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Needs Analysis of Cultural Diversity-Based E-Modules Using ATLAS.ti to Enhance Elementary School Students' Critical Thinking

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Abstract
Critical thinking skills are one of the essential 21st-century competencies that need to be developed from the elementary education level. However, preliminary studies indicate that science learning in elementary schools still focuses on memorization and the delivery of information, so activities that foster students' critical thinking have not been optimally developed. This study aims to identify the needs and characteristics of cultural diversity-based e-modules that can enhance elementary school students' critical thinking skills. This study employed a descriptive qualitative approach, involving teachers and students as data sources. Data were collected through observation and interviews and were analyzed using data reduction, data display, and conclusion drawing. The findings reveal that e-modules designed to promote critical thinking should incorporate a problem-based approach, include interactive activities, and provide opportunities for students to reflect and explore ideas. In addition, the e-modules should be contextually aligned with students' real-life experiences, use communicative language, and guide students to analyze, evaluate, and make decisions based on evidence. Therefore, well-designed cultural diversity-based e-modules have the potential to effectively enhance elementary school students' critical thinking skills.
Keywords: *critical thinking, cultural diversity, e-module, elementary school, science learning*

Abstract
Kemampuan berpikir kritis merupakan salah satu keterampilan abad ke-21 yang perlu dikembangkan sejak pendidikan dasar. Namun, hasil studi pendahuluan menunjukkan bahwa pembelajaran IPA di sekolah dasar masih berfokus pada hafalan dan pemberian informasi sehingga aktivitas yang menuntun peserta didik untuk berpikir kritis belum berkembang secara optimal. Penelitian ini bertujuan untuk mengidentifikasi kebutuhan dan karakteristik e-modul berbasis keberagaman budaya yang dapat meningkatkan kemampuan berpikir kritis siswa sekolah dasar. Penelitian ini menggunakan pendekatan deskriptif kualitatif dengan subjek guru dan siswa sebagai sumber data. Data diperoleh melalui observasi dan wawancara, kemudian dianalisis melalui tahap reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa e-modul yang mampu mengembangkan kemampuan berpikir kritis perlu dirancang dengan pendekatan berbasis masalah, dilengkapi dengan aktivitas interaktif, serta memberikan ruang bagi siswa untuk berefleksi dan mengeksplorasi ide. Selain itu, e-modul perlu disusun secara kontekstual dengan kehidupan nyata siswa, menggunakan bahasa yang komunikatif, serta mengarahkan peserta didik untuk menganalisis, menilai, dan membuat keputusan berdasarkan bukti. Dengan demikian, e-modul berbasis keberagaman budaya yang dirancang secara tepat berpotensi efektif dalam meningkatkan kemampuan berpikir kritis siswa sekolah dasar.
Kata kunci: *berpikir kritis, e-modul, IPAS, keberagaman budaya, sekolah dasar*

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INTRODUCTION

Science education in elementary schools plays an important role in shaping the basic way of thinking of students. At this level, students begin to be introduced to various natural and social phenomena that exist around them, so that science learning does not only aim to instill knowledge, but also to build a scientific way of thinking. One of the abilities that is very important to be developed early through science learning is critical thinking skills. This ability helps students to understand information in depth, assess the truth of a fact, and make decisions based on logical reasons.

Syafitri et al. (2021) state that critical thinking skills are the main foundation in the learning process because they allow students to think logically, rationally, and reflectively toward various problems faced. Students who have critical thinking skills are not only able to receive information, but also can process, analyze, and relate the information to their experiences and prior knowledge. In the long term, this ability is very much needed to form individuals who are independent and able to face life's challenges wisely.

In the era of 21st century learning, critical thinking skills are part of higher order thinking skills (HOTS) that must be developed at all levels of education, including elementary school. Manurung et al. (2023) emphasize that critical thinking plays a role as the basis for the development of creativity and innovative problem-solving skills. Therefore, ideal science learning is not enough to only emphasize mastery of concepts, but must also encourage students to think, ask questions, and find solutions to problems that are relevant to their lives. In line with this, the Independent Curriculum emphasizes the importance of contextual, meaningful, and student-centered learning. This curriculum also directs education to the formation of the Pancasila Student Profile, one of which is critical reasoning. To achieve this goal, teachers are required to be able to develop learning that is inseparable from the social and cultural context of students. Learning that relates material to real life and cultural values is expected to help students understand science more fully.

Indonesia as a country that has very rich cultural diversity provides great potential to be used as a learning context. This cultural diversity includes customs, traditions, languages, and local wisdom that develop in various regions. Nadhiroh & Anshori (2023) state that learning based on local wisdom can foster character and develop students' critical thinking skills, because they learn to understand the cultural values of their region as part of life and science. Thus, science learning in elementary schools should not be separated from the cultural context, so that students can think critically while appreciating their cultural identity.

However, these ideal conditions have not been fully realized in the field. Various studies show that the critical thinking skills of elementary school students are still in the low category. Hidayati et al. (2021) found that students tend to receive information passively and are not yet accustomed to processing or reasoning again the material studied. The learning process is still dominated by lecture methods and practice questions that emphasize memorization, so that students lack opportunities to think deeply, discuss, and express opinions.

The low critical thinking ability of students is also influenced by the limitations of teachers in implementing appropriate learning models. Endaryati et al. (2021) and Maulita et al. (2023) reveal that some teachers do not yet have adequate understanding of learning strategies that can foster critical thinking skills, such as Problem Based Learning (PBL) and Project Based Learning (PjBL). As a result, learning that should be oriented toward solving real problems is still focused on one-way delivery of material.

In addition, the use of digital teaching materials in elementary schools is still limited. Sae & Radia (2023) and Rahmani & Hikmawan (2025) state that the use of interactive e-modules, animation videos, and other digital learning media has not been optimally integrated. In fact, elementary school students today live in the digital era and have a high interest in learning media that are visual, interactive, and easily accessible. The

limitation of interesting and contextual teaching materials is one of the factors that hinder the development of students' critical thinking skills.

The gap is also seen in the aspect of learning assessment. Evaluation in elementary schools generally still focuses on the mastery of factual knowledge, while the ability to reason and evaluate has not received adequate attention. Syafitri et al. (2021) emphasize that the lack of assessment instruments that are appropriate to the characteristics of critical thinking in elementary school students causes this ability to be difficult to monitor and develop systematically. This condition shows a gap between curriculum demands and learning practices in the field.

Various efforts have been made to improve the critical thinking skills of elementary school students, one of which is through learning that relates material to culture and the surrounding environment. Contextual learning makes it easier for students to understand the material because it is directly related to their experiences. Rini (2023) shows that science learning that is linked to regional culture and local wisdom can help students develop critical thinking skills. Students not only understand scientific concepts, but also learn to analyze cause and effect and find solutions to problems in their environment.

Learning approaches such as Problem Based Learning and Project Based Learning have also proven effective in improving critical thinking skills. Asri et al. (2024) and Mariskhantari et al. (2022) show that through PBL, students are trained to solve real problems that are often related to life and cultural values in society. Meanwhile, Maulita et al. (2023) add that PjBL encourages students to think critically through project activities that require collaboration, analysis, and reflection. In supporting the implementation of these learning models, the availability of appropriate teaching materials is very important. One form of teaching material that is considered suitable for the characteristics of elementary school students is the e-module. E-modules allow students to learn independently while still getting clear and systematic guidance. In addition, e-modules can present material in the form of visuals, images, videos, and interactive activities that help students understand concepts concretely.

Asri et al. (2024) show that the development of IPAS e-modules based on Problem Based Learning can improve the critical thinking skills of elementary school students. The e-module is designed by presenting problems that are close to students' lives, so that they are encouraged to analyze and find solutions independently. This finding is in line with Endaryati et al. (2021) who explain that PBL-based flipbook e-modules can empower critical thinking skills through attractive visuals and problem-based activities.

In addition, Maulita et al. (2023) emphasize that e-modules based on Project Based Learning also have the potential to improve critical thinking skills because students are involved in projects that connect material with the environment and surrounding culture. Rahmani & Hikmawan (2025) also show that interactive e-modules designed contextually can improve critical thinking skills through reflective exercises and simulations. However, most of these studies have not specifically integrated national cultural diversity as the main focus in e-module development. In fact, cultural values such as mutual cooperation, tolerance, and respect for differences are very relevant to be instilled from elementary school, especially in the context of a multicultural Indonesian nation. The integration of cultural diversity in e-modules is expected not only to improve critical thinking skills, but also to foster cultural awareness and national character in students.

Based on the description above, critical thinking skills are essential in 21st century learning and are a demand in the implementation of the Independent Curriculum in elementary schools. However, conditions in the field show a gap between these demands and learning practices that are still dominated by lecture methods, limited use of digital teaching materials, and the not yet optimal implementation of innovative learning models. On the other hand, various studies have developed e-modules to improve critical thinking skills, but have not specifically integrated national cultural

diversity as the main context of learning. Therefore, this study focuses on analyzing the needs for developing e-modules based on national cultural diversity. Data analysis was carried out qualitatively with the help of ATLAS.ti software to produce more systematic and in-depth data mapping.

METHODS

This study uses a qualitative approach with a descriptive research type that aims to analyze This study uses a qualitative approach with a descriptive research design aimed at analyzing the needs and characteristics of e-modules based on national cultural diversity in an effort to improve the critical thinking skills of elementary school students. The qualitative approach was chosen because this study focuses on an in-depth understanding of learning conditions in elementary schools, students' learning experiences, and teachers' needs for teaching materials that are relevant to the curriculum context and student characteristics. The research subjects consisted of three fifth-grade teachers and students from three elementary schools in Surakarta who were selected purposively based on their direct involvement in IPAS learning. The interviews covered several aspects, including learning conditions, student characteristics, learning constraints, teaching material needs, and school support.

The data in this study were obtained from primary and secondary sources. Primary data were collected through semi-structured interviews with teachers conducted in one session with a duration of approximately 30 to 45 minutes, one classroom observation, and open-ended questionnaires given to students to explore their learning experiences, interests, and needs for digital teaching materials. Meanwhile, secondary data were obtained through documentation studies, including learning tools, textbooks, modules used in schools, and curriculum documents relevant to IPAS learning and the strengthening of the Pancasila Student Profile.

Data analysis was carried out qualitatively using the interactive analysis model of Miles and Huberman, which includes the stages of data reduction, data display, and conclusion drawing. The data analysis process was supported by the use of ATLAS.ti software to facilitate coding, data grouping, and systematic identification of themes. In the data reduction stage, the researcher selected and focused on data relevant to the research objectives, particularly those related to learning needs, student characteristics, and the potential integration of cultural diversity in e-modules. The reduced data were then presented in descriptive form to help identify patterns, trends, and relationships between themes.

The validity of the data in this study was tested using source and technique triangulation. Source triangulation was conducted by comparing data from teacher interviews, classroom observations, and student questionnaires. Meanwhile, technique triangulation was carried out by using various data collection methods to obtain consistent information. In addition, the researcher also conducted member checking by reconfirming the interview results with the informants to ensure the accuracy of the data. Thus, the results of this study are expected to provide a valid and in-depth description of the needs for developing e-modules based on national cultural diversity to improve the critical thinking skills of elementary school students.

RESULTS AND DISCUSSION

Based on the results of interviews with elementary school teachers, various findings were obtained regarding the need for the development of e-modules in IPAS learning. These findings are summarized in the following table.

Table 1. Results of Needs Analysis for E-Modules Based on National Cultural Diversity

Aspects	Code	Findings
Display	Eye-catching visuals	E-modules need to include many images and the use of attractive colors to increase students' interest in learning
Language	Simple language	The material must be presented in language that is easy for elementary school students to understand
Content	Contextual	The material needs to be related to real-life contexts to make it easier to understand
	Project-based	E-modules need to include simple projects that students can carry out
Activities	Practicum activities	There is a need for practicum activities to increase student involvement
Presentation	Clear systematics	The material is arranged in a sequential manner so that it is easy for students to follow
Evaluation	Clear and measurable assessments	E-modules must have a structured evaluation system
Implementation	Need for teacher guidance	The use of e-modules is more effective when accompanied by teacher guidance

Based on the table, it can be seen that the main needs in the development of e-modules include aspects of visual display, the use of simple language, the presentation of contextual material, as well as the inclusion of project-based and practicum activities. In addition, e-modules also need to be arranged systematically, equipped with clear assessments, and still require teacher guidance in their use.

The results of the study indicate that the need for e-modules in IPAS learning does not only focus on aspects of digitalization, but also on the quality of material presentation that can support active student involvement and understanding. The need for attractive visual displays and the use of simple language shows the importance of aligning teaching materials with the characteristics of elementary school students. These findings are in line with studies stating that the use of engaging digital learning media, such as flipbooks and e-modules, can increase learning interest and help students understand concepts more effectively (Nurwidiyanti & Sari, 2022; Wahyu et al., 2020).

In addition, the need for contextual material presentation indicates that learning should be linked to students' real-life experiences. Contextual learning allows students to understand the material more meaningfully and enhances their critical thinking skills. This is in line with the findings of Saputri & Desstya (2023), who state that learning that integrates environmental context and students' daily lives can improve conceptual understanding and make the learning process more meaningful.

The need for project-based and practicum activities in e-modules highlights the importance of implementing active learning in the learning process. These activities provide opportunities for students to be directly involved in learning, thereby training their critical thinking and problem-solving skills. This finding is supported by Latifah et al., (2020) and Yovita et al., (2023), who state that problem-based and project-based e-modules are effective in improving critical thinking skills through active student engagement in solving contextual problems.

From the presentation aspect, the need for clear systematics and measurable assessment indicates that e-modules function not only as learning resources but also as evaluation tools that support the overall learning process. E-modules that are systematically and interactively designed can help students understand the flow of

learning and develop critical thinking skills through reflective activities. This is in line with the findings of Rismayanti et al., (2022) and Cahyanto et al., (2022), who state that interactive e-modules can enhance critical thinking skills through structured material presentation and challenging learning activities.

Furthermore, the integration of national cultural diversity in e-modules is an important aspect in creating meaningful learning. Linking learning materials with cultural values and students' social life can help them understand concepts more concretely while fostering cultural awareness. This finding is consistent with Parisu et al., (2025), Agustini (2020), and Putri & Zenien (2022), who state that the integration of culture in science learning can improve conceptual understanding, critical thinking skills, and character development.

Thus, the developed e-modules function not only as digital learning media but also as active, contextual, interactive, and culture-based learning tools. The results of this study also reinforce the findings of Endaryati et al., (2021) and Rahmani & Hikmawan (2025), which show that PBL-based and contextual e-modules are effective in improving the critical thinking skills of elementary school students.

CONCLUSION

Based on the results of the study, it shows that the development of e-modules based on national cultural diversity in IPAS learning in elementary schools needs to consider several main aspects. The required e-modules must have an attractive visual display, use simple language, and present material in a contextual manner by relating it to daily life and cultural values. In addition, e-modules need to include project-based and practicum activities to encourage active involvement and the development of students' critical thinking skills. From the presentation aspect, the material must be arranged systematically and equipped with clear and measurable assessments. Although supporting independent learning, e-modules still require teacher guidance so that their use can be more optimal.

The implications of this study indicate that the development of digital teaching materials does not only focus on technological aspects, but also on suitability with student characteristics and cultural context. Therefore, developers and teachers need to design e-modules that are interactive, contextual, and activity-based. Future research is recommended to develop and test the effectiveness of e-modules based on national cultural diversity in improving students' critical thinking skills on a broader scale.

BIBLIOGRAPHY

Agustini, F. (2020). Integrasi nilai karakter melalui permainan tradisional tarik tambang dalam pembelajaran IPA. *Jurnal Ilmiah Sekolah Dasar*, *4*(2), 114–120.

Asri, K., Haryani, S., Ellianawati, E., Subali, B., & Widiarti, N. (2024). PENGEMBANGAN E-MODUL IPAS BERBASIS PROBLEM BASED LEARNING UNTUK MENINGKATKAN KETERAMPILAN BERPIKIR KRITIS SISWA SD. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *9*(03), 90–105.

Cahyanto, A., Lesmono, A. D., & Handayani, R. D. (2022). Pengembangan e-modul interaktif berbasis articulate storyline 3 untuk melatihkan kemampuan berpikir kritis pada pokok bahasan gelombang bunyi. *Jurnal Literasi Pendidikan Fisika (JLPF)*, *3*(2), 154–164.

Endaryati, S. A., Atmojo, I. R. W., St Y, S., & Suryandari, K. C. (2021). Analisis E-Modul Flipbook Berbasis Problem Based Learning untuk Memberdayakan Keterampilan Berpikir Kritis Pembelajaran IPA Sekolah Dasar. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, *5*(2), 300–312.

Hidayati, A. R., Fadly, W., & Ekapti, R. F. (2021). Analisis keterampilan berpikir kritis siswa pada pembelajaran IPA materi bioteknologi. *Jurnal Tadris IPA Indonesia*, *1*(1), 34–48.

Latifah, N., Ashari, A., & Kurniawan, E. S. (2020). Pengembangan e-modul fisika untuk meningkatkan kemampuan berpikir kritis peserta didik. *Jurnal Inovasi Pendidikan Sains (JIPS)*, *1*(1), 1–7.

Manurung, A. S., Fahrurrozi, F., Utomo, E., & Gumelar, G. (2023). Implementasi berpikir kritis dalam upaya mengembangkan kemampuan berpikir kreatif mahasiswa. *Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar*, *5*(2), 120–132.

Mariskhantari, M., Karma, I. N., & Nisa, K. (2022). Pengaruh model pembelajaran problem based learning (PBL) terhadap kemampuan berpikir kritis siswa pada pembelajaran IPA kelas IV SDN 1 beleka tahun 2021/2022. *Jurnal Ilmiah Profesi Pendidikan*, *7*(2b), 710–716.

Maulita, P. P., Hidayat, O. S., & Hasanah, U. (2023). Analisis Kebutuhan E-Modul berbasis Project Based Learning (PjBL) pada Pembelajaran IPA untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Kelas V Sekolah Dasar. *Kompetensi*, *16*(1), 168–175.

Nadhiroh, S., & Anshori, I. (2023). Implementasi kurikulum merdeka belajar dalam pengembangan kemampuan berpikir kritis pada pembelajaran pendidikan agama islam. *Fitrah: Journal of Islamic Education*, *4*(1), 56–68.

Nurwidiyanti, A., & Sari, P. M. (2022). Pengembangan media pembelajaran flipbook berbasis literasi sains pada pembelajaran IPA sekolah dasar. *Jurnal Basicedu*, *6*(4), 6949–6959.

Parisu, C. Z. L., Saputra, E. E., & Lasisi, L. (2025). Integrasi literasi sains dan pendidikan karakter dalam pembelajaran IPA di sekolah dasar. *Journal Of Human And Education (JAHE)*, *5*(1), 864–872.

Putri, S. E., & Zenien, S. S. (2022). Penguatan Sikap Peduli Lingkungan Melalui Integrasi Nilai Nilai Islam Dalam Mata Pelajaran IPA Materi Keseimbangan Ekosistem Kelas 6 Sekolah Dasar. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, *12*(2), 81–87.

Rahmani, Z., & Hikmawan, R. (2025). Pengembangan E-Modul Interaktif Pada Mata Pelajaran Matematika untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar. *Didaktika: Jurnal Kependidikan*, *14*(1 Februari), 743–756.

Rini, N. P. Y. (2023). Penerapan Pembelajaran IPA Berbasis Kebudayaan Daerah Kearifan Lokal untuk Meningkatkan Kemampuan Berpikir Kritis Siswa di SD N 6 Songan. *Jurnal Pendidikan Deiksis*, *5*(2), 35–42.

Rismayanti, T. A., Anriani, N., & Sukirwan, S. (2022). Pengembangan e-modul berbantu kodular pada smartphone untuk meningkatkan kemampuan berpikir kritis matematis siswa SMP. *Jurnal Cendekia*, *6*(1), 859–873.

Sae, H., & Radia, E. H. (2023). Media video animasi dalam pembelajaran IPA untuk meningkatkan kemampuan berpikir kritis siswa SD. *Indonesian Journal of Education and Social Sciences*, *2*(2), 65–73.

Saputri, A. N., & Desstya, A. (2023). Implementasi Pembelajaran IPA Sekolah Dasar Berbasis Kearifan Lokal di Kabupaten Sragen. *ELSE (Elementary School Education Journal): Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *7*(2), 154–165.

Syafitri, E., Armanto, D., & Rahmadani, E. (2021). Aksiologi kemampuan berpikir kritis (kajian tentang manfaat dari kemampuan berpikir kritis). *Journal of Science and Social Research*, *4*(3), 320–325.

Wahyu, Y., Edu, A. L., & Nardi, M. (2020). Problematika pemanfaatan media pembelajaran IPA di Sekolah Dasar. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 107–112.

Yovita, Y., Vebrianto, R., Janna, R. D., & Radeswandri, R. (2023). Pengembangan E-Modul Berbasis Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Hasil Belajar Siswa. *Literasi: Jurnal Bahasa Dan Sastra Indonesia Serta Pembelajarannya*, *7*(1), 139–146.