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IoT-Integrated Android Learning Application for Early Agricultural Career Awareness: Development and Feasibility Study

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ABSTRACT
The declining interest of younger generations in agricultural professions has become a growing concern, highlighting the need to introduce agricultural literacy from an early age. Integrating technology into early childhood education offers a promising approach to make agricultural concepts more engaging and meaningful for young learners. This study aims to develop and evaluate the feasibility of an IoT-integrated Android-based learning media designed to introduce agricultural professions to early childhood students in Raudhatul Athfal. The research employed a Research and Development (R&D) approach using the ADDIE model, which includes the stages of analysis, design, development, implementation, and evaluation. A small-scale field trial was conducted with 24 Group B students during classroom learning activities over a two-week implementation period. The developed application incorporates three main features: plant identification with voice narration, a simple planting simulation, and real-time greenhouse monitoring using IoT-based temperature and humidity sensors. The results of expert validation showed a high level of feasibility, with an average score of 3.53 out of 4, categorized as very feasible. In addition, student response analysis indicated strong engagement, with an average score of 3.6. The findings also demonstrated improvements in students' ability to recognize plants and an increased interest in agricultural professions. In conclusion, the integration of IoT-based environmental monitoring with Android learning media can create meaningful and experiential learning opportunities for early childhood learners. This approach not only enhances agricultural literacy but also fosters early awareness of agricultural careers. It is recommended that future studies expand the implementation on a larger scale and explore additional interactive features to further optimize learning outcomes in early childhood education.

Keywords: *Agricultural Career awareness, Android Educational Media, Early Agricultural Literacy, IoT-Based Learning*

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INTRODUCTION

The introduction of agricultural professions to early childhood is increasingly important amid the declining interest of younger generations in the agricultural sector. Early exposure to farming activities is essential because children need to understand the origin of food, the value of agricultural work, and the role of farmers in sustaining national food security (Syaleha et al., 2023). However, current data show a worrying trend: Indonesia is experiencing a crisis of millennial farmers (Noor & Suwandana, 2024), marked by reduced enthusiasm among youth to pursue agricultural careers due to perceptions of low income (Erliaristi et al., 2022), limited prestige, and urban migration (Julianti, 2025). These challenges are further intensified by the rapid reduction of green spaces and children's limited interaction with nature, especially in urban settings (de la Osa et al., 2024). Early childhood agricultural education is therefore crucial to cultivating environmental awareness (Andini, 2024), strengthening ecological literacy (Romadhon et al., 2025), and fostering positive attitudes toward farming from an early age (Makabori & Tapi, 2019). From a developmental perspective, early childhood represents a critical stage for shaping children's understanding of social roles and professions. Early childhood education plays an important role in supporting children's cognitive and social development, including their understanding of the surrounding social environment and professional roles (Chiang, 2022).

Early exposure to knowledge about different occupations helps children develop initial perceptions about professions and supports the formation of early career awareness (Attika & Retnaningsih, 2025; Keumala et al., 2018; Putri, 2024). Therefore, introducing agricultural professions during early childhood education can help build positive perceptions toward farming and increase children's awareness of agricultural careers. In addition, experiential learning emphasizes that children learn more effectively when they interact directly with real-world phenomena and observe environmental processes through exploration and hands-on activities. Learning environments that allow children to observe natural processes and interact with their environment can strengthen conceptual understanding and stimulate curiosity (Murro et al., 2025). In this context, integrating digital learning media with environmental monitoring technologies such as IoT can create experiential learning opportunities that connect technological exploration with real agricultural activities.

Despite its importance, early exposure to agriculture in ECE has not been optimally implemented. Learning activities in many early childhood institutions remain centered on storytelling, worksheets, and conventional visual aids, which limit children's opportunities to explore natural and scientific concepts meaningfully (Mahmud, 2024). Teachers often lack innovative media to introduce plants, farming activities, or agricultural professions in ways that are interactive and developmentally appropriate. As a result, children tend to be passive learners, have limited recognition of plant species, and rarely experience hands-on agricultural activities (Fitriah et al., 2021). Moreover, rapid digitalization in society has shifted children's daily interactions toward mobile devices, yet these tools are rarely utilized for educational purposes related to agriculture (Paremeswara & Lestari, 2021). This situation creates a gap between children's learning needs and the availability of instructional media that can bridge conceptual understanding, environmental awareness, and technology-based learning.

Previous studies related to early childhood agricultural learning can be grouped into three main thematic areas, namely digital learning media for young children, agricultural learning activities for early childhood, and the use of technology-enhanced learning environments such as IoT in education. First, a number of studies have discussed the role of digital learning media in supporting engagement, exploration, and cognitive development in early childhood education. The integration of Android-based learning media has been shown to enhance engagement, interactivity, and motivation among early childhood learners by offering multisensory experiences that support exploration, curiosity, and independent learning (Fitriani et al., 2022). In parallel, Internet of Things (IoT) technology provides unique opportunities for experiential learning by presenting real-time environmental data such as temperature and humidity which can strengthen children's understanding of plant growth conditions (Qudwatullathifah et al., 2025). Combining Android learning media with IoT-based greenhouse monitoring enables children to observe changes, interpret simple data, and build meaningful connections between digital experiences and real-world phenomena. Such technological integration is expected to stimulate curiosity, broaden learning experiences, and increase interest in agricultural activities through engaging and authentic interactions with plants and their environment.

Second, previous studies have highlighted the importance of agricultural learning activities in developing environmental awareness, agricultural literacy, and children's familiarity with nature-based practices. Previous studies have explored the development of Android-based learning media for early childhood and demonstrated that digital applications can effectively support concept learning, vocabulary development, scientific exploration, and cognitive improvement (Sanadz et al., 2023). Research on Android educational media, including Augmented Reality applications, shows increased learning motivation and interactive engagement among young learners (Abidin & Haq, 2023). Studies on agricultural education for early childhood also highlight the value of hands-on farming activities such as hydroponics (Nabila & Yuwan Fijar Anugrah, 2025) and urban farming in fostering environmental awareness and agricultural literacy (Syaleha et al., 2023). Meanwhile, nature-based agricultural learning models have been shown to significantly enhance children's recognition of plants, sensory development, and motivation to engage in environmental stewardship (Sunanik, 2018).

Third, recent studies have begun to examine the use of technology-enhanced learning environments, including IoT-based systems, to support real-world observation and experiential learning. However, most research on IoT applications focuses on agriculture for older students or general farming systems (Sunanik, 2018), while studies that integrate IoT with ECE learning media remain limited. Existing Android-based media for early childhood generally emphasize basic concepts such as shapes (Wahyuni et al., 2022), animals, fruits, or early literacy skills, rather than introducing agricultural professions.

Despite these contributions, the existing literature still shows an important gap in the integration of mobile learning, agricultural career introduction, and real-time IoT-based environmental monitoring for early childhood education. Although previous studies demonstrate the potential of digital media and nature-based approaches in early childhood agricultural education, a clear gap remains in integrating mobile learning with real-time IoT-based greenhouse monitoring to introduce agricultural professions to young children. Existing agricultural education initiatives largely emphasize planting activities without incorporating technology-enhanced monitoring that mirrors real agricultural practices. Likewise, Android-based learning media for ECE typically focus on foundational cognitive skills (Komang & Surya, 2021) rather than promoting awareness of agricultural careers. Therefore, this research proposes a novel approach that combines an IoT-integrated Android application with experiential agricultural learning to foster children's interest in farming professions while aligning with early childhood developmental needs.

Despite the growing body of research on digital learning media and nature-based agricultural activities for young children, several limitations remain evident in the existing literature. Previous studies tend to focus either on digital learning applications for general cognitive development or on hands-on agricultural activities aimed at fostering environmental awareness. Studies on Android-based learning media in early childhood education primarily emphasize basic learning concepts such as literacy, numeracy, shapes, animals, and vocabulary development. Meanwhile, research on agricultural education for young children mainly highlights gardening activities, hydroponic projects, or nature play approaches without integrating digital technologies that reflect modern agricultural practices. Furthermore, although IoT technology has been widely applied in agricultural monitoring and educational contexts, its integration into early childhood learning media remains limited. These gaps indicate the need for a learning approach that combines digital mobile learning, experiential agricultural activities, and real-time environmental monitoring technologies. Therefore, this study seeks to develop and evaluate an IoT-integrated Android learning media designed to introduce agricultural professions to early childhood learners while supporting the development of early agricultural literacy.

This study aims to develop an IoT-integrated Android learning media designed to introduce agricultural professions to early childhood. Specifically, the research seeks to: (1) design and construct an Android-based learning application integrated with real-time greenhouse monitoring data; (2) evaluate the feasibility and appropriateness of the media through expert validation; and (3) analyze children's and teachers' responses to the use of the media in early childhood learning contexts. The expected outcome is a developmentally appropriate and technologically enriched learning tool that supports early agricultural literacy and fosters children's interest in agricultural professions.

RESEARCH METHODOLOGY

This research employed a development approach using the ADDIE model, consisting of the stages of Analysis, Design, Development, Implementation, and Evaluation (Thim-Mabrey, 2006). The method was structured to produce an IoT-integrated Android learning media and assess its feasibility for introducing agricultural professions to early childhood learners.

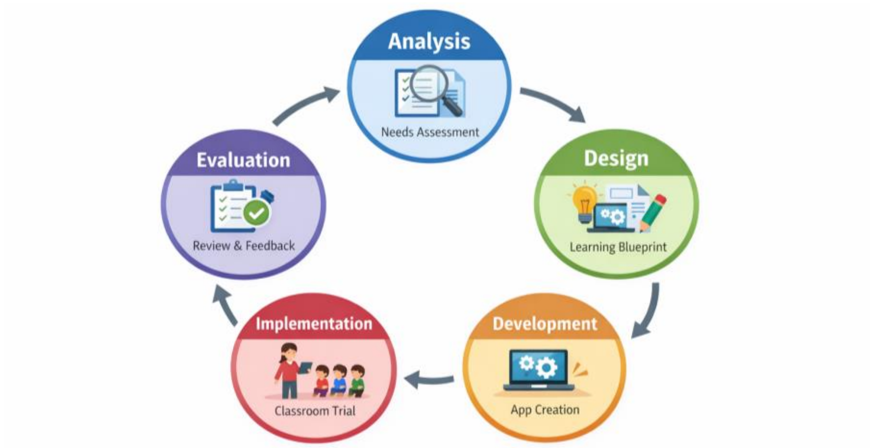

Figure 1. Research and Development Model Using ADDIE Framework

Data were collected through multiple techniques. First, a needs analysis was conducted through classroom observations and interviews with early childhood teachers to identify learning challenges, media availability, and opportunities for introducing agricultural concepts in ECE. Second, system documentation and testing were carried out to obtain greenhouse temperature and humidity data collected through IoT sensors integrated into the prototype. Third, expert validation was conducted involving a media expert, a material expert, and an early childhood education expert who assessed the content, interface design, and pedagogical alignment of the media. Fourth, field testing was conducted with children and teachers who used the application and completed response questionnaires. Instruments used in this study included observation sheets, interview guidelines, expert validation forms, and Likert-scale response questionnaires.

The participants in this study consisted of three experts—one media expert, one material/content expert, and one early childhood education expert who participated in the validation phase. The field implementation involved 24 early childhood learners from Group B at RA Cenderawasih, Bojonegoro Regency, along with their classroom teacher(s) who provided additional qualitative input regarding the usability and appropriateness of the learning media. The number of participants aligns with recommended sample sizes for small-scale trials in early childhood educational development research (Syahroni, 2022).

In the development phase, an initial prototype of the IoT-integrated Android learning media was produced based on the design specifications generated during the design stage. The prototype included key features such as plant identification, planting simulation, and real-time greenhouse monitoring using temperature and humidity sensors. The prototype then underwent expert validation involving the three experts mentioned above. Based on the feedback obtained from the validation process, two iterative revision cycles were conducted to improve interface clarity, child-friendly language, navigation structure, and the suitability of learning activities for early childhood learners. The revised prototype was subsequently implemented in a limited classroom trial with 24 children to evaluate usability, engagement, and the practicality of the learning media before final evaluation.

Expert judgment results were analyzed using Aiken's V formula to determine the validity of the media components, calculated as:

$$V = \frac{\sum s}{n(c-1)}$$

where V represents the validity coefficient, s is the score assigned by each expert, n denotes the number of experts, and c indicates the number of scale categories (Nabil et al., 2022). Feasibility categories were interpreted based on established criteria for media validation.

Response questionnaire data from children and teachers were analyzed using descriptive statistical techniques, calculated through the percentage formula:

$$P = \frac{f}{N} x\ 100\%$$

where P represents the percentage score, f is the total score obtained, and N is the maximum score. Observational data and IoT sensor outputs were analyzed descriptively to evaluate system performance, media usability, and alignment with learning objectives. All analytical procedures adhered to standard qualitative and quantitative educational research practices (Sofwatillah et al., 2024).

The study followed the ADDIE framework. The Analysis stage identified learning needs, media deficiencies, and opportunities to integrate agricultural content in early childhood settings. The Design stage included storyboard development, interface planning, and the IoT–Android integration scheme. The Development stage produced the Android application and IoT-based greenhouse monitoring system. The Implementation stage involved classroom trials with 24 children at RA Cenderawasih. The Evaluation stage encompassed expert validation, user feedback, and product refinements. This systematic process ensured the development of a functional, developmentally appropriate, and pedagogically relevant learning media.

RESULTS AND DISCUSSION

The development of the IoT-integrated Android learning media followed the ADDIE model and produced an educational application designed to introduce agricultural professions to early childhood learners. The media development process resulted in three major components: (1) a plant identification feature containing images and voice narration, (2) a simulation of simple planting procedures, and (3) a real-time greenhouse monitoring dashboard that displays temperature and humidity values transmitted through IoT sensors.

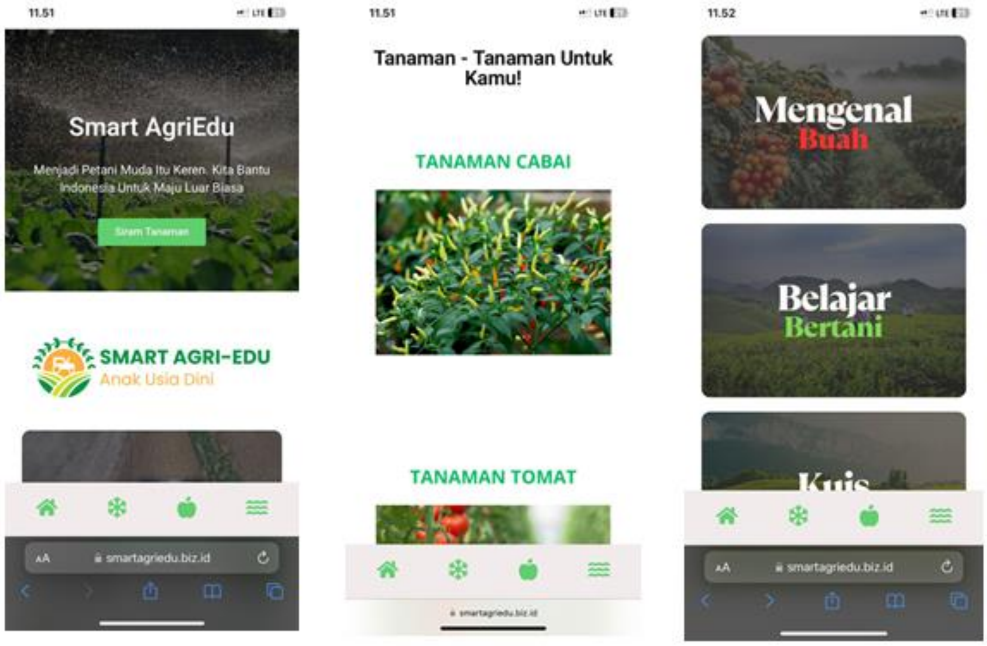

Figure 2. Introduction to Agriculture Media Display

These components collectively create an integrated digital learning experience in which children can observe how plants grow, recognize environmental conditions, and connect these observations to agricultural work. The prototype greenhouse successfully transmitted stable data to the application, with temperature fluctuations recorded from 29.5°C to 31.3°C and humidity reductions from 68% to 61% within a one-hour period. These environmental variations created meaningful learning opportunities, allowing children to form concrete connections between sensor data and plant growth conditions.

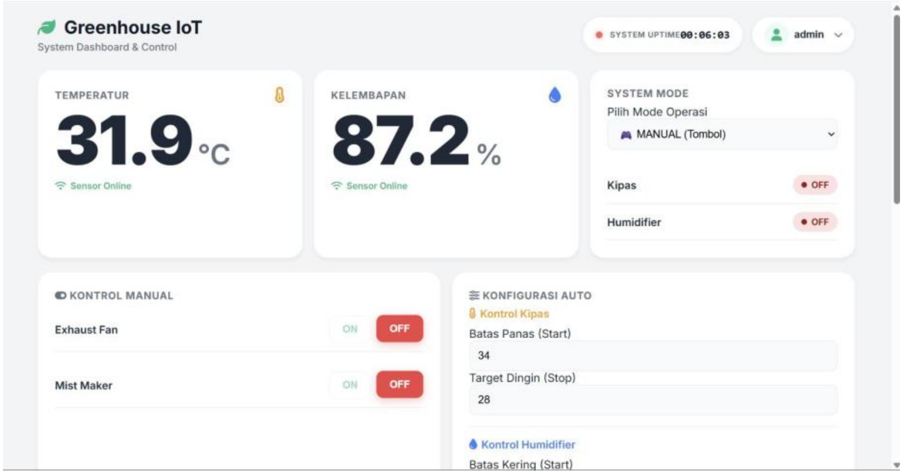

Figure 3. Greenhouse Control Media Display

To ensure the feasibility of the media, three experts evaluated the application from the perspectives of material accuracy, interface design, and pedagogical suitability. The evaluations showed that while the media and material components were rated very feasible, the pedagogical expert suggested refinements in child-friendly language and activity duration. Table 1 presents the validation results.

Table 1. Summary of Expert Validation Results

Validator	Average	Category
Material Expert	3.6	Very Feasible
Media Expert	3.6	Very Feasible
ECE Expert	3.4	Feasible
Overall Mean	3.53	Very Feasible

The strong ratings from material and media experts indicate that the application is visually engaging, structurally coherent, and contains content appropriate for young children. The ECE expert's feedback highlights the importance of aligning technological innovation with early childhood developmental principles. These results support the findings of Afni et al. (2021), who emphasized that well-designed Android media enhance clarity and interactivity in ECE learning contexts. Additionally, the integration of real-time environmental data aligns with previous studies stating that IoT-supported learning promotes concrete understanding of abstract phenomena, particularly when children can visually observe changes over time.

The implementation phase was conducted with 24 Group B students at RA Cenderawasih, Bojonegoro. Observations revealed that most children could operate the application independently and demonstrated curiosity as they explored plant images, listened to narrations, and interacted with the greenhouse monitoring feature. Children also showed interest in the changing temperature and humidity values, prompting spontaneous questions regarding the relationship between environmental conditions and plant growth. Teachers noted improvements in engagement, attention, and children's ability to recall plant characteristics and planting steps. Table 2 presents the quantitative results of student responses.

Table 2. Summary of Student Response Results

Indicator	Mean Score	Category
Learning Enthusiasm	3.8	High
Plant Recognition	3.5	High
Understanding Planting Steps	3.6	High
Interest in Agricultural Profession	3.6	High

Table 2 presents the summarized results of student responses after using the learning media. The results show an overall mean score of 3.6, indicating a strong positive response toward the application. The highest score was found in learning enthusiasm (3.8), followed by interest in agricultural professions (3.6) and understanding of planting steps (3.6). Plant recognition ability also showed a high score of 3.5, indicating that the learning media successfully supported children's understanding of basic agricultural concepts. These findings reinforce the argument by Syaleha et al. (2023) that early exposure to agricultural content fosters environmental awareness and positive attitudes toward nature-based activities. Furthermore, this study supports the notion that digital media can complement hands-on agricultural learning, enabling children to visualize, interpret, and make sense of environmental data in ways that traditional instruction cannot achieve.

Comparisons with prior studies show several meaningful alignments. First, the results echo findings from Camilleri & Camilleri (2019), who showed that mobile learning enhances exploration and independent learning in early childhood environments. Second, the study builds upon urban farming education initiatives, which highlight the importance of introducing agriculture in limited-space settings. Third, unlike previous studies that relied solely on nature play or manual gardening activities, this research introduces a hybrid model where digital simulation and real IoT monitoring coexist, offering a richer conceptual bridge between technology and agriculture. Fourth, the study contributes to ECE technology literature by demonstrating that IoT traditionally used in higher education can be adapted for early childhood in simplified, developmentally appropriate ways. Finally, this model extends agricultural education theory by framing agriculture not just as a hands-on activity but also as a scientific and technological profession.

Despite the promising findings, several limitations should be acknowledged. The study involved only 24 students from a single institution, limiting its generalizability. Additional trials in diverse ECE contexts are necessary to strengthen external validity. Furthermore, the IoT component measured only temperature and humidity; future enhancements could include soil moisture, light intensity, or nutrient monitoring sensors to broaden learning possibilities. Finally, the study assessed immediate responses rather than long-term impacts on children's agricultural career interest. Longitudinal research would provide more insights into how early exposure to agricultural professions influences career aspirations in later years. These limitations also provide important directions for the development of technology-enhanced agricultural learning for early childhood education. From a pedagogical perspective, integrating additional environmental sensors and expanding the learning context could support richer experiential learning opportunities, allowing children to observe more diverse environmental factors that influence plant growth. Such developments may strengthen inquiry-based learning experiences where children explore cause-and-effect relationships in natural processes. Moreover, broader implementation across different early childhood institutions would enable researchers to better understand how contextual factors such as learning environment, teacher facilitation, and technological accessibility influence the effectiveness of digital agricultural learning media.

In conclusion, the findings indicate that IoT-integrated Android learning media effectively supports early childhood agricultural education by merging digital interactivity with real-time environmental data. The media fosters enthusiasm, conceptual understanding, and early interest in agricultural professions. Its hybrid design offers practical and theoretical contributions, demonstrating that agriculture can be introduced to young children through an engaging blend of technology and experiential learning. Future studies are encouraged to refine the model, expand the scope of IoT usage, and explore long-term impacts on agricultural literacy and children's career awareness.

CONCLUSION

The development of IoT-integrated Android learning media demonstrates a promising approach for introducing agricultural professions in early childhood education. By combining digital learning applications with real-time environmental monitoring, the developed media provides an interactive learning environment that enables young learners to explore basic agricultural concepts through observation, simulation, and experiential interaction. The feasibility evaluation results indicate that the learning media is pedagogically appropriate and capable of supporting children's curiosity, engagement, and understanding of plant growth conditions. Beyond its practical application, this study highlights the potential of integrating emerging technologies such as IoT into early childhood learning contexts to enrich experiential learning opportunities. The combination of mobile learning and environmental monitoring offers a meaningful way to connect digital learning with real-world agricultural phenomena, thereby supporting the development of early agricultural literacy and environmental awareness among children.

This study also contributes to the growing discourse on technology-enhanced learning in early childhood education by proposing a pedagogical model that integrates digital media, experiential learning, and career awareness development. Future research is encouraged to expand the implementation across diverse early childhood education settings and incorporate additional environmental sensors to provide more comprehensive agricultural learning experiences. Longitudinal studies are also recommended to examine how early exposure to agricultural professions influences children's long-term perceptions and career interests.

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REFERENCES

Abidin, N., & Haq, A. F. (2023). Aplikasi Media Pembelajaran Anak Usia Dini Menggunakan Teknologi Augmented Reality Berbasis Android. *Jurnal Nasional Komputasi Dan Teknologi Informasi (JNKTI)*, *6*(1), 95–102. https://doi.org/10.32672/jnkti.v6i1.5807

Andini, D. (2024). Analisis Pelaksanaan Program Destinasi Agro Edu Wisata Kebun Bang Jani Terhadap Kesadaran Lingkungan Pengunjung (Generasi Muda) Di Kabupaten Bangkalan. *AGRINESIA: Jurnal Ilmiah Agribisnis*, 221–229. https://doi.org/10.37046/agr.v0i0.25911

Attika, S., & Retnaningsih, L. E. (2025). Bimbingan Karier untuk Anak Usia Dini. *JCE (Journal of Childhood Education)*, *9*(1), 99–105. https://doi.org/10.30736/jce.v9i1.2423

Chiang, L. (2022). Awareness , perspectives , and knowledge in early childhood education. *International Journal of Adult and Non Formal Education*, *3*(2). https://doi.org/10.25157/ma.v8i2.8007

de la Osa, N., Navarro, J. B., Penelo, E., Valentí, A., Ezpeleta, L., & Dadvand, P. (2024). Long-term exposure to greenspace and anxiety from preschool and primary school children. *Journal of Environmental Psychology*, *93*(October 2023), 102207. https://doi.org/10.1016/j.jenvp.2023.102207

Erliaristi, M., Prayoga, K., & Mariyono, J. (2022). Persepsi Pemuda Terhadap Profesi Petani Padi Di Kota Semarang. *Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, *8*(2), 1387–1408. https://doi.org/10.25157/ma.v8i2.8007

Fitriah, N., Iriani Putri, D., Nur, N., Vitasari, D. K. P., & Kismawati, D. (2021). Pengenalan Aktivitas Berkebun Sebagai Media Pembelajaran Terhadap Perkembangan Kognitif (Pengenalan Sains) Pada Anak. *Seminar Nasional Pengabdian Masyarakat LPPM UMJ*. http://jurnal.umj.ac.id/index.php/semnaskat

Fitriani, L., Fatimah, D. D. S., & Novitasari, S. (2022). Perancangan Media Pembelajaran Interaktif Pengenalan Bahasa Inggris untuk Pendidikan Anak Usia Dini (PAUD) Berbasis Android. *Jurnal Algoritma*, *19*(2), 537–546. https://doi.org/10.33364/algoritma/v.19-2.1140

Julianti, T. T. (2025). Migrasi Dini Remaja Pedesaan Sebagai Strategi Rasional Menghadapi Ketidakpastian Ekonomi. *Jurnal Penelitian Ilmu Sosial Dan Eksakta*, *5*(1), 110–119. https://doi.org/10.47134/trilogi.v5i1.1669

Keumala, E., Nurihsan, J., & Budiamin, A. (2018). The Development of Career Learning Program with Modeling Techniques to Improve Student Career Awareness. *Islamic Guidance and Counseling Journal*, *1*(2), 53–61. https://doi.org/10.25217/igcj.v1i2.270

Komang, A. N., & Surya, M. I. . (2021). Media Pembelajaran Zoolfabeth Menggunakan Multimedia Interaktif untuk Perkembangan Kognitif Anak Usia Dini. *Jurnal Pendidikan Anak Usia Dini Undiksha*, *9*(2), 194–201.

Mahmud, B. (2024). Kreativitas Guru Dalam Pengembangan Media Pembelajaran Anak Usia Dini. *EDUCHILD (Journal of Early Childhood Education)*, *4*(2), 93–102. https://doi.org/10.30863/educhild.v4i2.5514

Makabori, Y. Y., & Tapi, T. (2019). Generasi Muda Dan Pekerjaan Di Sektor Pertanian: Faktor Persepsi Dan Minat (Studi Kasus Mahasiswa Politeknik Pembangunan Pertanian Manokwari). *Jurnal Triton*, *10*(2), 2085–3823. https://jurnal.polbangtanmanokwari.ac.id/index.php/jt/article/view/46

Murro, L., Hasibuan, R., & Setyowati, S. (2025). Project-Based Learning with Recycled Bottle Planting: Effects on Young Children' s Cognitive and Gross Motor Skills. *Indonesian Journal of Early Childhood Educational Research*, *4*(2), 269–283. https://doi.org/10.31958/ijecer.v4i2.15463

Nabil, N. R. A., Wulandari, I., Yamtinah, S., Ariani, S. R. D., & Ulfa, M. (2022). Instrument Contents Minimum Competency Assessment. *Jurnal Penelitian Pendidikan*, *25*(2), 184–191. https://doi.org/10.20961/paedagogia.v25i2.64566

Nabila, U., & Yuwan Fijar Anugrah. (2025). Penerapan Tdba Hidroponik Sebagai Media Pembelajaran Steam Untuk Meningkatkan Motorik Halus Anak 5–6 Tahun. *PANDU : Jurnal Pendidikan Anak Dan Pendidikan Umum*, *3*(3), 9–16. https://doi.org/10.59966/pandu.v3i3.1956

Noor, R. M., & Suwandana, E. (2024). Ancaman Krisis Petani Di Indonesia Berdasarkan Hasil Sensus Pertanian 2023. *Jurnal Litbang Sukowati : Media Penelitian Dan Pengembangan*, *8*(2), 226–234. https://doi.org/10.32630/sukowati.v8i2.493

Paremeswara, M. C., & Lestari, T. (2021). Pengaruh Game Online Terhadap Perkembangan Emosi dan Sosial Anak Sekolah DasarParemeswara, Marsanda Claudia Lestari, Triana. *Pendidikan Tambusai*, *5*(1), 1473–1481.

Putri, S. O. (2024). The Effect of Career Exploration Behavior and Parent-Child Career Congruence on College Student Career Adaptability. *Jurnal Kajian Bimbingan Dan Konseling*, *6*(2). https://doi.org/10.17977/um001v6i22021p090-095

Qudwatullathifah, R. N., Ibnu, M., & Alfairisi, A. (2025). *Pengembangan IoT Playground untuk Peningkatan Pemahaman Konsep IoT pada Siswa Sekolah Dasar*. 1761–1769. https://doi.org/10.33364/algoritma/v.22-2.3015

Romadhon, M. F., Saleh, P. M., & Fattah, M. F. (2025). *Pemberdayaan Petani melalui Kegiatan*

Penanaman Bambu sebagai Upaya Peningkatan Literasi Lingkungan untuk Perlindungan Sumber Daya Air di Lahan Pertanian. *6*(September), 1344–1356. https://doi.org/10.26874/jakw.v6i3.1004

Sanadz, F., Ade, I. P., & Arif, R. D. (2023). Game Edukasi Menyusun Kata Berbasis Android Dengan Metode MDLC Sebagai Media Pembelajaran Anak Usia Dini Pada Paud Wijaya Kusuma 1 Fortuna, Sanadz Purnamasari, Ade Irma Dikananda, Arif RinaldiKota Cirebon. *Jurnal Teknologi Ilmu Komputer*, *1*(2), 61–65. https://doi.org/10.56854/jtik.v1i2.70

Sofwatillah, Risnita, Jailani, M. S., & Saksitha, D. A. (2024). Teknik Analisis Data Kuantitatif dan Kualitatif dalam Penelitian Ilmiah. *Journal Genta Mulia*, *15*(2), 79–91. https://ejournal.uncm.ac.id/index.php/gm/article/view/1147

Sunanik, S. (2018). Pembelajaran Berbasis Alam Untuk Anak Usia Dini Di Tk Alam Alazhar Kutai Kartanegara. *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah*, *3*(1), 81–110. https://doi.org/10.35931/am.v0i0.71

Syahroni, M. I. (2022). Prosedur Penelitian Kualitatif. *Jurnal Al-Musthafa STIT Al-Aziziyah Lombok Barat*, *2*(3), 43–56.

Syaleha, S. F. P. M., Putri, A. C., Alifah, L. N., & Febrian, E. S. (2023). Pengenalan Pertanian Sejak Dini melalui Nature Play Education. *Prosiding Seminar Nasional Pengabdian Masyarakat*, *1*. https://doi.org/10.61142/psnpm.v1.78

Thim-Mabrey, C. (2006). Sprachwandel in übersetzungsbearbeitungen zwischen 1846 und 1999. *Neuphilologische Mitteilungen*, *107*(3), 361–373. https://www.jstor.org/stable/pdf/43344239.pdf

Wahyuni, S., Suarman, & Kartikowati, S. (2022). Pengembangan Media Pembelajaran Berbasis Android (MEKOID). *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, *4*(3), 581–592.