Development of Multimedia-Based Edutainment for Learning About Animals and Plants: A Case Study at PAUD Bunda Pratiwi

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Abstract: This study examines the need for interactive multimedia-based learning to help young children, especially in preschool education, recognize animals and plants through information technology. Traditionally, teaching methods have relied on blackboards, books, and environmental exposure, with some educators incorporating interactive videos from platforms like YouTube. However, with rapid technological advancements, computer-based learning using interactive multimedia presents a more engaging alternative. Interactive multimedia integrates visual programming, sound, text, and images, creating a more dynamic and comfortable learning experience. Its implementation in education is expected to boost children's enthusiasm and comprehension by making lessons more visually appealing and easier to understand. The research aimed to develop an application that enhances learning through multimedia technology and assesses its effectiveness in addressing educational challenges. To evaluate the application's impact, scenario-based tasks were assigned to respondents, followed by a System Usability Scale (SUS) questionnaire to measure user satisfaction. The results showed an average SUS score of 91.92, placing it in the "A" Grade Scale and the "Acceptable" category according to Adjective Ratings. These findings indicate that the application meets user expectations and effectively supports early childhood learning. Overall, the study confirms that multimedia-based learning can significantly enhance engagement and understanding in young learners. By leveraging technology, educators can create more effective and enjoyable learning experiences, fostering greater interest in educational content. The positive usability results highlight the potential of interactive multimedia in modernizing early childhood education, making learning more accessible and stimulating for students.
Keywords: Edutainment, Animals, Plants, PAUD, Multimedia

1. INTRODUCING

Currently, the development of learning media is very varied, ranging from physical media to digital media that we usually find in society, including hearing or audio media, hearing or audiovisual media, to digital print media [1], [2]. The diversity of this media

provides many choices for educators in delivering material to students according to their needs and characteristics. With the existence of various types of learning media, it is hoped that teaching and learning activities will be more effective, interesting, and enjoyable for students [3], [4]. In the world of education, various learning media have been applied in teaching and learning activities. One form of learning media that is quite popular today is interactive multimedia, such as the use of animated videos for children [5]. This animated video plays an important role in helping children understand a concept or object in a more interesting and easy-to-understand way.

The use of moving images, bright colors, and fun sound effects can increase children's appeal and interest in learning [6]. In addition, animation can also present material in a more imaginative and creative way, thus helping children to more easily absorb the information provided. Another media that can be used as an interactive learning media is edutainment that combines entertainment-based technology with education [7]. Early age is the golden age in a child's development, as well as a very crucial period in their life stage. At this age, children experience rapid growth in various aspects, both cognitive, emotional, social, and motoric [8]. Therefore, early childhood education is an important foundation in forming children's mindsets and learning habits in the future. In early childhood education institutions, they begin to be introduced to the basics of how to learn, although the methods used are still flexible and adapt to the child's world [9]. Basically, children learn in the way they like, namely through play. Playing is not just an activity for fun, but also part of a very effective learning process. Through play, children can explore the world around them, develop thinking skills, and train their imagination [10]. They also learn to understand basic concepts without feeling burdened or forced to learn formally. At this age, children also have a very high level of curiosity. They often ask questions about things they see and hear, and try to imitate various behaviors they witness in their surroundings [11].

However, because their reasoning power is still developing, children often cannot distinguish between what is real and what is just imagination. This is the reason why they are more interested in the active world of play than sitting still to learn with conventional methods [12]. This fact is often a challenge for parents and teachers in introducing various learning concepts to children [13]. Children tend to dislike formal and serious learning methods, so if forced, they will actually lose interest in learning [14], [15]. Therefore, learning media are needed that are interesting, fun, and appropriate to the world of children. The use of media such as animated videos is an effective solution to help children understand various concepts without getting bored. With a more visual and interactive approach, children can learn in a more natural way, according to their developmental stage. Previous research has explored the use of Android smartphones as a medium for introducing animals and plants. However, one of the key challenges encountered was that not all mobile phone users rely on Android devices [16], [17], which limits accessibility and inclusivity. To overcome this limitation, the advantage of this study is the implementation of a progressive web application. This approach ensures that once the necessary data is loaded, users can access the content without repeatedly downloading it, making the learning experience more efficient and user-friendly. Additionally, a progressive web application provides greater flexibility as it can be accessed across different devices and operating systems, broadening its reach.

The focus of this research is to develop an interactive learning medium to introduce animals and plants to students at the PAUD education level. Through this approach, young learners will have the opportunity to explore and familiarize themselves with educational technology.
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2.   METHOD

The research method used in this study is divided into three parts, namely Data Collection, System Development and Research Tools used. The following is a discussion of the following:

Communication

In this research we collect data using observation and literature study, direct observation was conducted at PAUD Bunda Pratiwi to understand the material about animals and plants. The results of the observations were used to design systems, and we also read and take notes from books and other references relevant to learning media, system design, software engineering, and multimedia. After that we are using the System Development Method to completing this research.

Planning

The System Development Method used in completing this research is the Waterfall system development method whose stages are carried out sequentially, the stages carried out are communication, planning, modeling, construction and deployment. A picture of the stages to be carried out can be seen in Fig. 1.
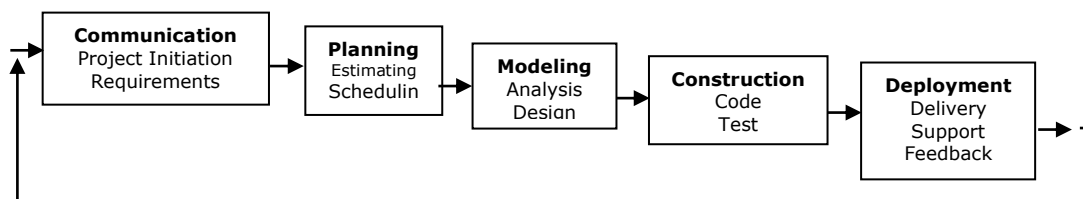

Figure 1. Waterfall

The stages carried out in Figure 1, Communication: Identifying system needs based on the background and problems found; Planning: Preparing time estimates and schedules for the development of learning media; Modeling: Creating system designs using diagrams such as flowcharts and context diagrams; Construction: Developing applications and conducting testing using the black box testing method; Deployment: Implementing applications and maintaining them to ensure that the application runs properly.

In this research we use hardware at least using a computer that supports html5 web browser and mouse input devices, keyboard and output in the form of speakers or headphones. We also use software such as Windows 10, Construct 2 Game Engine, Cool Edit Pro 2.0, and Adobe Photoshop CS. This approach is taken to produce interesting multimedia-based learning media that supports the learning process of early childhood.

Modeling

In this phase we analyze the current running system and made some design for our research. The Current Running System Analysis can be seen in Fig.2.
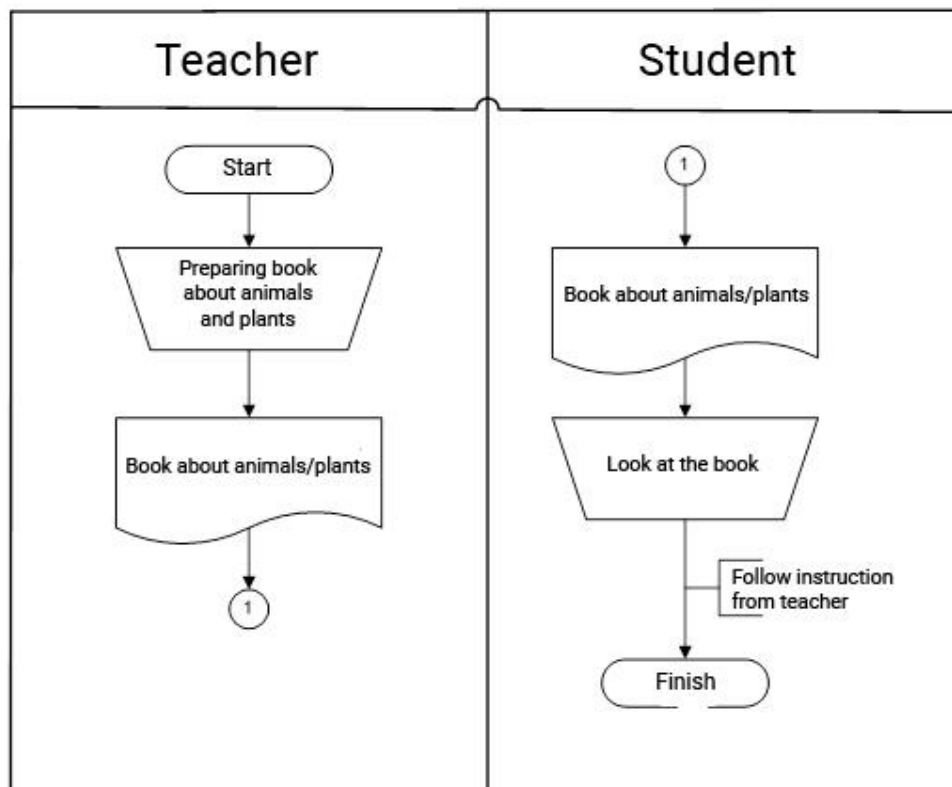
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Figure 2. Flowchart Current running system

In figure 2, the previous introduction to animals and plants was by using books. First, the teacher prepares the book, and the students look at the book. Then, because there are only pictures, the teacher must provide the correct instructions. After observing the design that needs to be made, a design is also made for the interface before the application is made, this is useful so that the research carried out is more focused and can be completed within the specified time period, the following is an example of an interface design that has been made previously which can be seen in Fig. 3.
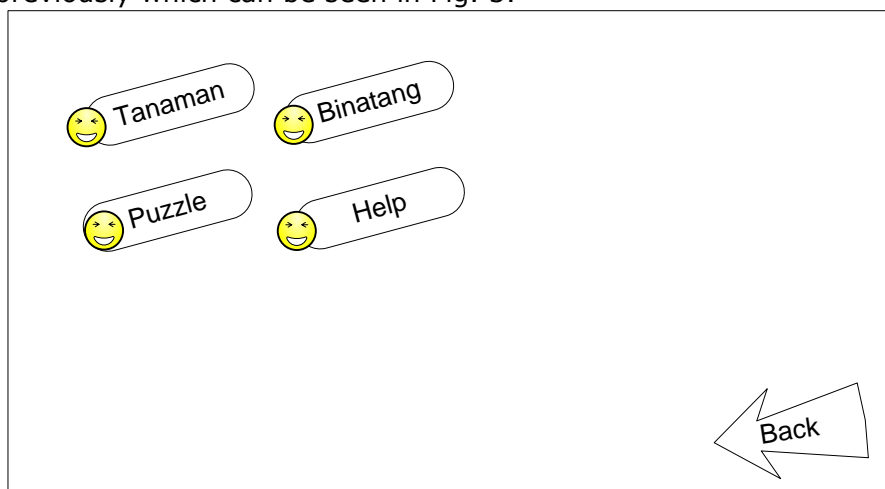

Figure 3. Example of a design that has been made

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As can be seen in Fig.3, there are several buttons that can later be used to enter other menus and at the bottom right there is a back button as one of the navigation buttons.

3.   RESULT AND DISCUSSIONS

Construction and Deployment

The next stage is construction, where researchers create program codes and test the applications that have been created. The program code created uses construct 2 and one of the existing interfaces is the interface from the main menu, which functions to select the sub-menu of the animal and plant recognition learning media application. The main menu interface has animal menu, plant menu, puzzle and help buttons. The Plant Menu function is to learn to know various plants such as vegetables and fruit. The Animal Menu functions to learn to recognize various types of animals which are divided into pets, non-pet animals, 4-legged animals and 2-legged animals. The Puzzle Menu functions to arrange image pieces and the Help Menu is a Tutorial or instructions for using learning media for recognizing animals and plants. The main menu interface can be seen in Fig.4
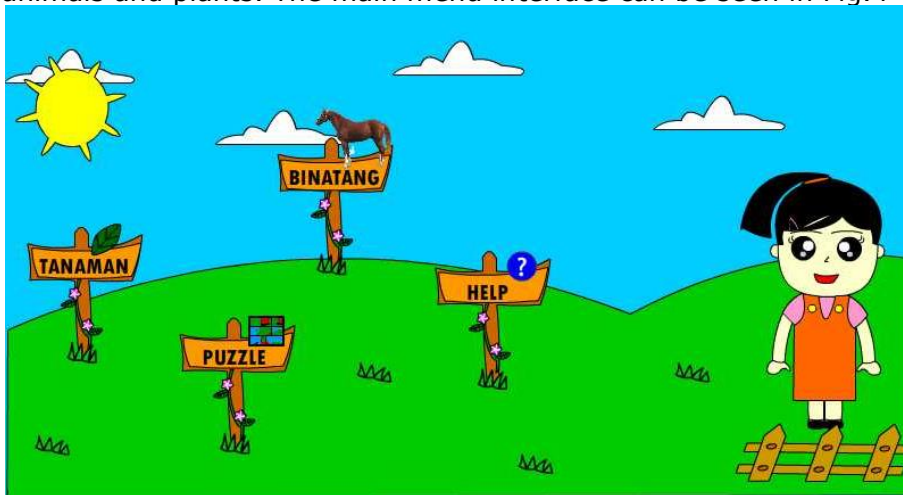

Figure 4. Main Menu Interface

We can see in fig.4 there are four buttons which each will take the user to another display, the animal button to see animals, plants to see plants, puzzle to start the game and help as a button to see help. An example of the program logical code that created using construct 2 can be seen in fig.5.
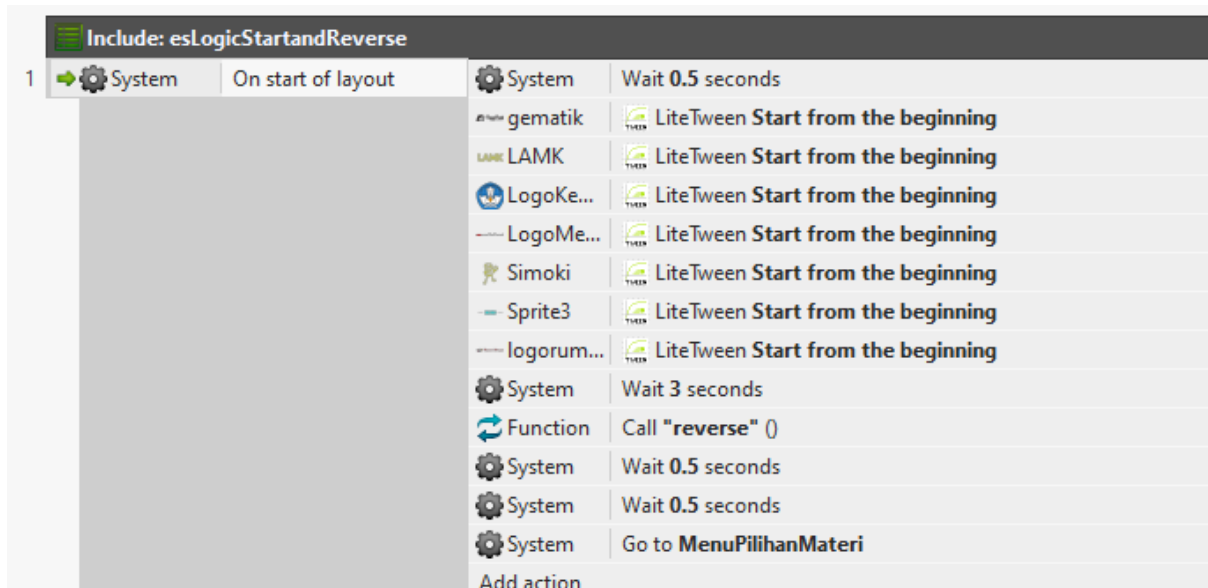
Figure 5. Construct 2 Logic Code

We can see in Fig. 5 that the program code created is logic that will later become an application that has animation in it. When on start of layout the system must wait for 0.5 seconds and after that the animation will come on screen. Simple logic like this will be the main factor in the success of existing applications.

After the application is finished being built, testing of the application is carried out. The test target for the application test is users with a sample size of 30 users. After identifying the test target, testing is carried out by filling out the SUS questionnaire to determine the level of user satisfaction based on the average SUS score obtained. The rating scale of SUS score can be seen in Fig. 6 [18].
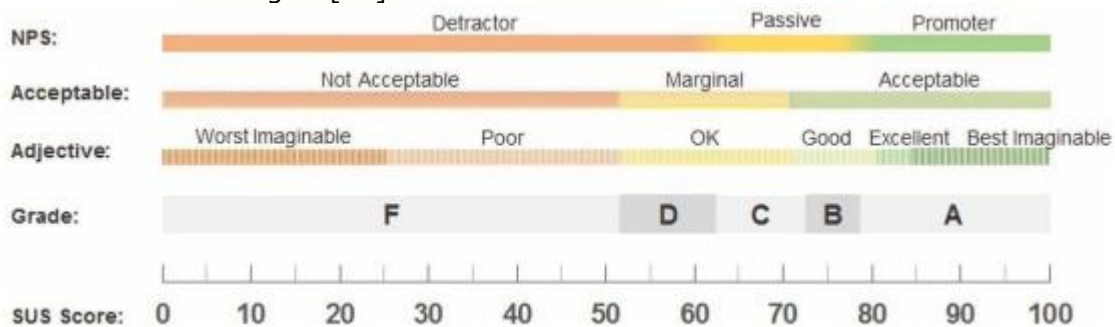
Figure 6. SUS Rating Scale

With the determined rating scale, the next step is to provide a questionnaire to 30 users, the results of which can be seen in table 1.

Table 1. Testing Result

User ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Odd items	Even Items	SUS Score	Grades
1	5	1	5	1	5	1	5	1	5	1	20	20	100	A
2	5	1	5	2	5	1	5	1	5	1	20	19	97.5	A
3	5	2	5	2	5	1	4	1	4	1	19	18	92.5	A
4	4	2	4	2	5	1	5	1	5	1	18	18	90	A
5	4	2	4	2	4	2	5	1	5	1	17	17	85	A

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User ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Odd items	Even Items	SUS Score	Grades
6	5	1	5	1	5	1	4	1	5	2	19	19	95	A
7	5	1	5	1	5	1	5	1	5	1	20	20	100	A
8	4	3	4	3	5	1	5	2	5	1	18	15	82.5	A
9	5	1	5	1	4	2	4	2	4	2	18	17	87.5	A
10	5	1	5	2	5	1	5	1	4	1	20	19	97.5	A
11	5	2	5	2	5	1	5	2	4	1	20	17	92.5	A
12	5	1	5	1	4	2	5	2	5	2	19	17	90	A
13	4	2	4	3	5	1	5	1	5	2	18	16	85	A
14	5	2	5	2	5	1	5	1	5	2	20	17	92.5	A
15	5	2	5	2	5	2	5	1	5	1	20	17	92.5	A
16	4	2	4	2	5	1	5	1	5	1	18	18	90	A
17	4	1	4	2	5	1	5	1	5	1	18	19	92.5	A
18	5	1	5	1	5	1	5	1	5	1	20	20	100	A
19	5	1	5	2	5	2	5	2	4	3	20	15	87.5	A
20	5	1	5	1	5	1	5	1	4	1	20	20	100	A
21	5	1	5	1	5	1	5	1	5	1	20	20	100	A
22	5	1	5	1	4	2	4	2	5	1	18	18	90	A
23	5	2	5	1	4	2	4	2	3	1	18	17	87.5	A
24	5	2	5	2	5	2	4	1	3	2	19	16	87.5	A
25	4	2	4	2	5	1	5	1	4	1	18	18	90	A
26	5	1	5	1	5	1	5	1	4	1	20	20	100	A
27	5	1	5	1	5	1	5	1	4	1	20	20	100	A
28	4	1	4	1	3	1	3	2	3	2	14	18	80	A
29	4	2	4	2	5	1	5	1	5	2	18	17	87.5	A
30	4	1	4	1	4	1	3	1	3	2	15	19	85	A
Average SUS Score													91.92	A

Based on Table 1, the average SUS score obtained through the usability test of the developed application obtained a score of 91.92 with the Rating Scale SUS Scores on the Grade Scale of A. In terms of Adjective Ratings, the results obtained are included in the Excellent category, while in terms of Acceptability Ranges, they are included in the Acceptable category. Furthermore, because the average SUS score obtained is ≥ 68 against the average SUS Score standard, the UI/UX design of the e-repository prototype is considered to have above average usability and can provide a sense of comfort and satisfaction to users.

4.   CONCLUSION

Based on the results of the research that has been done, it can be concluded that the application that has been developed can answer the problems and meet the needs of users. This can be seen from the scenario task that was successfully completed by the respondents and continued with filling out the SUS questionnaire to determine user satisfaction. Based on the results of the SUS analysis that was carried out, an average SUS score of 91.92 was obtained with a Grade Scale of A, according to Adjective Ratings it is

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included in the Acceptable category. Therefore, the average SUS score obtained is ≥ 68 against the average SUS Score standard, the application that was developed is considered to have above average usability and can provide a sense of comfort and satisfaction to users. With this application, it is hoped that it can help teachers and parents to teach in the introduction of animals and plants so that it can be used as a learning medium that makes children prefer to learn.

5. REFERENCES

[1] R. Rohani, "Media pembelajaran," 2020.
[2] J. W. Kusum, M. R. Akbar, and M. Fitrah, *Dimensi Media Pembelajaran (Teori dan Penerapan Media Pembelajaran Pada Era Revolusi Industri 4.0 Menuju Era Society 5.0)*. PT. Sonpedia Publishing Indonesia, 2023.
[3] M. S. Ulfa and C. E. Nasryah, "Pengembangan Media Pembelajaran Pop–Up Book Untuk Meningkatkan Motivasi Belajar Siswa Kelas IV SD," *Edunesia J. Ilm. Pendidik.*, vol. 1, no. 1, pp. 10–16, 2020.
[4] F. I. Rahma, "Media Pembelajaran (kajian terhadap langkah-langkah pemilihan media dan implementasinya dalam pembelajaran bagi anak Sekolah Dasar)," *Pancawahana J. Stud. Islam*, vol. 14, no. 2, pp. 87–99, 2019.
[5] R. Maghfiroh, A. D. Saputro, A. Setiyawan, and A. Nailasariy, "Pengembangan Media Pembelajaran PAI dan Budi Pekerti Berbasis Powtoon Materi Kejujuran Kelas 2 SD," *Al-Ishlah J. Pendidik. Islam*, vol. 21, no. 1, pp. 23–35, 2023.
[6] F. A. Widya and E. Ernawati, "VIDEO ANIMASI DUA DIMENSI SEBAGAI MEDIA PEMBELAJARAN PENGENALAN TATA SURYA UNTUK SISWA KELAS VI MI MIFTAHUL," *PRASI*, vol. 19, no. 02, pp. 170–184, 2024.
[7] S. Sintaro, "Accounting Edutainment an Alternative Accounting Learning (Dictionary and Accounting terms)," *J. Ilm. Sist. Inf. Akunt.*, vol. 3, no. 1, pp. 1–12, 2023.
[8] N. Baiti, *Perkembangan anak melejitkan potensi anak sejak dini*. Guepedia, 2021.
[9] A. Susanto, *Pendidikan anak usia dini: Konsep dan teori*. Bumi Aksara, 2021.
[10] E. Ester and D. S. Giamulia, "Metode Bermain Salah satu Metode Pembelajaran Untuk Anak," *Verit. Lux Mea (Jurnal Teol. dan Pendidik. Kristen)*, vol. 3, no. 1, pp. 35–45, 2021.
[11] M. Dian Novrita, "PENGEMBANGAN KOMPETENSI SOSIAL GURU DALAM MENINGKATKAN PROSES PEMBELAJARAN (Studi Kasus di Tk Anandita Kecamatan Klapanunggal Kabupaten Bogor)." 2024.
[12] A. Bantali, *Psikologi Perkembangan: Konsep Pengembangan Kreativitas Anak*. Jejak Pustaka, 2022.
[13] A. F. N. Miyazaki, H. Buabara, A. N. Rahmi, R. Rusmayadi, and H. Herman, "Tantangan dan solusi dalam menghadapi era digital: Pendidikan anak di zaman teknologi," *JUPEIS J. Pendidik. Dan Ilmu Sos.*, vol. 3, no. 3, pp. 127–135, 2024.
[14] H. R. Setiawan and D. Abrianto, *Menjadi pendidik profesional*, vol. 1. umsu press, 2021.
[15] S. Sintaro, "Fuzzy Logic in Decision Support Systems Using Linear Equations in Construct 3 Game Engine," 2023.
[16] M. S. Assidiq and F. Y. Al Irsyadi, "Game Edukasi Pengenalan Pertumbuhan Hewan dan TUmbuhan pada Anak Tunagrahita Ringan di SLB YPASP Gondangrejo." Universitas Muhammadiyah Surakarta, 2021.
[17] A. S. Affandi, "Pengembangan Media Game Edukasi 'Animal and Plant' Untuk Pembelajaran Nama Hewan dan Tumbuhan," *J. Sarj. Ilmu Pendidik.*, vol. 1, no. 2, 2021.
[18] "5 Ways to Interpret a SUS Score – MeasuringU." https://measuringu.com/interpret-sus-score/ (accessed Oct. 11, 2024).

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