

## The utilization of the Indonesian Karst Museum for Social Sciences learning in middle school

by

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<p><b>Article History</b> Submitted: 20-09-2024 Revised: 18-10-2024 Accepted: 20-10-2024</p> <p><b>Keywords:</b> Museum Karst, Social Studies Teaching Materials, Social Studies Learning</p>	<p><b>Abstract</b> This study seeks to explore how the Indonesian Karst Museum can be used in creating educational materials for Social Studies within the Gunung Sewu UNESCO Global Geopark area, while also exploring the museum's potential as an educational medium to enhance students' understanding of geology and karst ecosystems. The research employs a qualitative method through observations and interviews with museum staff and local Social Studies teachers. The findings reveal that the museum contains numerous relevant collections that can be incorporated into the Social Studies curriculum, though challenges in implementation were also identified. The use of the Indonesian Karst Museum in developing teaching materials for Social Studies within the Gunung Sewu area offers numerous benefits. Beyond enriching students' learning experiences, the museum also helps connect theoretical knowledge to daily life. By adopting an innovative and interactive approach, the museum has the potential to inspire Social Studies education. It is anticipated that it will lay the foundation for the development of more relevant teaching materials, optimize the use of local heritage in teaching practices, and engage students while raising awareness about the importance of preserving the karst environment in the region.</p>
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### Introduction

Indonesian Karst Museum is located in Gebangharjo Village, Pracimantoro District, Wonogiri Regency, Central Java. The museum is about 73 kilometers south of Surakarta, accessible via the Sukoharjo-Wonogiri route. From Yogyakarta City Center, the distance is approximately 65 kilometers, with a route passing through Wonosari and continuing along the main road to Pracimantoro, Wonogiri. The museum houses various aspects of Indonesian culture, such as rock formations, cave replicas, and depictions of ancient human life, and serves as a research center for historians and geologists. Wonogiri itself is a district situated in the southeastern region of Central Java.

The coast of Wonogiri Regency has three types of coastal typologies. The three types of coastal typologies are wave erosion coasts, marine deposition coasts, and structurally shaped coasts. This number is less than the karst area typology in Gunungkidul Regency which also has land erosion coast and subaerial deposition coast types (Marfai and Cahyadi, 2012; Marfai et al., 2013a). This typology appears with characteristics such as irregular winding or steep coastlines, and beach materials are dominated by sand and large rocks. The coastal dynamics in this area

are erosion by waves (abrasion) (Nugraha et al., 2013). However, because the rock material in this area is hard limestone, abrasion does not reach a dangerous level. In addition, in this typology, the location of facilities and infrastructure is very far or even non-existent, so the risk level is quite small.

In this regard, it is essential to investigate how the Indonesian Karst Museum can serve not only as an educational tool but also as a hub to raise environmental conservation awareness. By leveraging the unique and rich karst ecosystem of the Sewu Mountains, the museum can offer interactive educational programs that teach visitors about biodiversity and the environmental challenges in the area. Activities like sustainability workshops and the wise use of natural resources, for instance, could attract the attention of both local communities and tourists (Sulistiyowati et al., 2021).

Karst landscapes feature reciprocal interactions and mutual adjustments between biota and landforms, and interrelated geomorphological and ecological processes. (Phillips, 2016) Karst landscapes are present on almost every island in Indonesia. Within these karst areas, there are remnants of past life, reflecting unique socio-cultural characteristics that align with the ecosystem of each region. Karst areas are natural phenomena that encompass both living and non-living diversity. The presence of the Karst Museum is expected to serve as a valuable medium for providing the public with information about karst environments. The Sewu Mountains Geopark plays an integral role in the study and exploration of social sciences. In the Geopark development concept, the focus is on expanding knowledge, fostering community culture, and promoting economic growth.

Moreover, collaboration with local educational institutions to develop field-based curricula can strengthen community involvement and encourage active participation in the preservation of geological and cultural heritage. Thus, the museum becomes not only a place to view collections but also a center that inspires young generations to care for and protect their environment. Through various programs aimed at raising environmental awareness, the museum has the potential to become a model for similar institutions. These programs might include environmental-themed exhibitions, art displays, and innovation competitions where students create solutions to local issues. Partnerships with non-governmental organizations broaden the scope of these programs and provide extra resources to support this initiative (Sarah et al., 2012).

Moreover, developing and implementing training programs for teachers in the nearby areas can be a strategic measure to ensure that the Indonesian Karst Museum remains a valuable educational resource over the long term. Through these training sessions, educators can gain the knowledge and skills needed to incorporate conservation concepts into their curricula, fostering a generation more aware of environmental issues. Research indicates collaboration between museums and local schools can improve student learning outcomes and reinforce the link between education and the community. (Maulana, et al., 2018). In this way, the museum can evolve into a continuous learning center that has a lasting positive impact on society, while also preserving the invaluable natural heritage of the karst ecosystem. Additionally, interactive

programs that engage participants in field exploration and research activities can help students gain a deeper appreciation for the importance of environmental preservation.

Additionally, incorporating digital technology into the educational programs at the Indonesian Karst Museum could provide a novel method to engage younger generations. By creating apps or online platforms that offer interactive details about the karst ecosystem and environmental issues, the museum can extend its reach to a wider audience, including those who cannot visit in person. For instance, virtual reality could be employed to craft immersive experiences, enabling users to explore the natural beauty of the Sewu Mountains virtually, thereby raising their awareness of the importance of conservation (Kunardi et al., 2020). Such initiatives also have the potential to enhance the link between museums and educational institutions by offering valuable resources for classroom instruction and motivating students to take a more active role in tackling important environmental issues for their prospects ahead. Therefore, partnerships between schools, museums, and local communities can lead to dynamic and interactive educational programs that not only expand knowledge but also cultivate a sense of responsibility for protecting the environment. Furthermore, the use of Augmented Reality technology can enhance the learning experience by incorporating immersive visual features, such as interactive information about local flora and fauna.

Additionally, it's crucial to view the Indonesian Karst Museum as a link between scientific research and the educational community. By hosting seminars or public discussions with researchers, the museum allows visitors to gain a deeper understanding of environmental issues, such as the effects of climate change on karst ecosystems. This academic involvement enhances the learning experience while also promoting collaboration between scientists and educators, fostering a comprehensive approach to conservation. Studies indicate that direct engagement with experts significantly improves both students' and the community's understanding of the importance of preserving geological and cultural heritage (Agam, 2013).

By implementing this approach, the Indonesian Karst Museum transforms from a mere repository of information into a dynamic social hub that fosters the exchange of ideas and innovations in environmental conservation (A et al., 2018). In this role, the museum serves as a conduit between scientific knowledge and the wider community, inspiring concrete actions to protect the environment and raise awareness of pressing issues. Furthermore, the museum's regular educational programs aim to engage young generations, equipping them with knowledge and skills required to become advocates for karst preservation ecosystems (Simbirtseva, et al., 2020).

These programs offer seminars, workshops, and field activities, allowing students to learn directly from experts who actively participate and experts in conservation projects. This method aims to motivate younger generations to not only grasp the significance of karst ecosystems but also to play a role in sustainable conservation efforts (Wang & Chiou, 2018). Moreover, collaboration with local communities plays a crucial role in raising broader awareness, enabling active community participation in protecting and caring for their environment. These initiatives foster a synergy between youth and society, ensuring a holistic and sustainable approach to

preserving karst ecosystems. Involving various stakeholders, including government and non-governmental organizations, can strengthen and expand these efforts, building a robust network to support the future conservation of karst ecosystems. Additionally, integrating environmental education into the school curriculum can serve as a strategic step in instilling conservation values from an early age.

## **Methods**

The approach employed in this study is a qualitative one, specifically utilizing the phenomenological method. The approach used in this research is qualitative. According to Denzin & Lincoln (2009), qualitative research focuses on various methods, which include interpretative and naturalistic approaches to its subjects of study. This qualitative approach emphasizes various methods, including interpretive and naturalistic perspectives on the subject of study. Qualitative research is a scientific method aimed at understanding phenomena within their social context in a natural setting, prioritizing in-depth communication and interaction between the researcher and the phenomenon being examined.

In determining the informants, the researcher used the snowball sampling technique. According to Arikunto (2009), snowball sampling is a data collection technique where one data source is interconnected with another. Data collection techniques include literature reviews, which involve gathering information from libraries, research findings, and previous studies. The research team collects research journals, reference books, or written articles from various sources, both in libraries and online. Another data collection method is through observation at the Indonesian Karst Museum. These observations are conducted in various educational contexts, with the primary goal of exploring the practical implementation of social value transformation through activities conducted by educators and educational organizations.

Data analysis methods are conducted using content analysis, aimed at examining the discussion content to extract deeper insights. In this research process, several stages are followed. First, all key findings regarding the utilization of the Indonesian Karst Museum serves as a learning resource for enhancing Social Studies (IPS) teaching materials are recorded, drawing from various literature sources. Second, new theories or findings related to Social Studies learning are integrated. Third, these theories are analyzed through a critical review process, to present critical ideas about previous findings for discussion.

## **Results and Discussion**

In the context of utilizing the Indonesian Karst Museum as a source of Social Studies teaching materials, it is important to consider the active role of the local community in the development and preservation of the geopark. The karst area in Wonogiri can be developed for agriculture, livestock, special tourism attractions, and as a source of knowledge while preserving

its uniqueness and promoting sustainable resource exploitation (Soedwihajono & Pamardhi, 2020)

There are 30 site sites and 3 non-site sites on Mount Sewu UNESCO Global Geopark. This Geopark area is formed from conical hills consisting of 40,000 hills karst. Karst hill Mountain Thousand-shaped cone or shell coconut upside down (Santosa & Ethics, 2019). Draft development of the Karst Museum combines building physical and environmental nature of the surrounding area which is projection from indoor and outdoor activities. Diversity karst elements outside the building support the meaning and function of the museum so that the concept of “back to nature” has been achieved. The area outside the museum as a natural museum covers the entire Karst Mountain system Thousand in the form of karst caves (Marwati et al., 2010).

The community around the Sewu Mountains should not merely be seen as spectators, but can also be directly involved in educational activities that integrate local values with the educational curriculum. For instance, collaborative programs between educators and local communities can provide students with more contextual and relevant learning experiences while simultaneously raising awareness about the importance of environmental conservation (Hutabarat & Pratiwi, 2022). Learning social studies via objects in museums involves excitement, motivation, active participation, reconstruction of historical knowledge, enjoyment, and heightened interest in social studies as a valuable school subject. (Yilmaz, et.al, 2013). Moreover, involving the local community in the learning process can provide a deeper perspective on the relationship between humans and nature, making the educational experience more relevant and applicable to younger generations.

Museum of a Stalagmite containing a unique glacial climate record aims to demonstrate its potential as an educational and tourist resource, promoting the conservation and valorization of cave-material (Columbu, et.al, 2021). Furthermore, collaboration between museums and educational institutions can enhance the development of curricula based on local contexts. For instance, teacher training programs on methods for integrating geoscience and karst ecology into Social Studies lessons can improve the quality of education in schools near the Sewu Mountains.

Museums as educational environments in social studies lessons can provide benefits such as ensuring permanent learning, enabling students to learn better by seeing or living, and providing information about the past (Uslu, 2021). This, in turn, will encourage younger generations to become proactive agents of change, addressing environmental, social, and economic issues in their surroundings, while also supporting sustainable development goals in the region. Furthermore, it is essential to examine how the Karst Museum can serve as a hub for research and innovation for students and the community alike.

Social and mobile technologies can enhance the visitor experience in school field trips to museums by fostering social interactions and shared meaning-making processes. Charitonos, et, al (2012). The hills around the Karst Museum area provide a cottage tour for teenagers For Study more about the existence of diverse sites in geology like caves, life, and culture around the

geopark. The Karst Museum becomes tour Education. Teachers and schools give understanding to generation young will history and importance preservation of geosite sites.

Museum visits are a valuable resource for preservice social studies teachers to learn about local history and culture through visual, audio/oral, textual, and experiential learning methods. Pedros, et, al (2023). By providing opportunities for researchers and students to conduct field studies in the area, the museum evolves into a learning hub and a platform for advancing knowledge that addresses current environmental challenges. Initiatives like these will solidify the museum's role as a dynamic educational institution while encouraging active public participation in preserving its natural and cultural heritage for future generations.

Additionally, the Karst Museum plays a key role in promoting sustainable educational tourism in the Sewu Mountains region. By integrating tourism programs that include training for local guides and workshops for visitors on biodiversity and conservation values, the museum not only enhances public understanding but also creates new economic opportunities. This aligns with findings that community involvement in tourism-related activities can strengthen socioeconomic conditions, as demonstrated by research (Kunardi et al., 2020). Through this approach, Karst Museum can act as a bridge between education, conservation, and economic development, generating broader positive impacts for both the environment and the local community.

The use of the Indonesian Karst Museum in creating Social Studies teaching materials can take various forms, both printed and digital. Typical printed teaching materials consist of handouts, books, modules, brochures, and student worksheets. Handouts are materials provided to students during learning activities, designed to facilitate their understanding by offering additional information or serving as a guide. Some view handouts as written resources aimed at expanding students' knowledge (Prastowo, 2011). Teachers can develop handouts by sourcing content from relevant literature that aligns with the students' learning objectives. Today, handouts can easily be downloaded from the internet or adapted from a variety of publications and additional resources.

The use of the Indonesian Karst Museum in developing Social Studies instruction resources offers significant benefits for learning. According to Chosmin S. Widodo & Jasmadi (2008), the process of creating teaching resources involves several key steps: 1) determining Core Competencies and Activity Plans: Identifying core competencies is essential for laying the foundation of the teaching and learning process. A well-structured activity plan is necessary to ensure effective implementation, and teaching materials play a crucial role in this; 2) analyzing Teaching Material Needs: This involves assessing the competencies to determine the quantity and content of teaching materials required. The analysis includes defining competencies, identifying the scope of each competency unit, determining the necessary knowledge, skills, and attitudes, and selecting appropriate titles for the teaching materials; 3) drafting the Materials: This step involves organizing and structuring the learning content to achieve specific competencies or sub-competencies in a systematic manner. For example, teaching materials may be developed as a module focusing on the use of the Indonesian Karst Museum.

Generally, teaching materials serve specific purposes for both teachers and students. For teachers, these materials guide all activities throughout the learning process and outline the competencies to be taught. For students, teaching materials act as guidelines during their learning and detail the competencies to be studied. Additionally, teaching materials serve as instruments for assessing learning outcomes. Well-designed teaching materials should feature learning instructions, targeted competencies, content, supplementary information, exercises, work guidelines, evaluation methods, and feedback on assessment results.

The Indonesian Karst Museum builds similar as pyramid from Egypt, consisting of three floors that have a theme on each floor. The first floor of the museum is themed Karst for Life, then on the floor, both museums have the theme Karst for Knowledge, while the third floor is auditorium space used for various interests, such as meetings, demos, and film screening.

**Table 1.**

**List of caves in the Indonesian Karst Museum Area**

No	Cave Name	Cave Potential
1	Tembus Cave	Archaeology, Geotourism, Speleology and Geomorphology
2	Sondang Cave	Hydrology, Speleology, and geomorphology, caving, and tourism
3	Potro-Bunder Cave	Archaeology, speleology and geomorphology, geotourism
4	Crazy Cave	Archaeology, hydrology, speleology and geomorphology, caving and tourism
5	Mrico Cave	Geotourism, speleology and geomorphology
6	Sapien Cave / Luweng	Hydrology, speleology and geomorphology, caving, and tourism
7	Sonaya Ruri Cave	Hydrology, speleology, and geomorphology, caving and tourism

Source: Department of Culture, Tourism, Youth and Sports of the Regency Wonogiri

The existence of caves around objects World Karst Museum Area tour is one of the reasons that the District Pracimantoro Wonogiri is worthy of making it into the World Karst Museum Area. When teaching materials are created according to proper guidelines, teachers can effectively manage all aspects of the learning process, covering various competencies that need to be taught or practiced. For students, these materials clarify which competencies they need to master during the current learning program. Essentially, teaching materials provide a framework for students' learning experiences. A module designed for using the Indonesian Karst Museum in developing Social Studies teaching materials is intended for students to learn independently, either with or without teacher assistance. Therefore, the module should include learning instructions, targeted competencies, lesson content, supplementary information, practice questions, work guidelines, evaluation criteria, and feedback on assessment results

(Prastowo, 2011). Offering such a module enables students to learn independently at their own pace. Those who learn slowly can review each activity multiple times without time constraints, while those who learn quickly can benefit from a module that accommodates various learning speeds.

Additionally, the development of a karst museum can serve as a platform to raise awareness and educate the public about climate change, a critical issue in today's global context. By organizing seminars, workshops, and exhibitions that highlight the impact of climate change on karst ecosystems and local communities, the museum not only imparts knowledge but also encourages collaborative efforts for mitigation and adaptation. Studies suggest that active participation in these educational activities can improve the community's grasp of environmental risks and sustainable practices.

## **Conclusion**

Research found that the Indonesian Karst Museum serves as an important resource for social studies education, with positive experiences reported by both educators and students. Nevertheless, issues like limited resources and time limitations were also recognized identified noted. The study recommends increased teacher training and the development of more interactive exhibits. It also emphasizes a need for additional research to compare the impact of museum visits compared to other educational methods in the area. In summary, integrating incorporating museums into the social studies curriculum can enhance student learning and involvement, but it necessitates thoughtful support to achieve these benefits. Subsequent studies could examine how various types of museums affect student learning outcomes. And investigate effective ways to measure the success of museum integration.

Additionally, research could focus on overcoming obstacles to integrating museums into the curriculum, including challenges like insufficient funding or transportation issues. Overcoming the study's recommendations could lead to more impactful and beneficial museum experiences for students. In conclusion, incorporating museums in educational contexts offers students practical experiences that deepen their comprehension of various topics. Integrating museums enables students to interact with artifacts and displays, making learning more vivid compared to conventional classroom teaching. This hands-on approach not only enhances students' appreciation for the subject matter but also promotes critical thinking skills and a lasting passion for learning. Museums play a crucial role in enriching the educational experience and should be maximized for the benefit of both students and educators.

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