Journal of Instructional and Development Researches
Homepage: https://www.journal.iel-education.org/index.php/JIDeR
e-ISSN: 2807-5471; p-ISSN: 2807-548X

JIDeR, Vol. 5, No. 1, February 2025

Page: 23-29

Analysis of the Need for Interactive Learning Media in Developing Learning with a Literacy and STEAM Approach

***Ihtiari Prastyaningrum, Alisa Alfina, Rizky Dwi Wisesa**
Universitas PGRI Madiun, Madiun, Indonesia
*Email: ihtiari.prastya@unipma.ac.id (Corresponding Author)

Check for updates OPEN ACCESS

DOI: https://doi.org/10.53621/jider.v5i1.445

Informasi Artikel

Article History:
Received: December 23, 2024
Revised: February 13, 2025
Accepted: February 14, 2025
Published: February 28, 2025

Keywords:
21st-century skills;
Creativity;
Critical thinking;
Solar panel.

ABSTRAK

The implementation of learning at the early childhood education level will never be separated from what is called learning media. The learning media used must be able to be a tool to help transfer knowledge from teachers to their students. The use of learning media by teachers must also be accompanied by the teacher's understanding of what knowledge will be transferred with the help of the media. As is well known, currently learning at the early childhood level is directed at learning with a Literacy and STEAM approach. Therefore, the existence of appropriate learning media is needed. This study aims to analyze the need for interactive learning media that can support the implementation of learning activities with a Literacy and STEAM approach. The observation and in-depth interview methods supported by questionnaires are steps to obtain research results. The results of this study indicate that early childhood needs learning media that can accommodate science, technology, engineering, art, and mathematics. However, the pedagogical competence and literacy quality of a teacher are also important factors so that the use of learning media can be maximized. In relation to the results obtained, it is suggested that in the future learning media containing the five STEAM disciplines can be accommodated, so that it is hoped that the implementation of the STEAM approach in learning can run more optimally.

INTRODUCTION

Learning media is an essential component that cannot be separated from the world of education. Learning media can be defined as a tool that aids in the transfer of knowledge to support learning activities. A learning media should be designed to stimulate a child's thoughts, interests, feelings, and attention, thus encouraging them to engage in learning activities (Kurnia et al., 2020). Moreover, learning media should also be able to influence students' thinking, emotions, attention, abilities, and skills (Salshabella et al., 2022). In early childhood education, learning media can bridge the gap in children's experiences, providing a psychological impact that motivates them in the learning process (Ariani & Nurzaelani, 2024; Rahman et al., 2023). This mediua also encompasses all forms of communication that serve to convey messages or information from teachers to students (Sukma et al., 2020).

he use of learning materials in early childhood education has been quite extensive. Every school undoubtedly has learning materials as a supporting tool for learning activities. However, preliminary research has shown that the learning materials available in preschools are relatively simple. For instance, they often consist of two-dimensional materials like pictures and posters, or three-dimensional ones like dolls, statues, and wooden educational toys. Some preschools have begun to incorporate technology into their teaching, using devices such as laptops, projectors, and smartphones. A few have even adopted smart technology-based learning materials, such as colorball learning media for teaching numbers (Pratama et al., 2024) and colour (Prastyaningrum et al., 2023). In order to introduce simple English to young children, the "English Fun" media is also one of the media used at the early childhood education level (Prastyaningrum et al., 2022).

Learning media with a touch of technology has been quite a lot so far. Along with the development of learning, currently PAUD is moving towards learning with the Literacy and STEAM (Science Technology Engineering Art and Mathematics) approaches, so inevitably the learning media used must also adjust. Several studies related to learning media with the Literacy and STEAM approaches say that the use of natural materials from the environment can be an alternative learning media (Handayani et al., 2023). In addition, the use of Loose Parts can also be one of the choices of learning media. The findings in this study indicate that the use of loose parts can increase children's naturalist intelligence (Farida et al., 2023).

Learning with the Literacy and STEAM approach is very close to the environment. Learning from the environment is one way that can be taken to carry out learning with the Literacy and STEAM approach. One thing that can be learned from the environment and is very close to children is about electricity. Every day children will interact with electricity. However, because the material on electricity can be said to be an abstract material, sometimes teachers have difficulty explaining it. However, it is not impossible for electricity material to be explained to early childhood.

Literacy and STEAM approaches are considered very appropriate for explaining electricity to children. One of the electricity materials that can be introduced is about "where electricity comes from". Knowledge about the origin of electrical energy is an important part when explaining the basic concepts of electricity to children.

Some of these things are considered that it is important to conduct an analysis of the needs of interactive learning media. This media must be able to integrate the five fields of STEAM science and have a literacy content. In order to achieve this goal, a study involving experts, PAUD teachers and children needs to be conducted. The involvement of many supporting elements of PAUD schools will provide more accurate analysis results.

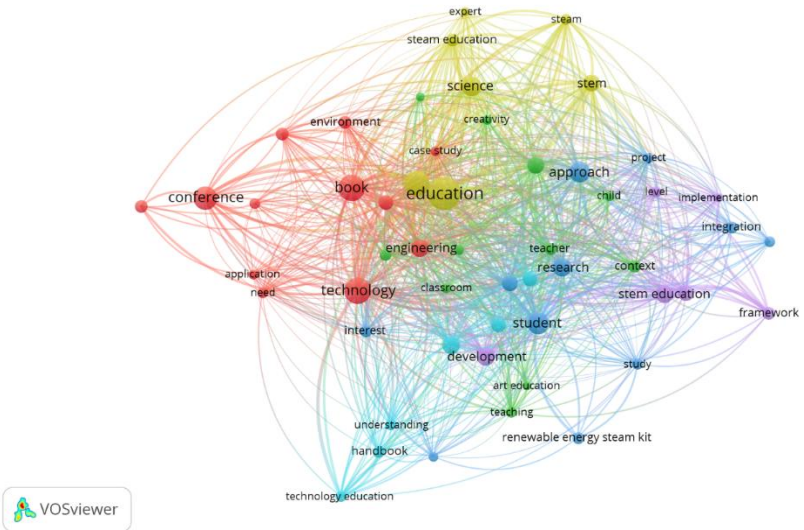

Figure 1. VOS Viewer analysis result

The results of the research trend analysis using VOS Viewer in the last 10 years show that there is no connectivity between STEAM Learning and Early Childhood, even though STEAM itself has become part of early childhood education. This shows that there is still a lack of research on the analysis of the need for electrical learning media with literacy and STEAM content. The results of this bibliometric analysis show that research on the analysis of learning media needs with a Literacy and STEAM approach is a novelty in this paper.

This study aims to analyze the need for interactive learning media in the scope of early childhood education related to learning with literacy and STEAM approaches. The findings at each stage of this study can be the basis for further research.

METHOD

This research is a type of exploratory descriptive research, namely research that describes the state of a phenomenon in depth and comprehensively, especially phenomena that have not been widely researched (Arikunto, 2010). This research was conducted in one semester, namely in the Odd Semester of the 2024-2025 Academic Year. The population in this study were teachers in the Madiun City and Regency areas, with a sample of 20 teachers representing early childhood education in both areas.

Qualitative and quantitative approaches are used in this study. Qualitative approach allows researchers to explore deep meaning from the data. The techniques used in the qualitative approach are interviews and in-depth observations. While the quantitative approach is an approach that provides a broader picture of a phenomenon equipped with a survey. This approach is also presented in the form of data in the form of numbers (Donatus, 2016).

Data collection was conducted by conducting observations and interviews with 20 teachers involved in the research activities. This sample was selected using random sampling techniques. This sampling technique is the simplest technique (Firmansyah & Dede, 2022), where all elements of the population have the opportunity to be selected as a sample (Arieska & Herdiani, 2018). The survey was conducted by providing a questionnaire related to learning media with the Literacy and STEAM approach, and the extent of the need for the media. Several things that were of concern in the observation and interview activities included the implementation of learning with the Literacy and STEAM approach, the existence of media as a supporter of learning activities, and the use of existing media in implementing learning. The results of observations and interviews were supported by the results of field surveys. The results of data processing from the questionnaire became a reinforcement in drawing conclusions in this study.

RESULT and DISCUSSION

Result

The observations were conducted at several PAUD schools both in Madiun City and Regency. Based on the results of the observations, findings were obtained on the percentage of schools implementing learning with the Literacy and STEAM approaches. The percentage of the number of schools is shown in Table 1.

Table 1. Percentage of Schools Implementing Learning with Literacy and STEAM Approaches

No	Implementation Status	Percentage
1.	Carry out fully and independently	16 %
2.	Implement with guidance, especially in the use of learning media	50 %
3.	Leading to the implementation of learning with a Literacy and STEAM approach	34 %

After the observation process was carried out, the research activity continued to the interview stage. This interview stage was carried out after the teachers were previously given a learning media in the form of a solar panel and hydroelectric power plant kit. Teachers were given directions on how to assemble it, and how the system works. Then the teachers were interviewed regarding the media. Interviews were conducted face to face with each teacher.

They provided their input and analysis regarding the media we provided. Questions at this stage focused on four main things. The results of the interview process are shown in Table 2.

Table 2. Learning Media Analysis with Literacy and STEAM Approaches

No	Analysis Questions	Problem Identification	Conclusion
1.	Media used for practical work is complicated	The components in the media are too small	Need media with simple components and large sizes
2.	Media used for practical work is less interesting	The colors used are monotonous red, blue and black	Need media with diverse colors but without reducing the meaning of the colors
3.	Teachers have difficulty practicing with the media provided	Teacher literacy related to renewable energy is not yet optimal	Teacher literacy related to renewable energy needs to be improved
4.	Difficult to explain the concept of art from the available media	Minimal support for features in the media to support the explanation of the art concept	Need simple media that in addition to carrying the STEM concept also contains elements of art

The implementation of this research also involved quantitative data in the form of a questionnaire to determine teachers' understanding of learning with the Literacy and STEAM approaches. This questionnaire needs to be given to measure how far the teachers' understanding is so that this becomes a step in further research on the development of learning media with the Literacy and STEAM approaches. This is important so that the media developed can follow the teachers' knowledge of Literacy and STEAM. The use of learning media must be supported by an understanding of the accompanying knowledge, teachers become more creative and innovative, so that learning runs conducive (Sihombing et al., 2023).

There are eight questions in this questionnaire. The first question is divided into three things, namely understanding of electrical energy, solar energy, and water energy, the second is a question about the condition of the solar panel system if there is no solar heat, the third is knowledge related to how the solar panel system works, the fourth is about how the hydroelectric power plant works, and the last is what affects the size of the output electrical energy from the hydroelectric power plant and solar panel system.

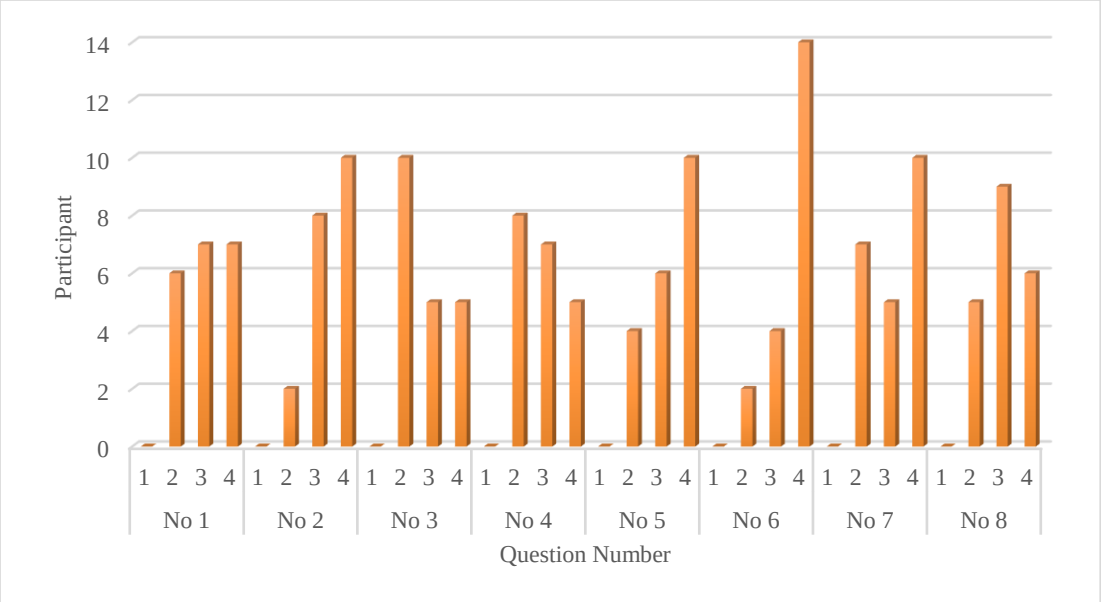

Figure 2. Questioner Result

Discussion

Observation Stage

Observation was conducted at the beginning of the research. The results showed that schools have started to implement literacy and STEAM-based learning, but at different levels. In this study, three levels of implementation were found: full and independent implementation, implementation with guidance, and not fully implemented but have already conducted learning that is oriented towards the Literacy and STEAM approach.

Based on these findings, it can be said that intensive training and mentoring are still needed, especially related to the utilization of learning media. This is aimed at improving the pedagogical competence of teachers related to STEAM-based learning. Because pedagogical competence is one of the challenges of STEAM in the future (Su et al., 2024). STEAM learning is considered very important, and it would be better if it started from early childhood education. As several previous studies have stated, STEAM-based learning is important for improving creativity and problem-solving skills (Atikah & Biru, 2024; Wahyuningsih et al., 2020).

In-Depth Interview

In-depth interviews were conducted through casual face-to-face discussions with teachers. They were approached personally and invited to discuss casually. Prior to the interview, the teachers were invited to practice assembling small-scale hydropower and solar power plant kits. The research team accompanied these practical activities, providing basic theoretical concepts about solar and hydropower plants. This step was taken to obtain analysis from teachers regarding the media used.

The media analysis focused on four aspects: ease of use, media appearance, the level of difficulty teachers experienced in explaining material using the media, and the elaboration of Science, Technology, Engineering, Art, and Mathematics concepts within the media used. These four focus areas indicated that teachers found difficulty in using the media because it was too small and complex. They had to connect one component to another where the size was quite small. This is certainly contrary to the size regulations of media for early childhood, where the size of the media must be adjusted to suit young children (Lailan, 2023).

Aside from the components being too small, the PLTS and PLTA media lacked visual appeal in terms of color. The media only used blue, black, red, and brown colors. This reduced the attractiveness of the media to children. Learning media for children should use an attractive color composition, as this will stimulate children's cognitive abilities (Rupnidah & Suryana, 2022).

The next aspect discussed in the interviews related to the teachers' ability to explain the learning material about renewable energy using this learning media. It turned out that the teachers experienced difficulties; they lacked knowledge related to renewable energy. Their literacy quality still needs to be improved. The quality of literacy related to learning materials is very important, because with good literacy quality, learning becomes more enjoyable (Paluvi et al., n.d.). Teachers were able to explore everything, especially from the environment, related to the learning material. They could connect the media with the material, environmental conditions, and phenomena that occur in daily life.

The last aspect of the interview was related to the exploration of all STEAM science fields from the learning media. In this case, it turned out that teachers still had difficulty exploring and explaining the concept of art through the media. This was due to the limited features of the media. For example, if the teacher wanted to introduce the concept of color, the media did not support it due to limited colors. Art in learning media is an important element. Art can stimulate communication and harmony in learning (Anwariningsih, 2011).

Assessment Questionnaire

To assess the extent of teachers' understanding of renewable energy material and its relationship to Literacy and STEAM, a questionnaire was given to the teachers. The results of the questionnaire showed that, in general, teachers were already aware of renewable energy, but their understanding was still not deep. More in-depth learning is still needed, especially regarding the delivery of material to students.

Knowledge of the material supports the learning process. With adequate knowledge quality, teachers will be able to explore various teaching methods, making it more varied (Andrian & Desnita, 2023). In addition, learning will run smoothly because students get satisfaction with the answers from the teacher and feel happy when their questions can be answered well.

The results of this questionnaire can also be used as a basis for determining the next steps. For example, since it was found that the teachers' understanding of the subject of solar energy conversion was not yet optimal, training or mentoring, or possibly both, can be scheduled.

CONCLUSION

The research conducted has shown that it is crucial to develop learning media that adopts a literacy and STEAM approach. However, pedagogical competence and a teacher's literacy quality are important factors for the optimal utilization of media. In relation to this, there is a need to develop interactive learning media based on literacy and STEAM, as well as training and mentoring for early childhood educators to be able to maximally implement learning using existing interactive media. The limitation of this study is the relatively small sample size, so in the future, similar research can be conducted in the same area but with a larger sample size.

REFERENCE

Andrian, A., & Desnita, D. (2023). Komparasi Kemampuan Menjawab Pertanyaan Siswa yang Menggunakan Model Pembelajaran NHT dan STAD. ORBITA: Jurnal Hasil Kajian, Inovasi Dan Aplikasi Pendidikan Fisika, 9(1).

Anwariningsih, S. H. (2011). Unsur Estetika Dalam Perancangan Media Pembelajaran Berbasis Karakter Untuk Mata Pelajaran TIK Siswa Sekolah Dasar (SD). Jurnal Gaung Informatika, 4(2).

Ariani, A., & Nurzaelani, M. M. (2024). The Effective Learning Media for Early Childhood in Improving Life Skills at Sekolah Alam Matoa. Educate: Jurnal Teknologi Pendidikan, 9(1). https://doi.org/doi.org/10.32832/educate.v9i1.17034

Arieska, P. K., & Herdiani, N. (2018). Pemilihan Teknik Sampling Berdasarkan Perhitungan Efisiensi Relatif. Jurnal Statistika: Universitas Muhammadiyah Semarang, 6(2). https://doi.org/10.26714/jsunimus.6.2.2018.%25p

Arikunto. (2010). Prosedur Penelitian Suatu Pendekatan Praktik. Rineka Cipta.

Atikah, C., & Biru, L. T. (2024). STEAM-based Learning to Enhance Early Childhood Creativity. International Journal of STEM Education for Sustainability, 4(1), 164–175. https://doi.org/10.53889/ijses.v4i1.303

Donatus, S. K. (2016). Pendekatan Kuantitatif dan Kualitatif dalam Penelitian Ilmu Sosial: Titik Kesamaan dan Perbedaan. Studia Philosophica et Theologica, 16(2).

Farida, H., Putri, S. U., & Muqodas, I. (2023). Penerapan Pembelajaran STEAM Menggunakan Media Berbasis Loose Parts Untuk Meningkatkan Kecerdasan Naturalis Anak. Jurnal Smart PAUD, 6(2). https://doi.org/10.36709/jspaud.v6i2.75

Firmansyah, D. & Dede. (2022). Teknik Pengambilan Sampel Umum dalam Metodologi Penelitian: Literature Review. Jurnal Ilmiah Pendidikan Holistik (JIPH), 1(2), 85–114. https://doi.org/10.55927/jiph.v1i2.937

Handayani, W., Kuswandi, D., Akbar, S., & Arifin, I. (2023). Pembelajaran Berbasis STEAM untuk Perkembangan Kognitif pada Anak. Murhum : Jurnal Pendidikan Anak Usia Dini, 4(2), 770–778. https://doi.org/10.37985/murhum.v4i2.390

Kurnia, R., Mahdum, Azriyenni, & Pernantah, P. S. (2020). Development of Learning Media for Early Childhood Based on the Mechatronics System: Proceedings of the 2nd International Conference Innovation in Education (ICoIE 2020). 2nd International Conference Innovation in Education (ICoIE 2020), Padang, Indonesia. https://doi.org/10.2991/assehr.k.201209.221

Lailan, A. (2023). Urgensi Media Pembelajaran untuk Pendidikan Anak Usia Dini. SENTRI: Jurnal Riset Ilmiah, 2(12), 5027–5034. https://doi.org/10.55681/sentri.v2i12.1887

Paluvi, I., Mulia, I. T., Audina, M., Sari, N., & Dafit, F. (n.d.). Pentingnya Pelaksanaan Gerakan Literasi Bagi Guru dan Siswa di Sekolah Dasar 08 Kampung Rempak. Educativo: Jurnal Pendidikan, 2(1). https://doi.org/10.56248/educativo.v2i1.147

Prastyaningrum, I., Afifah, D. R., & Amumpuni, R. S. (2022). English Fun With Arduino Uno untuk Meningkatkan Kemampuan Bahasa Inggris Anak Usia Dini. Jurnal Education and development Institut Pendidikan Tapanuli Selatan. Jurnal Education and Development, 10(3), 220–222.

Prastyaningrum, I., Kholifah, U., Afifah, D. R., & Afifah, S. N. (2023). Colour Ball Based on Microcontroller as A Educational Games Tools for Early Childhood Learning. Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini, 7(5), 6249–6258. https://doi.org/10.31004/obsesi.v7i5.5279

Pratama, F. Y. D., Prastyaningrum, I., & Hardyanto, D. (2024). Exciting Early Childhood Game with Coloring Ball Based on Arduino Uno. In J. Handhika, M. Lukitasari, S. Ricahyono, & D. A. Nugraha (Eds.), Proceedings of the 4th International Conference on Education and Technology (ICETECH 2023) (Vol. 25, pp. 726–734). Atlantis Press International BV. https://doi.org/10.2991/978-94-6463-554-6_59

Rahman, T., Yufiarti, & Nuraini, Y. (2023). Analysis of the Use of Learning Media in Early Childhood Education. Scientia, 2(2), 146–149. https://doi.org/10.51773/sssh.v2i2.244

Rupnidah, R., & Suryana, D. (2022). Media Pembelajaran Anak Usia Dini. JURNAL PAUD AGAPEDIA, 6(1), 49–58. https://doi.org/10.17509/jpa.v6i1.48199

Salshabella, D. C., Pujiati, P., & Rahmawati, F. (2022). Analisis Kebutuhan Pengembangan Media Pembelajaran Interaktif Dalam Upaya Meningkatkan Kompetensi Akuntansi. Economic Education and Entrepreneurship Journal, 5(1), 35–43. https://doi.org/10.23960/E3J/v5i1.35-43

Sihombing, Y., Haloho, B., & Napitu, U. (2023). Problematika Guru Dalam Pemanfaatan Media Pembelajaran. JUPE : Jurnal Pendidikan Mandala, 8(2), 710. https://doi.org/10.58258/jupe.v8i2.5597

Su, J., Yim, I. H. Y., Wegerif, R., & Wah Chu, S. K. (2024). STEAM in early childhood education: A scoping review. Research in Science & Technological Education, 1–17. https://doi.org/10.1080/02635143.2023.2296445

Sukma, A., Kurnia, R., & Febrialismanto, F. (2020). Pengaruh Media Alphabet Smart terhadap Kemampuan Mengenal Huruf Anak Usia Dini. Aulad : Journal on Early Childhood, 3(1), 29–35. https://doi.org/10.31004/aulad.v3i1.50

Wahyuningsih, S., Nurjanah, N. E., Rasmani, U. E. E., Hafidah, R., Pudyaningtyas, A. R., & Syamsuddin, M. M. (2020). STEAM Learning in Early Childhood Education: A Literature Review. International Journal of Pedagogy and Teacher Education, 4(1), 33. https://doi.org/10.20961/ijpte.v4i1.39855