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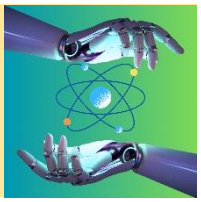

Strengthening Technology Literacy for Children in Cot Suruy Village: Drone as A Creative Learning Media

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Abstract

The development of digital technology demands greater technology literacy from an early age. However, in Cot Suruy Village, children have limited exposure to advanced technology beyond gadgets used for entertainment. This community service activity aims to strengthen children's technological literacy in Cot Suruy Village by introducing drones as a creative learning medium. The method used included training and hands-on practice involving 15 children aged 8–12 years. The activity was divided into three sessions: theory (a basic introduction to drones), practice (flying drones, navigation, and image capture), and reflection and evaluation. The results showed that the children successfully understood the basic concepts of drone technology and were able to operate them effectively. More importantly, the program succeeded in increasing their interest in science and technology and in developing creativity, coordination, and teamwork skills. This activity demonstrates that drones can serve as an effective educational medium to spark children's interest in technology in the digital era.

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1. Introduction

Entering the digital era, technological literacy is no longer considered an additional skill but a fundamental necessity that must be cultivated from an early age. The younger generation's ability to use technology wisely will play a crucial role in determining the nation's progress. In Indonesia, however, the integration of digital literacy into the educational system, particularly at the elementary school level, still faces various challenges [1]. Many children are exposed to technology primarily through entertainment-oriented devices such as smartphones and tablets, which tend to encourage passive consumption rather than creative or productive engagement.

Appropriate technological introduction in educational contexts can significantly enhance knowledge development and problem-solving skills. This underscores the importance of integrating STEM-based learning (Science, Technology, Engineering, and Mathematics), which aims to train students to think critically, creatively, and collaboratively to solve real-world problems [2]. Among various tools that can support STEM learning, drones stand out as one of the most promising technologies for education, yet their potential remains underexplored, mainly among children.

Several community service initiatives in Indonesia have demonstrated the effectiveness of drones as innovative learning media. Drone-based learning programs have been shown to enhance students' competencies and adaptability in the Industrial Revolution 4.0 era [3]. Moreover, introducing drones to younger learners can be an engaging way to explore audio-visual recording technology and spatial awareness, helping them understand how digital tools interact with real-world environments [4]. These findings suggest that drones can bridge the gap between abstract technological concepts and hands-on experiences that stimulate curiosity and innovation.

In the context of Gampong Cot Suruy, located in Ingin Jaya District, Aceh Besar Regency, children show a high level of enthusiasm for learning but have had minimal exposure to advanced technologies such as drones. The lack of educational facilities and extracurricular resources outside of school remains a significant obstacle. Despite this, Cot Suruy's strategic location and good accessibility make it a suitable environment for community-based educational programs aimed at technological empowerment. These conditions provided a strong rationale for implementing a drone-based educational outreach initiative.

Through this community engagement program, Abulyatama University seeks to introduce drones as an educational and recreational learning medium. The activity was designed not only to familiarise children with the basic principles of drone operation but also to cultivate technological literacy as a lifelong learning skill. By engaging children in hands-on experiences with technology, the program aims to encourage them to view drones not merely as toys but as creative learning tools that can enhance observation, problem-solving, and teamwork abilities.

Ultimately, introducing drones to children in rural communities like Cot Suruy is a strategic step toward reducing the digital divide in education between urban and rural areas. It also demonstrates that early exposure to emerging technologies can strengthen students' cognitive, social, and emotional skills while aligning with Indonesia's national goal of fostering a technologically literate generation. This initiative reinforces the idea that digital literacy should be inclusive, engaging, and adaptable to the diverse contexts in which Indonesian children grow and learn.

2. Methodology

This community engagement activity was conducted in Gampong Cot Suruy, located in Ingin Jaya District, Aceh Besar Regency. The program employed a participatory training method combined with hands-on practice, emphasising participants' direct involvement to enhance understanding and engagement. The target group consisted of children aged 8–12 years residing in Cot Suruy Village. A total of 15 participants actively participated in the training sessions, which were designed to introduce the fundamental concepts and applications of drone technology in an interactive, child-friendly manner.

Program Design and Implementation Process

The program was structured around a training and practical learning model that focused on the use of drones as uncrewed aerial vehicles (UAVs) and visual recording tools. The design emphasised experiential learning to promote technological literacy through real-world application. The entire activity was divided into three main stages: preparation, implementation, and evaluation. Each stage was systematically developed to ensure that participants could learn progressively, from conceptual understanding to practical operation.

Preparation Stage

During the preparation stage, the community service team conducted an initial field survey to analyse the needs and conditions in Gampong Cot Suruy. The team also held coordination meetings with the village head, community leaders, and parents to gain support and ensure local participation. Equipment preparation was another key component at this stage, including the provision of child-safe drone units and supporting instructional materials. The preparation process ensured that the activities would run smoothly, safely, and effectively in accordance with the learning objectives.

Implementation Stage

The implementation phase was carried out in two main venues: the courtyard of Meunasah Cot Suruy and a nearby open field suitable for drone flight training. The training was divided into two primary sessions: theoretical and practical. Theory Session: Delivered informally and engagingly to maintain participants' interest, this session introduced the basic concepts of drone technology, including the identification of parts, understanding of functions, principles of flight, and potential educational benefits. Practical Session: The children were divided into small groups to encourage teamwork and shared learning. Each group practised drone operations under supervision, including basic flight manoeuvres, safe navigation, and techniques for aerial photography and videography. The session aimed to develop technical, motor, and coordination skills while fostering curiosity and enjoyment in learning technology.

Evaluation Stage

The final stage involved participatory evaluation, emphasising reflection and feedback. The facilitators observed the children's performance and skill development during the activities, focusing on their ability to control and navigate the drones safely. Evaluation was conducted through interactive discussions and question-and-answer sessions, allowing participants to express their understanding, challenges, and personal impressions. This stage provided valuable insights into the effectiveness of the training and the participants' learning outcomes, highlighting increased enthusiasm, comprehension, and technological awareness among the children.

3. Result & Discussion

The results of this community engagement program demonstrate clear, measurable achievements from both output and outcome perspectives, in alignment with the primary objective of enhancing children's technological literacy. From an output standpoint, the program successfully engaged 15 participants aged 8 to 12, all of whom developed an understanding of the basic principles of drone technology. Participants were able to identify the main components and functions of a drone and, more importantly, operate the devices safely and effectively under supervision. These results affirm that, with proper guidance, children can comprehend complex technological concepts when presented through engaging, context-appropriate methods.

During the training process, participants exhibited progressive improvement in confidence and operational skills. Initially, they were cautious and somewhat anxious in handling the drones. However, by the final session, they demonstrated the ability to execute basic manoeuvres, including takeoff, landing, hovering, and directional navigation. This progression illustrates the effectiveness of hands-on learning approaches, where direct interaction with technological tools enhances comprehension and skill retention [8], [9]. Such methods also encourage curiosity and experimentation, key traits in early STEM education.

Moreover, the training sessions revealed the importance of peer learning and collaboration. By organising participants into small groups, the activity fostered teamwork, communication, and problem-solving. The children worked together to coordinate drone flights and troubleshoot operational challenges. These experiences not only improved their technical capabilities but also cultivated essential social and collaborative skills—a foundation for future engagement in STEM-based education [2], [10]. This finding resonates with the constructivist learning framework, which emphasises the value of collaborative interaction in constructing knowledge.

From an outcome perspective, the activity achieved its main goal of increasing children's technological literacy in Gampong Cot Suruy. Observations during and after the sessions showed a significant rise in enthusiasm toward science and technology. The children expressed excitement and curiosity about drone design, camera systems, and potential applications in various fields such as mapping, agriculture, and disaster monitoring. This enthusiasm demonstrates how experiential learning using emerging technologies can serve as a gateway for STEM motivation among young learners [3], [7].

The children's reactions also reflect a positive shift in perception toward technology from mere entertainment to meaningful educational exploration. Before the program, most participants associated technology solely with gadgets used for games or videos. Afterwards, they began to perceive technology

as a tool for creativity, innovation, and problem-solving. This transformation aligns with prior findings that early engagement with educational technology can help children develop a growth-oriented, exploratory mindset [8]. The shift indicates that technology literacy can evolve through carefully designed experiential programs rather than purely theoretical instruction.

An equally important outcome of the program was the emergence of critical thinking and creativity among participants. During the practice sessions, children often asked analytical questions about flight mechanisms, drone sensors, and camera stabilisation. These questions revealed a growing sense of inquiry and reasoning, key indicators of developing cognitive engagement. According to Afriana [2], STEM-based learning promotes such inquiry-oriented behaviour by integrating science and technology into interactive, real-world contexts. The use of drones, in this case, made abstract engineering concepts tangible and relatable.

The community dimension of the activity also played an important role. Parents and local community leaders observed the sessions and provided positive feedback, noting that the children appeared more motivated and disciplined after participating. Their engagement helped reinforce the program's sustainability by encouraging families to support technology-based learning at home. This aligns with findings from similar outreach programs in Aceh Besar and other regions, where community involvement significantly enhanced the continuity and effectiveness of technology literacy initiatives [4], [5].

Comparatively, the outcomes observed in Gampong Cot Suruy mirror those of similar initiatives across Indonesia. For instance, Alghafur et al. [4] found that introducing drones to children in Gampong Meunasah Kulam successfully broadened their technological perspectives and creativity. Likewise, Oswara et al. [5] demonstrated that drone training in Islamic boarding schools (pesantren) effectively served as an engaging learning medium, bridging traditional education with modern technology. These parallels reinforce the argument that drone-based education can be replicated and scaled to various community contexts, provided that cultural and logistical adaptations are made.

Another noteworthy result is the development of psychomotor and coordination skills. Operating drones requires synchronisation of visual, motor, and cognitive responses, which helps improve children's fine motor control and situational awareness. According to S. Rahman et al. [11], such motor-technical coordination activities significantly contribute to neurological and cognitive development in early learners. Therefore, beyond its technological objectives, the program indirectly supports the development of physical and perceptual skills among participants.

In summary, the drone literacy program implemented in Gampong Cot Suruy effectively demonstrated that integrating modern technology into informal education can bridge the digital divide in rural areas. The program not only increased awareness and knowledge of drone technology but also encouraged curiosity, teamwork, and problem-solving abilities. These findings confirm the relevance of drone-based educational activities as a viable approach to fostering creativity and STEM engagement among children in local communities. Ultimately, this initiative exemplifies how community-based technology education can catalyse nurturing a generation that is not merely technologically competent but also innovative, critical, and socially collaborative.

4. Conclusion

The community engagement program introducing drones as a creative learning medium was successfully implemented and made a positive contribution to enhancing children's technological literacy in Gampong Cot Suruy. Through this activity, the participants not only learned about drone technology and developed the ability to operate it safely and effectively but also cultivated essential skills such as creativity, coordination, and teamwork. The enthusiasm shown by the children throughout the program demonstrates that drones can serve as an effective educational tool to spark young learners' interest in science and technology. To ensure the sustainability of this initiative, continued support from local schools and village authorities is highly recommended to expand access to educational technology. Furthermore, similar programs should be extended to other villages with comparable conditions to broaden their positive impact. Finally, improving technology-based educational facilities, such as

providing computers and reliable internet connections, remains essential to foster a more modern, engaging, and interactive learning environment for children in rural communities.

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References

[1] D. A. Putri and A. Nanggala, "Analisis Penerapan Literasi Digital Dalam Pembelajaran Di SDN 258 Sukarela," Journal of Social Science Research, vol. 3, no. 4, 2023.
[2] J. Afriana, "Pendekatan Pembelajaran STEM untuk Menghadapi Revolusi Industri 4.0," in Prosiding Seminar Nasional Pendidikan IPA, Universitas Negeri Semarang, 2016.
[3] D. Danardono, S. Sunariya, and V. N. Fikriyah, "Peningkatan Ketrampilan Siswa dalam Menghadapi Perkembangan Keilmuan Geografi Era 4.0 Melalui Pengenalan Drone Mapping," Aksiologiya: Jurnal Pengabdian Kepada Masyarakat, vol. 5, no. 1, pp. 104–111, 2020.
[4] J. Alghafur, I. Safwadi, and R. E. Putra, "Pengenalan Drone sebagai Alat Perekaman Audio Visual kepada Anak-Anak dan Remaja Gampong Meunasah Kulam Kecamatan Mesjid Raya Kabupaten Aceh Besar," Al Ghafur: Jurnal Ilmiah Pengabdian kepada Masyarakat, vol. 2, no. 2, pp. 241–247, 2023.
[5] R. M. Oswara, R. L. Fathira, I. S. Permana, M. S. Renjani, D. Heriyanto, and S. Wijaya, "Pengenalan Teknologi Drone di Pondok Pesantren Al-Inayah 3," Community Development Journal: Jurnal Pengabdian Masyarakat, vol. 6, no. 1, pp. 968–972, 2025.
[6] UNESCO, "Education for Sustainable Development Goals: Learning Objectives," Paris: UNESCO Publishing, 2017.
[7] World Economic Forum, "The Future of Jobs Report," Geneva, 2023.
[8] A. Kolb and D. A. Kolb, Experiential Learning Theory: A Handbook of Theory, Research, and Practice. Englewood Cliffs, NJ: Prentice Hall, 2017.
[9] L. Vygotsky, Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press, 1978.
[10] M. Honey, G. Pearson, and H. Schweingruber, STEM Integration in K–12 Education: Status, Prospects, and an Agenda for Research. Washington, DC: National Academies Press, 2014.
[11] S. Rahman, L. Wibowo, and A. Siregar, "Integrating Drone-Based Learning in Elementary Education to Enhance Cognitive and Psychomotor Development," International Journal of STEM Education Research, vol. 4, no. 2, pp. 45–56, 2022.