Contents list avaliable at Directory of Open Access Journals (DOAJ)
Aulad : Journal on Early Childhood
Volume 8 Issue 1 2025, Page 198-206
ISSN: 2655-4798 (Printed); 2655-433X (Online)
Journal Homepage: https://aulad.org/index.php/aulad

Implementation of Assemblr EDU in Early Childhood Education: Teacher's Perspective

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DOI: 10.31004/aulad.v8i1.875

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Article Info

Keywords:
Learning media;
Augmented Reality;
Assemblr EDU;
Early Childhood Education;

Abstract

This research discusses the implementation of Assemblr Edu in early childhood education which aims to find out the views and efforts of teachers in implementing learning through Assemblr Edu. The approach used in this research is a qualitative approach using the case study method. The results showed that; (1) The background of PGRI Purworejo Kindergarten and Anak Sholeh Mojosari Kindergarten teachers utilising the Assemblr EDU application is by attending training, besides that teachers also feel many benefits and advantages so that the objectives in utilising the Assemblr EDU application as a learning media are maximally achieved; (2) The efforts of teachers in utilising the Assemblr EDU application include planning, implementing and evaluating learning; (3) The obstacles felt by teachers in utilising the Assemblr EDU application include the intensity of using the Assemblr EDU application and the lack of available facilities such as the internet and mobile phones as supporting tools.

1. INTRODUCTION

Currently, the world including Indonesia has entered the era of the industrial revolution 4.0, where the development of science and technology is increasingly diverse and interactive (Fonna, 2019). The emergence of the diversity of technologies that are present today has an impact on all aspects of human life, especially in the education field (Agustian & Salsabila, 2021). In education, the industrial revolution 4.0 has demanded that the conventional learning process change towards learning that utilizes information technology (Rahim et al., 2017). Therefore, to face the era of the industrial revolution 4.0 in education field, especially in Early Childhood Education (PAUD), it can be done by optimizing the use of technology as a learning media, which can support the learning process and be able to achieve the planned learning objectives (Zaini & Soenarto, 2019).

One of the technologies that is currently trending in education is Augmented Reality (AR). Augmented Reality technology is a three-dimensional (3D) virtual technology that can connect the virtual world with children's real world in real time (Aprilia & Rosnelly, 2020). Meanwhile, Azuma (1997) states that Augmented Reality (AR) is a technology that can combine the real world with the virtual world to create interactions and present with three-dimensional (3D) objects. AR aims to take the real world as a basis by combining several virtual technologies and adding contextual data so that human understanding as a user becomes clearer. This contextual data can be in the form of computer audio, location data, historical context or in other forms (Hartanti, D., & Kurniawan, M. 2022). With the use of AR technology, the delivery of material is presented in an interesting way so that it can increase children's motivation in the learning process (Hakim, 2018). This opinion is consistent with Abi Hamid et al. (2020) which argued that the use of learning media must be able to stimulate thoughts, feelings, attention, and willingness so that students are motivated to engage in learning.

But in fact, the use of augmented reality technology is still less well known and used as a learning media in PAUD (Andinata, 2019). In line with this, Chen et al. (2017) state that Augmented Reality is more widely applied in

Received Januari, 05 2025; Received in revised form Januari, 10 2025; Accepted February, 04 2025
Available online February, 04 2025/

higher education and other compulsory education, but little research has been done in early childhood education. This is due to the lack of application software that supports Augmented Reality (AR) technology in displaying objects, text, video, audio, or other forms of images effectively and efficiently (Danaei et al., 2020). Another reason is the lack of teachers' knowledge about technology, especially AR technology which the Ministry of Education and Culture (Kemendikbud) state that 60% of teachers in Indonesia still have limited skills in using and mastering information and communication technology (Makdori, 2021).

From the problems that have been describe, software application has been developed that employs augmented reality (AR) technology as a learning media. This application, designated "Assemblr EDU" (Assemblr EDUcation). The use of *Assemblr EDU* applications can make it easier for teachers to design learning materials using augmented reality technology in an interactive and fun way for children(*Assemblr EDU*, 2021). According to Vinka as *Assemblr's community relations*, *Assemblr EDU* is designed to help users create three-dimensional (3D) educational content that is visualised in the form of *Augmented Reality* and then the results can be placed in the real world for everyone to access (Vinka, 2022)

Assemblr EDU provides the ACE *(Assemblr Certified Educator)* community which aims to accommodate teachers in using the *Assemblr EDU* application (Vinka, 2022). The ACE *(Assemblr Certified Educator)* community is a community for teachers around the world with the same vision and mission of making learning and teaching experiences more fun and interactive using *Assemblr EDU*. In this ACE community, there is a ToT (*Training of Trainers*) which aims to train teachers in developing interesting learning materials. In the implementation of this ToT, teachers can take part in free training and get an ACE *(Assemblr Certified Educator)* certificate (Vinka, 2022). The ToT is expected to improve teachers' competence in utilising and developing learning media and improve the quality of teaching and learning activities.

Based on previous research conducted by Saraswasti et al. (2023) on the introduction of professions for PAUD using *Assemblr*, it shows that the use of AR book-based educational media using *Assemblr* can trigger positive changes in teaching methods that are more creative and innovative, and increase student involvement in learning. In addition, research conducted by Hayati et al. (2023) shows that the *Assemblr EDU* Application can make it easier for students to understand the material and create interactive learning and this research proves that *Assemblr EDU* can improve critical thinking skills in grade 5 elementary school children in science lessons. Another research conducted by Febriyani et al. (2024) on the STEM approach with the help of *Assemblr EDU* can improve primary school students' science literacy skills. From some of the previous studies above, it can be seen that there is research on the use of the Assemblr EDU application conducted for junior and senior high school students, but there is no research that discusses the efforts and views of kindergarten teachers (PAUD) on the use of the Assemblr EDU application. Therefore, researchers are interested in raising the issue to be used as a research. Based on the above background, researchers are interested in conducting research with the title "*Implementation of Assemblr EDU in Early Childhood Education: Teacher's Perspective"*

2. METHOD

This research design is a qualitative with case study method to find out the implementation of the *Assemblr EDU* application used in early childhood education. The qualitative case study approach provides an analysis of the implementation of the use of the Assemblr *EDU* application used as a learning media in the classroom in increasing student motivation. This research uses *purposive sampling* technique to select the sample. This sampling technique is implicit because sampling must consider various aspects, especially the respondent's knowledge of the research objectives. The criteria for the participants of this study were educators who had more than five years of early childhood teaching experience and status as certified early childhood teachers and had ACE (*Assemblr* Certified Education) certificates. Based on these criteria, the subjects were obtained as many as 1 PAUD educator / teacher at PGRI Purworejo Kindergarten, which is located in Ngunut District, Tulungagung, Central Java and 1 educator at Anak Sholeh Mojosari Kindergarten located in Mojosari District, Mojokerto, East Java. Before the research was conducted, the researcher gave *informed consent* to the subject who expressed willingness to participate in the study.

Based on an initial preliminary study conducted by researchers to one of the teachers who used the Assemblr EDU application at PGRI Purworejo Kindergarten and Anak Sholeh Mojosari Kindergarten, information was obtained that teachers at PGRI Purworejo Kindergarten and Anak Sholeh Mojosari Kindergarten have been using the *Assemblr EDU* application since 2021/2022. The theme that has been conveyed through the use of the *Assemblr EDU* application at PGRI Purworejo Kindergarten is the theme of land and sea animals, while at Anak Sholeh Mojosari Kindergarten is the theme of marine life / world, where the learning material is adjusted based on the 2013 curriculum. PGRI Purworejo Kindergarten and Anak Sholeh Mojosari Kindergarten teachers already have ACE *(Assemblr Certified Education)* certificates

The research instruments used were semi-structured interview guides and documentation. In accordance with the problem to be studied, the data collection instrument sheet used in this study is an instrument grid and interview guidelines. The instrument sheet is used as a tool to find out how the use of Augmented Reality-based Assemblr EDU application for early childhood is carried out by PGRI Purworejo kindergarten teachers and Anak

Sholeh Mojokerto kindergarten teachers. The data analysis technique in this study uses the 1984 Miles and Huberman model which is carried out through four stages. *Data Collection*: Collected data by using semi-structured interview techniques and in-depth documentation to the research subject. *Data Reduction:* Data Reduction a form of analysis that organises data in such a way that final conclusions can be drawn and verified or often referred to as coding. *Data Display:* Presentation of data is the activity of presenting a set of arranged data then drawing conclusions and taking action in descriptive form. *Conclusion Drawing/Verifying:* Drawing conclusions is a final activity to carry out the process of giving meaning to the data through discussion carried out by drawing conclusions from the research results. The research data analysis is illustrated with the chart in Figure 1.

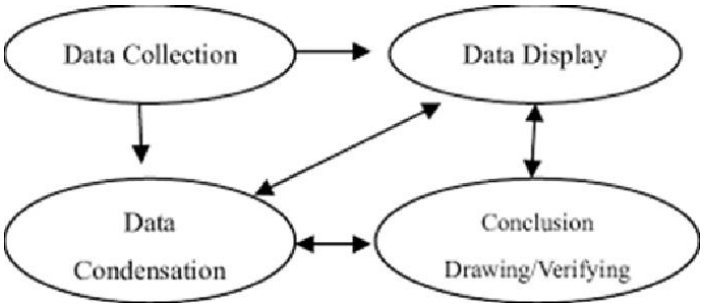

Figure 1. Data Analysis

The following are the research questions to guide this study: 1) How do teachers view the use of *Augmented Reality-based Assemblr EDU* application for early childhood? 2) How are teacher's efforts in utilising the *Augmented Reality-based Assemblr EDU* application for early childhood? 3) How are teacher's obstacles in utilising the *Augmented Reality* -based *Assemblr EDU* application for early childhood?

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3. FINDINGS AND DISCUSSION

How do teachers view the use of Augmented Reality-based Assemblr EDU for early childhood education?

This study was designed to find out teacher's views on *Augmented Reality* technology through the *Assemblr EDU* application. The following are the results of the data collection and analysis process. The background of teachers using the *Assemblr EDU* application is by seeing the enthusiasm of children when learning using a touch of technology, students are more motivated in participating in learning and are able to create more interactive learning, so teachers increase their professional competence by participating in learning media *webinar* training through applications or technology that can support learning for early childhood Nurarfiansyah et al. (2022). One of the trainings attended was the *Assemblr EDU* application training provided by ACE (*Assemblr Certified Educator)*. With this training, in this digital era, teachers are motivated to utilise technology as a learning media through the *Assemblr EDU* application.

Teachers get to know the Assemblr EDU application by participating in webinar training on learning media through applications or technology that can support learning for early childhood. One of the trainings attended was the Assemblr EDU application training provided by ACE (Assemblr Certified Educator) (Figure 2). This was stated by Mrs CD:

> *"Eee I started it during the new school year, well there are activities for teachers to carry out what is called an application webinar that supports children's learning media, especially now that everything is digital so to support children's learning, we involve teachers to take part in seminars or webinar activities which can support children's learning more attractively."*
>
> *(Interview CD, 24 June 2022)*

Agreeing with Ridho & Hudha Ekowati (2024) stated that with the development of increasingly modern times, teachers are expected to maximise the learning process, one of which is by utilising technology-based learning media. And according to Maiza & Nurhafizah (2019) The efforts made by a teacher in improving professionalism is in the form of self-development. According to the book general guidelines for the Continuous Professional Development Programme (Directorate General of Teachers and Education Personnel, 2018), that this self-development is intended to enable teachers to achieve or improve competence.

Figure 2. Assemblr Certified Education (ACE)

Some of the goals of teachers using the *Assemblr EDU* application as a learning media in the classroom are to make learning more interesting so that children can be motivated to take part in learning and can create interactive learning. The following are interview excerpts that explain this

> "*Ooh the first, making teaching materials more interesting. Secondly, to train teachers to be more innovative of course. So the media can bring learning materials to life so that children pay attention, so that children become active, interactive and more quickly grasp the lessons given."*
>
> *(Interview CD, 24 June 2022)*

This is in line with the results of research by Mustaqim & Kurniawan (2017) which states that through augmented reality, teachers can create learning media that is fun, interactive and easy to use. Zaman and Eliyawati (2010) who state that with the use of learning media, teaching materials will be conveyed more clearly and attract children's attention and can be understood by children because it is concrete and not only in verbalistic form so as to create interaction with students. Another goal is that learning can be easily understood by children because the *Assemblr EDU* application can display 3D objects in *real-time* (Azuma, 1997). Agreeing with Saraswati (2023) the learning method using *Assemblr EDU* can make it easier for students to understand learning materials and can significantly increase student learning motivation by providing an interactive experience.

The benefits of implementing *Assemblr EDU* are teachers can apply learning in accordance with the times, because today is all digital, teachers can maximise the use of technology as a learning media, so the technology can be introduced early to children (Ridho & Hudha Ekowati, 2024). In line with that, based on Permendiknas of the Republic of Indonesia Number 16 of 2007 concerning the competency standards of PAUD/TK/RA teachers in the pedagogical competence section, it is stated that teachers are required to be able to utilise technology to improve the quality of educational development activities. The other benefits are *Assemblr EDU* can create more interactive learning and the material can be delivered more clearly and concretely because *Assemblr EDU* can display 3D objects as if the object is around the child, besides that children can see the details of the object by zooming in/zooming out, rotating right, left up and down so that children are more motivated and enthusiastic about learning. This agrees with Yasa et al. (2024) state the teacher who stated that the learning method using *Assemblr EDU* allows students to understand learning materials, increase learning motivation, provide interactive learning, and increase students' understanding in receiving materials.

Teachers also mentioned the advantages of *Assemblr EDU* implementation, including that the *Assemblr EDU* application has a menu or features that can make it easier for teachers to use.

> *"As for the advantages in the Assemblr application for me as an educator, the advantage of Assemblr is that the media in it is unlimited. In the sense that it is unlimited, we can use the application eee creatively, the design is not determined but we determine, so in it we can design ourselves, we can insert what like audio or video. Then on the other hand we can what eeee can insert a description. So when we use Assmeblr EDU, we can create our own design and then apply it to the children. On the other hand, the advantage is also, for example, if the children have limited face-to-face time, we can share the link of the content that we created earlier through the Assemblr EDU application."*
>
> *(Interview CD, 24 June 2022)*

In line with Yasa et al. (2024) who argues that the Assemblr EDU App is superior to other Augmented reality applications because it provides 3D objects that are very user-friendly and users can easily use it without the need for in-depth understanding of complex programming. Besides being easy to use, *Assemblr EDU* also has unlimited material so it is easy for teachers to create teaching materials through the *Assemblr* application. The *Assemblr* application has a feature to share links to teaching materials with other users or students so that it can make it easier for teachers to provide teaching materials to students if learning is done online. In addition, Saraswati (2023) also explains that *Assemblr EDU* has interesting features, such as animation, audio video and *Assemblr EDU* does not require difficult programming and can be presented in various perspectives so that it can increase learning

efficiency. with all the conveniences that have been mentioned the teacher also stated that with the use of Assemblr EDU, it is easier for teachers to find learning media without costing money, Hakim (2018) explained one of the advantages of Assemblr EDU is that it provides benefits in terms of time used because it is not costly and easy to operate. because it does not cost money and is easy to operate. In line with Setiawan & Nugraha (2017) which states that augmented reality has advantages, including being more interactive, effective in its use and can be widely implemented in various media, simple object display and manufacturing that does not cost too much, of course, easy to use.

How are teachers' efforts in utilising the Augmented Reality-based Assemblr EDU application for early childhood?

Based on the results of interviews from the two informants or participants, the data obtained that in utilising the Assemblr EDU application as an Augmented Reality-based learning media, the two teachers carried out lesson planning tailored to the theme, flow and learning objectives in the form of RPPH and RPPM which used Assemblr EDU learning media. The following are interview excerpts that explain this:

> *"We use this as material for our learning media, especially for teachers to prepare lesson plans because it is adjusted to the theme, learning flow, learning objectives. So our basic project must be adjusted to the flow that is in line. First, designing the theme that will be applied to children, then we compile learning objectives in the form of lesson plans that are adjusted through lesson plans so that learning objectives can be delivered properly, like that. So, for example, I take the theme of animals to prepare lesson plans by taking the theme of animals, for example farm animals, now for the activities we input the Assemblr EDU application. So, the children's daily learning is fun, the attraction comes from the Assemblr application"*
>
> *(Interview AB, 24 June 2022)*

First, teachers conduct learning planning that includes content objectives, and program management plans compiled in weekly activity plans and daily activity plans by identifying children's needs in the learning process (Safitri et al., 2020), after the teacher adjusts to the theme and learning objectives which later the material will be delivered to children through *Assemblr EDU*. This is in line with Zaman & Eliyawati (2010) what states that learning media planning is carried out by identifying children's needs in the learning process and the use of learning media is aimed at improving the quality of early childhood learning processes and outcomes. After conducting identification, the teacher obtains data on the types of media needed. The type of media identified must be adjusted to the theme, ability and desired goal.

After planning, teachers implement fun learning, involving elements of playing, moving, singing and learning. The learning methods used by teachers in teaching are using more varied methods including: habituation, storytelling, conversation, question and answer, demonstration, field trips and assignments. This is applied so that the teacher gets closer and gets to know the students (Safitri et al., 2020).

Figure 3. Planning Learning Media Trough Assemblr EDU

In delivering learning materials by using learning media through *Assemblr EDU*, first the teacher explains the learning theme which the two teachers use the theme of Animals, in addition to explaining the topic of animals the teacher also introduces *Augmented Reality* technology and how to use *Assemblr EDU*. After the children understand the explanation and rules that have been conveyed, the teacher divides the groups consisting of 2-3 children/group. After that, the teacher conducts a question and answer session with the children which aims to find out the children's prior knowledge before the children make observations through Assemblr *EDU*. The teacher divides the groups with various activities. In learning activities, there are groups that make observations through *Assemblr EDU*, groups that work on worksheets and there are also groups that do sensory play. These varied activities aim to create conducive and effective learning.

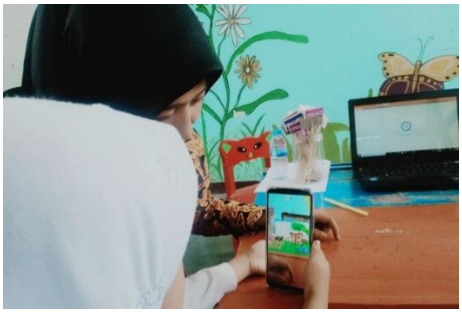

Figure 4. Learning Media Application Using Assemblr EDU

After implementing learning, teachers conduct learning assessment. Learning assessment is carried out with assessment techniques namely assignments, anecdotal records, conversations, observations, work performance, work results, and portfolios (Ita, 2018). And from the results of the assessment, both teachers showed that children's knowledge developed after learning using *Assemblr EDU* learning media.

How are teacher's obstacles in implementation the Augmented Reality-based Assemblr EDU application for early childhood education?

Both informants or participants stated that in understanding the Assemblr EDU application, they must attend intense training so that teachers are more proficient in using it.

> *'For now, it's not difficult, it's easy because there are already parts of the features that are easy to learn, but there are some weaknesses in terms of understanding, sometimes I am also confused if I don't join the training for just one day so I have to attend intense training'*
>
> *(Interview AB, 14 June 2022)*

> *'If I create learning materials using Assemblr EDU there are no obstacles, because Assemblr is very supportive like a free learning media platform but there are also pro ones. So some of the images are free and some are pro so it depends on us who use it, and Assemblr EDU has easy features'*
>
> *(Interview CD, 24 June 2022)*

Based on the information above, it can be seen that Assemblr EDU has features that are easy to understand. In line with Assemblr EDU (2021) which states that Assemblr EDU only has four features, namely topics, classes, scans, profiles. With a small number of features, it is easier for teachers to understand the use of the Assemblr EDU application.

However, according to Wallace (2018) AR has a weakness in people's lack of knowledge and understanding of the use of AR technology, so instructions are needed to download and use it. This is in accordance with AB's opinion who stated that to understand how to use the Assemblr EDU application, teachers must take training seriously.

And other obstacle are teachers do not use Assemblr EDU every day in their core activities, because more variety is needed so that children do not feel bored. The following is an excerpt from her interview

> *'If my obstacle is time, so I don't use it every day like that, the term is if every day like that the children will feel bored so they need more variety'*
>
> *(Interview AB, 14 June 2022)*

This is in line with Wallace's (2018) opinion, which states that AR technology is not used often enough in everyday life so that it becomes its weakness.

Another opinion states that there are obstacles in supporting facilities for using applications such as internet availability, sometimes 3D objects do not appear if the internet is unstable, besides the lack of smartphones that can be used by children. This is in line with Wallace (2018) who states that one of the disadvantages of using AR is that not everyone has a smartphone / technology that supports the use of AR. ked Meanwhile Ningsi (2021) states that in using the Assemblr EDU application, you must use a laptop or mobile phone (android phones and tablets) that fall into certain specifications, which for mobile phone users (android phones and tablets) this application is supported by IOS 9, 5.0 Lollipop and has a minimum of 2 GB RAM with a 5 MP camera. Meanwhile, laptops are supported when using Windows 7 and Windows 10 (Ningsi, 2021).

4. CONCLUSION

The current study provides insights into the implementation of Assemblr EDU by teachers in early childhood education. The findings seem to highlight the potential, barriers and strategies of teachers in utilising AR technology through the Assemblr EDU application. Despite this study, further research to explore the

improvement of students' abilities in teaching and learning by exploring the use of various AR environments, learning strategies and settings.

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