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Earth at Your Fingertips Socialization: Getting to Know Digital Maps and Google Earth Regarding Lembang Fault Mitigation at SMP Negeri 2 Lembang

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Abstract

Lembang, located near a fault line, demonstrates significant susceptibility, underscoring the need for proactive disaster literacy initiatives. This community service initiative seeks to enhance students' understanding of earthquake disaster mitigation by using digital maps and Google Earth to pinpoint areas, assess potential risks, and formulate disaster risk reduction measures. The implementation technique is a participatory-educational strategy that includes presentations of materials, demonstrations of digital maps, practical exploration of the Lembang Fault area in Google Earth, and interactive conversations. The participants, students from SMP Negeri 2 Lembang, acquired a thorough understanding of fundamental Geographic Information System (GIS) principles, the identification of high-risk areas, and basic visual-spatial analysis simulations. The findings indicate an enhancement in students' understanding of disaster prevention principles and their capacity to analyze digital spatial data. This activity demonstrates that incorporating digital technology into disaster education effectively enhances risk awareness from a school-age perspective.

Keywords: *Disaster Mitigation, Lembang Fault, Digital Maps, Google Earth, Geographic Information Systems*

Introduction

The swift advancement of digital technology in recent years has brought substantial changes across multiple facets of society, including education and crisis management. Employing geospatial technology, such as Google Earth, allows users to interactively access, observe, and evaluate the Earth's surface in real time. This phenomenon illustrates that geography and disaster education have transcended traditional methods, evolving into more relevant and engaging digital alternatives for pupils (Goodchild, 2007; Kim & Bednarz, 2021). Conversely, Indonesia's position within the Ring of Fire makes the nation susceptible to significant geological hazards, particularly the Lembang Fault in West Java, which has the potential to trigger catastrophic earthquakes. Data from the Meteorology, Climatology, and Geophysics Agency (BMKG, 2022) indicates that the Lembang Fault is an active fault extending approximately 29 km and has the potential to produce earthquakes of magnitudes 6.8-7.0. This issue corresponds to a study by the Geological Agency (2023), which indicates that the area near the Lembang Fault demonstrates a significant vulnerability index owing to a substantial population increase and rapid urban development. The primary concern in the region at present is the inadequate disaster literacy among pupils. A report from the National Catastrophe Management Authority (BNPB, 2021) indicates that students' understanding of catastrophe risks and mitigation measures is rated as poor to moderate. Amri et al. (2023) assert that disaster education in schools is inadequate, largely due to educators' reliance on traditional methods and the infrequent use of digital technology. At SMP Negeri 2 Lembang, situated near the Lembang Fault zone, the situation is particularly urgent, as students live in a high-risk area with insufficient awareness of mitigation strategies. This community service initiative aims to improve early disaster literacy through innovative, technology-driven methods. The incorporation of digital maps and Google Earth in training sessions enhances visual engagement and deepens students' comprehension of their surroundings (Hidayati et al., 2022). Kerski (2020) argues that integrating geospatial technology into education effectively enhances students' critical thinking and spatial analysis skills.

According to previous research, the majority of disaster mitigation socialization activities predominantly depend on traditional lecture techniques, basic simulations, and printed materials (Shaw et al., 2011; BNPB, 2021). The application of interactive GIS technology in community service initiatives at the junior high school level is notably limited, especially in localized contexts such as the Lembang Fault mitigation. Research by Setyowati et al. (2024) indicates that the incorporation of digital technology into school disaster education is inadequate. This mismatch underscores a notable divide between advances in instructional technology and their practical application in disaster education.

This community service initiative seeks to solve this deficiency by:

1. Improve students' comprehension at SMP Negeri 2 Lembang regarding Lembang Fault catastrophe mitigation through digital mapping and Google Earth-based outreach.
2. Enhance kids' knowledge and readiness for potential calamities in their vicinity;
3. Propose a digital technology-based disaster education approach that schools may easily implement.
4. Facilitate initial disaster risk mitigation initiatives.

Method

Instructors and students from STMIK Mardira Indonesia commenced a community service initiative to deliver disaster mitigation education and outreach with digital maps at SMP Negeri 2 Lembang, West Bandung Regency, West Sumatra. This program emphasizes the introduction to digital maps, Google Earth, and the Lembang Fault, while enhancing comprehension of fault lines and the location and distinct characteristics of the Lembang Fault. The team also outlines the historical activity in the Lembang region regarding potential earthquake and landslide risks. The seminar offers extensive information on digital mapping, disaster consequences, mitigation measures, rescue operations, management

frameworks, and spatial hazard and risk zone maps in the vicinity of the Lembang Fault.

The team employs instructional techniques to enhance students' comprehension at SMPN 2 Lembang of the digital mapping of the Lembang Fault and the associated hazards during an earthquake, which is essential for risk mitigation and guiding responses in a real seismic event. After the presentation, the action shifts to discussions and question-and-answer (Q&A) sessions. Discussions are a potent pedagogical approach that facilitates the exchange of ideas, opinions, and information among participants and presenters. This approach seeks to cultivate critical thinking, communication, and collaboration through several forms, including small-group discussions, classroom dialogues, and debates, making it an exceptionally powerful tool for fostering interactive and participatory environments (Ruslandi et al., 2025). The incorporation of talks and Q&A sessions effectively improves understanding while addressing uncertainties or misconceptions about the presented materials.

Consequently, the team conducts interviews to assess students' comprehensive understanding of disaster mitigation training and digital map applications, enabling facilitators to tailor future information dissemination to students' knowledge levels. The interview methodology functions as a principal method for data collecting through direct or indirect face-to-face question-and-answer sessions with respondents as data sources (Rahmawati et al., 2024). Direct interviews entail immediate discourse with the observed individuals, devoid of intermediaries. Following the interviews, the activity advances to digital map presentations and earthquake simulations, which educate students on vital emergency rucksack items and self-evacuation strategies in the event of a Lembang Fault disaster.

Results and Discussion

On December 4, 2025, the team secured official authorization and submitted a notification letter from the LPPM (Institute for Research and Community Service) of STMIK Mardira Indonesia to the Principal of SMP Negeri 2 Lembang to implement the community service program. A student representative formally delivered the administrative letter to the ninth-grade pupils, which was well accepted by the school management. This administrative compliance constituted the essential preliminary phase of the program, ensuring rigorous adherence to appropriate bureaucratic regulations to facilitate the seamless execution of the community service activity and fulfill the team's established objectives.

On January 14, 2026, following the conclusion of the administrative process, lecturers and students from STMIK Mardira Indonesia successfully executed the community service activity, thereby meeting one of the fundamental tenets of the Tri Dharma Perguruan Tinggi (the Three Pillars of Higher Education). This initiative sought to provide direct benefits to the wider community by organizing a socialization session on digital mapping and Google Earth, while also imparting essential disaster mitigation education on the Lembang Fault using Geographic Information Systems (GIS) to students at SMP Negeri 2 Lembang, Lembang District, West Bandung Regency, West Java.

Figure 1. Location of Community Service Activities

The community service initiative produced favorable results, particularly allowing ninth-grade students at SMP Negeri 2 Lembang to understand the use of digital maps and Google Earth, while promoting ongoing awareness of Lembang Fault disasters. The ninth-grade kids demonstrated remarkable passion and engagement throughout the program, ensuring a smooth transition from the opening session to the closing ceremony. Figure 1 illustrates the documentation of the community service initiative conducted for the ninth-grade students at SMP Negeri 2 Lembang.

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Figure 2. Presentation of Plaque to the Principal of SMPN 2 Lembang

Figure 3. Implementation of Material Presentation

After the material presentation, the concluding session included discussions, interviews, simulations, and award presentations for selected students. The team conducted thorough discussions, simulations, and interviews to assess the audience's comprehension of the topic and address

any remaining questions. The facilitators awarded gifts of appreciation to several kids who exhibited exceptional engagement and participation during the activity.

Figure 4. Gift Giving

Conclusion

A community service team comprising academics and students from STMIK Mardira Indonesia successfully conducted an educational program for ninth-grade students at SMP Negeri 2 Lembang, West Bandung Regency. The team meticulously executed each element of the project, encompassing the acquisition of administrative school permits, the presentation of materials, and the facilitation of interactive conversations, simulations, and organized interviews. The team leaders and members completed the community service program, demonstrating excellent execution and earning overwhelmingly good comments from participants. This program enhanced students' comprehension of the imperative for continuous monitoring of Lembang Fault hazards. They also excelled in the use of Geographic Information System (GIS)-based digital maps, which is

particularly pertinent given their dwellings' location along the Lembang Fault line. Additionally, the students gained insight into basic preparedness measures to ensure optimal readiness in the occurrence of a natural disaster.

The implementation of the community service program titled "Earth at the Fingertips: Introducing Digital Maps & Google Earth for Lembang Fault Mitigation at SMP Negeri 2 Lembang" led the team to conclude that the ninth-grade students markedly enhanced their understanding of the significance of utilizing digital maps and Google Earth to promote awareness and disaster prevention. The curriculum effectively enhanced kids' understanding, better equipping them for unforeseen emergencies during natural disasters, while enabling them to share this essential disaster mitigation knowledge with their parents.

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