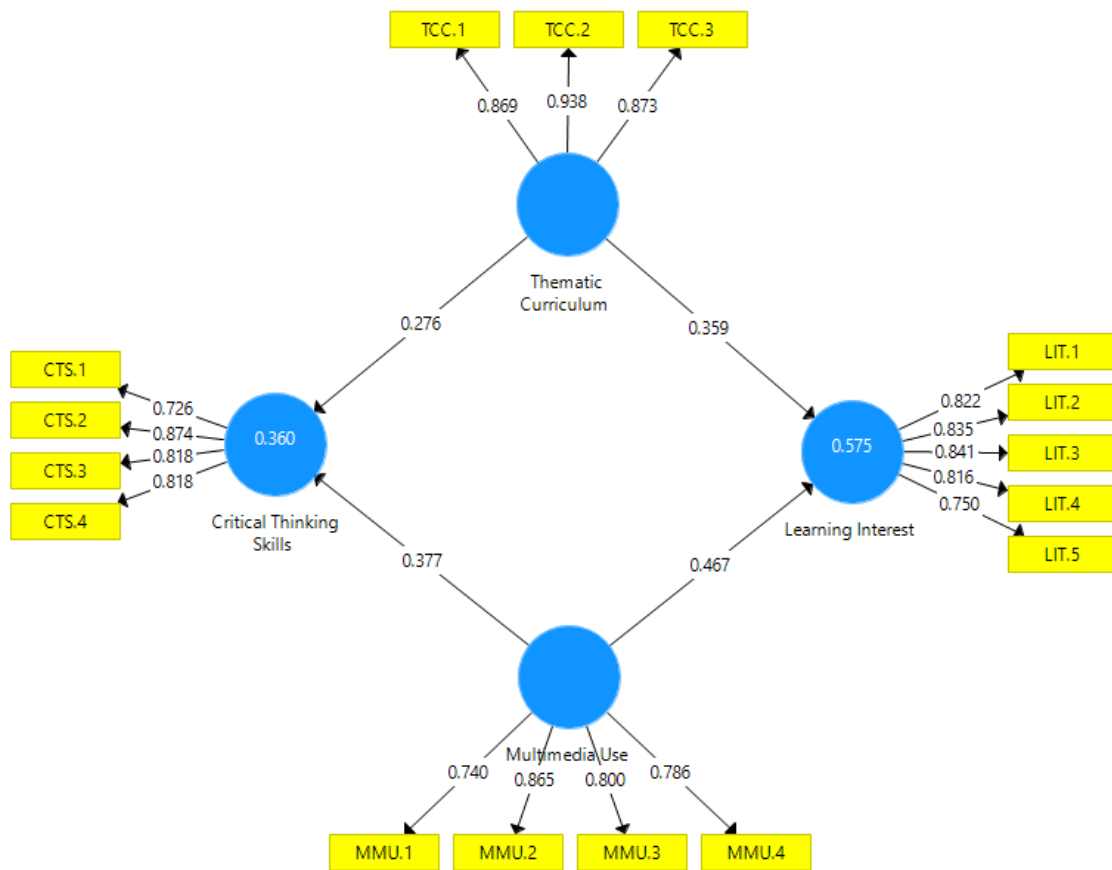


Figure 2. Model Results

Source: Data Processed by Researchers, 2024

4.4 Model Fit

Model fit indices are used to evaluate how well the hypothesized model represents the observed data. For this study, several fit indices were examined, including the Standardized Root Mean Square Residual

(SRMR), the squared Euclidean distance (d_ULS), the geodesic distance (d_G), Chi-Square, and the Normed Fit Index (NFI). These indices provide insights into the adequacy of the model in capturing the underlying relationships among the constructs.

Table 4. Model Fit Results Test

	Saturated Model	Estimated Model
SRMR	0.088	0.101
d_ULS	1.056	1.383
d_G	0.394	0.429
Chi-Square	405.318	427.840
NFI	0.792	0.781

Source: Data Processed by Researchers, 2024

The Standardized Root Mean Square Residual (SRMR) measures the difference between the observed and model-implied correlation matrices, with values less than 0.08 considered a good fit (Hu & Bentler, 1999). The SRMR values for the saturated model (0.088) and estimated model (0.101) are slightly above this threshold, suggesting minor discrepancies between observed and model-implied correlations. The Squared Euclidean Distance (d_ULS) and Geodesic Distance (d_G) also measure differences between observed and model-implied covariance matrices, with lower values indicating a better fit. The d_ULS and d_G values for the saturated model (d_ULS = 1.056, d_G = 0.394) and estimated model (d_ULS = 1.383, d_G = 0.429) suggest an acceptable fit, though the estimated model shows slightly higher values. The Chi-Square statistic tests the difference between observed and expected covariance matrices, with lower values indicating a better fit; however, it is sensitive to sample size. The Chi-Square values for the saturated model (405.318) and estimated model (427.840) are relatively high, common in large samples, suggesting an imperfect fit but requiring consideration of sample size sensitivity. The Normed Fit Index (NFI) compares the fit of the hypothesized model to a null model, with values closer to 1 indicating a better fit. The NFI values for the saturated model (0.792) and estimated model (0.781) are below the 0.90 threshold but above 0.70, indicating an acceptable fit in some contexts (Bentler & Bonett, 1980).

The R^2 value, also known as the coefficient of determination, measures the proportion of variance in the dependent variable that is predictable from the independent variables, with higher R^2 values indicating greater explanatory power of the model. For critical thinking skills, $R^2 = 0.460$, meaning 46% of the variance in critical thinking skills can be explained by the thematic curriculum and multimedia use, indicating a moderate level of explanatory power. For learning interest, $R^2 = 0.575$, meaning 57.5% of the variance in learning interest is accounted for by the thematic curriculum and multimedia use, indicating a strong explanatory power. The Q^2 value, also known as the Stone-Geisser criterion, assesses the model's predictive relevance, with Q^2 values greater than zero indicating predictive relevance. For critical thinking skills, $Q^2 = 0.453$, indicating good predictive relevance, while for learning interest, $Q^2 = 0.571$, indicating strong predictive relevance. This suggests that the model not only explains a significant portion of the variance but also has good predictive accuracy for these constructs.

4.5 Hypothesis Testing

Hypothesis testing was conducted to examine the relationships between the thematic curriculum, multimedia use, learning interest, and critical thinking skills. The results of the hypothesis testing, including the path coefficients, sample means, standard deviations, t-values, and p-values, are presented in the table below.

Table 5. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values

Multimedia Use -> Critical Thinking Skills	0.377	0.370	0.079	4.792	0.000
Multimedia Use-> Learning Interest	0.467	0.468	0.070	6.628	0.000
Thematic Curriculum -> Critical Thinking Skills	0.276	0.284	0.083	3.309	0.001
Thematic Curriculum -> Learning Interest	0.359	0.360	0.079	4.541	0.000

Source: Process Data Analysis (2024)

The analysis of the hypotheses revealed the following results: For Hypothesis 1 (Multimedia Use -> Critical Thinking Skills), the path coefficient is 0.377, with a t-value of 4.792 and a p-value of 0.000, indicating a positive and significant effect, thus supporting Hypothesis 1. For Hypothesis 2 (Multimedia Use -> Learning Interest), the path coefficient is 0.467, with a t-value of 6.628 and a p-value of 0.000, indicating a strong, positive, and significant effect, supporting Hypothesis 2. For Hypothesis 3 (Thematic Curriculum -> Critical Thinking Skills), the path coefficient is 0.276, with a t-value of 3.309 and a p-value of 0.001, indicating a positive and significant effect, supporting Hypothesis 3. For Hypothesis 4 (Thematic Curriculum -> Learning Interest), the path coefficient is 0.359, with a t-value of 4.541 and a p-value of 0.000, indicating a positive and significant effect, supporting Hypothesis 4.

Discussion

The results of this study provide empirical support for the positive effects of thematic curriculum and multimedia use on high school students' learning interest and critical thinking skills. All hypothesized relationships were found to be positive and significant, indicating that both multimedia use and thematic curriculum play crucial roles in enhancing these important educational outcomes.

Multimedia Use and Critical Thinking Skills

The findings indicate that multimedia use has a significant positive effect on students' critical thinking skills (H1). The path coefficient of 0.377 and a highly significant t-

value of 4.792 ($p < 0.001$) suggest that the incorporation of multimedia tools in the classroom substantially enhances students' ability to analyze, evaluate, and synthesize information. This supports previous research by [13], [14], who found that multimedia tools facilitate interactive and exploratory learning, which in turn enhances critical thinking. Multimedia presentations, simulations, and interactive activities provide students with opportunities to engage deeply with the content, analyze information from multiple perspectives, and apply their knowledge in various contexts.

Multimedia Use and Learning Interest

The strong positive impact of multimedia use on learning interest (H2) is demonstrated by a path coefficient of 0.467 and a significant t-value of 6.628 ($p < 0.001$). This result is consistent with the findings of [13], [14]. Multimedia tools make learning more engaging and visually appealing, capturing students' attention and maintaining their interest. This increased engagement can lead to higher levels of motivation and enthusiasm for learning, which are crucial for academic success. The interactive and visually rich nature of multimedia content can transform the learning experience, making it more enjoyable and effective.

Thematic Curriculum and Critical Thinking Skills

The study also found that the thematic curriculum positively influences students' critical thinking skills (H3), with a path coefficient of 0.276 and a t-value of 3.309 ($p < 0.001$). This aligns with the research by [5], [8], [10]–[12], who reported that thematic teaching promotes cognitive development by helping students make connections between

different subjects and concepts. By integrating various disciplines around central themes, the thematic curriculum encourages students to think critically and holistically about the material. This approach helps students to see the relevance of what they are learning and apply their knowledge in broader contexts.

Thematic Curriculum and Learning Interest

The positive effect of the thematic curriculum on learning interest (H4) is indicated by a path coefficient of 0.359 and a significant t-value of 4.541 ($p < 0.001$). This supports previous findings by [5], [8], [10]–[12]. Thematic learning provides context and relevance to the content, making it more meaningful and relatable to students. This relevance can increase students' intrinsic motivation to learn, leading to higher levels of interest and engagement in their studies. Thematic curriculum makes learning an active and purposeful process, fostering a deeper connection to the material.

Implications for Educational Practice

The results of this study have important implications for educational practices in Central Java and beyond:

1. **Integration of Multimedia Tools:** The strong impact of multimedia use on both learning interest and critical thinking skills underscores the need for schools to invest in multimedia tools and training for teachers. Multimedia can make learning more engaging and interactive, thereby enhancing students' critical thinking skills and learning interest.
2. **Adoption of Thematic Curriculum:** The thematic curriculum's positive influence on critical thinking skills and learning interest suggests that schools should consider adopting or expanding thematic teaching approaches. This

method helps students connect different subjects and enhances their overall understanding and interest in learning.

3. **Comprehensive Educational Strategies:** While the thematic curriculum and multimedia use are significant predictors of learning outcomes, the moderate R^2 value for critical thinking skills indicates the need for a comprehensive approach that includes other pedagogical strategies and environmental factors.

Limitations and Future Research

While this study provides valuable insights, it is not without limitations:

1. **Sample Size and Generalizability:** The study was conducted with a sample of 160 high school students in Central Java, which may limit the generalizability of the findings. Future research could replicate this study with larger and more diverse samples to confirm the results.
2. **Cross-Sectional Design:** The use of a cross-sectional design limits the ability to draw causal conclusions. Longitudinal studies could provide deeper insights into the long-term effects of thematic curriculum and multimedia use on learning outcomes.
3. **Additional Variables:** Future research could explore additional variables that may influence learning interest and critical thinking skills, such as teacher quality, classroom environment, and students' socio-economic background.

5. CONCLUSION

The findings of this study demonstrate that both the thematic

curriculum and multimedia use significantly enhance high school students' learning interest and critical thinking skills in Central Java. The positive and significant relationships observed between these variables underscore the importance of adopting innovative educational practices to foster student engagement and cognitive development. The strong impact of multimedia use on both critical thinking skills and learning interest highlights the value of integrating multimedia tools in classroom instruction, making learning more interactive and engaging, thus improving students' ability to analyze and evaluate information critically and maintain their interest in learning. The positive effects of the thematic curriculum on students' critical thinking skills and learning interest suggest that thematic teaching approaches can promote holistic understanding and intrinsic motivation among students. By connecting various subjects around central themes, the thematic curriculum helps students see the relevance of

their learning, thereby enhancing their cognitive and motivational outcomes. Schools should consider investing in multimedia tools and providing training for teachers to effectively use these tools in their teaching practices. Additionally, the adoption or expansion of thematic curricula should be encouraged to help students make meaningful connections between different subjects and maintain their interest in learning. While this study provides valuable insights, it is limited by its sample size and cross-sectional design. Future research should replicate this study with larger and more diverse samples and employ longitudinal designs to explore the long-term effects of thematic curriculum and multimedia use on educational outcomes. Furthermore, additional variables such as teacher quality, classroom environment, and students' socio-economic background should be considered to provide a more comprehensive understanding of the factors influencing learning interest and critical thinking skills.

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