International Journal of Research and Review
[Indexed, Peer-Reviewed Journal]
Volume 12; Issue: 3; March 2025
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

The Effectiveness of Articulate Storyline Media Containing Ethnoscience in Improving Critical Thinking Skills of Elementary School Students

Anggita Tia Mustika[1], Woro Sumarni[2], Agung Tri Prasetya[3]

[1,2,3]Master Program, Student of Primary Education, Universitas Negeri Semarang, Semarang citu, Indonesia

Corresponding Author: Anggita Tia Mustika

DOI: https://doi.org/10.52403/ijrr.20250332

ABSTRACT

Education not only cultivates students' comprehension of scientific concepts but also enhances critical thinking skills. Utilising instructional media that incorporates ethnoscience, the indigenous flora of Wonosobo can serve as an effective approach to enhance students' critical thinking abilities. This study seeks to evaluate the efficacy of Articulate Storyline media including ethnoscience in enhancing the critical thinking abilities of elementary school students. The employed methodology is the ADDIE RnD model. The study involved 17 fourth-grade children from SDN Bomerto 2 as the experimental group and 33 fourth-grade students from SDN Bomerto 1 as the control group. The data collection methods employed in this study included observation, interviews, questionnaires, and test questions. The data analysis employed normality tests, homogeneity tests, paired sample t-tests, N-gain calculations, and student responses to assess the efficacy of the implemented learning media. The findings indicated that learning media incorporating ethnoscience enhances critical thinking abilities, as evidenced by the critical thinking test results: the experimental class achieved an N-Gain of 0.44, while the control class attained 0.28. Thus, it was concluded that the Articulate Storyline learning media grounded in ethnoscience outperformed the image media utilised in the control class. The average posttest score of the experimental class rose by 32.7%, whilst the control class grew by 22.2%. This is substantiated by the students' responses following their engagement with the Articulate Storyline learning media, which yielded a result of 90.2%

Keywords: Articulate storyline, Ethnoscience, Effectiveness, Critical Thinking Skills

INTRODUCTION

Education has an important role in advancing the nation, of course education should be an activity that can create positive changes in students and also influence students to adapt to their environment. According to Hamalik (2017) Education is a process designed to enable pupils to adapt effectively to their environment, resulting in personal transformation.

Students must possess critical thinking abilities to confront the difficulties of the 21st century, as critical thinking enhances their ability to reason effectively in problem-solving, particularly in scientific contexts. Permendikud No. 12 of 2024 provides a comprehensive explanation of

the transition from the 2013 curriculum to the independent curriculum. In the autonomous curriculum, the disciplines of science and social studies are amalgamated into the topic of Natural and Social Sciences (IPAS).

As per Sujana (2013) Science or IPA is a science that studies the universe and its contents, as well as the events that occur in it that are developed by experts based on scientific processes.

Science learning certainly requires learning media. One of the media that can be used is Articulate Storyline. Amiroh (2020) mentions that Articulate Storyline is a multimedia authoring tool used in the creation of interactive learning media with various contents, namely collaboration of text, video, sound, images, graphics and animation. According to Amiroh (2020) and Santyasa *et al.* (2020) Articulate Storyline offers several advantages: 1) user-friendly operation; 2) inclusion of a storyline quiz feature; 3) the output of learning media generated through Articulate Storyline is web-based (HTML5) and can also be converted into application files compatible with mobile devices, including laptops, tablets, and Android smartphones. Leveraging the surrounding environment as an educational resource can render the learning process more tangible, thereby connecting instructional material with indigenous knowledge.

Sudarmin (2014) Ethnoscience is characterized as a collection of scientific knowledge possessed by a community or ethnic group, acquired through specific methods and procedures inherent to the traditions of that society, with its 'truth' subject to empirical validation. Local knowledge in Wonosobo includes carica plants, potato plants, and Dieng chili plants. This is based on the findings from study interviews performed in the Kejajar region of Wonosobo, where numerous farmers cultivate carica, potatoes, and fat chilies. The informants participating in this study are engaged in potato farming, papaya cultivation, and the production of hot chilies. Potato plants can serve as educational resources for pupils; nevertheless, their potential has not been completely realized in this capacity. Components of the plant structure can be linked to the content on plant propagation included in the grade IV elementary school curriculum. The researcher conducted interviews with carica farmers and laborers from chili farms, discovering the concept of natural science within the discussions. The principles of plant propagation were evident in relation to carica plants, chilies, and potatoes. The topic of plant propagation can be included into the science curriculum for fourth-grade students studying plant propagation material. Furthermore, researchers performed unstructured interviews with multiple educators and fourth-grade students at SDN 1 Bomerto, SDN 2 Bomerto, and SDN Sambek in Wonosobo. The findings indicated that the science instruction provided by these teachers was relatively varied, incorporating methods such as inquiry and project-based learning (PJBL); however, it was not comprehensive, as educators were still acclimating to the transition from the 2013 curriculum to the independent curriculum. The employed method was conversation and question-and-answer. The learning conducted was connected to daily life through contextually relevant examples. The

instructor argued that students' critical thinking abilities remained inadequate.

The findings from the unstructured interview indicated that the utilized learning materials included government textbooks, LKS, and the local environment. The critical thinking skills of students remain inadequate. The three schools have utilized the internet network. The educational resources employed are restricted to YouTube videos, as certain educators have not incorporated local wisdom into the learning process. Interviews with the three educators revealed a significant necessity for learning media to aid teachers in instruction and support students in their learning endeavors. The content of the integrated local wisdom learning media encompasses carica cultivation, potato cultivation, and cayenne pepper cultivation in Wonosobo. Carica, potato, and cayenne pepper plants are commonly found in the Wonosobo region, particularly in the Dieng Plateau.

Interviews with farmers of carica, potato, and cayenne pepper reveal that planting techniques in Dieng have been transmitted through generations. This aligns with the viewpoint Nelmi and Amini (2023) yang menyatakan bahwa etnosains merupakan studi tentang budaya masyarakat dan fenomena alam yang berpusat pada pengetahuan yang telah diwariskan dari generasi ke generasi. Dataran Tinggi Dieng terletak pada ketinggian ±2.400 mdpl di wilayah kabupaten Wonosobo, provinsi Jawa Tengah. Letak geografis Dataran Tinggi Dieng mengakibatkan daerah Dieng bersuhu cukup rendah. Pada siang hari suhunya berkisar antara 15-20°C dan 10°C pada malam hari (Fitriningrum dan Susilowati, 2013). This fruit can exclusively thrive at altitudes between 1,500 and 3,000 meters above sea level, making it particularly well-suited for cultivation in the Dieng Plateau. Carica fruit is rarely found in other regions, although it thrives in the Dieng Plateau in Wonosobo. This plant is believed to have been brought to Indonesia by the Dutch colonial authority circa 1900, prior to World War II, and was successfully cultivated in the Dieng Plateau. The presence of 50-year-old Dieng carica plants cultivated near residences in Sikunang Village, Sembungan Village, and Dieng Village substantiates this claim. This fruit has been traditionally prepared by the locals of Wonosobo, evolving into a distinguished souvenir product characteristic to the region (Ramadhani dan Sabarisman, 2021).

Ethnoscience plays an important role in education because it offers insight into natural science which includes an understanding of natural conditions, the phenomena that occur in them, and the natural phenomena that appear (Lidi *et al.,* 2022)

Based on interviews related to local wisdom in the form of carica plants, potatoes and chili peppers, there is a concept of plant propagation that can be used for the science learning process in grade IV on plant propagation material.

Previous research on ethnoscience by Fiteriani *et al*., (2021) The findings indicated that poster media including Lampung ethnoscience earned a highly favorable evaluation from media experts, language experts, and material experts, thereby qualifying it as an appropriate instructional medium for elementary schools. The research encompasses many sorts of cultures cultivated in the Lampung region. Distinct from Etnoscience, which will be addressed by researchers, is the

educational medium derived from Articulate Storyline. Researchers will focus on the unique culture of plant propagation in Wonosobo. This Articulate Storyline learning media will be created as a video that elucidates the plant propagation process, hence enhancing the understanding of the subject matter.

Additional studies conducted by (Wahyuni *et al.,* 2022; Legina and Sari 2022; Nabil *et al.,* 2021) produced findings that the media developed were declared feasible and could improve students' critical thinking skills. What differentiates it from the research raised by the researcher is the difference in material and has not yet linked it to local wisdom.

Relevant research by Intika and Jumiati, (2020) resulted in the finding that the Articulate Storyline media is feasible to use and can improve student learning outcomes from an average of 58.67 to 88.37. So it is different from the research that will be raised by researchers who use the concept of plant propagation at the elementary school level which includes carica plants, potato plants and chili plants. Thus, teachers and students need ethnoscience-based learning media that are associated with local wisdom, namely potato plants, carica plants and chili plants which contain plant propagation material used to improve critical thinking skills of grade IV elementary school students. The purpose of this study is to analyze the effectiveness of ethnoscience-based Articulate Storyline learning media to improve students' critical thinking skills.

MATERIALS & METHODS

This research is a research and development (R&D), the model used is the ADDIE development model. The model used is the ADDIE development model. The ADDIE model has five stages including Analysis, Design, Development, Implementation, and Evaluation (Sugiyono, 2016). This development methodology was selected for its simplicity, obvious systematic stages, and minimal time requirement. Research instruments, including learning media, materials, and critical thinking test questions, have been deemed viable and valid by experienced lecturers, allowing for their application in the experimental class. The media utilized for the control group is visual media. This study employs observation, interviews, questionnaires, and test questions as methods of data gathering. The participants in this study were 17 students from class IV SDN Bomerto 2, designated as the experimental group, and 33 students from class IV SDN Bomerto 1, designated as the control group.

The data analysis employed normality tests, homogeneity tests, paired sample t-tests, and N-gain to assess the efficacy of the Articulate Storyline learning media grounded on ethnoscience for enhancing the critical thinking skills of fourth-grade elementary children. A normality test and a homogeneity test were conducted on the pretest learning outcomes of both the experimental and control groups. This was conducted to ensure that all classes commenced under identical conditions prior to receiving therapy. The Gain Normality Test served as a metric for assessing student learning results prior to and during the intervention. Furthermore, a response study was conducted to assess the reactions of students and teachers to the Articulate Storyline learning media.

RESULT

This development research produces a product in the form of an Articulate Storyline learning media based on Wonosobo's typical plant ethnoscience. This learning media was developed with a focus on plant propagation. This study examines the effectiveness of the Articulate Storyline learning media based on ethnoscience in improving students' critical thinking skills.

Feasibility of Articulate Storyline Learning Media Based on Ethnoscience

The learning media to be tested requires expert validation. This can be seen in the summary table of expert validation results for media, materials and language.

Table 1. Recapitulation of Media, Material and Language Expert Validation Results

Expert Validation Stages	Percentage Results
Media Validation	92,7%
Material and Language Validation	93%
Critical Thinking Test Question Validation	92,5%

According to the average assessment by learning media specialists and the proposed questions for evaluation, it was deemed viable. It is applicable for research purposes. Following its declaration of feasibility, the media underwent testing in small groups, informed by the outcomes of teacher and student questionnaires, which yielded an average score of 87.4%. Students offered recommendations and enhancements to refine the Articulate Storyline media. The researcher subsequently modified the Articulate Storyline instructional material in accordance with the recommendations and enhancements.

The Effectiveness of Articulate Storyline Learning Media Based on Ethnoscience to Improve Critical Thinking Skills

A large group study was done to assess the efficacy of ethnoscience-based Articulate Storyline learning media in enhancing critical thinking skills. The efficacy of Articulate Storyline learning medium on students' critical thinking abilities was assessed using N-gain comparisons between the experimental and control groups based on pre-test and post-test outcomes. The pre-test was administered prior to the students receiving the intervention, specifically the learning facilitated using ethnoscience-based Articulate Storyline media. The post-treatment assessment was administered subsequently.

The extensive group trial comprised 17 students in the experimental class utilizing ethnoscience-based Articulae Storyline media, and 33 students in the control class employing pictorial media. The pretest and posttest results exhibited a considerable disparity. Table 2 displays the mean results for the pretest and posttest.

Table 2. Average pretest and posttest scores

Group	Pre-test
Experimental Class Average	57,65
Control Class Average	56,21

The efficacy of the Articulate Storyline learning medium is evidenced by the N-gain. Prior to conducting the N-gain test, normality and homogeneity assessments are performed, followed by the execution of the paired sample t-test. The prerequisites for conducting a paired sample t-test are that the data must exhibit normal distribution and homogeneity. In the tests for normality and homogeneity, only the pretest data from the experimental and control classes were conducted. This indicates that both groups commence from identical conditions. Furthermore, the pretest findings indicate that the experimental class achieved an average score of 57.65, while the control class averaged 56.21, suggesting that both courses commenced under comparable conditions. The normality test results for the data are displayed in Table 3.

Table 3. Test of Normality

Kelas	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest experimen	0,916	17	0,125
Pretest control	0,961	33	0,227

Based on Table 3, the results of the pretest data normality test of the experimental class and control class using the Shapiro-Wilk test showed a significance value > 0.05 which indicates that the data is normally distributed. After being confirmed to be normally distributed, a homogeneity test was carried out to see whether the pretest and posttest data came from homogeneous or heterogeneous variances.

Table 4. Test of Homogenity of Variance

		Levene Statistic	df l	df 2	Sig.
Experimental control pretest	Based on Mean	0,398	1	48	0,531

According to Table 4, the significant value for the homogeneity of the pretest data between the experimental and control groups is 0.531, which is greater than 0.05, signifying that the pretest and posttest data are homogeneous. Once the data is normalized and homogenous, a paired sample t-test is conducted to compare the mean pretest and posttest scores of the experimental and control groups. The paired t-test findings indicate that both classes possess a significance value (2-tailed) of 0.000, which is less than 0.05, leading to the rejection of the null hypothesis (Ho) and the acceptance of the alternative hypothesis (Ha). This signifies a disparity in the averages of the pretest and posttest data.

Uji N-gain

Based on the calculation results, a score of 0.44 was produced for the experimental class, while the control class was 0.28. Then analyzed using the n-gain criteria table, it was found that the increase in critical thinking skills of students in the experimental class between before and after using the Articulate Storyline learning media based on ethnoscience was in the medium criteria. While the increase in the control class that did not use the Articulate Storyline media was in the low criteria.

Tabel 5. Pretest, posttest and improvement scores

Group	Score		Improvement (%)
	Pretest	Posttest	
Experimen	57,65	76,53	32,7
Control	56,21	68,72	22,2

Analisis berpikir kritis siswa digunakan untuk measuring critical thinking skills consisting of 5 critical thinking indicators, namely interpretation, analysis, evaluation, inference, explanation. Critical thinking analysis is measured from the N-gain of the experimental class and the control class. The N-gain chart of critical thinking indicators for students in the experimental class and the control class can be seen in Figure 1 and Figure 2.

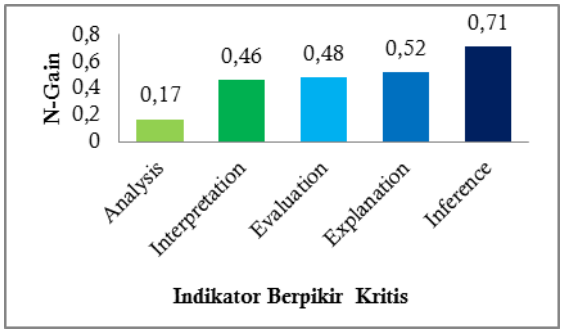

Figure 1. N- Gain indicator of experimental class

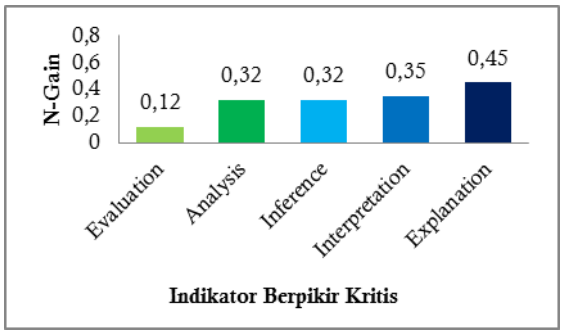

Figure 2. N- Gain indicator of control clas

The calculation findings demonstrate that the enhancement of critical thinking skills, as measured by N-gain, in students from the experimental class utilizing ethnoscience-based Articulate Storyline learning media, surpasses that of students in the control class employing visual media. The response from students following their engagement with the Articulate Storyline learning media

corroborates this, with 90.2% indicating that the material presented is comprehensible, that the visual elements facilitate understanding, and that utilizing this learning media enhances their grasp of the content to be taught in class. The reaction indication receives a high rating. The pretest and posttest scores indicate that the experimental class utilizing Articulate Storyline media experienced a 32.7% rise, whereas the control class saw a 22.2% increase. It can be determined that Articulate Storyline learning media with ethnoscience information is more effective than image media.

This is substantiated by studies (Damayanti *et al.,* 2022) development of flipbooks based on local wisdom can improve students' critical thinking skills. The flipbooks presented in the study are almost similar to this study, namely they both have other features besides text, such as images, learning videos, and interactive quizzes. Learning activities by presenting materials containing local wisdom can help students build comprehensive knowledge through observation and analysis of social events which in turn are expected to develop students' critical thinking skills based on their learning experiences.

The above findings are reinforced by research Hunaepi *et al*., (2020) The blending of learning and local wisdom fosters student curiosity regarding the subject matter and enhances problem-solving abilities. Moreover, critical thinking can be enhanced by enabling the analysis of actual phenomena in the students' surrounding environment. Investigations conducted by Subagyo *et al.,* (2021) yielded findings indicating that the utilization of enrichment books featuring local wisdom can enhance student learning outcomes. Following the execution of the N-gain test for each indication to evaluate student comprehension, the findings were further examined by elaborating on each acquired value. This technique seeks to categorize student scores into distinct classifications: low, medium, and high, contingent upon the degree of improvement observed in each indicator. This categorization provides a clear perspective on student comprehension and advancement, enabling the identification of areas needing additional focus and those demonstrating satisfactory outcomes. The pertinent indicators are those of critical thinking: interpretation (I1), analysis (A), evaluation (E1), inference (I2), and explanation (E2).

Figures 3 and 4 illustrate the distribution of student data throughout the categories of low, medium, high, and very high critical thinking indicators.

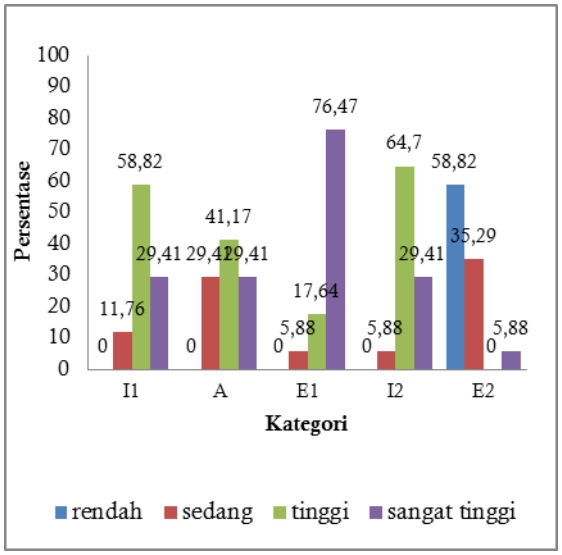

Figure 3. Distribution of percentage of critical thinking indicators in experimental class

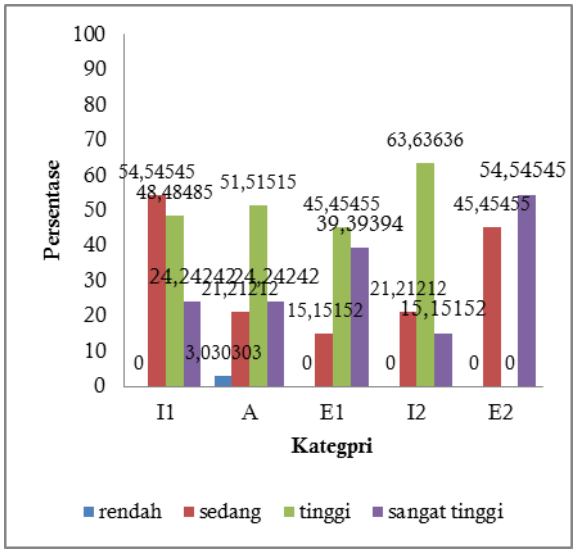

Figure 4. Distribution of critical thinking indicator data for students in the control class

The Articulate Storyline learning medium grounded on ethnoscience significantly enhances critical thinking skills across all indicators when compared to classes that do not utilize this media. This is evidenced by the variation in N-gain outcomes for each critical thinking metric.

The study's results indicate a disparity in the enhancement of N-Gain critical thinking skills between the experimental and control classes across several measured variables. The experimental class exhibited an increase of 0.46 in the interpretation indicator, classified as moderate, whereas the control class attained an increase of 0.12, categorized as low. The findings indicate that the Articulate Storyline medium grounded in Etnoscience utilized in the experimental group is more efficacious in enhancing students' interpretative skills compared to the control group. In the analysis indication, the experimental group achieved a rise of 0.17, classified as low, whereas the control group attained an increase of 0.32, categorized as moderate. The results indicate that the experimental class exhibited inferior performance on this indicator due to internet buffering, which disturbed the work process.

The assessment indicator in the experimental class demonstrated a rise of 0.48 under moderate conditions, whereas the control class attained 0.32 with identical requirements. The results demonstrate that the methodology employed in the experimental class effectively enhances students' ability to critically assess material.

In the inference indicator, the experimental group exhibited an increase of 0.71, categorized as high, whereas the control group demonstrated an increase of 0.35, classified as moderate. The implementation of ethnoscience-based Articulate Storyline learning media in the experimental class is highly effective in enhancing students' ability to draw inferences from existing facts and knowledge.

In the explanation indicator, the experimental group exhibited a rise of 0.52, classified as moderate, whereas the control group achieved an increase of 0.45, also categorized as moderate. The growth in both classes was relatively equitable, although the experimental class had a modest advantage.

This study's results demonstrate that ethnoscience-based Articulate Storyline learning media utilized in the experimental class is more effective in enhancing students' critical thinking skills compared to the control class, particularly in the areas of interpretation, evaluation, and inference. This underscores the need of employing pertinent educational material to enhance students' critical thinking abilities. This aligns with the findings of Wahyuni et al. (2022), Intika and Jumiati (2020), and Legina and Sari (2022), which indicate that Articulate Storyline media enhances student engagement and fosters critical thinking abilities. The N-gain results for the analysis indicator in the experimental group remain inadequate due to students' failure to complete the characteristics portion, with some also neglecting to provide definitions. The findings are corroborated by student feedback regarding the limited time available for utilizing the Articulate Storyline learning media, which is hindered by connectivity issues and insufficient cellphone storage capacity, preventing optimal functionality. Additionally, the

researchers did not incorporate characteristic materials into the Articulate Storyline learning media. Students and educators exhibit significant interest in Articulate Storyline learning media due to its incorporation of images, quizzes, and videos. The Articulate Storyline learning medium is effective, hence enhancing students' motivation and facilitating active engagement in the learning process (Setyaningsih *et al.*,2020; Arwanda *et al.*, 2020).

This is in line with the opinion that states that the Articulate Storyline learning media presents material by combining text, images, audio and video, making the material presented more interesting and easier to understand (Anggraini dan Reinita, 2021). The advantages of the Articulate Storyline learning media are that the media can be easily used, its use can be distributed to various e-learning platforms today, it can be used without space and time limits because its format is an HTML5 link, this media can make students enthusiastic about learning because it is very interesting and not boring, this media contains slides that are combined from various images, videos, texts and sounds, the Articulate Storyline media can also be used to work on questions or quizzes so that learning is more interesting (Anggraini dan Reinita, 2021; Legina dan Sari, 2022).

Android-based technological devices are specifically created to enhance students' comprehension of the course. This medium is designed to align with kids' cognitive skills and employs straightforward language for enhanced comprehension. This educational media is supplemented with numerous auxiliary resources, including films, graphics, and animations, intended to elucidate complex content. Videos illustrate specific procedures or methods for problem-solving, whilst visuals enhance students' comprehension. Student engagement is a primary emphasis to ensure their active participation in the learning process. Students engage not simply in listening or reading but also in actions such as responding to questions, resolving issues, or participating in live simulations. This approach aims to enhance student motivation for learning while fostering autonomous comprehension of the topic. The utilization of Android-based technology featuring graphics and sound enhances the engagement and enjoyment of the learning process. This Android-based media enhances students' comprehension of the topic and delivers an exceptional learning experience, fostering greater engagement, confidence, and enthusiasm in their studies (Adam dan Mulyani, 2023; Masrifah dan Setyasto, 2024).

Ethnoscience-based learning integrates insights into science which includes an understanding of natural conditions, the phenomena that occur in them, and natural phenomena that appear integrated into science learning (Ilhami *et al.*, 2020; Lidi *et al.*, 2022; Rikizaputra *et al.*, 2022).

Through ethnoscience, students are anticipated to reconstruct knowledge and scientific concepts derived from their environment into scientific understanding, so rendering classroom learning more meaningful and facilitating comprehension (Ilhami *et al.*, 2020).

Findings in the field show that the use of the articulate storyline media has an attractive appearance. This media has succeeded in encouraging students to participate in learning and is able to improve critical thinking skills (Akhlilia *et al.*, 2024; Nurhasanah *et al.*, 2024)

The media created with Articulate Storyline is founded on Ethnoscience. Ethnoscience is the examination of community culture and natural phenomena, focusing on knowledge transmitted across generations, which can be empirically validated, such as in relation to the utilization of nature for human sustenance, local production, indigenous cuisine, and cultural heritage (Puspasari *et al.*, 2019; Nabil *et al.*, 2021; Nelmi and Amini 2023). Ethnoscience in science learning combines scientific concepts with local wisdom or culture which can encourage active attitudes and student

motivation in the learning process (Gumilar *et al.*, 2024).

The cultural component used in the Articulate Storyline educational medium centered on Ethnoscience pertains to the cultivation of indigenous Wonosobo flora. Typical plants are used into the educational process to elucidate the notion of learning materials related to these plants and to promote their introduction and preservation (Jannah dan Jumini 2022; Nabil, *et al.*, 2021).

The drawback of the Articulae Storyline learning media is its need on an internet connection. The inadequate technological infrastructure in schools, including wifi networks, necessitates that students rely on personal data packages, which not all students possess (Fansury *et al.*, 2020; Özüdoğru dan Çakır 2020). Therefore, the researcher activated the hotspot and used one cellphone for two people during the learning process in the classroom. Therefore, human resources are needed who understand ethnoscience and technology and are sensitive to the cultural and social diversity of society (Yusof *et al.*, 2024). At the dissemination stage, the Articulate Storyline learning media product that was developed was then distributed to several elementary schools for use or followed up for further development.

CONCLUSION

The study's findings indicated that the Articulate Storyline learning media, grounded in Ethnoscience, effectively enhanced the critical thinking skills of fourth-grade elementary students. The paired t-test results revealed a significant difference in the average scores between the pretest and posttest data of both the experimental and control groups, with the experimental class achieving an N-gain score of 0.44, categorized as moderate. The N-gain findings for the control class were 0.28, categorized as low. The results demonstrate that the enhancement of critical thinking skills, as measured by N-gain, among students of the experimental class utilizing Articulate Storyline learning media grounded in ethnoscience, surpasses that of students in the control class employing visual media. The student and teacher response questionnaire following the utilization of the Articulate Storyline learning medium based on Etnoscience yielded percentages of 90.2% and 91.66%, respectively, indicating highly positive criteria. This material effectively enhances the critical thinking skills of fourth-grade students.

Declaration by Authors

Acknowledgement: None
Source of Funding: None
Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. Adam, N. F, & Petra, K. M. 2023. "Development of Interactive Learning Media Articulate Storyline of Indonesian Language Learning in Fourth Grade Elementary School." *Journal of Education, Teaching, and Learning* 8(2): 274–81.
2. Akhlilia, T., NovitaP. D., Sri W, & Nuni, W. 2024. "Systematic Literature Review: The Impact Of Using Articulate Storyline Media On Enhancing Critical Thinking Abilities." *Journal Civic and Social Studies* 8(1): 1–13. https://doi.org/10.31980/journalcss.v8i1.1048.
3. Ilhami, A. Revi, S. Ukhti, M. & Diniya. 2020. "Kajian Etnosains Tradisi Maauwo Di Danau Bakuok Sebagai Sumber Pembelajaran Biologi." *Bioeduca: Jurnal Pendidikan Biologi* 2(2): 79–86.
4. Amiroh. 2020. *Mahir Membuat Media Interaktif Articulate Storyline*. Yogyakarta: Pustaka Ananda Srva.
5. Anggraini, Tri, S. & Reinita. 2021. "Pengembangan Media Interaktif Articulate Storyline 3 Berbasis Kontekstual Pada Pembelajaran Tematik Terpadu Di Kelas IV Sekolah Dasar." *Journal of Basic Education Studies* 5(3): 9853–59. https://ejurnalunsam.id/index.php/jbes/article/view/4088.
6. Anjarwati, A., Wahyuni, R., Agustin, Y., Utami, C., & Wardana, R. A. 2022. "Penerapan Media Pembelajaran Sistem

Pencernaan Manusia Ilmu Pengetahuan Alam SDN Mangunharjo 5." *Jurnal Pendidikan, Sains Dan Teknologi, 1(1), 118–122*.

7. Arwanda, P., Sony I. & Ana A. 2020. "Pengembangan Media Pembelajaran Articulate Storyline Kurikulum 2013 Berbasis Kompetensi Peserta Didik Abad 21 Tema 7 Kelas Iv Sekolah Dasar." *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah* 4(2): 193.
8. Damayanti, N. S., Eko H. & Suratno, S. 2022. "Developing A Local Wisdom-Based Interactive Flipbook with the Problem-Based Learning Model to Enhance Critical Thinking Skills." *Journal of Primary Education* 11(2): 178–90. https://journal.unnes.ac.id/sju/index.php/jpe.
9. Fiteriani, I. Nadia., K. N, Irwandani., Kurnia, S. & Romlah. 2021. "Media Poster Dengan Pendekatan Etnosains: Pengembangan Bahan Ajar IPA Siswa Sekolah Dasar." *Jurnal Pendidikan Sains Indonesia* 9(4): 540–54.
10. Fitriningrum, R. & Ari, S. 2013. "Analisis Kandungan Karbohidrat Pada Berbagai Tingkat Kematangan Buah Karika (Carica Pubescens) Di Kejajar Dan Sembungan, Dataran Tinggi Dieng, Jawa Tengah." *Bioteknologi* 10(1): 6–14.
11. Gumilar, G. Fatmi, R. N. H. Yustri, M. Anatri, D. Yulia, M. H.. 2024. "Pembelajaran Ipa Berbasis Etnosains Pada Materi." *Jurnal Ilmiah Pendidikan IPA* (2015).
12. Hadi, W. P., Feby P. S., Aris, S., Wardatul, M, & Samsul, A. 2019. "Terasi Madura: Kajian Etnosains Dalam Pembelajaran Ipa Untuk Menumbuhkan Nilai Kearifan Lokal Dan Karakter Siswa." *Quantum: Jurnal Inovasi Pendidikan Sains* 10(1): 45.
13. Hamalik, O. 2017. *Proses Belajar Mengajar*. Jakarta: PT Bumi Aksara.
14. Fansury, A. H., Restu, J. Ali, W. R., & Syawal. 2020. "**西南交通大学学**报 Digital Content for Millennial Generations: Teaching the English Foreign Language Learner on Covid-19 Pandemic **千禧一代的数字内容：在新冠肺炎大流行中**讲英语的外国语言学 习者." *Journal of Southwest Jiaotong University* 55(3).
15. Hunaepi., Laras, F., Taufik, S., Endang, S. & Raharjo. 2020. "Efektifitas Perangat Pembelajaran Inkuiri Terintegrasi Kearifan Lokal Terhadap Keterampilan Berpikir Kritis Mahasiswa." *Scholaria: Jurnal Pendidikan dan Kebudayaan* 10(3): 269–81.
16. Intika, T. & Jumiati. 2020. "Pengembangan Bahan Ajar Etnospem (Etnosains Pempek) Terhadap Keterampilan Proses Sains Siswa Sekolah Dasar." *Jurnal Riset Pendidikan Dasar* 03(2): 134–42.
17. Jannah, F. A. N. & Sri J. 2022. "Potensi Keunggulan Carica Melalui Kurma Carica Khas Desa Atas Awan Berdasarkan Ethnoscience." *Jurnal Kreatif Online* 10(3): 71–80.
18. Legina, N. & Prima, M. S. 2022. "Pengembangan Media Pembelajaran Interaktif Articulate Storyline Berbasis Keterampilan Berpikir Kritis Pada Pembelajaran IPA Bagi Siswa Sekolah Dasar." *Jurnal Paedagogy* 9(3): 375.
19. Lidi, M. W., Veronika, P. S. M. W. & Melkyanu, B. U. K. 2022. "Implementasi Etnosains Dalam Pembelajaran Ipa Untuk Mewujudkan Merdeka Belajar Di Kabupaten Ende." *OPTIKA: Jurnal Pendidikan Fisika* 6(2): 206–16.
20. Masrifah, A. & Novi, S. 2024. "Android-Based Articulate Storyline Interactive Media in IPAS Subjects." *Jurnal Penelitian Pendidikan IPA* 10(6): 2978–88.
21. Nabil, M., Eko, J. & Rina, R. 2021. "Pengembangan Modul Ipa Berbasis Etnosains Pengolahan Kopi Untuk Meningkatkan Kemampuan Berpikir Kritis." *Indonesian Journal of Natural Science Education (IJNSE)* 4(2): 457–67.
22. Nelmi, F. & Amini, R. 2023. "Bahan Ajar Berbasis Etnosains Pada Pembelajaran Tematik Terpadu Di Kelas V Sekolah." *Jurnal Elementaria Edukasia, 6(3), 1140-1253. DOI: https ://doi.org/10.31949/jee.v6i3.6151*.
23. Nurhasanah, M., Purwati, K., Suprapto. & Ryan, A. 2024. "The Effectiveness of Problem-Based Learning Assisted by Articulate Storyline Interactive Students' Critical Thinking Skills." *Jurnal Inovasi Pendidikan IPA* 10(1): 1–9.
24. Özüdoğru, G. & Hasan, Ç. 2020. "An Investigation into the Opinions of Pre-Service Teachers toward Uses of Digital Storytelling in Literacy Education." *Participatory Educational Research* 7(1): 242–56.
25. Ramadhani, M. & Sabarisman, I. 2021. "Pengembangan Konsep Produk Dan

Kemasan Koktil Buah Carica (Carica Pubescens) Menggunakan Metode Value Engineering." *Universitas Gadjah Mada*. http://etd.repository.ugm.ac.id/.
26. Rikizaputra, Arlian, F. & Mega, E. 2022. "Kajian Etnosains Tapai Ketan Hijau Makanan Khas Indragiri Hilir Sebagai Sumber Belajar Biologi." *Bio-Lectura : Jurnal Pendidikan Biologi* 9(2): 238–47.
27. Santyasa, I. W., Juniantari, M. & Santyadiputra, G. S. 2020. "Efektivitas Pelatihan Pembuatan Media Pembelajaran Interaktif Berbasis Articulate Storyline 3 Untuk Guru-Guru Di SMAN 2 Singaraja." *Proceeding Senadimas Undiksha, 1784–1790*. *https://lppm.undiksha.ac.id/senadimas2020/assets/ProsidingSenadimas2020/file/246.pdf*.
28. Setyaningsih, S., Rusijono, & Ari, W. 2020. "Pengaruh Penggunaan Media Pembelajaran Interaktif Berbasis Articulate Storyline Terhadap Motivasi Belajar Dan Hasil Belajar Siswa Pada Materi Kerajaan Hindu Budha Di Indonesia." *Didaktis: Jurnal Pendidikan dan Ilmu Pengetahuan* 20(2): 144–56.
29. Subagyo, S, T., Supriyanto, & Amin, Y. 2021. "Developing Of Writing Enrichment Book Based On The Local Wisdom Value Of Javanese Poetry (Geguritan)." *Journal of Primary ...* 10(28): 359–72. https://journal.unnes.ac.id/sju/index.php/jpe/article/view/44438.
30. Sudarmin. 2014. "Pendidikan Karakter, Etnosains Dan Kearifan Lokal." *Fakultas Matematika dan Ilmu Pengetahun Alam, UNNES*: 1–139. http://lib.unnes.ac.id/27040/1/cover_PENDIDIKAN_KARAKTER_SUDARMIN.pdf.
31. Sugiyono. 2016. *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Bandung: PT Alfabeta.
32. Sujana. 2013. *Pendidikan IPA*. Bandung: Rizqi Press.
33. Wahyuni, S., Zainur, R. R, & Dwi, N. R. 2022. "Pengembangan Media Pembelajaran Interaktif Berbasis Articulate Storyline Terhadap Kemampuan Berpikir Kritis Siswa SMP Pada Materi Tata Surya." *Jurnal IPA & Pembelajaran IPA* 6(2): 99–110.
34. Yusof, N., Lalu, N. Y.,, Pg, M. R. P. A. & Saidatul N, M. 2024. "The Integration of Ethnoscience and Technology: A Review." *International Journal of Ethnoscience and Technology in Education* 1(2): 131.

How to cite this article: Anggita Tia Mustika, Woro Sumarni, Agung Tri Prasetya. The effectiveness of articulate storyline media containing ethnoscience in improving critical thinking skills of elementary school students. *International Journal of Research and Review*. 2025; 12(3): 251-262. DOI: *https://doi.org/10.52403/ijrr.20250332*

******